



**International
Diabetes
Federation**
Western Pacific



**Metabolic
Diseases**
Breakthrough Discoveries in Diabetes and Obesity

**Melbourne Convention
and Exhibition Centre**
18-21 August 2026



WELCOME TO IDF-WPR & ADC & METABOLIC DISEASES 2026

ABSTRACT
BOOK



Stream 1:

Living with Diabetes

Beyond Blame: Ending stigma in Type 2 Diabetes through a migrant woman's lived experience

Abraham S

¹UQ, Brisbane, Australia

Purpose and Aim

Diabetes stigma remains an under-recognised barrier to effective diabetes management and wellbeing. This poster aims to highlight how stigma is experienced across cultural and systemic contexts through the lived experience of a migrant woman living with type 2 diabetes, and to explore how a systems perspective can inform stigma-reduction strategies.

Target Population

This poster seeks to impact people living with diabetes—particularly migrants and culturally diverse communities—as well as healthcare professionals, workplaces, and policymakers involved in diabetes care and prevention.

Who Was Involved

The initiative draws on my lived experience as a migrant woman navigating diabetes across multiple cultural contexts in 2 states in Australia, combined with public health training and engagement in diabetes advocacy and advisory roles. Insights are informed by interactions with healthcare providers, workplaces, and multicultural communities.

Outcomes and Impact

Experiences across healthcare, workplace, and community settings revealed recurring stigma narratives framing type 2 diabetes as a consequence of personal failure. Cultural food traditions sometimes conflicted with standard dietary guidance, while workplace understanding of diabetes was often limited. These experiences illustrate how stigma can reduce individuals to biomedical markers such as BMI or HbA1c while overlooking social and cultural contexts influencing diabetes management.

Learnings for the Future

Reducing diabetes stigma requires shifting from individual blame to systems-informed approaches. Key strategies include strengthening stigma-aware clinical communication, integrating culturally responsive diabetes education, improving diabetes literacy in workplaces, and embedding lived experience in diabetes policy and program design.

Supporting young children with Type 1 Diabetes (T1D) in early childhood education and care (ECEC): insights from Australian families

Bolam K¹, Goodwin L¹

¹Lived Experience Of Type 1 Diabetes, 4553 Palmview, Australia

Purpose & Aim:

Participation in ECEC is an important part of childhood development, however, young children with T1D and their families face significant logistical, mental and emotional wellbeing challenges when accessing safe and inclusive care within ECEC settings in Australia. This work aims to highlight the lived experiences of families accessing care for their children with T1D in ECEC settings and to highlight the broader impact T1D management can have on wellbeing and participation. The overall goal is to improve the state of care for these children and their families.

Who the project/ initiative was seeking to impact:

By amplifying lived experience, this work seeks to formalise and highlight the issues to present to decision-makers and policymakers within Australia.

Who was involved in the project/ initiative

Our work is led by two mothers of children with T1D, Lia Goodwin and Kate Bolam, with significant contributions from other parents and carers of children with T1D, diabetes stigma researchers and advocates.

What outcomes and impact did the project/ initiative achieve

The work is in progress and current outcomes include identifying common experiences among families and the development of formalised collaborations with researchers. Future outcomes will include co-led evidence of the challenges experienced by families in accessing safe and inclusive care in ECEC and a roadmap for improvements to present to policy and decision makers.

Learnings for the future

The experiences of families highlight the importance of recognising and incorporating lived experience perspectives in discussions about care and inclusion for children with complex medical needs within ECEC. Ensuring these voices are heard may support future improvements that enable children living with T1D to participate safely and confidently in early childhood education, while reducing the logistical and emotional burden on families. For too long, the challenges faced by families navigating ECEC with a child living with T1D have remained under-recognised, with significant consequences for safety, participation and family wellbeing.

How people with Type 2 diabetes hear insulin: Patient-reported communication barriers during insulin initiation discussions

Dash S¹, Sharma S², Mallabadi R²

¹Dr Sanjay's Wellness Centre, Talcher, India, ²SigmaMozak Solutions Pvt Ltd, Hyderabad, India

Purpose and aim of the project/initiative

Insulin initiation in type 2 diabetes (T2D) is frequently delayed despite clear clinical indications. While reluctance toward insulin is often viewed as a patient issue, less attention has been paid to how insulin discussions are experienced and remembered by people living with T2D. This initiative explored how physician communication during insulin initiation discussions may shape emotional response and readiness to start therapy.

Who the project/initiative was seeking to impact

The initiative focused on adults with T2D who had recently been advised insulin initiation or titration, while also informing clinicians and diabetes educators involved in insulin counselling.

Who was involved in the project/initiative

Thirty-three adults with T2D completed a structured patient survey assessing how insulin was discussed. Survey domains included treatment framing, clarity of explanation, emotional response, exploration of concerns, and willingness to initiate insulin.

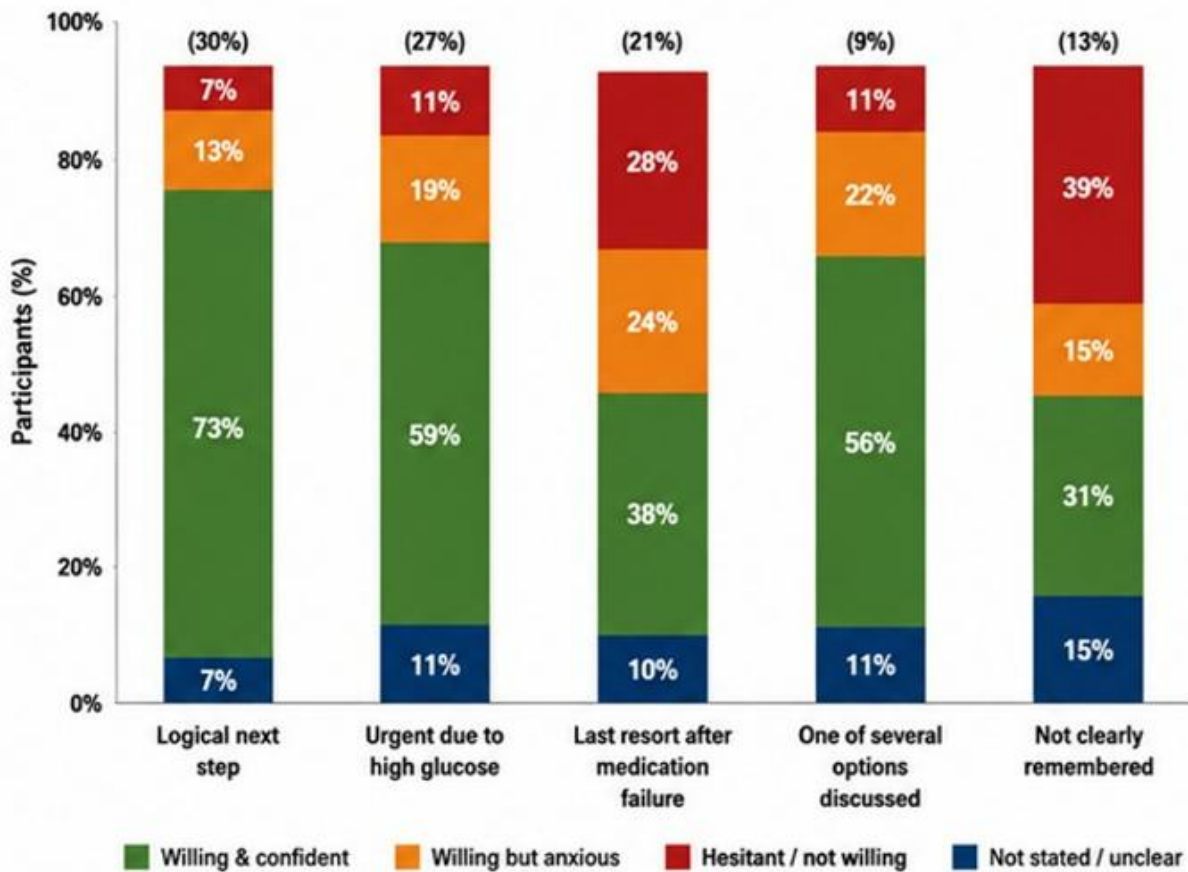
What outcomes and impact did the project/initiative achieve

Insulin was most commonly recalled as a logical next treatment step (30%), urgent because of high glucose levels (27%), or a last resort after medication failure (21%). Nearly half reported unclear explanations or excessive medical jargon (46%). Failure-based messages such as “uncontrolled diabetes” or “failure of tablets” were recalled by 45% of participants, and concerns were not explored in 45% of consultations. Emotional responses varied substantially: 33% reported anxiety, while 45% felt confident and prepared. (Fig 1).

Learnings for the future

People with T2D often hear insulin through frames of failure, urgency, or technical complexity. Clearer, more person-centered insulin discussions that actively explore concerns may improve emotional readiness and support timely insulin initiation. These findings may also inform future clinician communication training and audit-feedback initiatives in diabetes care.

Figure 1. Communication Framing vs Insulin Acceptance



Values may not add to 100% due to rounding.

Pyramids to Persia: Utilising archaeology and historical sources to give a voice to the ancient & medieval history of the “Silent Pandemic”

Harris S¹

¹Diabetes Australia, Canberra, Australia

According to Diabetes Australia, Diabetes Mellitus is the “fastest growing chronic condition in Australia.” The total number of cases in the last twenty years has grown exponentially with 58,600 new cases from 2000-2021; 3,000 diagnoses in 2021 alone. T1D is often described as “the silent pandemic” because the symptoms take time to present, are usually ignored or the condition is left undiagnosed altogether. However, based on history and archaeological evidence, I would like to consider it is not silent as the name suggests.

Utilising archaeology, etymology, population records, and translated literature, this conference presentation will look at the ancient and medieval history of Type 1 Diabetes Mellitus, to provide a concise historical framework of the condition. This is completed by examining the four main regions in which significant progress was made: Egypt (c. 2650-1550 BC), Asia (c. 500s BC-AD 1640), the Mediterranean (c. 460 BC-AD 869) and the Islamic World (c. AD 865-1231). This is achieved through an introduction to the origins of the word *diabetes* and its four main signs: *polyuria* (excessive urination), *polydipsia* (excessive thirst), *polyphagia* (excessive hunger), and weight loss; all of which have been recorded throughout human history. From this, all records of these accounts are tabulated, and individuals are selected to highlight this research, such as Hesy-Ra, Sushruta, Demetrius of Apamea, Celsus, Galen and Araeteus of Cappadocia, Rhazes and Ibn Sina.

The central consensus of this presentation points towards an enduring narrative of Type 1 Diabetes Mellitus from the earliest written history to today; it is not new and has always existed. The aim of this presentation is to present an alternative view of the ‘silent pandemic,’ providing hope to those who struggle with the condition and to assist those who work in the scientific and medical world, to better understand its true origin.

A multimedia YouTube design creation titled; 'can art therapy help people living with diabetes' which potentially maybe created into a book.

Hilton D¹, Hilton E¹, Hilton N¹

¹YouTube - www.youtube.com/@deborahhilton5719; www.researchgate.net/profile/Deborah-Hilton, ASHWOOD, Australia

Aim

The purpose and aim of the project/initiative is to create a book design that is accurate yet easy to comprehend for teenagers or adults. The project/initiative is seeking to impact those living with diabetes, plus family members describing how alternative therapies [art therapy] maybe of benefit. Submitter's publication titled; Do researchers have their heads in the clouds, bogged down with scientific medical detail? [art therapy maybe a simpler alternative] is her most read publication on ResearchGate [>2000 reads; <https://www.researchgate.net/profile/rrrrrr-ssssss>]. It pictures a brilliant 'head in the clouds' artwork by Miss FIRSTLASTNAME [RMIT visual arts diploma graduate and winner of two prestigious people's choice art show prizes]. The sensational artwork plus the manuscript sparks interest in the idea that art therapy may enhance or substitute other treatment depending upon diabetes diagnosis.

Method. The project will involve other artwork by NoName or ZeroName to give impact. The initiative involves research by SILENTName plus statements related to evidence of effectiveness of art therapy for diabetes utilising Yang and colleagues' manuscript on art therapy to alleviate the levels of depression and blood glucose in people living with diabetes; a systematic review and meta-analysis which found that art therapy had a positive effect on levels of depression and blood glucose. Real life perspectives and challenges sourced from close acquaintances, plus the Australian Institute of Health and Welfare with four Australian stories listed titled; Living with diabetes enhances understanding. This book design will be manipulated in Clipchamp for video Youtube upload onto NoName's digital creator site [<https://www.youtube.com/NoName>].

Result. The outcome and impact will be continually monitored up until the conference to assess analytics [view numbers, % viewed, total view time, comments]. Conclusion. This will create learnings for the future about whether it would be feasible to create a printed book from this project proposal.

Supporting strong living with Type 2 Diabetes in remote Queensland: A collaborative care approach

Khine A¹

¹Cairns Hospital, Cairns , Australia

Purpose:

To describe a collaborative, culturally respectful approach supporting a 65-year-old First Nations man from Lockhart River living with type 2 diabetes and multimorbidity, including a challenging diagnosis of lateral cutaneous nerve compression syndrome in the context of established peripheral neuropathy.

Context:

Delivering specialist diabetes care in remote communities is complex, with limited access to diagnostics, workforce constraints, travel burden, and competing social priorities. The individual presented with persistently elevated glucose levels (HbA1c 12.1%) and severe anterolateral thigh pain limiting mobility and his ability to continue working as a plumber. Distinguishing worsening diabetic peripheral neuropathy from superimposed lateral cutaneous nerve compression required detailed clinical assessment, as imaging and nerve conduction studies were not readily available. Chronic hepatitis B required ongoing monitoring, and alcohol intake was relevant to liver and metabolic risk.

Our Approach:

Care was delivered through partnership between outreach endocrinology services and local RFDS clinicians, ensuring continuity and culturally safe shared decision-making.

Priorities included:

- Clinical differentiation of neuropathic pain sources and targeted pharmacotherapy for neuropathic and compressive features
- Restoring mobility to maintain employment and independence
- Agreeing on staged, achievable glycemic targets
- Respecting his informed decision to defer insulin initiation
- Ongoing hepatitis B surveillance
- Supportive counselling regarding alcohol and liver health

Pain-focused management led to meaningful reduction in reported pain severity and improved functional capacity within weeks, strengthening engagement with glucose monitoring and lifestyle strategies.

Impact:

By addressing functional priorities first, therapeutic trust improved and follow-up attendance increased. The individual agreed to medication optimization and ongoing review of insulin readiness.

Learnings:

Coordinated outreach–local partnerships enable nuanced clinical assessment in remote settings. Prioritizing symptom relief and shared decision-making can enhance engagement and long-term diabetes outcomes for people living with complex multimorbidity.

Advocacy in Japan: What we see, learn, and achieve over time

Kodani N¹

¹National Center For Global Health And Medicine, Tokyo, Japan

Recognition of diabetes stigma emerged later in Japan compared with Western countries, possibly reflecting cultural norms emphasizing group harmony and reluctance toward self-disclosure. Although awareness of stigma among healthcare professionals has increased, public understanding remains insufficient. In particular, self-stigma—where individuals attribute poor glycemic control to personal failure—remains a major psychosocial issue in diabetes care. One historical factor contributing to this stigma was the 1996 policy by Japan's Ministry of Health and Welfare classifying chronic diseases, including non-insulin-dependent diabetes, as "lifestyle-related diseases," unintentionally reinforcing perceptions of personal responsibility.

To address these issues and promote diabetes advocacy, a symposium entitled "Hear the Voices of People with Diabetes" was launched at the Annual Meeting of the Japan Diabetes Society in 2024. Now in its third year, the symposium brings together healthcare professionals, people with diabetes (PWD), families, industry representatives, media, educators, and policymakers, creating active multi-stakeholder dialogue. Our goals are to reduce diabetes stigma, promote understanding, and advance equity in future health policy initiatives.

Advocacy efforts in Japan have begun to produce meaningful outcomes. Financial support for type 1 diabetes currently ends at age 18, leading some individuals to discontinue automated insulin delivery (AID) systems for financial reasons. Although national policy change remains challenging, local advocacy efforts are expanding. Recently, the Tokyo Metropolitan Government has agreed to subsidize insulin pump therapy during pregnancy for women with type 1 diabetes.

Although these achievements remain small steps, they represent steady progress in diabetes advocacy in Japan and we aim to continue our advocacy efforts across the Asia-Pacific region, with our global advocacy networks.

Reducing compression-related CGM inaccuracy through a consumer-led 3D printing solution

Kumar S^{1,2}, Matson A¹, **Dawkings T**³

¹Adult Cystic Fibrosis Centre, The Prince Charles Hospital, Metro North, Queensland Health, Chermside, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, St Lucia, Australia, ³Person living with diabetes, Chermside, Australia

Purpose and Aim

Continuous glucose monitoring (CGM) is central to modern diabetes management, particularly for people using multiple daily insulin injections or automated insulin delivery (AID) systems. However CGM can be affected by compression-related inaccuracies, particularly during sleep. These false low readings may disrupt sleep, increase anxiety, trigger unnecessary insulin suspension on AID and fracture engagement with diabetes self-management technologies. This joint project aimed to mitigate pressure-induced CGM inaccuracies through a consumer-led, low cost wearable solution.

Impact focus

This project focused on individuals experiencing nocturnal CGM inaccuracies where false hypoglycaemia alerts were negatively impacting sleep, safety and/or self-management.

Involvement

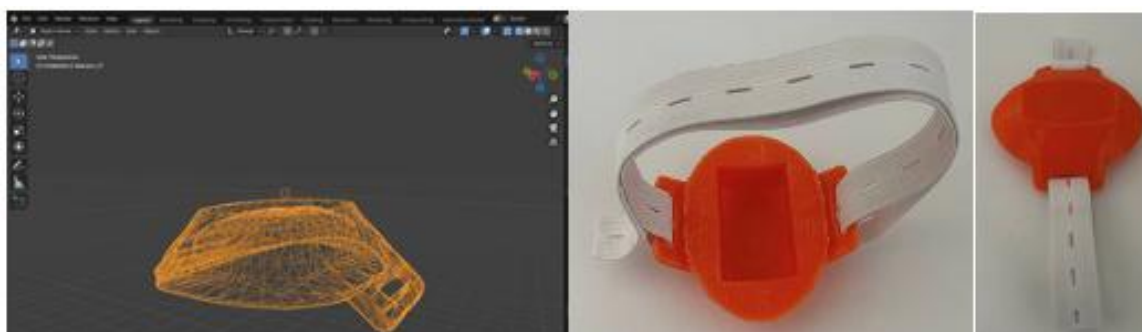
The project was consumer-led by TD who lives with cystic fibrosis related diabetes, supported by his endocrinologist (SK) and diabetes educator (AM) within the Adult Cystic Fibrosis Centre at The Prince Charles Hospital in Queensland, Australia.

Outcomes and impact

Using open-source software and accessible 3D printing technology, a wearable armband was developed to mechanically offload pressure from the CGM sensor during sleep. Iterative testing under simulated and real-world conditions demonstrated a marked reduction in false overnight low-glucose alerts between 2200 and 0600. Improved sleep confidence and sustained night use were reported by TD.

Learnings for the Future

This case highlights the value of consumer-clinician partnerships in identifying real-world barriers to diabetes technology use and enabling consumer-driven innovation and solution testing. Readily available 3D printing methods offer scalable, personalised solutions and this initiative has already demonstrated rapid translation, with similar products now commercially available online.



A National longitudinal consumer survey of the lived experience of Australians with Type 1 Diabetes (2023–2026)

Liston-McCaughley A¹, Boyer T², Goss P³, Goss J³, Pitman L⁴, Edwards T¹

¹Type 1 Foundation, Geelong, Australia, ²National Type 1 Diabetes Council, Ivanhoe, Australia,

³Team Diabetes Geelong, Geelong, Australia, ⁴Type 1 Voice, Adelaide, Australia

Aim

Despite the significant daily burden of type 1 diabetes (T1D), there is limited national data describing the lived experiences across community, education and workplace settings. This study aimed to examine the experiences of Australians living with T1D and their carers across domains including community participation, mental health, financial stability, education, employment, safety, government policy and public perceptions.

Methods

A series of national consumer surveys were conducted between 2023 and 2026 among Australians living with T1D and their carers. The initiative was led by The Type 1 Foundation, Australia's largest independent consumer organisation for type 1 diabetes, with contributions from Type 1 Voice, Team Diabetes and the National Type 1 Diabetes Council. Data from the four survey waves were consolidated and analysed using descriptive and thematic approaches to identify common experiences, emerging issues and trends. This series of surveys represents one of the first longitudinal consumer datasets describing the lived experience of people living with T1D in Australia across multiple social and policy domains.

Results

The initial national survey conducted in 2023 generated 2,900 responses within 11 days. Subsequent surveys in 2024, 2025 and 2026 expanded the dataset and enabled analysis of trends over time. Findings highlight barriers to participation in education, employment and community life, psychosocial impacts including mental health concerns, financial pressures associated with diabetes management, safety considerations and variability in public understanding of T1D. Findings from these surveys are currently informing national policy discussions and parliamentary inquiries relating to diabetes care and support in Australia.

Conclusion

This consolidated dataset provides one of the most comprehensive collections of consumer-reported experiences of living with T1D in Australia. The findings provide an important evidence base to inform policy development, service design and research priorities, and highlight areas of improvement for health, education and community programs for people living with T1D.

Beyond the Numbers: How Diabetes Camp Supports Teen Wellbeing

Logan N¹

¹Diabetes Victoria, Mulgrave, Australia

Purpose and Aim

The aim of this initiative was to engage teenagers aged 15-17 living with type 1 diabetes as they transition from paediatric care; a critical and often unstable time for teenagers. Many experience diabetes burnout, as well as negative impacts on mental health and wellbeing due to the daily demands of living with type 1 diabetes. The program's aims were for teenagers to:

- Experience a sense of normality being surrounded by other teenagers living with type 1 diabetes
- Create a long-lasting peer support network
- Increase diabetes self-management skills, confidence and independence
- Experience role modelling from adult volunteers living with type 1 diabetes
- Engage in education, supervision and support from experienced health professionals and volunteers in a safe environment

A secondary aim was for carers to experience respite from the daily care giving needs of type 1 diabetes.

Diabetes Victoria has been running diabetes camps for over 70 years. Monash Children's Hospital and Royal Children's Hospital provide medical governance and the camps are supported by medical officers, diabetes nurse educators, wellbeing coordinators and dietitians, as well as volunteer leaders; many of whom live with type 1 diabetes.

Outcomes and Impact

Parents of teenagers provided feedback from 2025 and 2026 teenage camps. Some statistics from our 2025 data shows that:

- 95% of parents felt camp had a positive impact on their teen's mental health and wellbeing
- 83% of parents felt camp gave their teen more people to turn to for support/help
- 79% of parents felt camp helped their teen normalise the ups and downs of life with diabetes
- 79% of parents felt camp helped increase their teen's knowledge to manage their diabetes in emerging life situations

Learnings for the Future

Campers have more complex emotional and social needs each year and significantly benefited from this program. Feedback from this camp was overwhelmingly positive with many requests for a longer camp.

Living with Diabetes: Empowering schools and communities through education, awareness, and advocacy initiatives across the Maldives

Mohamed F¹

¹Diabetes Society Of Maldives, Male', Maldives

This presentation highlights the “*Living with Diabetes*” community awareness programs I have conducted across the Maldives, aimed at improving understanding and acceptance of diabetes among students, teachers, school employees, and the general public. The initiative was developed as part of my advocacy journey through the International Diabetes Federation’s Young Leaders in Diabetes (IDF YLD) Programme, which empowers young people living with diabetes to lead impactful health initiatives within their communities. The main goal of the “*Living with Diabetes*” program was to enhance awareness, encourage early screening, and promote supportive environments in schools and local communities. The sessions focused on practical diabetes education, including recognizing early signs of diabetes, identifying symptoms of hypoglycemia and hyperglycemia, and understanding how to respond and treat them appropriately. Through interactive discussions, demonstrations, and personal storytelling, the program helped make diabetes management accessible and relatable to different audiences.

The initiative engaged schools, local councils, healthcare professionals, and volunteers across multiple islands. These activities helped participants better understand the realities of living with diabetes and emphasized empathy, lifestyle management, and early intervention for improved health outcomes.

In addition to school-based programs, I have led nationwide awareness efforts—such as running a half marathon, participating in countrywide running events, and completing certified diving—to demonstrate that living with diabetes does not limit one’s potential. I have also participated in multiple patient advocacy meetings with government ministries and medical organizations to strengthen collaboration, improve diabetes care, and promote inclusive health policies.

Key outcomes include improved diabetes literacy, greater inclusion within schools, and stronger community networks. Moving forward, the program aims to expand to remote islands, integrate digital education tools, and collaborate with national stakeholders in alignment with the WHO Global Diabetes Compact’s vision for equitable and inclusive diabetes care.

Constructing user personas of family caregivers of older adults with Diabetes: A descriptive qualitative study

Pang R¹, Pan H¹, Xu Y¹

¹Zhejiang University School of Medicine Sir Run Run Shaw Hospital Department of Nursing, Hangzhou, China

Background: With 589 million adults living with diabetes worldwide, older patients increasingly depend on family caregivers. Existing support often treats these caregivers as homogeneous, overlooking differences in family structure, life stage, motivation and resources. Identifying within-group heterogeneity is essential for person-centered interventions.

Aim: To explore caregiving experiences, burdens and support needs of family caregivers of older adults with diabetes, and to construct user personas reflecting this heterogeneity.

Method: A descriptive qualitative design was used. Between April-May 2026, purposive sampling with maximum variation recruited 18 family caregivers from a tertiary hospital in Zhejiang, China. Semi-structured interviews (45-60 min) were conducted until data saturation. Transcripts were analyzed by qualitative content analysis in MAXQDA 25.0. Personas were built across five dimensions: caregiving structure, daily practice, physical-psychological experience, social-role impact and attitude toward substitute care.

Results: Five user personas were co-constructed: (1) Solitary Exhausted (n=4) – burnout, need respite and psychological support; (2) Family-Collaborative Anxious (n=4) – disease-management anxiety, need diabetes-care training; (3) Emotionally-Invested Companions (n=6) – emotional labour, fear of loss, need peer support; (4) Development-Constrained (n=2) – blocked personal growth, need career/financial aid; (5) Multi-Role Pressured (n=2) – role competition, need offloading non-care tasks. The partner hospital has adopted them as a caregiver-screening framework in outpatient diabetes visits, enabling earlier identification of high-risk caregivers and targeted referrals.

Conclusion: Family caregivers of older adults with diabetes are heterogeneous. Stratified, persona-based interventions rather than uniform support are needed, and caregiver-needs assessment should be integrated into routine diabetes care to improve the sustainability of home-based care.

Keywords: diabetes mellitus; older adults; family caregivers; user personas; qualitative research

Table 1. Five user personas of family caregivers of older adults with diabetes (n = 18)

Persona	n	Core stressor	Key support need
Solitary Exhausted	4	Burnout, no relief	Respite, psychological care
Family-Collaborative Anxious	4	Disease-management anxiety	Diabetes-care training
Emotionally-Invested Companion	6	Emotional labour, fear of loss	Peer/community support
Development-Constrained Conflicted	2	Blocked personal growth	Career/financial aid
Multi-Role Pressured	2	Role competition	Family-task offloading

Lived experience as knowledge: Translating consumer insight into effective diabetes practice

Pascoe L¹

¹Rural Doctors Network, Dubbo, Australia

Purpose and aim of the project / initiative: The purpose of this initiative was to recognise lived experience as a form of expertise and embed the knowledge of people living with diabetes into diabetes-related work, workforce development, and service delivery. The aim was to demonstrate how consumer-led approaches translate lived experience knowledge into more respectful, person-centred, and effective diabetes practice, while reducing stigma within healthcare settings.

Who the project / initiative was seeking to impact: The initiative sought to impact both people living with diabetes and the health professionals who support them. Particular focus was placed on diabetes-related work delivered in regional and remote communities, where workforce capacity, access to education, and culturally responsive care are ongoing challenges.

Who was involved in the project / initiative: The initiative was led by a person living with Type 1 diabetes and implemented through a consumer-led workforce development model in regional and remote Australia. People living with diabetes were actively involved as leaders, educators, and co-designers, working alongside health professionals, education providers, and service partners to shape workforce activities and practice approaches.

What outcomes and impact did the project / initiative achieve: Embedding lived experience knowledge into diabetes-related work strengthened workforce capability by improving understanding of the psychosocial realities of living with diabetes. Health professionals reported increased confidence in delivering person-centred care, greater awareness of the impact of language and assumptions, and improved alignment between clinical recommendations and lived experience. The approach supported reduced stigma, stronger engagement, and increased trust between people living with diabetes and the workforce.

Learnings for the future This initiative highlights the importance of recognising lived experience as a core component of diabetes expertise. Consumer-led models provide a practical and scalable approach to translating lived experience knowledge into everyday practice. Future diabetes workforce development should embed lived experience leadership alongside clinical expertise to support more equitable, responsive, and effective diabetes care systems.

Beyond clinical care: How peer support and lived experience shape long-term wellness in Type 1 diabetes – a personal perspective

Read D¹

¹Duncan Read (Lived Experience), SEAFORTH, Australia, ²Member: Community Advisory Group at Rio Tinto Children's Diabetes Centre, which includes researchers at the Perth Children's Hospital and The Kids Research Institute Australia, Perth, Australia

Introduction:

Australia's healthcare system provides expert medical guidance for type 1 diabetes management. However, something profound happens in the spaces between clinic visits. The daily realities of managing a chronic condition - including the practical strategies, emotional resilience, penny-dropping moments, and lifestyle adaptations - seldom come from textbooks and treatment plans alone. They often come from people with lived T1D experience (peers) and may be equally crucial to long-term wellness.

This presentation explores how sharing peer-to-peer knowledge fills gaps that medical appointments and structured education cannot address. It suggests peer support, together with glucose management (HbA1c and time in range), leads to more choice, better quality of life, and overall wellbeing.

Purpose:

Drawing on 40 years of lived experience with type 1 diabetes, this presentation will:

- Position peer support as a key determinant of long-term wellness
- Demonstrate how peers help other people with T1D refine or discover new management strategies
- Highlight how peer support can be delivered and integrated to enhance clinical care models
- Share practical and provocative examples for diabetes education and research

Who will this impact:

- Healthcare professionals developing patient education programs
- Researchers investigating psychosocial determinants of diabetes wellness
- People living with diabetes or other chronic conditions
- Organisations designing and delivering peer support initiatives

What outcomes are expected:

The presentation demonstrates peer support is essential, not supplementary. It aims to:

- Inform the consideration and integration of peer support into models of care
- Connect people with lived experience to researchers in this field, collaborative partnerships, and established peer support networks
- Invite delegates to collaborate and share further strategies, insights, and life stories that highlight how support from peers helps people living with type 1 diabetes pursue healthy and fulfilling lives.

Culturally appropriate service delivery to empower Māori, Pacific Peoples and other high-risk communities living with or affected by diabetes to engage with their wellness journey.

Dutton L¹, **Ropiha-Stewart M**¹

¹Diabetes New Zealand, Thorndon, New Zealand

Purpose and Aim: To provide a culturally appropriate diabetes care delivery service to engage Māori, Pacific Peoples and other high-risk communities living with and affected by diabetes to self-manage their diabetes wellness. Delivery is people centric, informed by indigenous knowledge, using a range of culturally safe approaches while incorporating the important role of the collective in these communities which benefits the health of the whole family.

Seeks to impact: High-risk communities needing advocacy, support and education to empower their knowledge to self-manage their wellness journey. This impacts their engagement with health care teams, in-community care and social services.

Involved: Diabetes New Zealand diabetes community coordinators who are Māori and Pacific Peoples with lived experience or connected with those affected by diabetes, and Diabetes NZ's partner organisations within communities throughout Aotearoa New Zealand.

Outcomes & Impact: High-risk communities have increased empowerment and confidence engaging with their wellness – reduction in HbA1c and weight, increase in movement, informed decisions with food choices, understanding the role of medication.¹ It has reduced shame and increased open discussion in families, wider social connections and improved relationships with health care teams. Each team member sits within our partner organisations located in different regions throughout Aotearoa New Zealand. It's important to create a solid team culture of support and collegiality through regular online meetings and in-person when financially practical.

Learnings for the Future: When working with high-risk community health providers, it's important their engagement practises use the correct cultural protocols, language pronunciation and are respectful. This can sometimes include providing education that supports the clinicians to successfully engage. Understanding the shifting political funding directives can drive competition between providers, it's important to highlight this service will improve their resourcing through increased engagement with high-risk communities.

¹ The authors will discuss the outcomes from two cases.

Combination therapies for people with Type 1 diabetes

Sheikh A¹

¹Lived Experience Stream, GREENVALE, Australia

Purpose and Aim

This presentation explores multi-faceted benefits resulting from integration of Semaglutide (as Ozempic) and/or insulin glargine into insulin aspart therapy via pump, for Type 1 diabetes (IDDM). The case study demonstrated improved glycaemic control, weight management and mental health. This challenges insulin pump therapy, utilising short-acting insulin only, uniformly suits all IDDM patients. The findings advocate responsive care and research into combination treatments.

Target Population

Long-term Type 1 IDDM patients, when responsiveness to pump therapy falls short.

Stakeholders Involved

Presenter (IDDM patient), diabetes educator, GP and Endocrinologist.

Outcomes and Impact

Therapy employing semaglutide and/or long-acting glargine, alongside pump therapy involving insulin aspart (as Apidra/Novorapid), significantly improved diabetes control, reduced dosage by one-third, aided weight loss, and enhanced physical and mental health. Ozempic produced intended therapeutic benefits, additionally meeting individual needs for 25 years+ IDDM.

Learnings

- Expand clinical research in combination therapies.
- Rethink generalised promotion of pump therapy alone.
- Foster shared management decisions to improve IDDM burden.
- Reduce barriers to enable long-term quality of life.
- Challenge reluctance towards equitable access to emerging treatments for IDDM patients.

Figure 1: Comparative 2 x14 day data sets demonstrating improved function with semaglutide (A) vs aspart alone (B).

Statistics	(A)	(B)
 SmartGuard (per week)	75% (5d 06h)	93% (6d 12h)
Manual Mode (per week)	15% (1d 01h)	7% (12h)
Sensor Wear (per week)	77% (5d 09h)	96% (6d 18h)
Average SG $\pm$ SD	9.1 $\pm$ 3.4 mmol/L	9.1 $\pm$ 2.5 mmol/L
GMI ³	7.2% (55.4 mmol/mol)	7.2% (55.6 mmol/mol)
Coefficient of Variation (%)	37.1%	27.2%
Low / High SG Alerts (per day)	3.1 / 1.6	1.4 / 1.3
 Average BG	13.5 $\pm$ 5.5 mmol/L	9.8 $\pm$ 3.7 mmol/L
BG / Calibration (per day)	1.2 / 0.5	0.4 / 0.4
 Total daily dose (per day)	69.4 units	98.7 units
Bolus amount (per day)	40.5U (58%)	53.7U (54%)
Auto Correction amount (per day)	16.3U (40%)	30.1U (56%)
Auto Basal / Basal amount (per day)	28.9U (42%)	45.0U (46%)
Set / Reservoir Change	11.0 / 3.7 days	2.6 / 2.6 days
 Carbs entered / Meal (per day)	110 $\pm$ 47 g / 3.8	123 $\pm$ 29 g / 4.8
 Active Insulin time	2:00 hrs	2:00 hrs
24hr programmed manual basal ⁴	12.000U	24.000U

When HCPs get it wrong: The consequences of misdiagnosis

Tribe L¹

¹Baker Heart And Diabetes Institute, Melbourne, Australia

It is estimated that up to 80% of people living with MODY are misdiagnosed as either type 1 or type 2, and as many as 10% of people with LADA are misdiagnosed as type 2. Misclassification of the subtype of diabetes can result in suboptimal management. As an example, the risk of DKA means correctly identifying people with T1D, and timely commencement of insulin therapy, are therefore essential. In LADA, which may have clinical similarities to T2D, sulfonylureas are discouraged as they might accelerate worsening of beta-cell function. Misclassification also has the potential to adversely affect the relationship between the doctor and the person with diabetes.

In this presentation, the speaker, who lives with LADA will take the audience on his misdiagnosis journey and how it almost had life altering consequences. He will also describe how his experience led to the creation of the first published complete diagnosis and treatment guideline for MODY, type 1, LADA, and type 2.

Stream 2:
Diabetes education and
quality improvement

Using pre appointment continuous glucose monitoring (CGM) to improve engagement and diabetes care in Aboriginal clients: A quality improvement initiative.

Anderson C¹, **Abdo S**^{1,5,6}, Korai A^{1,2}, Russell H^{1,3,4}, Tohi M¹, Mackay V¹, Dunne A¹

¹SWSLHD - Aboriginal Chronic Care Program, Miller , Australia, ²Nutrition and Dietetics Group, Faculty of Medicine and Health, The University of Sydney , Camperdown , Australia , ³Diabetes and Endocrinology Department, Liverpool Hospital , Liverpool , Australia , ⁴Conjoint Senior Lecturer, South West Clinical School, University of New South Wales, Kensington, Australia , ⁵Co-Head of Department, Diabetes and Endocrinology, Bankstown Lidcombe Hospital, Bankstown , Australia , ⁶Conjoint Senior lecturer, Western Sydney University, Penrith , Australia

Background & Aim:

Aboriginal Australians are disproportionately affected by Type 2 diabetes mellitus (T2DM) and diabetes technologies including CGM remain largely inaccessible. At the Aboriginal Chronic Care Program (ACCP), CGM sensors are applied on the same day as endocrinology appointments, limiting the utility of the data they generate. This project aimed to assess whether applying CGM sensors in advance of endocrinology appointments improves diabetes self-management among Aboriginal clients with T2DM and supports clinical decision-making for endocrinologists.

Methods:

Over a three-month period, all Aboriginal clients with T2DM attending ACCP endocrinology clinics were invited to participate. CGM sensors were applied 15 days before their scheduled review. Participants completed pre- and post-intervention surveys assessing blood glucose monitoring frequency, dietary behaviours, and diabetes distress (T2-DDAS items 1–8). Endocrinologists completed brief surveys on the utility of CGM data in guiding clinical decisions. Quantitative data were summarised descriptively, and qualitative feedback was thematically analysed.

Results:

Of the 22 eligible participants, 15 aged 32–84 years old completed the project. T2-DDAS scores decreased in 13 participants and remained unchanged in two. Fourteen participants increased the frequency of BGL monitoring, and ten reported positive CGM-attributed dietary changes. Fourteen participants reported CGM as helpful for diabetes management and would consider future use was cost not a major barrier. Endocrinologists reported improved access to clinically relevant glucose data and enhanced capacity to tailor treatment decisions. Key qualitative themes included reduced testing fatigue, high acceptability, and improved diabetes self-education.

Discussion / Conclusion:

Applying CGM prior to endocrinology appointments was feasible, acceptable, and associated with improved self-management and more effective clinical consultations. This QI initiative supports integrating earlier CGM application into routine diabetes care within ACCP.

Interdisciplinary nurse practitioner-led cardiometabolic management for people living with severe mental illness: a pilot model of care.

Abrahamson G¹, Brewer M¹, Brunorio L¹, Gregory M¹, Chen R¹

¹St Vincent's Hospital, Sydney, Darlinghurst, Australia

Aim:

To pilot a novel interdisciplinary, nurse practitioner-led model of care embedded within mental health services to manage cardiometabolic risk factors in people living with severe mental illness.

Methods:

A dedicated cardiometabolic clinic was integrated within existing inpatient and community mental health services at St Vincent's Hospital, Sydney to help address the high rates of premature cardiometabolic disease in those living with severe mental illness. The model of care centres on interdisciplinary patient-centred case management and includes a mental health nurse practitioner (NP), diabetes transitional NP, chronic disease transitional NP, mental health CNC, exercise physiologist, mental health junior medical officer, peer worker and endocrinologist. Consumers are identified via routine metabolic screening with prioritisation for the service given to persons, experiencing homelessness, those with multimorbidity, or from Aboriginal and Torres Strait Islander backgrounds. The clinic evaluates cardiometabolic risk, manages cardiometabolic medication initiation and optimisation, recommends lifestyle and exercise interventions, and facilitates linkage with primary, community and specialist care. Quantitative data including service activity, cardiometabolic risk factor identification and treatment will be presented. The clinic will also analyse qualitative data from consumers and clinicians.

Results:

Primary outcomes of this pilot programme will include numbers of referrals, attendance and follow-up rates, and completeness of cardiometabolic assessment within the mental health setting. Clinical process outcomes will include identification, documentation, and active management of cardiometabolic risk factors, initiation or optimisation of evidence-based therapies, and referrals to GPs and specialists. Acceptability of the model to consumers, clinicians, and peer support workers, and perceived impact on care coordination between mental and physical health services will be reported.

Conclusion:

This novel interdisciplinary NP-led metabolic clinic model relocates cardiometabolic care into familiar mental health environments, addressing structural barriers that prevent people with severe mental illness from accessing conventional primary care. By combining advanced nursing roles, endocrinology oversight, exercise physiology, and peer-supported engagement, the model of care has the potential to normalise routine metabolic monitoring, reduce fragmentation, and create a scalable template for cardiometabolic risk management in tertiary and community mental health systems.

Novel model of care integrating diabetes and endocrine management into a heart and lung transplant service.

Abrahamson G¹, Chen R¹, Raven L¹, Muir C¹

¹St Vincent's Hospital, Sydney, Darlinghurst, Australia

Aim/s

To describe and evaluate a multidisciplinary endocrine model of care integrated into a heart and lung transplant clinic focused on provision of integrated diabetes care and management of comorbid endocrine complications.

Methods

Heart and lung transplant recipients frequently develop corticosteroid induced hyperglycaemia, post-transplant diabetes mellitus (PTDM), osteoporosis, as well as thyroid dysfunction. Therefore, a structured model of care and pathway were developed, emphasising early identification and management of corticosteroid induced hyperglycaemia in the immediate post-transplant period, detection, prevention and treatment of PTDM, and systematic assessment of bone and thyroid health. Over time, our transplant endocrine service has expanded to include three part-time endocrinologists (0.5 FTE), a full-time endocrine registrar (1.0 FTE) and a diabetes transitional nurse practitioner (TNP). The transplant endocrine clinic (TEND) is fully integrated within the St Vincent's Hospital, Sydney, heart and lung transplantation service. Recipients with corticosteroid-induced hyperglycaemia or pre-existing diabetes are seen within 1–2 weeks of hospital discharge and reviewed closely by the diabetes TNP during the initial 3-month post-transplant period to manage rapidly changing corticosteroid doses and glucose-lowering therapy (insulin and others). All recipients are reviewed at three months post-transplant and at least annually for comprehensive metabolic assessment and treatment. In addition, integration of the TNP has enabled implementation of diabetes technology into routine patient care, enabling detailed information of glycaemia and the appropriate titration of insulin at each consultation particularly valuable in those living in regional and remote area where a face-to-face review may not be possible.

Results

Over a 12-month period, there were 3132 occasions of service, a third being face to face, and the remainder by telehealth. Quantitative data on the incidence of corticosteroid induced hyperglycaemia, post-transplant diabetes, and interventions will be presented.

Conclusion

This multidisciplinary endocrine model of care embeds diabetes and endocrine management into routine transplant care and follow up, supporting closer monitoring of immunosuppression induced complications, particularly hyperglycaemia and optimising long term outcomes. The inclusion of a diabetes TNP provides a sustainable, scalable framework that can be replicated in other transplant services.

Personalized T-Plate Diet model: A practical strategy to improve dietary adherence and glycemic control in Type 2 diabetes

Adjie W¹

¹Fatmawati General Hospital, Jakarta, Indonesia

Background and Aim

Type 2 Diabetes Mellitus (T2DM) is a growing global health burden requiring effective long-term management. Conventional dietary approaches are often non-individualized and difficult to implement, resulting in poor adherence and suboptimal glycemic control. This study aimed to evaluate the effectiveness of a personalized T-Plate diet model in improving dietary adherence and glycemic outcomes among patients with T2DM.

Methods

A quasi-experimental study with a nonequivalent control group design was conducted at a tertiary hospital in Jakarta, Indonesia. A total of 112 patients with T2DM were assigned to an intervention group (n=56), receiving the personalized T-Plate model, and a control group (n=56), receiving standard dietary care. Dietary adherence was assessed using digital food photography via WhatsApp, and glycemic control was measured using random blood glucose levels. Data were analyzed using paired and independent t-tests, and Chi-square tests.

Results

The intervention group showed significantly higher dietary adherence (67.9%) compared to the control group ($p < 0.05$). A significant reduction in blood glucose levels was observed in the intervention group (-27.13 mg/dL), while no meaningful improvement was found in the control group. Dietary adherence was significantly associated with improved glycemic control.

Discussion/Conclusion

The findings suggest that the personalized T-Plate model improves glycemic outcomes primarily through enhanced dietary adherence. Its visual and individualized approach simplifies dietary recommendations, thereby increasing patient engagement and compliance. This model represents a feasible, low-cost strategy with potential for integration into routine clinical practice to optimize diabetes management.

Knowledge, attitude and practices of insulin therapy among patients with Type 2 Diabetes attending a Tertiary Care Hospital in Bangladesh

Akter N¹

¹MARKS Medical College & Hospital, Dhaka, Bangladesh

Background

The management plan for type 2 diabetes requires a multidisciplinary approach to help them understand the disease and treatment options, practice self-care and prevent complications.

Objectives

This study aimed to assess the knowledge, attitude and practices of patients with type 2 diabetes on insulin regarding insulin therapy.

Methodology

This cross-sectional study was conducted at the OPD of a Hormone & Diabetes clinic of a tertiary care hospital in Dhaka, Bangladesh from July to December 2025. Interviews of 292 participants with type 2 diabetes followed the structured format of a questionnaire designed to obtain demographic details and score participants on knowledge, attitude and practices of insulin therapy. The knowledge domain consisted of eight questions that assessed patients' knowledge of diabetes, treatment options and complications related to insulin use. The attitude domain consisted of seven questions that addressed patients' psychosocial aspects in terms of embarrassment and fears associated with insulin therapy, impact on daily life and coping with the disease. The practice domain consisted of nine questions that evaluated the participants' insulin injection techniques.

Results

The median age of participants was 43.5 years ; 65.8% were female. Mostly (59.6%) were from urban area and middle socio-economic status (55.1%). More than 33% of patients passed secondary school certificate. The mean HbA1c was 8.2%. The mean percentage scores for knowledge, attitude and practices of insulin therapy were 61.9% (Male vs. Female: 20.42%, 41.5%), 46.08% (14.4%, 31.71%) and 52.96% (Male vs. Female:18.44 vs. 37.25%) respectively.

Conclusion

Patients with type 2 diabetes receiving insulin therapy and attending Hormone & Diabetes clinic of a tertiary care hospital in Dhaka, Bangladesh had moderate knowledge, a mixed attitude and active practice regarding insulin therapy.

Footprints- Walking on Country: A mobile outreach model improving access to Diabetes Foot screening and early risk identification.

Allen C¹

¹Sunshine Coast Health Service , Nambour , Australia, ²University of the Sunshine Coast, Sippy Downs, Australia

Background & Aim:

Diabetes-related foot disease is a leading cause of preventable hospitalisation and lower limb amputation. Timely foot screening is critical to reducing these complications, yet access remains limited for people facing geographic, social or structural barriers to healthcare. Aboriginal and Torres Strait Islander peoples experience a disproportionate burden of diabetes complications. Footprints- Walking on Country was developed to address these gaps through a mobile outreach service delivering diabetes foot screening within community settings across the Sunshine Coast region in Queensland. The program aimed to increase access to screening, strengthen engagement with priority populations and support early risk identification.

Methods:

Footprints- Walking on Country is a nurse-led mobile outreach service operating across the Sunshine Coast Hospital and Health Service catchment. Care is delivered from a purpose-adapted clinical vehicle, providing diabetes foot screening, brief education and referral in community locations including regional townships, neighbourhood centres and services supporting people experiencing homelessness. The service is open to all community members, with emphasis on improving access for Aboriginal and Torres Strait Islander peoples and others who face barriers accessing conventional services.

Results:

Between February 2024 and September 2025, 1,087 individuals were screened and 440 referred for podiatry following identification of foot risk. Program evaluation identified 135 hospital admissions and seven emergency department presentations potentially avoided through earlier detection and intervention. Aboriginal and Torres Strait Islander peoples represented 11.1% of service users compared with approximately 2.3% of the local population, indicating strong engagement with priority communities.

Discussion / Conclusion:

Delivering preventative diabetes foot care within community settings can reduce access barriers and support earlier risk identification. The Footprints- Walking on Country model demonstrates how mobile outreach services can strengthen engagement with preventative care and facilitate timely referral pathways, with potential to reduce avoidable hospitalisations and improve access to diabetes complication screening.

Are we doing transition care well? A mixed methods evaluation of a Young Adult Diabetes Service: experiences of patients and clinicians

Amarasinghe Y¹, Liu C¹, Goldstein R¹, Ng A¹, Naderpoor N¹

¹Monash Health, , Australia

Background & Aim

Young adulthood is a period of significant change and emerging responsibilities. For individuals living with Type 1 Diabetes, this transitional stage presents additional challenges in diabetes management. As such, young adults are at increased risk of disengagement with care, loss to follow up, and experiencing both acute and chronic diabetes related complications. This study aimed to evaluate the experiences of both participants (aged 16-30) attending the Monash Health Young Adult Diabetes Service (YADS) multidisciplinary model (across two sites) and their clinicians.

Methods

A mixed methods study was conducted using participant questionnaires (patients attending YADS) and semi-structured interviews (participant attending YADS and clinicians working in YADS). Questionnaire data included patient demographics, health information, patient satisfaction, and psychosocial wellbeing. Qualitative data were analysed using inductive thematic analysis to identify key themes and subthemes.

Results

110 survey responses were obtained. Most participants were satisfied with the delivery of YADS care (73% satisfied), identifying multidisciplinary input, clinician knowledge, and overall support and positive factors. However, 76% participants expressed an increased degree of diabetes distress. 13 participants were interviewed: 6 patients, 3 endocrinologists, 2 diabetes educators, 1 social worker and 1 admin representative. Participant interview themes: navigating access to care, psychosocial burden and lived experience, support systems, accessing diabetes information and transition to adult services. Unmet needs included lack of peer support options, a need for more discussion of psychological wellbeing and waiting times. Clinicians also desired additional psychologist wellbeing support. Clinician themes: seeing the whole young person, building trust for personalised care, one-stop multidisciplinary care, and shared purpose and passion for YADS

Conclusion

These findings highlight an opportunity to improve service delivery through better integration of psychological support, improving clinic wait times, as well as provision of a structured transition to adult care.

Cognitive challenges in older adults with Type 1 Diabetes influencing diabetes education

Ariarajah D¹, Steele C¹, Nguyen Y¹

¹Western Health, St Albans, Australia, ²Western Health, St Albans, Australia, ³Western Health, St Albans, Australia

Introduction:

Cognitive impairment is a significant complication among older adults with diabetes. Changes in cognitive functions such as memory, attention span, and decision-making abilities can impact effective diabetes management potentially leading to life-threatening complications.

This case study focuses on an elderly adult with type 1 diabetes diagnosed with vascular dementia (VD) and explores overall effect on his wellbeing.

A Diabetes Nurse Educator (DNE) from the Hospital Admission Risk Prevention (HARP) team in collaboration with a Neuropsychologist conducted home visits for assessment, implement therapeutic strategies and reviewing progress.

Discussion:

The main concern was the extreme volatility in glucose levels highlighted by CGMS reports. His diminished insight into his current insulin regimen and reliance on muscle memory to recall insulin doses from the past resulted in an inability to manage his diabetes safely.

Refusal to accept a diagnosis of VD as well as financial constraints created challenges to engage with community nursing services

Social isolation hindered engagement with community resources such as dementia support services due to language barriers and cultural beliefs, particularly for this Eritrean person and his family.

For this individual, his elderly wife will supervise the insulin doses based on written instructions from the DNE. A referral has been submitted to ACAS to increase the current package to include nursing services

Conclusion:

This case highlights that older people with diabetes often encounter cognitive complications that impede effective diabetes management. Involving a multidisciplinary team is essential to ensure patient centered care is delivered effectively.

Although the HARP service is temporary, it will continue until permanent management solutions are established. Complex care can be lengthy and costly. However, health organizations have an ethical duty to support all individuals with a chronic condition to ensure wellbeing and quality of life.

Continuous glucose monitoring as an experiential tool to improve diabetes knowledge and empathy in medical students

McNeill B¹, Wood-Bradley R¹, Macfarlane S², Rivera L¹, Dwyer K³, **Aston-Mourney K¹**

¹Deakin University, School of Medicine, IMPACT, The Institute for Mental and Physical Health and Clinical Translation,, Geelong, Australia, ²Deakin Learning Futures, Deakin University, Burwood, Australia, ³The Royal Melbourne Hospital, The University of Melbourne, Parkville, Australia

Background & Aim: Continuous glucose monitors (CGM) are a cornerstone of modern diabetes management, yet medical student education on this technology is currently purely theoretical. Using the principles of experiential learning, this study explored the impact of personal CGM use on medical students' understanding of metabolism, insight into patient experience and clinical confidence.

Methods: Following a comprehensive tutorial, twenty-seven second-year medical students wore a CGM for two weeks. Afterward, a survey evaluated the impact of the activity on student insight into glucose physiology and use of CGMs, as well as providing a perspective on the patient experience

Results: Students gained insights into their glycaemic response to food (100%) and exercise (81%). Crucially, the lived experience fostered a deeper connection to the patient journey. The vast majority of participants reported increased empathy (85%) and felt more confident in their ability to help future patients with the management of their diabetes (96%). The experience also shifted their clinical perspective, with 70% stating it would change how they advise patients on diet and exercise. Importantly, 96% of participants found the experience beneficial for their education.

Discussion / Conclusion: These findings suggest that providing medical students with firsthand CGM experience is a powerful educational tool that not only deepens their knowledge of metabolism and glucose regulation but also builds crucial empathy, better preparing them to care for patients living with diabetes.

Effect of insulin dose adjustment for normal eating among patients with Type 1 Diabetes: Experience from a Tertiary Care Centre in Sri Lanka

Arambewela M^{2,4}, **Athukorala T**^{1,3}, Chandrasekaran M³, Dissanayake P³, Jayawardena C³, Jayakody S², Sumanatilleke M³

¹University of Otago, Dunedin, New Zealand, ²University of Sri Jayawardenapura, , Sri Lanka,

³National Hospital of Sri Lanka, Colombo, Sri Lanka, ⁴Royal Darwin Hospital, Darwin, Australia

Background & Aim: Insulin dose adjustment for normal eating (DAFNE) among type 1 diabetes (T1D) is not extensively practiced in Sri Lanka and majority of the patients are managed with fixed insulin dose regimes. This study aimed to determine the effect of DAFNE on glycaemic control and other parameters in T1D patients.

Methods: Patients with T1D at a specialized clinic in National Hospital of Sri Lanka, naïve to DAFNE were recruited. Carbohydrate counting, insulin dosing/titration, managing hypoglycaemia, sick days, exercise and eating out were introduced in a structured manner. Glycaemic control was monitored 3 monthly. Quality of life was assessed at baseline and at 9 months with Vida 1 questionnaire.

Results: The analysis included 45 patients, of whom 21 were males. Mean age was 25.07 (± 7.76) years, while the average age at diagnosis was 16.13 (± 5.8). Mean HbA1C improved significantly from 10.58% (± 3.05) at baseline to 9.17% (± 2.21) at 9 months ($P = 0.009$). At baseline 17 episodes of diabetes ketoacidosis were reported among 6 participants with no episodes at 9 months. ($P=0.048$).

At baseline 4 major hypoglycaemic episodes were reported by 3 patients and none at 9 months ($P=0.102$) while 150 minor episodes were reported by 20 patients and at baseline and 55 episodes by 17 patients at 9 months ($P=0.829$). Mean Vida 1 value of interference to daily life improved from 34 at baseline to 31 at 9 months ($P = 0.013$). Mean overall quality of life score significantly improved from 93.45 at baseline 83.45 at 9 months ($P = <0.001$).

Discussion / Conclusion: DAFNE based structured education significantly improved glycaemic control, diabetic ketoacidosis episodes and quality of life among Type 1 DM patients while reducing hypoglycaemic episodes. These results highlight the potential role of structured self-management education in a resource limited setting. Wider implementation and larger scale studies are warranted.

Collaborative integrated In-home care model for vulnerable children living with Type 1 Diabetes

Bais L¹, Robinson J¹, Nguyen Y¹

¹Diabetes Victoria, Carlton, Australia

Aim

To enable a vulnerable child with type 1 diabetes to continue to thrive in the family home with in-home support and a collaborative model of care.

Method

A vulnerable child living with type 1 diabetes from a major metropolitan paediatric diabetes service experienced a sudden change of family circumstances. The child and their three siblings were now being cared for in the family home by their Vietnamese speaking grandfather.

To enable the child to thrive and remain in the family home it was identified that in-home diabetes care, education and support was required for the child's carer.

Diabetes Care Plus (DCPlus) was approached by a family support service to provide in-home support by a bilingual diabetes nurse educator. The DCPlus clinic acted as an extension of the diabetes treating team to support the Diabetes Care Plan for this child which included assessment of type 1 diabetes management within the home and reinforcing education and diabetes goals across thirteen sessions of up to 3 hours duration and seven telehealth. Collaboration with the family support service helped to identify and navigate barriers affecting diabetes management such as installing a 'stop switch' to enable the elderly carer to stop the internet when focus on diabetes management was needed by the child.

Result

The in-home diabetes visits by the diabetes nurse educator resulted in a HbA1c reduction of 2% which is now just above target range. Regular communication with the diabetes treating team enabled diabetes goals to be adjusted for the carer and child based on their current home circumstances.

Conclusion

Through in-home diabetes care, this could remain with their family instead of being hospitalised or placed in alternative care. This supports emotional wellbeing, reduces trauma, and helps maintain normal daily routines such as school and family life. This model should be considered by paediatric diabetes services for vulnerable children living with type 1 diabetes.

Turning the tide: Clinical impact of a multidisciplinary lifestyle intervention on prediabetes in Northern Malaysia

Binti Syed Hamzah S¹, Kamaruddin M¹

¹Ministry Of Health, Malaysia, Alor Setar, Malaysia

Background & Aim:

The rising prevalence of non-communicable diseases (NCDs) in Malaysia necessitates targeted primary care interventions. Prediabetes is a pivotal period for preventing Type 2 Diabetes Mellitus (T2DM). This study investigates the impact of a 6-month multidisciplinary lifestyle programme on anthropometric, glycaemic and functional fitness outcomes in adults with prediabetes at Simpang Kuala Health Clinic.

Methods:

This retrospective descriptive study examined records of adults with prediabetes who participated in a structured lifestyle programme from January 2024 to October 2025. The intervention engaged Family Medicine Specialists, nutritionists, and allied health professionals providing nutritional and physical activity counselling along with behavioural support. Extracted data included pre- and post-intervention anthropometry (BMI, weight), glycaemic indices (HbA1c, fasting plasma glucose, FPG) and functional fitness (3-Minute Step Test). Paired t-test was used to analyse changes from baseline.

Results:

The intervention yielded statistically significant clinical improvements. Participants achieved a mean weight loss of 2.1 kg ($p < 0.05$) and a significant reduction in waist circumference (WC) of 2.4 cm ($p < 0.01$), effectively targeting central obesity. Glycaemic control showed a positive outcome, with mean HbA1c decreasing by 0.3% ($p < 0.05$) and FPG reducing by 0.04 mmol/L ($p < 0.01$). Functional fitness scores significantly improve, demonstrated by a mean reduction in the 3-Minute Step Test recovery heart rate of 8 beats per minute ($p < 0.001$), indicating enhanced cardiovascular endurance.

Discussion / Conclusion:

The multidisciplinary approach in a government primary care setting is feasible and effective. The statistically significant improvement in functional fitness and WC suggest these are sensitive markers for monitoring lifestyle intervention in the Malaysian population. This study supports the integration of allied health professionals in primary care to manage prediabetes and mitigate the national NCD burden.

Primary care models facilitating type 2 diabetes remission: a systematic review and narrative synthesis of operational elements

Blackie A^{1,2}

¹Western NSW Local Health District, Bathurst, Australia, ²Orange Aboriginal Medical Service , Orange, Australia

Background: Evidence shows that T2DM remission can be achieved through lifestyle modification; however, remission in routine primary care is uncommon. The dietary interventions and clinical characteristics of people most likely to achieve remission have been defined but less is known about the operational aspects of care that improve implementation of effective lifestyle modifications.

Aim: To identify and evaluate operational elements in models of care implemented in primary care settings that have achieved T2DM remission through intensive lifestyle modification.

Methods: Using the PICO framework, the review included studies involving people with T2DM in which a lifestyle intervention was delivered in primary care and T2DM remission was reported as an outcome. The Quality Criteria Checklist for primary research was used to evaluate the quality of included studies.

Results: 11 studies were identified, totalling 3,286 participants. Study quality was mixed. All studies achieved remission in over 10% of participants, using definitions that varied. All interventions were diet-based, with the most common approach being very-low-calorie diets with total meal replacement (n=6). Eight common operational elements were identified: (1) ≥ 2 different healthcare professionals (HCP) in delivery; (2) HCP training in the intervention; (3) duration ≥ 12 months; (4) ≥ 10 scheduled contacts over the duration of the intervention; (5) utilisation of multiple modes of delivery; (6) the inclusion of face-to-face care; (7) utilisation of multiple behaviour change techniques (BCTs); (8) graded tasks as one of the BCTs.

Discussion/Conclusion: Whilst the included studies were heterogeneous, they were all highly structured programs with frequent contact over extended periods, capable of delivering T2DM remission in real-world primary care settings. This review has identified common operational elements of care that can guide future model development.

Enhancing primary care nurse capability through a structured diabetes education program within the Diabetes Alliance Program Plus (DAP+)

Acharya S^{1,2}, **Borgas D**¹, Hure A^{1,2}, Joseph M¹, Parsons M¹, Ross-Evans S¹, Southwell A¹

¹Diabetes Alliance Program Plus (DAP+), Newcastle, Australia, ²The University of Newcastle, Newcastle, Australia

Background & Aim:

DAP+ delivers gold standard diabetes care across the region through a collaborative case conference model of care involving specialists, GPs and primary care nurses.

Feedback from participating nurses identified specific knowledge gaps, directly informing a structured diabetes education program tailored to general practice needs. The program aims to provide an energising, interactive education experience that boosts nurse confidence, strengthens exemplary practice and enhances impact through meaningful feedback.

Methods:

A primary care nurse education day was established in 2017, designed and delivered by the DAP+ team.

Content was informed by needs identified during case conferencing and by organisers' primary care experience. Participant feedback was collected via Slido, including qualitative responses. Iterative refinement of program structure and content was guided by ongoing evaluation and clinical insight.

Results:

The program has evolved into a blended model incorporating didactic teaching and small-group interactive learning. Participants rotate through topic stations and engage in collaborative problem-solving. Attendance is capped at 42, with a waitlist now required. Participants have also included Aboriginal health workers/practitioners, pharmacists and nurse practitioners. The program is delivered twice yearly across local and regional sites. To date, over 400 nurses have participated. Feedback collected over the last year showed a satisfaction rating of 5/5, with 80% of participants indicating they would change their practice due to the education provided. Qualitative comments highlight the value of small-group sessions and the relevance of content to primary care nursing.

Discussion / Conclusion:

A primary-care-focused diabetes education model that blends formal teaching with informal peer learning has been proven to be an effective way to build capability for delivering optimal evidence-based diabetes care in general practice. This structured, clinician-specific educational approach can be adapted and replicated for other workforce groups to strengthen knowledge, confidence and consistent, high-quality chronic disease management.

Mentoring without borders: A national group tele-mentoring model for health professionals

Bryce A¹

¹Gerald Burns Pharmacy Diabetes Clinic, Bicton, Australia

Background & Aim: Access to professional mentoring remains challenging for many health professionals, particularly those working in rural, sole practitioner or time-constrained roles. Traditional one-to-one mentoring models are often limited by workforce shortages, geographic isolation and difficulty accessing suitable mentors. Mentoring is a critical component of the credentialing pathway for diabetes educators under the Australian Diabetes Educators Association (ADEA). To address these barriers, a virtual group mentoring programme was established for health professionals across Australia. This study explored participant experiences of this model, focusing on accessibility, educational value and professional impact.

Methods: A qualitative evaluation was conducted with 42 mentees enrolled in a structured group mentoring programme. Participants were predominantly pharmacists, but include optometrists, a dentist, an exercise physiologist and podiatrist, representing metropolitan, regional and remote settings. Mentees entered a 6–12 month mentoring contract and attended twice monthly Zoom-based group sessions facilitated by an experienced clinician-educator. The twice monthly format enabled participants to attend one session per month, providing flexibility with time zone differences between Eastern Australia and Western Australia. Sessions incorporated peer discussion, case sharing, reflective practice and guest expert presentations. Qualitative feedback was collected through reflective surveys and facilitated discussions and analysed thematically.

Results: Participants described the tele-mentoring model as accessible, flexible and professionally enriching. The virtual format enabled engagement regardless of location, workload or inability to secure locum cover. Flexible attendance supported sustained participation. Mentees reported that the group dynamic enhanced learning through shared experiences, collaborative problem-solving and exposure to diverse practice contexts. Guest speakers added significant value by providing expert insight and fostering professional connections. The programme supported increased confidence, reduced professional isolation and strengthened professional identity.

Discussion / Conclusion: Group tele-mentoring is a scalable and sustainable model for credentialing-aligned professional support. As an acceptable pathway, this expands equitable access to ADEA's required mentoring while leveraging peer learning and expert engagement. This approach offers a future-ready strategy to strengthen workforce capability, wellbeing and professional connectedness.

Developing a multidisciplinary pregnancy planning clinic for women with pre-existing diabetes at a Tertiary Teaching Hospital.

Bucholtz G¹, Glastras S¹, Inglis S¹, Lum C¹

¹Royal North Shore Hospital, St Leonards, Australia

Background

Pregnancy in women with pre-existing diabetes is associated with increased risks of maternal and neonatal complications. Optimising glycaemic control, cardiovascular risk factors and medication safety prior to conception is critical, yet many women enter pregnancy without adequate preparation. Dedicated preconception services for diabetes remain limited, highlighting the need for structured multidisciplinary (MDT) models of care.

Aim

To describe the development and implementation of an MDT pregnancy planning clinic for women with pre-existing diabetes at a large tertiary hospital.

Methods

An MDT pregnancy planning clinic was established at a large tertiary teaching hospital to support women with type 1 and type 2 diabetes prior to conception and during early postpartum follow-up. The clinic integrates endocrinology, diabetes education and dietetics to provide coordinated preconception care. A detailed MDT assessment is completed at initial consult, personalised care is provided over 3-6 months prior to conception. Key focus areas include optimisation of glycaemic management, access to continuous glucose monitoring subsidies, medication review, cardiovascular risk assessment, weight and nutrition support, and pre-pregnancy supplementation. As it is well documented that glycaemic instability, hypoglycaemia risk and lost to follow-up commonly occur following pregnancy in pre-existing diabetes; postpartum MDT follow-up includes support for glycaemic management during breastfeeding and ongoing cardiometabolic risk reduction.

Results

Implementation of the clinic has supported a coordinated approach to preconception care and strengthened collaboration between disciplines. The service provides a structured pathway for women planning pregnancy, aiming to improve access to preconception counselling and promote early engagement with specialist diabetes care.

Conclusion

MDT pregnancy planning clinics provide an opportunity to deliver coordinated, proactive care for women with pre-existing diabetes. This model supports early engagement, risk reduction and continuity of care across the preconception and postpartum periods. Further evaluation is planned to explore patient experience and service outcomes associated with this model of care.

Your Health, Your Summary: Co-designing a digital discharge summary to improve postpartum care after gestational diabetes

Butten K¹, Varnfield M¹

¹Australian eHealth Research Centre, CSIRO, Herston, Australia

Background & Aim: Many women remain unaware of the ongoing health risks associated with gestational diabetes (GDM), and postpartum follow-up and diabetes screening rates remain low. A key contributor is fragmented discharge communication, where GDM-related information is embedded within broader maternity documentation and is not clearly visible or actionable for women or general practitioners (GPs).

This project aims to co-design a patient held digital discharge summary embedded within M♡THER, an established digital GDM management platform. The summary provides women with clear, personalised information about their GDM journey, future health risks, and recommended follow-up, while enabling accurate sharing of GDM-related information with their GP

Methods: A participatory action research approach is being undertaken across three Queensland hospital sites. Early activities have focused on clinician consultation and prototype development, informed by prior research. Semi-structured interviews with health professionals, including midwives, diabetes educators, obstetric clinicians and GPs, are being conducted using early visual mock-ups to explore content priorities, usability, and fit within clinical workflows.

Consultation with women with lived experience of GDM is underway and will inform how personalised information, education, and follow-up recommendations are presented to support engagement with postpartum care.

Results: Early clinician feedback indicates strong support for a GDM-specific digital discharge summary that separates maternal metabolic health information from general birth records and presents it in a patient-accessible format. Poor visibility of GDM history and follow-up recommendations at discharge was identified as a major barrier to preventive primary care. Findings from consultation with women will be presented.

Discussion/Conclusion: By positioning women as holders of their own health information, this project reframes postpartum GDM care as a prevention opportunity. A patient held digital discharge summary may improve understanding, empowerment, and continuity of care between maternity services and general practice

Impact of a brief diabetes education on teachers' diabetes knowledge, attitudes, and confidence in diabetes care

Buzás N¹, Horváth M¹, Tesch Z¹, Papp-Zipernovszky O²

¹University of Szeged, Szeged, Hungary, ²Eötvös Loránd University, Budapest, Hungary

Background & Aim: Young children living with type 1 diabetes require continuous supervision and care. Teachers' engagement and their diabetes literacy are crucial from the start of school socialization, as the child spends a significant amount of time at school each week. Our objectives were to assess whether a brief (one-hour) standardized diabetes education could improve teachers' knowledge, attitudes, and confidence regarding diabetes care.

Methods: We distributed questionnaires before, immediately after, and one month following the training to assess diabetes knowledge (Diabetes Knowledge Test 2), attitude (Diabetes Attitude Survey 3, School Personnel Diabetes Attitude Scale, Semantic Differential), and confidence in diabetes management. Sixty teachers (mean age = 43.72 years) completed our questionnaire. There were two options for diabetes education: online (n = 36) and in-person (n = 24), enabling comparison between virtual and face-to-face learning.

Results: All participants' knowledge of diabetes significantly increased after the education program (M = 20.31, compared to 16.41 before the education). One month later, their level of diabetes knowledge remained stable (M = 20.14). The in-person education group showed mostly positive attitude changes, while the online format did not significantly influence attitudes toward diabetes. Only through semantic disparity was there a notable shift in attitude. The education also boosted participants' confidence in managing their diabetes, but in the online group, this confidence started to decline a month later than in the in-person group.

Conclusion: We find that a brief instructional resource can significantly increase knowledge about diabetes and that this knowledge is retained over time. However, this type of instruction is not enough to change people's attitudes toward diabetes; instead, more advanced, possibly interactive training is recommended. These experiences can help design effective short-term diabetes education programs.

Exploring parental emotional involvement in managing Type 1 Diabetes in children

Buzás N¹, Horváth M¹, Tesch Z¹, Papp-Zipernovszky O²

¹University of Szeged, Szeged, Hungary, ²Eötvös Loránd University, Budapest, Hungary

Aim: The emotional involvement of parents of children with type 1 diabetes affects how they manage the condition. Stress about the illness, fear of hypoglycemia, anxiety about technology use, or doubt in their own abilities all influence the parents' attitude.

Method: Our study examines how parental emotional involvement affects behavioral patterns in the management of type 1 diabetes among children aged 5-14 years. A total of 403 parents (average age = 41.5 years, SD = 5.7) completed our questionnaire. The measures included 1) Fear of Hypoglycemia (FHP) to assess related anxiety and behaviors aimed at preventing hypoglycemia; 2) Diabetes Distress (P-PAID-C) to evaluate distress linked to diabetes care; 3) Diabetes-Specific Technology Attitude of Use (DSAT) to measure overall attitudes toward diabetes technologies.

Result: Using Latent Profile Analysis (LPA) with the statistical software Jamovi (Version 2.5), five attitudinal patterns related to diabetes management were identified: 'Inactives' (13.0%) with low levels of anxiety and hypoglycemia-preventing behaviors; 'Worriers' (32.6%) with high anxiety and proactive behaviors; 'Balanced' (31.1%) with moderate anxiety and proactive behaviors; 'Confidents' (10.0%) with low anxiety and low proactivity; and 'Over-insurers' (13.3%) with high proactivity to avoid hypoglycemia but low anxiety levels. Significant differences were found between profiles in parents' and children's ages, as well as in diabetes-related stress and self-efficacy, while no differences were observed in HbA1c levels.

Conclusion: Our study broadens the understanding of parental FOH by identifying distinct profiles reflecting a range of behavioral and emotional responses to managing their child's T1D. Our findings show that parents' anxiety-like symptoms can be categorized into specific profiles, which may be useful in clinical practice. From a public health perspective, these results highlight the importance of including emotional support components in parental education programs and diabetes care interventions. Enhancing parents' emotional coping skills could improve outcomes in pediatric diabetes and help prevent long-term complications.

Advancing rural foot health equity through a Podiatry led Diabetes alliance model (DAP+): Strengthening workforce capability, connectivity and service sustainability

Callender N^{1,2,3,4}, Acharya S^{1,2,3,4}, Parsons M^{1,2,3,4}, Southwell A^{1,2,3,4}, Joseph M^{1,2,3,4}, Olsen A²

¹Diabetes Alliance Program Plus (DAP+), Newcastle, Australia, ²Hunter New England Health, New Lambton Heights, Australia, ³University of Newcastle, Callaghan, Australia, ⁴Primary Health Network, Newcastle, Australia

Background & Aim: disproportionate burden of diabetes-related foot disease exacerbated by fragmented pathways, workforce shortages and limited access to specialist care. Rural podiatrists often work in isolation without access to timely specialist diabetes support, contributing to professional fatigue and challenges in workforce retention.

The Diabetes Alliance Podiatry Plus (DAP+) program established a podiatry-led model positioning a senior DAP+ podiatrist, two days per week with an aim to provide a clinical anchor, mentor and system connector across public and private sectors, metropolitan and rural services, and multidisciplinary teams. This abstract describes how this role builds capability, links clinicians, provides expert advice and education, and strengthens the collective voice of rural podiatrists.

Methods: The DAP+ podiatrist completed a district-wide needs assessment to identify workforce, service and connectivity gaps that a central senior role could address. Priorities included rural high-risk foot service redesign, peer support, and education across public and private podiatrists. To respond, the DAP+ podiatrist established a bi-monthly Diabetes Lower Limb Community of Practice (CoP), supported redesign of an established regional service, and co-developed a MediBus model providing rural generalist intervention, mentoring and real-time clinical support across geographically dispersed sites to strengthen pathways and improve multidisciplinary collaboration.

Results: From June–December 2025, the MediBus team visited nine regional and rural locations, delivering podiatric assessment to 70 patients, most experiencing geographic disadvantage. Service redesign resulted in a standalone regional high-risk foot clinic with strengthened local capability. The CoP engaged over 85 clinicians, improving access to specialist support, reducing isolation and strengthening collaboration and clinical confidence.

Discussion/Conclusion: The DAP+ model demonstrates the value of senior podiatry leadership in outreach, capability building and service integration. Protected time for senior podiatrists to mentor rural clinicians and coordinate system-wide improvements is essential to advancing foot health equity and sustaining the rural workforce.

From consultation to leadership: embedding lived-experience governance in a digital social prescribing model for diabetes self-management support

Cao T^{1,2}, Lynch C², Alemu T², Scibilia R^{3,4}, Rathod P⁴, Oldenburg B²

¹School of Allied Health, Human Services and Sport, La Trobe University, Bundoora, Australia,

²Noncommunicable Diseases and Implementation Science Lab, Baker Heart and Diabetes Institute, Melbourne, Australia, ³Global Access Program, Breakthrough T1D, ⁴Lived Experience Advisory Panel

Background & Aim: Consumer involvement is increasingly promoted in diabetes research and service development; however, engagement often remains consultative and episodic, with limited influence on governance and decision-making. Emerging models of care aim to strengthen diabetes self-management by connecting people living with diabetes to community-based health and social supports. Connect4Health is a large-scale program developing a digital social prescribing model designed to improve care coordination and support self-management. To ensure program development is informed by lived experience, a governance framework was designed to embed consumer leadership in program design and implementation. This initiative describes the development and early operationalisation of a lived-experience governance framework supporting co-design and implementation of digital social prescribing for diabetes care.

Methods: The governance framework was developed through an iterative co-design process integrating participatory design and multi-stakeholder consultation. The framework includes a Lived Experience Advisory Panel (LEAP) providing sustained leadership across program development, implementation, and evaluation, and a Content Expert Advisory Panel (CEAP) contributing clinical, service, and implementation expertise to ensure alignment with health system priorities. A Steering Committee retains responsibility for final scientific and implementation decisions. Development involved people living with diabetes alongside clinicians, social prescribing practitioners, digital health experts, and health system stakeholders involved in referral pathways and community services.

Results: The framework operationalises lived-experience leadership within Connect4Health through a governance model integrating lived-experience, clinical, and implementation expertise. Mechanisms capture advisory recommendations, link advisory input with program decision-making, and maintain feedback loops between advisory groups and program leadership, enabling integration of lived-experience perspectives across program design, implementation, and evaluation.

Discussion/Conclusion: Embedding lived-experience leadership within program governance may strengthen the design and implementation of digital social prescribing initiatives for diabetes care. Integrating consumer perspectives alongside clinical and system expertise may support responsive, person-centred models of care that enhance diabetes self-management and promote equity in diabetes services.

Integrating social and emotional wellbeing support into Health Care for First Nations youth living with T2D: Health professional perspectives and practice

Carino M¹, Wicklow B², Dart A², Brodie T³, Titmuss A¹, Kirkham R¹

¹Menzies School Of Health Research - Charles Darwin University, Casuarina, Australia, ²Children's Hospital Research Institute of Manitoba - University of Manitoba, Winnipeg, Canada, ³Adelaide University, Adelaide, Australia

Background and Aim:

First Nations youth experience a high burden of early-onset type 2 diabetes (T2D), often complicated by systemic and social stressors. This study explored health professional (HP) perspectives, practices, and perceived enablers and barriers in providing culturally appropriate social and emotional wellbeing (SEWB) support for First Nations youth living with T2D across northern Australia.

Methods:

Mixed-methods study including a cross-sectional survey (n=71) and semi-structured interviews (n=12) in the Top End and Central Australia. Qualitative data were analysed using inductive phenomenology to identify themes related to culturally appropriate SEWB support.

Results:

While over 90% of HPs recognised that SEWB impacts diabetes risk, management, and complications, only 42% reported screening rarely or not at all for mental health concerns. HPs reported low confidence in providing culturally appropriate SEWB support (69%) and limited access to SEWB services (59%), including a lack of established referral pathways (37%). HPs described social determinants of health as often taking priority over clinical targets in youth living well with T2D. Shame, stigma, and cultural disconnect were identified as barriers to engagement, with relationship-building, trust, and long-term rapport recognised as essential for effective care. HPs also expressed a strong need for visual and peer-led resources. Enablers of care included shifting to youth-friendly, non-clinical environments, using culturally safe terminology, and ensuring the central involvement of First Nations staff and community members.

Conclusion:

HPs recognise the link between SEWB and T2D, but report systemic and social barriers, limited culturally appropriate screening tools, and unclear referral pathways reduce their confidence and ability to provide support. Addressing these gaps requires a shift toward an enhanced model that prioritises building trust, youth-friendly environments, and increased involvement of First Nations staff and community members.

Comparing patient satisfaction using weight based and fixed-dose approach for managing hypoglycaemia in Type 1 diabetic patients: a cross-over trial

Lam K¹, Sin W¹, **Chan H**¹, Mok P¹, Ng M¹

¹Hospital Authority, Kowloon, Hong Kong SAR

Background & Aim: Hypoglycaemia is a frequent complication in Type 1 diabetes which is commonly treated with a fixed 15 g glucose dose. This approach does not account for body weight differences and may lead to repeated treatment or rebound hyperglycaemia. Weight-based dosing can be a considerable alternative but patient acceptability remains unclear. As satisfaction influences adherence and confidence in self-management, this study aimed to compare patient satisfaction between fixed-dose and weight-based treatments.

Methods: A randomized cross-over trial was conducted at United Christian Hospital Diabetes Centre, Hong Kong. Adult patients with Type 1 diabetes on insulin were recruited and randomly assigned to begin with either fixed-dose or weight-based (0.3 g/kg) glucose treatment, then switched afterwards. Reasons for hypoglycaemia and satisfaction was assessed using structured questionnaires. Data were analyzed to compare satisfaction level, willingness to continue the treatment and confidence for managing future episodes of hypoglycaemia by Chi square or Wilcoxon signed-rank test.

Results: Sixty patients were recruited (15 males, 35 females; mean body weight 60.35 kg, SD 8.72). The causes of hypoglycaemia included delay in taking meals (52.6%), adequate adjustment for exercise (16.5%), inadequate carbohydrate intake (15.5%), inappropriate site of insulin injection (13.4%), and others (2.0%). Satisfaction scores were similar for both treatments (fixed-dose: 8.06; weight-based: 8.09, $p=0.83$). Patients underwent weight-based treatment were also comparable to fixed-dose, in willingness to continue the treatment ($p=0.60$) and confidence for managing future episodes of hypoglycaemia (fixed dose: 5.38; weight based: 5.60, $p=0.49$).

Discussion / Conclusion: Patient with weight-based treatment were found to have similar satisfaction experience with those with fixed-dose treatment. These findings support further exploration in adopting weight-based treatment for long term self-management in Type 1 diabetes.

Mindfulness in communication development for diabetes care

Chan Y¹, Poh W¹, Lim B¹, Chua C¹, Othman N¹, Choo V¹

¹Association of Diabetes Educators (Singapore), Singapore, Singapore

Background & Aim:

The non-profit organisation comprising of diabetes nurse educators worked with behavioural therapist and developed an innovative game-based Mindfulness in Communication programme to enhance patient-educator interactions in diabetes care, addressing the critical need for empathetic and present communication between healthcare professionals and patients.

Methods:

The programme employs gamification principles through three core frameworks: Empathy-Building Prompts (10 emotional acknowledgement techniques), Mindful Communication Techniques (10 reflection and partnership strategies), and Positive Empowerment Techniques (5 strength-based approaches). Fifteen wildcard scenarios introduce unpredictability to test authentic responses and adaptability. The game-based format creates a safe practice environment for healthcare professionals to rehearse difficult conversations without real patient consequences. The inaugural session on 25th October 2025 involved 40 diabetes nurse educators using structured role-play exercises in an interactive card game format, with scenarios evaluated across five criteria: empathy, clarity, relevance, engagement, and creativity.

Results:

Participants demonstrated high engagement levels with positive feedback, indicating successful skill development through active, experiential learning. The gamified approach effectively enhanced educators' ability to create psychologically safe environments for patient interactions.

Future Implementation will expand the training across different institutions and community nurses and allied health caring for people with diabetes.

Conclusion:

This game-based programme establishes a systematic foundation for transforming patient-educator relationships through structured mindfulness practices, enabling patients to feel heard, understood, and empowered while potentially improving diabetes management outcomes.

Understanding the diagnostic experience of individuals with autoantibody negative type 1 diabetes

Cheng M¹, Patel S^{1,2}, Greenfield J^{1,2,3}

¹St Vincent's Clinical School / University of NSW, Sydney, Australia, ²Department of Diabetes and Endocrinology, St Vincent's Hospital, Sydney, Australia, ³Victor Chang Cardiac Research Institute, Sydney, Australia

Background and aim:

Autoantibody-negative type 1 diabetes (T1D) accounts for 10-15% of T1D cases. The absence of autoantibodies can contribute to diagnostic uncertainty, misclassification and/or delays in treatment. In this study, we aim to understand the diagnostic experience of this cohort, to identify barriers within diagnostic pathways and opportunities to improve communication and care.

Methods:

This qualitative study will aim to recruit 60 individuals with autoantibody-negative type 1 diabetes through diabetes clinics, community networks and online platforms. Participants will complete an online survey through REDCap. A subset of participants will be invited to participate in a semi-structured interview to further explore their experiences, including time to diagnosis, interactions with healthcare providers, emotional impact of diagnostic process and diagnosis, and initial management. Qualitative data will be analysed using reflexive thematic analysis to identify patterns and themes within participants' diagnostic journeys.

Results:

This study is expected to identify themes related to diagnostic uncertainty, delays or misclassification and the emotional impact of the diagnostic process on individuals.

Conclusion:

Findings from this study will provide insight into the diagnostic experience of autoantibody-negative type 1 diabetes individuals. It may identify strategies to improve diagnostic pathways, clinician communication and patient support.

Unmasking knowledge and adherence to sodium–glucose cotransporter-2 inhibitors among hospitalized adults in Malaysia: A cross-sectional study

Chong S¹, TAN XY¹, Chai YN¹, Nur Izzah Najihah Zainal Aripin¹, Cheng YM¹, Pang AJ¹, Aida Qaisara Ahmad¹, Siti Rosnah Suradi¹

¹Hospital Sultan Ismail, Johor Bahru, Malaysia

Background & Aim

Sodium–glucose cotransporter-2 inhibitors (SGLT2-I) provide well-established glycaemic and cardiorenal benefits. Nevertheless, their safe use depends on patient knowledge and medication adherence, particularly regarding the recognition and management of adverse effects. Despite increasing utilization in Malaysia, real-world insights into patients' understanding and medication-taking behaviour remain scarce. This study aimed to evaluate knowledge and adherence to SGLT2-I therapy and identify factors associated with these outcomes among hospitalized adults.

Methods

A prospective study was conducted in general medical wards of Hospital Sultan Ismail, Malaysia. Adult patients (≥ 18 years) with diabetes, heart failure or chronic kidney disease who received SGLT2-I therapy were recruited. Data were collected via face-to-face interviews using a self-developed, validated questionnaire to assess SGLT2-I knowledge and the Malaysia Medication Adherence Assessment Tool (MyMAAT) to assess adherence. Association between knowledge and adherence as well as potential factors influencing knowledge and adherence were explored.

Results

Among 166 participants, 65.1% demonstrated moderate-to-poor knowledge and 63.3% had moderate-to-poor adherence to SGLT2-I. Knowledge was strongly associated with adherence ($p = 0.001$). Higher education level, lower pill burden, and longer therapy duration were significantly associated with better knowledge. Notably, 94% participants reported not receiving counselling on potential adverse effects prior to initiation. Understanding of ketoacidosis (4.8%) and genitourinary infections (6.0%) was particularly low. Only 1.8% of respondents were aware of sick-day rules. Most participants (76.5%) expressed a need for counselling from healthcare professionals.

Conclusion

Suboptimal knowledge and adherence to SGLT2-I were common among hospitalized patients. Better knowledge was strongly associated with improved adherence, underscoring the importance of structured education and pharmacist-led counselling.

Barriers and facilitators to upskilling primary health care clinicians in diabetes education and management in Australia: a scoping review

Cornford E^{1,2}, Hure A^{2,3}, Wynne K^{2,4}, Taylor R^{2,3}, Mingay E^{2,3}

¹James Cook University, Townsville, Australia, ²University of Newcastle, Callaghan, Australia, ³Hunter Medical Research Institute, New Lambton Heights, Australia, ⁴John Hunter Hospital, New Lambton Heights, Australia

Background & Aim: Primary health care (PHC) is the first and most consistent point of contact for individuals with chronic conditions such as diabetes. As diabetes management and treatment options continue to evolve and clinical guidelines are regularly updated, ongoing professional development for clinicians is essential. Therefore, this scoping review aimed to identify and map barriers and facilitators influencing the upskilling of PHC clinicians in diabetes education and management in Australia, and to highlight gaps to inform future research and professional development initiatives.

Methods: A scoping review was conducted in accordance with the Joanna Briggs Institute methodology. In August 2025, systematic searches were performed in Medline (Ovid) and Embase (Ovid), including primary studies published from 2000 onwards, with additional reference list hand-searching. Primary studies of any design reporting barriers and/or facilitators to professional development for PHC clinicians in Australia were included. Two-reviewer screening was conducted in Covidence, and a Microsoft Excel spreadsheet was used to extract data and synthesise results. Data extracted included study characteristics, study design, and primary and secondary outcomes guided by the Population, Concept, Context framework. Data were synthesised thematically.

Results: A total of 25 articles were included in the study. Study participants included general practitioners, nurses, allied health clinicians, and Aboriginal and Torres Strait Islander Health Practitioners or workers. Thematic analysis identified key barriers to upskilling, including time constraints and workload pressures, limited access to education and resources, workforce turnover, organisational and systemic constraints, technology limitations, and perceived lack of need. Facilitators included workforce motivation and engagement, accessible and practical education formats, availability of tools and resources, mentorship and interprofessional collaboration, and strong organisational support.

Discussion / Conclusion: This review identified a wide range of facilitators and barriers for upskilling in diabetes education and management. Targeted and accessible professional development, supported by organisational and policy initiatives, is essential to reduce the barriers to undertaking professional development activities.

When Type 2 isn't Type 2: Routine autoantibody screening in a specialist diabetes service

Dick H¹, Maberly G^{1,2}, Jayaballa R^{1,3}, Meyerowitz-Katz G^{1,2}, Serrano J¹, Shahidi M¹, Tiwari S¹, Bannawe M¹

¹Western Sydney Diabetes, Blacktown, Australia, ²University of Sydney, Sydney, Australia,

³Macquarie University, Sydney, Australia

Background

Type 2 diabetes is increasingly recognised as a heterogeneous condition, spanning insulin resistance–dominant, insulin-deficient and insulin-requiring phenotypes, often overlapping with obesity and variable clinical presentation. This can obscure autoimmune diabetes in adults. We evaluated routine pancreatic autoantibody testing in a specialist diabetes clinic to assess diagnostic yield and clinical impact. This quality improvement initiative evaluated the clinical value of routine autoantibody screening.

Methods

All new referrals labelled as type 2 diabetes over 3 months underwent GAD and IA-2 antibody testing. As testing was often performed opportunistically at varying times, C-peptide was not included initially. Demographic, clinical and biochemical data were retrospectively analysed, including age, BMI, HbA1c, diabetes duration and treatment. Outcomes included antibody positivity and implications for diagnosis and management.

Results

Four of 53 patients (7.5%, 95% CI 0.44%–14.66 %) were antibody positive. Ages ranged from 43–61 years, with BMIs between 26.7 and 44.8, diabetes duration unknown for one and over 10 years for 3 and mixed treatment profiles, illustrating the clinical heterogeneity of adult-onset autoimmune diabetes. Identification prompted diagnostic reassessment and treatment changes, including insulin initiation discussion and altered eligibility for CGM-supported care.

Discussion & Conclusion

Routine autoantibody screening within specialist services may help identify a clinically meaningful subgroup of adults with autoimmune diabetes who might otherwise be missed using clinician judgement alone. Earlier recognition supports timely insulin initiation as for the patient who is yet to start insulin, recognising disease progression, and may reduce patient distress related to self-management failure. Diagnostic reclassification can enable access to subsidised continuous glucose monitoring as it did for this small group but within Australian PBS may restrict access to GLP1 agonist for insulin resistant patients. The cost benefit of this intervention has yet to be examined. Larger studies are needed to define optimal screening strategies and downstream outcomes.

Building nutrition capacity in rural diabetes care: The Diabetes Alliance program plus (DAP+) model in Hunter New England

Chan K¹, Acharya S², Parsons M², Joseph M², Southwell A², **Dwyer S²**

¹Diabetes Alliance Program Plus (DAP+), Tamworth, Australia, ²Diabetes Alliance Program Plus (DAP+), Newcastle, Australia

Background and Aim: Access to dietetic services and evidence-based nutrition support remains limited in rural and remote areas of NSW, contributing to fragmented diabetes care and reduced capacity to manage low risk patients within specialist services. Workforce shortages, dilution of dietetic skills, and limited resources further constrain service delivery.

The Diabetes Alliance Program Plus (DAP+) Nutrition initiative delivered in the New England region of NSW aims to strengthen diabetes related nutrition care by building local workforce capacity across primary health care and community settings using coordinated, regionally tailored approaches that leverage existing resources.

Methods: The project was implemented across rural, regional, and remote areas of the Hunter New England region (MMM 1-6). Systematic mapping of available dietetic resources from workforce capacity, referral pathways, professional development opportunities, and community education was undertaken to determine current availability and gaps in those communities. Identified gaps then informed the design of the interventions that would be piloted to improve access for underserved communities and support clinicians across primary health care, community, and specialist diabetes care settings.

Results: Key outcomes included the establishment of a multidisciplinary Nutrition Community of Practice with over 70 participants, delivery of targeted DAP+ nutrition education events, and development of a collaborative regional network involving Hunter New England Local Health District dietitians, private practitioners, nongovernment organisations, and university partners. Nutrition education was also delivered through the DAP+ Medibus at Aboriginal Medical Services, expanding reach to underserved rural communities and strengthening dietetic support for diabetes care.-government organisations, and university partners. Nutrition education was also delivered through the DAP+ Medibus at Aboriginal Medical Services, expanding reach to underserved rural communities and strengthening dietetic support for diabetes care.

Discussion/Conclusion: The DAP+ Nutrition model demonstrates how coordinated networking and workforce capacity building can improve access to nutrition support in rural diabetes care. By strengthening local capability and referral pathways, the model supports sustainable service delivery, enhances integration across care settings, and reduces reliance on specialist services, with potential applicability to other rural and remote health contexts.

Cooking, connection and community: Nutrition education on the Diabetes Alliance Program Plus (DAP+) Medibus

Chan K¹, Acharya S², Parsons M², Joseph M², Southwell A², **Dwyer S²**

¹Diabetes Alliance Program Plus (DAP+), Tamworth, Australia, ²Diabetes Alliance Program Plus (DAP+), Newcastle, Australia

Background & Aim: DAP+ launched Medibus in 2025 to provide Diabetes and Endocrinology outreach services to remote, rural and regional communities across the Hunter New England region. The established DAP+ Rural Week model of care supports capacity building within general practices to improve diabetes management in community settings; however, access to practical, community-based nutrition education remains limited in many rural and remote locations. The DAP+ Medibus provides an opportunity to extend this model by incorporating community focused nutrition education, maximising service reach and optimising time on the road.

The aim of this initiative was to deliver sustainable, community centred nutrition education using practical, culturally relevant approaches to support people living with diabetes and their wider community.

Methods: This quality improvement initiative was delivered during Medibus outreach weeks servicing communities classified as Modified Monash Model (MMM) 3 (large rural towns) to MMM 6 (remote). Early engagement with local clinicians, community leaders and services informed needs analysis, program planning and opportunities for sustainability. Collaborative planning with local clinicians and community representatives supported continuity beyond the Medibus visit.

In addition to usual GP case conferences and DAP+ education evenings for healthcare professionals, community nutrition education sessions were incorporated where appropriate. Education was delivered by a dietitian using flexible formats that utilised existing local facilities and programs. Sessions focused on practical skill development through cooking demonstrations, food tasting and facilitated group discussion.

Results: Community education sessions were well received, with positive participant feedback gathered through informal evaluation and discussion. Reported outcomes included increased nutrition knowledge, improved food skills and exposure to new foods and flavours. Capacity building occurred through cascading of learning from the dietitian to local health and community providers. The initiative also enhanced understanding of local strengths and challenges related to nutrition, diabetes management and wellbeing, strengthening referral pathways and local networks.

Discussion/conclusion: Community co-design and reciprocal learning were central to the success of this initiative. Integrating practical nutrition education into outreach models such as Medibus supports sustainable diabetes education, local capacity building and quality improvement in rural and remote settings.

Psychological burden and diabetes self-management in adults with Type 2 Diabetes: A cross-sectional study in Singapore

Er B¹, Chan Y¹, Goh H¹, Liow E¹, Lim H¹, Ren J¹, Lau M¹, Chandran S³, Lim S²

¹Speciality Nursing, Singapore General Hospital, , , ²Nursing Research, Singapore General Hospital, , ,

³Department of Endocrinology, Singapore General Hospital, ,

Background/Aims: Effective diabetes self-management is essential for maintaining optimal glycaemia and preventing complications. However, living with type 2 diabetes requires daily decisions relating to medication, diet, physical activity and glucose levels, imposing considerable psychological burden. Diabetes distress, reflecting the emotional burden of managing diabetes, has been associated with poorer treatment adherence and lower self-care behaviours but remains under-recognised in routine care. This study examined the association between diabetes distress and self-management behaviours in adults with type 2 diabetes.

Methods: A cross-sectional study was conducted at a specialist diabetes outpatient clinic in a large tertiary hospital in Singapore. Adults aged ≥ 21 years with type 2 diabetes were recruited between April 2022 and July 2023. Diabetes distress was assessed using the Diabetes Distress Scale (DDS-17) and self-management behaviours using the Diabetes Self-Management Questionnaire (DSMQ). Sociodemographic data were obtained from questionnaires and electronic records. One-way ANOVA examined associations between diabetes distress and self-management behaviours.

Results: Among 100 participants, 59% had diabetes for more than 10 years and 63% had suboptimal glycaemia (HbA1c $>8\%$). Moderate-to-severe distress was reported in 48% (31% moderate, 17% severe) of participants. Higher distress was significantly associated with poorer self-management ($p=0.002$). Mean self-management scores declined progressively with increasing distress: 7.30 (SD 1.56) with little or no distress, 6.38 (SD 1.54) with moderate distress, and 5.94 (SD 1.05) with severe distress. Dietary control showed the strongest association with diabetes distress, with lower scores observed at higher distress levels ($p=0.02$). Poorer self-management was also observed among participants with HbA1c $\geq 7\%$ ($p=0.004$).

Discussion/Conclusion: The progressive decline in self-management with increasing distress indicates a graded relationship between psychological burden and diabetes self-care behaviours. Dietary control appeared most affected, highlighting the potential influence of psychological burden on dietary behaviours. Routine assessment of diabetes distress may identify individuals requiring support to strengthen diabetes self-management and improve outcomes.

Test of a dual intervention in Arabic-speaking diabetic patients attending Melbourne General Practices: A prospective cohort feasibility study

Fawzi K¹

¹Victoria University, HILLSIDE, Australia

Aim

This paper outlines a prospective cohort feasibility study investigating a dual intervention—home medicines review (HMR) and group diabetes education (GDE)—for Arabic-speaking individuals with type 2 diabetes (T2DM) in Melbourne general practices. The study aims to assess the feasibility, acceptability, and preliminary clinical impact of integrating pharmacist-led medication reviews with culturally tailored diabetes education.

Background

Type 2 diabetes is a significant health burden in Australia, especially among culturally and linguistically diverse communities. The Arabic-speaking population experiences higher rates of T2DM, poorer glycaemic control, lower medication adherence, and higher diabetes-related hospitalisations than the general population. Factors such as delayed healthcare engagement and complex pharmacotherapy exacerbate these challenges. However, there is limited evidence on culturally appropriate, primary care-based strategies that address both medication management and self-management education for this group.

Method

This 12-month study will recruit 100 Arabic-speaking adults with T2DM from general practices in North and West Melbourne. Participants will receive pharmacist-led HMR, including three in-house assessments and written recommendations to referrers, along with culturally tailored GDE delivered over eight structured sessions in small groups. Outcomes include feasibility, acceptability, glycaemic control (HbA1c), medication adherence, medication wastage, unplanned hospitalisation, and patient-reported educational impact. Pre- and post-intervention qualitative interviews will explore patient experiences and barriers to engagement.

Results (Anticipated)

The intervention is expected to be feasible and acceptable within general practice settings, with anticipated improvements in glycaemic control, medication use, and self-management engagement. Qualitative data will likely identify cultural, linguistic, and system-level factors influencing participation and sustainability.

Conclusion

This study integrates culturally responsive education with structured medication review to position Arabic-speaking individuals with T2DM at the centre of diabetes care. Findings will inform the refinement of the intervention and lay the groundwork for future trials, addressing a critical gap in equitable, person-centred diabetes management.

Diabetic ketoacidosis in transit: A retrospective review describing emergency presentations by rural, interstate and international visitors at a tertiary referral metropolitan hospital.

Finneran C¹, Ludington J¹, Abrahamson G¹, Raven L¹

¹St Vincent's Hospital, Sydney, Darlinghurst, Australia

Background and Aim:

Diabetic ketoacidosis (DKA) is a potentially life-threatening complication. Anecdotally a significant number of DKA presentations to this tertiary referral metropolitan hospital are by visitors. The project aims to characterise DKA emergency department (ED) presentations by people from outside the local metropolitan area.

Method:

Patients with a documented home address outside the local metropolitan area were identified from a quality assurance audit of hospital presentations in 2025, with DKA identified by coding. Retrospective review of healthcare records identified demographics and outcomes which are analysed descriptively.

Results:

Of 47 patients coded with DKA, 14 (30%) had a home address outside the local metropolitan area; 6 overseas, 5 interstate and 3 within the state. Median age of visitors was 31 years (IQR 25-55) and the local cohort 46 years (IQR 30-66). Two visitors had new diagnosis of diabetes, diabetes duration for the remaining 12 was 4-35 years. Two visitors experienced SGLT2i associated DKA with type 2 diabetes. Majority of visitors (12/14) were admitted, median length of stay 2 days (IQR 2-3) compared to local patients 3.5 days (IQR 3-8). Two patients were using continuous subcutaneous insulin infusion devices, neither required admission, mean ED LOS 6 hours. All patients using multiple daily insulin injections required admission. Precipitating factors included infection, alcohol and recreational drug use, reduced carbohydrate intake, missing insulin, mental health issues. One traveller had 3 DKA admissions over 2 visits.

Discussion and Conclusion:

In this metropolitan hospital 30% of DKA presentations were people from outside the local area. This highlights opportunities for education to improve understanding of strategies to manage sick days and changes to routines, particularly for people with diabetes who are travelling.

An audit of medication related hypoglycaemia in inpatients with Diabetes at a Tertiary Centre

Flannery W¹, Ramanathan J^{1,2,3}

¹Liverpool Hospital, Liverpool, Australia, ²Royal Prince Alfred Hospital, Camperdown, Australia, ³WSU School of Medicine, Liverpool, Australia

Background & Aim: Hypoglycaemia is the most common complication of glucose lowering medications and is associated with increased risk of adverse outcomes. Liverpool Hospital in NSW has historically reported higher rates of inpatient hypoglycaemia compared to peers. The reasons for the elevated hypoglycaemia have been unclear.

Methods: A retrospective record review was conducted for the months of July and August 2025. Cases were identified using Hospital Acquired Complications data for the respective months. Electronic medical records were manually searched and relevant data extracted into an Excel spreadsheet. Inclusion criteria were new or established diagnosis of diabetes mellitus during admission, inpatient hypoglycaemic events, and use of oral or injectable hypoglycaemic medications. Data was analysed using simple statistics.

Results: 39 patients met criteria for inclusion. 21 (54%) patients were female, and the median age was 69 years (IQR 14 years). Median number of hypoglycaemic episodes during admission was 3 (IQR 3). 20 (51%) included patients had recurrent hypoglycaemia. The most severe hypoglycaemic episode was outside of business hours for 36 (92%) patients. Only 26 (66%) of patients had the admitting team adjust the patient's hypoglycaemic medications post hypoglycaemia.

Discussion / Conclusion: Hypoglycaemia related to medications was common, and most patients had recurrent hypoglycaemic episodes which often occurred outside of usual working hours. Only two thirds of patients had their regular medications adjusted post severe hypoglycaemia by the admitting team. Further systems-based initiatives to encourage regular review of hypoglycaemic medication may help to reduce recurrent hypoglycaemia.

Doing It Together; piloting and evaluating peer support and peer-led education for First Nations young people living with type 2 diabetes in the Northern Territory

Freeman N¹, Murphy E

¹Menzies School Of Health Research, Darwin, Australia

Background & Aim:

First Nations youth in the Northern Territory (NT) experience the highest rates of youth-onset type 2 diabetes (T2D) globally. Youth-onset T2D differs from adult-onset T2D, progressing more rapidly and complications occurring earlier and with greater severity. Young people with T2D report isolation and shame, impacting on self-management. Models of care have historically been ineffective in engaging youth with T2D or improving outcomes.

‘Doing It Together’ aimed to improve wellbeing and connection of First Nations youth living with T2D through co-design of peer-support and peer-led education.

Methods:

Experience-based co-design (EBCD), supported by developmental evaluation, was used in partnership with services across the Big Rivers region of the NT.

Youth with T2D were employed as Peer Facilitators, working across three sites, two peer support sites and one peer-led education site. Peer Facilitators also co-led two camps for young people.

Qualitative (focus groups, interviews, questionnaires, reflections) and quantitative data were collected pre, post and during the intervention to support developmental evaluation and explore enablers, barriers, satisfaction, wellbeing and engagement. Process and outcome evaluation was informed by the RE-AIM Framework.

Results:

Youth participants reported a sense of relief through connection - sharing experiences and management ideas as well as an improved understanding of T2D and a desire to learn more. Young people saw Peer Facilitators as credible, reliable educators and engaged more in diabetes self-management and with health services.

Peer Facilitators reported a deeper understanding of diabetes motivating behavioural change, increased confidence in discussing diabetes, pride in presenting and a network of support and help with their diabetes journey.

Discussion / Conclusion:

Preliminary findings highlight the strengths of peer-led support models for both participants and Peer Facilitators. Peer Facilitators play a critical role in creating spaces and activities where First Nations youth feel comfortable, can share experiences and engage in conversations about management, all vital for improving health outcomes.

Clinical audit of standards of care at a Diabetic clinic in a Tertiary care center in Sri Lanka, with re-audit following targeted interventions.

Gamage A¹, Galla Watta H¹, Senanayaka H¹, Katulanda P²

¹National Hospital of Sri Lanka, Colombo, Sri Lanka, ²Faculty of Medicine, University of Colombo, Colombo, Sri Lanka

Background and Aim

Diabetes mellitus is highly prevalent in Sri Lanka. Compliance with diabetes care standards has proven to improve patient outcomes. This audit aimed to improve standards of care at a tertiary care diabetic clinic in Sri Lanka.

Method

All university diabetic clinic attendees over 18 years, with type-2 diabetes, for more than 1 year and followed up for at least 12 months, were audited over one month (November 2025- 1st cycle). Audit standards were based on National and the American Diabetes Association-2025 recommendations. Identified deficiencies were addressed through staff education and implementation of a structured checklist, followed by a 1-month re-audit (January 2026-2nd cycle). Level of performance was measured as percentage compliance per recommendation.

Results

Two cycles included 51 and 47 participants. Overall screening rates were satisfactory in both cycles (1st -96.08%, 2nd 100%, within the last year). Incomplete screening was identified as a deficiency in practice during initial audit. This was improved with targeted intervention in almost all individual components. A comparison of selected elements is given in Table-1.

Discussion/Conclusions

This interventional audit showed improved standards of care in diabetes, in a tertiary care clinic following targeted interventions.

Table-01- Comparison of screening rates of selected elements.

Selected elements of comprehensive screening done within a year	1 st cycle N=49	1 st cycle- %	2 nd cycle N=47	2 nd cycle- %
Glycaemic control monitoring	49	100	46	97.87
Spot urinary albumin-to-creatinine ratio	18	36.73	28	59.57
Serum creatinine and estimated glomerular filtration rate assessment	40	81.63	36	76.59
Lipid profile	29	59.18	31	65.96
Calculation of body mass index	14	28.57	27	57.45
Comprehensive foot examination	7	14.29	35	74.47
Fundoscopy examination	36	73.47	37	78.72
Assessment for MASLD and MASH using FIB4	3	6.12	30	63.83
Cardiovascular risk assessment	11	22.44	23	48.94

Barriers to following dietary advice in type 2 diabetes mellitus: People's lived experiences and professionals' perspectives in a South Asian context

Garage M¹, MacLaughlin H¹, Jayawardena R², Vidgen H¹

¹School of Exercise and Nutrition Sciences, Faculty of Health, Queensland University of Technology, Kelvin Grove, Australia, ²Department of Physiology, Faculty of Medicine, University of Colombo, Colombo 08, Sri Lanka

Purpose and aim of the project/initiative:

Diet is a cornerstone of type 2 diabetes mellitus (T2DM) management, yet many people find it difficult to follow dietary advice in everyday life. This study aimed to explore barriers to following dietary advice among people living with T2DM in Sri Lanka, interpreting finding using the Theoretical Domains Framework (TDF) and Capability, Opportunity, Motivation Model of Behaviour (COM-B).

Who the project/ initiative was seeking to impact:

The project sought to improve support for people living with T2DM in Sri Lanka, and to inform how healthcare professionals (HCPs) can better tailor dietary support in routine care.

Who was involved in the project/ initiative:

A 2-hour online discussion was conducted with people living with T2DM and HCPs. Ten adults living with T2DM and ten HCPs were purposively recruited to ensure heterogenous representation.

What outcomes and impact did the project/ initiative achieve:

Participant's narratives highlighted a mismatch between guideline-based expectations and actual behaviours within complex home, work, social and economic environments. Barriers were identified across 12 of 14 TDF domains, but were most concentrated in *Environmental context and resources*, corresponding to *Opportunity* in COM-B, including work commitments and lack of time for food-related tasks, higher prices and limited availability of healthy foods when eating-out, household responsibilities, convenience of home-away foods, financial constraints and the need to satisfy multiple family food preferences. Social influences also reflected social opportunity. Limited food-related skills and impractical dietary advice and meal plans were highlighted, while HCPs emphasised limited knowledge together constraining *Capability*. Low confidence, beliefs about medication consequences, low motivation and emotions, low persistence over time reflected *Motivation*. Overall, opportunity-related barriers outweighed capability or motivation-related barriers.

Learnings for the future:

Future initiatives should prioritise addressing opportunity-based barriers, while also strengthening capability and motivation through culturally relevant, person-centred pathway.

Diabetes education and technologies improve glycaemic outcome in cystic-fibrosis-related-diabetes: A case report

Gao Y¹, Tan S¹, Chand S¹, Topliss D^{1,2}

¹Bayside Health (Alfred), Melbourne, Australia, ²School of Translational Medicine, Monash University, Melbourne, Australia

Background

Diabetes technologies, including automated insulin delivery (AID) and continuous glucose monitoring (CGM), have clinically shown improved glycaemic outcomes in type 1 diabetes. However, their effectiveness in cystic fibrosis related diabetes (CFRDM) management is less well evaluated and not widely recognized. Notably, people with CFRDM are ineligible for the CGM subsidy program in Australia. Therefore, we aim to use a case report to demonstrate the positive impact of AID and CGM, supported by personalised diabetes education, on glycaemic outcomes in an adult with CFRDM.

Methods

A 33-year-old mother of twin toddler boys with a 16-year history of CFRDM, CF, and CF-related liver disease was using an AID system (Tandem Control-IQ) and self-funded CGM (Dexcom G6). She was referred to the Diabetes Education service in January 2026 for enhancement of diabetes technology use. Interventions included reinforcement of appropriate pre-meal bolus through AID, education on advanced AID features (exercise activity mode), sick-day management guidance, and transition to an improved CGM device (Dexcom G7). She was provided ongoing phone or in-person reviews. Baseline and post-intervention glycaemic metrics from pump downloads were compared.

Results

At baseline, time in range (TIR; 3.9–10.0 mmol/L) was 49% and time above 13.9 mmol/L was 22%. The mean glucose was 10.7 mmol/L and coefficient of variation was 36%. Following personalized diabetes education and enhancement of AID and CGM use, TIR increased to 70%, mean glucose decreased to 9.0 mmol/L, and time above 13.9 mmol/L reduced to 9.6%. There was no significant increase in hypoglycaemia. The patient also reported improved confidence in self-management and engagement with health services.

Conclusion

This case demonstrates that personalised diabetes education enables effective utilisation of AID and CGM and improves glycaemic outcomes in CFRDM. These findings support the utilization of advanced diabetes technologies in CFRDM management and CGM subsidy inclusion for people with CFRDM.

Acknowledgement:

This work was supported by Fibrosis Service and Endocrine & Diabetes Service of Alfred Care Group

Formative usability evaluation of a lifestyle and wellbeing mHealth application for Australian adults with type 2 diabetes: a two-session think-aloud study

Gargya D^{1,2}, Ko K³, Chan V¹, Thrimawithana T¹, Stupans I¹, de Courten B^{1,2,4}, Lim C^{1,2}

¹School of Health and Biomedical Sciences, RMIT University, Bundoora, Australia, ²Department of Medicine, School of Clinical Sciences, Monash University, Clayton, Australia, ³School of Design, College of Design and Social Context, RMIT University, Melbourne, Australia, ⁴Department of Diabetes and Vascular Medicine, Monash Health, Clayton, Australia

Background and aim:

Digital health programmes can extend lifestyle and wellbeing support for adults living with type 2 diabetes (T2D), but apps developed in one context may not fit another. We evaluated the usability and user experience of a United Kingdom-developed mobile health (mHealth) application to inform culturally responsive adaptation for Australia by identifying barriers and user experience factors that may affect uptake and sustained engagement, and generating evidence-based, human-centred recommendations for Australian users.

Methods:

Australian adults living with T2D, smartphone ownership, and English proficiency completed two in-person usability sessions (RMIT University/public library), separated by 7-10 days of independent at-home app use. During each session, participants completed predefined tasks using concurrent think-aloud to capture real-time usability insights. Following each session, participants completed the System Usability Scale (SUS) and open-ended feedback; the 18-item mHealth App Usability Questionnaire (MAUQ) followed second session. A mid-study update was made to the food diary section and evaluated using the same protocol.

Results:

Participants (N=6; pre-update n=3; post-update n=3) were mostly <60 years old; 4/6 identified as female; all were born overseas. Usability improved after update: mean SUS increased from 39.17 (poor; pre-update, Session 1) to 56.67 (fair; post-update, Session 2); mean MAUQ overall score increased from 3.87 (pre-update) to 5.15 (post-update) on a 1-7 scale, with subscale improvements in ease of use (3.40→4.53), interface and satisfaction (3.62→4.90), and usefulness (4.22→5.44). Feedback emphasised the app's all-in-one concept (learning content, health tracking, community features) and food-intake tracking, notably barcode and image scanning. Priority improvements included navigation and findability (icons, signposting, search and back functionality, menu structure), intuitive food-logging workflows, and localisation/accessibility (Australian units/defaults, language).

Discussion/Conclusion:

Targeted updates improved perceived usability; however, further adaptations are necessary to optimise fit for Australian users. Ongoing user-centred refinement is needed to strengthen accessibility, cultural responsiveness, and sustained uptake across diverse populations.

Lifestyle, wellbeing and support preferences for managing type 2 diabetes among multicultural Australians: a cross-sectional survey

Gargya D^{1,2}, Shahidi M³, Meyerowitz-Katz G³, Nguyen K^{1,2}, Chan V¹, Thrimawithana T¹, Ko K⁴, Wong J⁵, Stupans I¹, de Courten B^{1,2,5}, Lim C^{1,2}

¹School of Health and Biomedical Sciences, RMIT University, Bundoora, Australia, ²Department of Medicine, School of Clinical Sciences, Monash University, Clayton, Australia, ³Western Sydney Diabetes, Integrated and Community Health, Western Sydney Local Health District, Blacktown, Australia, ⁴School of Design, College of Design and Social Context, Melbourne, Australia, ⁵Department of Diabetes and Vascular Medicine, Monash Health, Clayton, Australia

Background and Aim:

Diabetes self-management education and support (DSMES) and mobile app-based health (mHealth) programmes are expanding. However, engagement remains inconsistent and may widen inequities for culturally and linguistically diverse communities. We investigated lifestyle and wellbeing support priorities and delivery preferences among Australians from multicultural backgrounds living with type 2 diabetes (T2D) and family/friend supporters to identify domains associated with engagement with programme-based and digital DSMES.

Methods:

Adults living with T2D and supporters completed an online or paper survey recruited through health and community services. Principal component analysis (oblimin) derived latent engagement domains; factor scores were analysed using group comparisons with effect sizes (η^2 , d) and exploratory block-wise linear regression.

Results:

Among 221 responses (84.6% people living with T2D), 64.7% were born overseas, 19.5% lived outside metropolitan areas, and 65.6% reported other long-term conditions. Despite strong interest in nutrition/healthy eating (65.2%), physical activity (51.1%), diabetes medicines (49.8%), sleep (44.3%), and stress/anxiety support (39.4%), only 16.7% had previously attended a diabetes programme. Face-to-face delivery was most preferred (52.5%), followed by mHealth delivery (22.2%). Six engagement domains were identified, including concerns about mHealth and psychosocial/cultural participation barriers. Demographics explained 13.0% of variance in mHealth concerns ($\text{adj}R^2=0.114$; $p<0.001$), with concerns higher in older and lower-education groups ($\eta^2=0.089$ and 0.83 ; $p<0.001$). Age ($\beta=0.225$; $p=0.001$) and education ($\beta=0.231$; $p=0.001$) were independent predictors. Psychosocial/cultural barriers varied by demographics ($\text{adj}R^2=0.098$; $p<0.001$), were greater outside metropolitan areas ($d=0.44$, $p=0.008$), and modestly associated with clinical characteristics ($\text{adj}R^2=0.04$; $p=0.03$). They were higher among those diagnosed within 10 years ($d=0.47$; $p<0.001$).

Discussion/Conclusion:

Low prior programme participation despite strong lifestyle priorities indicates a need-access gap. Actionable determinants, particularly supporting choice-based, blended DSMES pathways with culturally responsive participation options, ensuring clear privacy and safety communication, and endorsed by health professionals, can enhance DSMES engagement among multicultural Australians and enable equitable and sustained participation.

Building capacity of diabetes care providers in promoting oral health: Developing, evaluating and endorsing a continuing professional development (CPD) program

George A^{1,2,3,4,5}, Kong A^{1,2}, Poudel P¹, Arora A^{5,6,7,8,9}, Griffiths R¹, Sofronoff S¹², Martin R^{1,10,13}, Akerman L¹⁴, Wong J^{15,16}, Uthurralt N¹¹, Priede A¹⁰, Wong V^{17,18}, Forsyth C³, Marwaha P¹⁹, Kezhekkara S¹, Calache H^{1,20,21}

¹Australian Centre for Integration of Oral Health (ACIOH), Western Sydney University, Liverpool, Australia, ²Ingham Institute for Applied Medical Research, Liverpool, Australia, ³School of Dentistry, Faculty of Medicine and Health, The University of Sydney, Camperdown, Australia, ⁴Faculty of Science, Medicine and Health University of Wollongong, Wollongong, Australia, ⁵Translational Health Research Institute, Western Sydney University, Campbelltown, Australia, ⁶School of Health Sciences, Western Sydney University, Campbelltown, Australia, ⁷Health Equity Laboratory, Campbelltown, Australia, ⁸Discipline of Child and Adolescent Health, Sydney Medical School, The University of Sydney, Camperdown, Australia, ⁹Sydney Dental Hospital/Sydney Local Health District, Surry Hills, Australia, ¹⁰Melbourne Dental School, The University of Melbourne, Melbourne, Australia, ¹¹NSW Ministry of Health, Centre for Oral Health Strategy, St Leonards, Australia, ¹²Oral Health Victoria, Carlton, Australia, ¹³Oral Health Services, Barwon Health, Newcomb, Australia, ¹⁴Australian Diabetes Educators Association, Turner, Australia, ¹⁵Monash Health, Clayton, Australia, ¹⁶School of Clinical Sciences, Monash University, Clayton, Australia, ¹⁷South-Western Sydney Clinical School, University of New South Wales, Liverpool, Australia, ¹⁸Fairfield & Liverpool Diabetes Services, South Western Sydney Local Health District, Liverpool, Australia, ¹⁹Dental Services, Monash Health, Springvale, Australia, ²⁰School of Health and Social Development, Faculty of Health, Institute for Health Transformation, Deakin University, Burwood, Australia, ²¹La Trobe Rural Health School, La Trobe University, Bendigo, Australia

Aims: Diabetes and oral health share a bidirectional relationship, yet oral health promotion remains limited among diabetes care providers. This study aimed to develop and evaluate a diabetes oral health CPD program to improve Diabetes Educators' oral health knowledge and confidence in discussing, screening and referring clients to oral health services. The acceptability, feasibility, and sustainability of integrating the program into practice was also examined.

Methods: The online CPD program was developed with a large team involving health professionals, health services, people with diabetes, government organisations, oral and public health academics, and professional organisations. The program consisted of three modules and integrated demonstration videos, a validated 3-item screening tool and dental referral resources that had been adapted and endorsed for Diabetes Educators in both NSW and Victoria. A mixed-methods approach was used to evaluate the CPD program. Knowledge and confidence were assessed pre- and post-intervention using questionnaires analysed with paired-sample t-test. The questionnaires included a qualitative component to explore acceptability, feasibility and sustainability, and analysed the data using directed content analysis based on pre-defined themes.

Results: Thirty diabetes educators from New South Wales and Victoria were recruited. There was an overall significant increase in the knowledge scores post-test (mean=29.67; $p<0.001$) compared to pre-test (mean=23.24) ($n=21$). Confidence also increased ($p<0.001$). Participants discussed that the training was acceptable, feasible, and sustainable, and offered suggestions to improve long-term sustainability.

Conclusion: The CPD program and tailored resources improved diabetes educators' oral health knowledge and confidence and were seen as suitable for integration into clinical practice. The training has subsequently been endorsed by the Australian Diabetes Educators Association for 4 CPD

hours and is available online as a microcredential. Further evaluation is underway (NHMRC-funded) to test the clinical effectiveness and cost effectiveness of the training program in improving health outcomes (oral health and diabetes).

Diabetes education and quality improvement (QI): Implementing AUSDRISK screening during World Diabetes Day to identify community diabetes risk

Georgiou A¹, Li C¹, John S¹, Le Q¹, Marimuthu R^{1,4}, Wong T^{1,2,3}, Abdo S^{1,2}

¹Department of Diabetes and Endocrinology, Bankstown-Lidcombe Hospital, South Western Sydney Local Health District, Bankstown, Australia, ²School of Medicine, Western Sydney University, Sydney, Australia, ³Faculty of Medicine, University of New South Wales, Sydney, Australia, ⁴Faculty of Medicine and Health, University of Sydney, Sydney, Australia

Background & Aim:

Type 2 diabetes (T2DM) commonly remains undetected in its early stages, reducing the opportunity for early intervention and effective prevention. World Diabetes Day offers an opportunity for community awareness and diabetes risk screening. This QI project aimed to implement structured AUSDRISK screening and establish baseline diabetes risk profiles to inform future diabetes education and prevention activities. This aligns with Strategic Outcome 3: People are healthy and well, within the *Future Health 2022–2032 Health Outcomes and Action Plan*, which prioritises diabetes prevention through early risk identification and community engagement.

Methods:

A one-off opportunistic AUSDRISK screening activity was conducted during a hospital-based World Diabetes Day event. Adults attending were invited to complete the AUSDRISK questionnaire. Data collected included age, gender, family history, and AUSDRISK risk scores. Descriptive analysis categorised participants as low, intermediate, or high diabetes risk.

Results:

Of 107 adults approached, 63 (59%) completed screening. Risk classification identified 29 (46%) as low risk, 17 (27%) as intermediate risk, and 17 (27%) as high risk. Participants were predominantly female (79%). Nearly half (49%) were aged <35 years. Individuals of Asian background comprised 29 (46%) of the screened cohort, with 69% scoring intermediate or high risk (20/29). A family history of diabetes was reported by 30%. Although fewer men participated, a higher proportion reported family history and high-risk scores, suggesting under-representation of a potentially higher-risk subgroup.

Discussion/Conclusion:

Opportunistic screening identified a substantial proportion of participants with intermediate or high risk, including within a relatively young cohort. Elevated risk among participants of Asian background and low male participation highlights gaps in engagement and opportunities for targeted outreach. The 59% completion rate indicates potential to optimise screening pathways in future events. Embedding structured AUSDRISK assessment within community health activities can enhance early risk identification, support tailored diabetes education, and inform targeted prevention strategies for higher-risk populations.

Improving safety of diabetes medicines management through a multidisciplinary and collaborative approach

Given A¹, Kyi M^{1,2}, Robins M¹

¹Northern Health, Epping, Australia, ²Department of Diabetes and Endocrinology, Royal Melbourne Hospital, Parkville, Australia

Background & Aim:

Insulin is widely recognised as a high-risk medicine that remains a leading contributor to medication-related adverse events. Studies have reported 32% of inpatients with diabetes had at least one medication error, with severe hypoglycaemia occurring in up to 10% of inpatients treated with insulin¹. To address the need for coordinated governance, education, and system-wide risk mitigation, a multidisciplinary committee was established.

Methods:

The Diabetes Medicines and Insulin Stewardship Committee was introduced in 2018 and aligned with the NSQHS Medication Safety Standard. The committee included representation from endocrinologists, pharmacists, junior doctors, nurse practitioners, diabetes and nursing educators, and informatic analysts.

Key functions of the committee include the development and review of organisational policies and procedures, systematic review of all incidents involving glucose-lowering medicines (GLMs) reported through VHMS and implementation of improvement strategies, risk identification and management, education, capability building and communication.

Results:

Key improvements achieved through this approach have included:

- Improving governance for medication risks related to GLMs, including new high concentration insulins, medication shortage management, discontinuation of formulations and devices.
- Optimisation of the Electronic Medication Record to standardise and improve diabetes management.
- Monitoring and review of critical incidents related to GLMs and implementation of appropriate risk mitigation strategies
- Clinical audits and research projects.
- Revision and updating of the education approaches including the ACSQHC insulin eLearning module.

Discussion / Conclusion:

The committee provides robust oversight of hospital acquired endocrine complications and drives continuous quality improvement activities. The multidisciplinary membership enables rapid translation of insights into practice, ensuring recommendations are implemented effectively across all clinical areas.

This model of clinician-led stewardship demonstrates how coordinated multidisciplinary collaboration can improve inpatient diabetes care and offers a model for other health services seeking to reduce risk and optimise outcomes for consumers with diabetes.

1. Donovan et al., Med J Australia 2021

Insulin prescribing and management errors in hospitalised adults at a Regional Health Service

Goshrani A^{1,2,3}, Fearnside K², Hung A²

¹Centre for Research and Education in Obesity (CREDO), Austin Health, Melbourne, Australia, ²Albury Wodonga Health, Albury, VIC, ³The Royal Melbourne Hospital, Parkville, Australia

Background & Aim: Insulin is a high-risk medication, and inpatient prescribing and documentation errors can result in significant patient harm. This quality improvement audit aimed to quantify the frequency, types, and associated harms of insulin charting and management errors using the National Insulin Prescribing Chart at Albury Hospital, Albury Wodonga Health.

Methods: A one-month series of weekly point-prevalence audits was conducted across medical and surgical wards at Albury Hospital. Basic demographic data were collected. Predefined insulin prescribing, documentation, and management errors and associated glycaemic harms were collected and analysed descriptively.

Results: A total of 170 charts were audited, with errors identified in 52 (30.6%). Forty-eight patients were prescribed insulin and 34 (70.8%) had at least one error. Error rates were more frequent on surgical wards compared to medical wards (35.1% vs 28.3%). The most frequent errors involved inappropriate management of hypoglycaemia or hyperglycaemia and incorrect supplemental insulin charting. Among insulin-treated patients, one in four (25%) had long-acting insulin withheld inappropriately. Insulin-related harm occurred in 14.7% of patients overall and in 37.5% of insulin-treated patients, predominantly due to ongoing hyperglycaemia. Hypoglycaemia occurred in 4% of insulin-treated patients, and no cases of diabetic ketoacidosis or hyperosmolar hyperglycaemic state were identified.

Discussion / Conclusion: Insulin charting and management errors were common and frequently associated with ongoing hyperglycaemia, particularly among insulin-treated patients and more frequently on surgical wards. These findings highlight the need for targeted interventions to improve inpatient insulin safety. This audit will inform a planned intervention and re-audit cycle to reduce insulin-related harm.

Exploring appointment non-attendance trends in young adults with Diabetes attending Western Sydney Outpatient Clinic (2024–2025)

Grech N¹, Holmes-Walker J

¹Wslhd - Westmead Hospital, Westmead, Australia

This project evaluated appointment attendance patterns and did-not-attend (DNA) rates among young adults attending the Western Sydney Young Adult Diabetes Clinic (YAC) between 1 July 2024 and 30 June 2025, to identify gaps in engagement and inform targeted quality improvement strategies to improve attendance and continuity of care.

Attendance data for scheduled outpatient appointments, including in-person and telehealth consultations, were extracted from electronic medical records. Eligible participants were young adults with type 1 diabetes (T1D), type 2 diabetes (T2D), or type 3C diabetes (T3CD) who had at least one scheduled appointment during the study period. Exclusion criteria included pregnancy-related diabetes, steroid-induced diabetes, cystic fibrosis-related diabetes, and islet transplant recipients. Appointment data were analysed to assess attendance patterns, DNA trends, demographic and clinical variables. Individual consent was waived as data was de-identified.

A total of 320 young adults were scheduled for YAC appointments, comprising 931 appointments. Of these, 710 were attended and 221 were DNAs, resulting in an overall DNA rate of 23.3%. Most patients had T1D (90%), with smaller proportions diagnosed with T2D and T3CD. The mean HbA1c among attendees was 8.4%, and 15.6% had HbA1c levels >10%. 7% of patients had no attended appointments over 12 months and were classified as lost to follow-up, with repeated non-attendance contributing to disengagement. DNA rates and loss to follow-up were similar across T1D treatment modalities, CSII and MDI. Previous service evaluations reported lower DNA rates (10–20%), loss to follow-up (5%), and a median of 2.9 clinic visits per year.

Young adults attending the YAC demonstrated higher DNA rates and greater loss to follow-up than previously reported. The proportion of patients with markedly elevated HbA1c highlights the clinical impact of missed care and supports early follow-up after DNA events and adequate staffing to improve engagement, continuity of care, and glycaemic outcomes.

Victorian Virtual Emergency Department: More than an after-hours 'Band-Aid' service

Green G¹, Robbins M¹, Sarah L¹, Cole L¹, Foged C¹, O'Shannassy J¹, Sher L¹, Ekinci E

¹Victorian Virtual Emergency Department, Northern Health, Melbourne, Australia, Epping, Australia

In July 2024, an after-hours 7 day week diabetes service staffed by Diabetes Nurse Practitioners (DNP) was added to the established multidisciplinary 24 hour Victorian Virtual Emergency Department (VVED).

The diabetes service provides direct telehealth contact (including prescribing) for people of all ages and types of diabetes experiencing acute issues such as hypo/hyperglycaemia, ketosis, illness and diabetes technology difficulties. During a consultation, the DNP can liaise with a variety of health care professionals allowing a more holistic approach to addressing complex needs. Access to My Health Record facilitates additional up to date medication, pathology and inpatient discharge summaries.

Following a telehealth episode of care, patients can be 'admitted' into the adult and paediatric Extended Care Wards, receiving ongoing regular contact for up to 5 days. Patients with complex diabetes needs can be referred to the telehealth Victorian Virtual Specialist Clinics (adult and paediatric Endocrinology clinics or diabetes nurse educator). For clients residing in residential aged care facilities – DNPs can directly refer to the Residential In-Reach program for ongoing onsite management. Other clients requiring non-emergency room management can be redirected to Urgent Care Centres located around the state. Where possible discharge summaries are sent to public and private diabetes services and clinicians. Previous clinical data has indicated that approximately 80% of diabetes-related emergencies treated in the community accessing VVED avoid physical emergency department presentations.

VVED presentations also provides a teaching opportunity for people with diabetes and their families, VVED colleagues, attending paramedics, aged care and disability staff.

In a system of often fragmented care, the VVED Diabetes NP service provides a new model of care for people with diabetes to access timely care and management at a time of clinical crisis, including the opportunity to access more integrated care.

Patient experiences of shared care between hospital and community Podiatry services in Australia

Griffiths D¹, Depangher J¹, Anghie S¹, Bullen B²

¹Eastern Health, Burwood East, Australia

Background & Aim:

In response to Covid-19 lockdown measures, the Eastern Health (EH) podiatry service in Victoria, Australia, initiated a shared care model in 2020, involving EH High Risk Foot and Community Health (CH) podiatry services. This shared care model promotes podiatric care in an outpatient setting, with the acute EH High Risk Foot team providing less frequent review of individuals with stable and improving foot conditions.

Methods:

A prospective cohort study sought to evaluate patient experiences of this new shared care model. Patients attending under the shared care model were invited to complete a seven-item survey to provide feedback on their experience during a 5-month study period, spanning 23rd September 2024 to 14th February 2025.

Results:

Thirty patients participated in this study. All six quantitative survey items surpassed the pre-determined threshold for 'good' satisfaction, with total agreement ranging from 76.7% to 96.7%. Twenty individuals further responded with open text, revealing three themes, Communication and mixed messages; Making it easier; and Happy and helpful.

Discussion / Conclusion:

This study provides insight into a novel podiatric shared care model in Australia, demonstrating patient satisfaction with this initiative. Traditional models of care, with high dependence on acute, tertiary centers, are becoming less sustainable, given the increasing burden of foot disease. Eastern Health made one such change for individuals with foot disease, including active foot ulceration, and this study sought to understand the consumer experience related to this shared care model.

Bone health screening in patients with type 2 diabetes mellitus - a single-centre retrospective audit

Hao E¹, Nayak D¹, Chen W^{1,2}, Chen R^{1,2}, Sheu A^{1,2}

¹St Vincent's Hospital Sydney, Sydney, Australia, ²Garvan Institute of Medical Research, Sydney, Australia

Background & Aim:

Skeletal fragility is increasingly recognised as a complication of T2DM. However, bone mineral density (BMD) screening using dual-energy X-ray absorptiometry (DXA) underestimates fracture risk in T2DM patients, as BMD is often normal/elevated due to concomitant obesity. There is no current Medicare-funded reimbursement for screening DXA for patients with T2DM under the age of 70 and it is unclear what proportion of these patients undergo bone health assessment.

This study aims to evaluate the frequency of bone health assessment in our clinic and investigate associations between diabetes-related metabolic factors with BMD.

Methods:

Two researchers will collect retrospective data from patients attending St Vincent's Hospital Complex Diabetes Clinics between July-December 2023.

Records were assessed for bone health assessment: fracture history, DXA BMD, trabecular bone score (TBS), anti-resorptive therapy, and documentation of screening status. Associations between T2DM-related factors (BMI, complications, HbA1c, UACR, CKD stage, lipids, 25-hydroxyvitamin D) and BMD (total hip and lumbar spine) were assessed using Spearman correlations.

Results:

We collected data from a total of 105 patients. Mean age of patients was 60 years (range 23 – 92), mean BMI 30kg/m² (standard deviation 7.2), mean HbA1c 8.1 % (IQR 6.6-8.9), 68.4% were male. 16 of 105 patients received bone health screening (15.2%) with female patients being screened more than males (24.1% vs 11.7%). Screening rates did not differ according to HbA1c or CKD stage. There was an association between Hip BMD and BMI however no significant associations found between total hip BMD or TBS and the duration of T2DM, presence of diabetes complications, insulin use and HbA1c.

Discussion / Conclusion:

Despite clear evidence of increased skeletal fragility in T2DM, bone health assessment is uncommon, potentially related to a lack of guidelines. Larger prospective studies are needed to refine screening criteria and enable earlier detection and intervention.

Identifying care gaps in Cardio-Kidney-Metabolic Disease using EMR-based outreach in primary care

Haq R¹, Ngui A², Khera G³, Ngui D^{4,5}

¹University Of Western Australia, Perth, Australia, ²Vancouver College, Vancouver, Canada, ³UBC Faculty of Pharmaceutical Sciences, Vancouver, Canada, ⁴Fraser Street Medical, Vancouver, Canada, ⁵University of British Columbia, Vancouver, Canada

Background & Aim: Cardio-kidney-metabolic (CKM) conditions are prevalent, progressive, and often under-recognized in primary care, where fragmented disease silos and time constraints lead to missed opportunities for early intervention. These interconnected conditions contribute to morbidity, mortality, reduced quality of life, and rising health-care utilization. Gaps in disease awareness, laboratory monitoring, and guideline directed medical therapy (GDMT) further exacerbate adverse outcomes.

Methods: This quality improvement (QI) project evaluated the feasibility of a primary care, team-based, proactive electronic medical record (EMR) workflow incorporating recalls, chart review, and 1:1 visits to identify CKM care gaps and support GDMT optimization. Our initial three EMR recall queries by our pharmacist trainee identified 68 patients with potential CKM-related care gaps who were living with diabetes and obesity, chronic kidney disease (CKD), or congestive heart failure (CHF).

Results: A chart review by a physician resulted in 35 patients (51.5%) being appropriate for one-to-one visits, while 33 patients (48.5%) were excluded due to advanced age, limited prognosis, or significant comorbidity. Among eligible patients, 25 of 35 (71.4%) had overdue laboratory monitoring. Two patients were initiated on new cardiorenal protective GDMT, with additional patients' therapy starts following repeat laboratory testing, specialist input, or follow-up.

Discussion / Conclusion: EMR recalls efficiently identified a broad CKM population; however, clinician-led review was essential to ensure appropriate and patient-centred outreach in primary care. This population health approach enabled timely identification of monitoring and guideline-directed therapy care gaps. A team-based model represents a sustainable approach for CKM recalls, with the potential to engage patients and reduce downstream cardiovascular and renal events.

Community co-design: Developing digital resources to support type 2 diabetes medication use.

Lamev S¹, Harris K¹, McGough S¹

¹Diabetes WA, Perth, Australia

Background & Aim:

This project seeks to support type 2 diabetes self-management, through the development of community co-designed digital resources. The project involves the development of tailored digital resources to address barriers to diabetes medication use, with a focus on community led design, relevance, and accessibility for Australian communities.

Methods:

A national survey was conducted to explore barriers to medication use, and identified community preferences regarding the content, format, and delivery of digital resources. Throughout the resource development process, members of the survey cohort continued to be consulted to provide community-led solutions and feedback, enabling refinement of the resources and ensuring responsiveness to community needs and preferences.

Results:

Among 208 respondents, 28.3% responded that they did not consistently take their diabetes medication as prescribed. Common challenges included forgetting to take medication (45%), concerns about side effects and injectable therapies (64%), and poor mental health (45%). Participants expressed a strong preference for short, accessible video resources featuring people with lived experience of type 2 diabetes (75%), followed by self-paced online programs. These findings informed the development of the final resources, which were shaped through ongoing input and feedback from the community.

Discussion / Conclusion:

Following a community co-design process, two digital resources have been developed to address barriers to taking diabetes medication. These include a lived experience video focused on remembering to take medication as prescribed and an animated infographic addressing concerns about side effects. These resources provide accessible, relevant, and practical support for individuals experiencing challenges with taking medication.

From lived experience to animation: A creative resource empowering Culturally and Linguistically diverse (CALD) Australians living with type 2 diabetes to improve medication literacy.

Harris K¹, Lamev S¹, McGough S¹

¹Diabetes WA, Subiaco , Australia

Background & Aim:

Medication literacy in the type 2 diabetes (T2D) has been identified as a priority area to address the quality use of medicines in Australia, particularly in the Culturally and Linguistically Diverse (CaLD) community. A codesign process was undertaken with five language groups to elicit a deeper understanding of the practical and perceptual barriers to taking medications as prescribed. Insights were used to develop an accessible 'in language' digital resource aimed at reducing these barriers, increasing medication literacy and building confidence to discuss medications with health professionals.

Methods:

Fifteen 'in language' interviews were conducted across five language groups with interpreter support. Participants shared their lived experience, their understanding of diabetes, medications, and their comfort in communicating with healthcare providers.

These insights directly shaped the messaging, tone and structure of the digital resource, which after further consultation with community, was produced and translated into five languages.

Results:

Themes elicited from the interviews demonstrated limited understanding of how diabetes affects the body or how medications work. Other themes included rarely seeking medication clarification from health professionals and independently ceasing medications when experiencing uncertainty or side effects. Participants expressed a preference for an animated resource format, describing it as engaging and easy to understand.

The animation begins with a clear, foundational explanation of diabetes and uses co-designed analogies to convey how taking diabetes medications as prescribed assists with diabetes management. It reinforces that asking questions, raising concerns, and discussing medication alternatives with health professionals is an important aspect of diabetes self-care.

Discussion / Conclusion:

By validating lived experience in the context of culture and normalising questions, the resulting animation will engage more of the CALD community in diabetes self-care. It will give both CALD community and health professionals a tool to support more effective communication when discussing diabetes medications.

Improving inpatient ketone recognition using infection-control approved visual sticker prompts: A quality improvement initiative

Hatendi P¹

¹St John Of God Midland, Midland, Australia

Background & Aim: Delayed recognition of ketonaemia and diabetic ketoacidosis (DKA), including euglycaemic ketoacidosis, remains a significant inpatient safety risk. Increasing SGLT2 inhibitor use and variable staff familiarity with ketone thresholds increase the risk of delayed escalation and treatment. Incident reviews within our Australian hospital identified variability in ketone interpretation, escalation, and early management initiation. Contributing factors included cognitive load, time pressure, and lack of immediate point-of-care decision support for frontline staff.

Aim: To improve early identification and escalation of elevated ketones using infection

Control approved visual cue stickers placed at point-of-testing locations, and to evaluate impact on ketone related clinical incidents.

Methods: A nurse-led quality improvement initiative implemented Infection Prevention and Control approved stickers on glucometer boxes across inpatient wards. Stickers were colour coded to align with existing clinical escalation frameworks and included ketone interpretation ranges, escalation triggers, first-line management prompts, and safety alerts highlighting risk of euglycaemic ketoacidosis. Education was delivered through ward in-services and point-of-care reinforcement. Sustainability was supported through a governance process requiring wards ordering new blood glucose monitoring stations to contact the diabetes educator to ensure sticker application. Pre- and post-implementation data included ketone-related incident reports, escalation patterns, and staff feedback.

Results: Post-implementation data demonstrated reduced ketone-related incidents and improved escalation consistency. Staff reported improved confidence in ketone interpretation and escalation decision-making. The intervention was low cost, scalable, and required no additional staffing resources, utilising existing equipment infrastructure.

Disucssion/Conclusion: Conclusion

Point-of-care visual prompts improved early recognition and escalation of ketonaemia and euglycaemic ketoacidosis risk in the inpatient setting.

Impact Statement

A low-cost, scalable visual decision-support intervention improved ketone safety recognition while integrating into existing hospital workflows without additional staffing burden.

Lived Experiences of women and their partners on closed-loop insulin therapy during pregnancy with Type 1 Diabetes: A CIRCUIT-Australia Study Qualitative Analysis

Hicks R¹, Hirtle J⁴, Mathews K¹, Jani P¹, Hegde S¹, Feig D⁵, Donovan L⁴, Chaput K⁴, Simmons D^{1,2}, MacMillan F³

¹Western Sydney University, Campbelltown, Australia, ²Campbelltown and Camden Hospitals, Campbelltown, Australia, ³Office of Research, Enterprise and International, Western Sydney University, Penrith, Australia, ⁴University of Calgary, Calgary, Canada, ⁵University of Toronto, Toronto, Canada

Background: The CIRCUIT trial (one of only 3 large randomised controlled trials of automated insulin delivery in T1D pregnancy) investigated if closed-loop insulin delivery (CL) improves blood glucose, lessens diabetes self-management burden and results in healthier pregnancies/infants. We conducted a qualitative sub-study of Australian women and their partners' lived experiences with CL technology.

Aim: To assess lived experiences of Australian CIRCUIT participants with T1D and their partners, focusing on differences in experiences between control and intervention participants regarding their diabetes management, sleep, stress, and quality of life (QoL) during pregnancy.

Methods: All participants (N=11) from the Intervention (Tandem t:slim X2™ with Control-IQ™) and Control (Dexcom CGM with pre-enrolment insulin delivery method) groups and their partners were invited to share experiences via Zoom interviews using semi-structured questions (6/11 consented to participate). Interviews were recorded, transcribed verbatim, de-identified, and imported into NVivo for coding. Qualitative reflexive thematic analysis identified themes and sub-themes.

Results: 6 women and each of their partners (total 12) from the Australian sites participated (Intervention = 5, Control = 1). Key themes included reduced burden/diabetes distress, improved self-efficacy in diabetes management, improved sleep and overall QoL as a family post-delivery, and eagerness to continue CL or CGM post-delivery. Partner themes included feeling more confident supporting diabetes management as an equal contributor, reassurance, and less hypoglycaemia-related stress. In comparison to the women with diabetes, partners were stronger advocates for equitable access to technology and more vocal on QoL benefit for the family. Both groups identified cost as the main barrier to continued use but were eager to continue if accessible.

Conclusions: Australian participants and partners reported positive experiences with either CL therapy and CGM, including improved quality of life and reduced diabetes distress. These findings support prioritising equitable access to CL technology during and after T1D pregnancies nationally.

Improving education and access to diabetes therapies and technology in rural NSW: two-year outcomes from a multidisciplinary DREAM outreach service

Holters G¹, Raven L^{1,4}, Lenders N¹, Greenfield J^{1,2}, Viardot A¹, Christie A³

¹St Vincents Hospital Sydney, Darlinghurst, Australia, ²University of New South Wales, Kensington, Australia, ³Murrumbidgee Primary Health Network, Wagga Wagga, Australia, ⁴Garvan Institute of Medical Research, Darlinghurst, Australia

Background & Aim: Background: Rural Australians experience limited access to specialist diabetes therapies and technology despite national schemes to improve equity. The Diabetes Regional Education, Access and Management (DREAM) outreach service was established in 2024 to bring specialist care, education and device support into Murrumbidgee general practices. Aim: To evaluate two-year changes in access to specialist diabetes therapy and technology among patients attending a rural multidisciplinary outreach service

Methods: Initial outreach clinics were conducted at general practices in the Murrumbidgee. Participating practices were identified by utilising available data, health needs assessments, and local knowledge. An endocrinologist and credentialled diabetes nurse educator reviewed patients in conjunction with local general practitioners (GPs) and practice nurses. Follow-up telehealth clinics were conducted 6-months after the initial visit. De-identified service data were analysed for all patients seen from February 2024 to December 2025. Outcomes included initiation of glucagon-like peptide-1 receptor agonists (GLP-1 RAs), continuous glucose monitoring systems (CGMs) and insulin pump therapy. Education and upskilling activities for GPs and practice nurses were captured through case conferences and structured professional development training.

Results: Over two years, 313 patients with complex diabetes were reviewed. GLP-1 receptor agonists were initiated in 80 patients (26%), and 93 (30%) commenced continuous glucose monitoring. Insulin therapy was initiated or intensified in 50 patients (16%), and 7 (2%) commenced or upgraded insulin pump therapy. Importantly, insulin was reduced or ceased in 44 patients (14%). Multidisciplinary care included case conferences with 56 GPs and 23 practice nurses, and education attended by 111 health professionals.

Discussion/Conclusion: There was substantial scale-up of technology and contemporary pharmacotherapy access and education within a small rural region. A multidisciplinary outreach model embedded in general practice can meaningfully increase access to GLP-1 therapy and diabetes technology over two years while concurrently building local workforce capability and capacity.

Study on individualized intervention for community Type 2 Diabetes mellitus patients based on CGM data

Huang J¹, Sun X², Li C³, Zhang Y⁴, Xu R⁵

¹Second Xiang Ya Hospital of Central South University, Diabetes Nursing Committee of the Chinese Nursing Association, Changsha, China, ²Wuhan University Central South Hospital, Wuhan, China, ³Anhui Provincial Hospital, Changsha, China, ⁴Second Xiang Ya Hospital of Central South University, Changsha, China, ⁵Second Xiang Ya Hospital of Central South University, Changsha, China

Background & Aim: Diabetes management remains sub optimal in China. This study evaluated an individualized intervention based on continuous glucose monitoring (CGM) data for community type 2 diabetes mellitus (T2DM) patients.

Methods: A three-arm cluster randomized controlled trial was conducted with 125 T2DM patients. Participants were assigned to: Group A (conventional care + hospital CGM), Group B (conventional care + personal CGM), or Group C (Group B + multidisciplinary individualized intervention). The intervention lasted 12 weeks.

Results: Among 101 patients who completed the study, Group C showed a significantly greater reduction in HbA1c vs. Group A ($P=0.020$) and higher Time in Range (TIR) ($P=0.043$). Self-management improved, and diabetes-related distress and fear of hypoglycemia were reduced.

Discussion / Conclusion: CGM-driven individualized intervention effectively improves glycemic control, enhances self-management, and alleviates psychological burden in community T2DM patients, demonstrating promise for broader application.

Yarning for change: How DESY training is empowering Aboriginal health practitioners to deliver culturally meaningful diabetes self-management support in flexible ways.

Huet K¹, **Ledger D**¹

¹Diabeteswa, Subiaco, Australia

Background & Aim:

Diabetes Education and Self-Management Yarning (DESY) training was co-designed with Aboriginal Health Practitioners (AHPs) and the Aboriginal Health Council of WA (AHCWA), in response to community demand for culturally secure diabetes education. The training aims to increase diabetes knowledge, build practical, self-management support skills, and strengthen the confidence of AHPs to deliver DESY within their communities.

Methods:

Since 2021, forty AHPs from across Western Australia have completed DESY training. The training is delivered over five days, with opportunities to experience DESY as learners, observers and practice facilitating sessions with peers. It incorporates yarning style communication, culturally responsive behaviour change strategies, and practical diabetes education tools. It draws on the real-world experiences of AHPs who have delivered DESY in their communities.

Results:

Thirty seven of forty trainees (93%) rated the training highly, giving it a net promoter score of 87, indicating they would highly recommend it to others. Trainees reported that the yarning approach created an engaging and culturally safe learning environment. Trainee feedback included:

- “It is so much more than diabetes—amazing skills and tools to support our mob.”
- “The learning style enables clients to join in at their own pace with constant encouragement.”

Discussion & Conclusion:

DESY training has equipped AHPs with the knowledge, skills, and confidence to deliver diabetes education and self-management support in flexible, culturally meaningful ways. AHPs are implementing DESY as community programs, individual topic specific sessions, and integrating DESY tools into clinic appointments. Resources such as the Health Profile are used to illustrate diabetes status, while the Action Plan supports collaborative goal setting.

Strong uptake and consistently positive feedback highlight the value of culturally grounded diabetes education that empowers AHPs and strengthen community led chronic disease care. A key lesson learned is the importance of flexibility rather than adhering to a rigid curriculum.

Evaluating The Utility of Point-of-Care HbA1c Testing in Specialist Diabetes Clinics: A Literature Review

Iddawela I¹, Baqar S^{1,2}, Ekinici E^{1,2}, Seah J¹

¹The University Of Melbourne, Melbourne, Australia, ²Austin Hospital, Heidelberg, Australia

Background & Aim:

Point of care testing (POCT) of HbA1c is an evolving area of diabetes management, with current evidence suggesting that significant improvements to patient care may be derived from bypassing delays involved in laboratory testing. The immediate feedback of HbA1c POCT has been demonstrated to improve efficiency, accessibility and patient engagement in diabetes management. Existing studies support the value of POCT in primary care and screening settings, with evidence of improved glycaemic control. However, evidence exploring POCT implementation in secondary care (specialised outpatient clinics) remains limited. This review aims to evaluate existing evidence on HbA1c POCT and its impact on glycaemic control and patient satisfaction from a secondary care perspective, to determine its potential utility and inform future implementation.

Methods:

A systematic search of the electronic databases Medline, Embase and PubMed was conducted using MeSH and keywords. Studies examining the impact of HbA1c POCT on glycaemic control or diabetes management for patients with diabetes mellitus were included.

Results:

Evidence from 20 studies demonstrated that the data is largely in favour of HbA1c POCT, and its contribution to diabetes management through achieving improved glycaemic control, therapeutic adjustment and patient engagement compared to laboratory testing. Out of the 14 studies directly analysing HbA1c trends post POCT implementation, 12 demonstrated a statistically significant improvement in HbA1c attributable to POCT, with particular benefit seen in patients with HbA1c > 8%. The remaining 2 studies commented that POCT must be evaluated within a holistic diabetes management program to determine its true effect.

Conclusion:

HbA1c POCT represents a promising model for enhancing diabetes care in secondary care settings. Immediate result feedback and therapeutic adjustment facilitate timely glycaemic control, whilst improving patient engagement. The significant benefit observed in patients with HbA1c > 8% — reflective of the more complex disease burden apparent in specialised clinics — suggests POCT implementation to be particularly promising in this population.

A proposed service model: The establishment of a nurse-led diabetes prevention service at Royal North Shore Hospital (RNSH)

Inglis S¹, Wu L¹, Bucholtz G¹, Glastras S¹

¹Royal North Shore Hospital, St Leonards, Australia

Background

One in six individuals in Australia over the age of 25 years has prediabetes and forecasts estimate that within the next 10 years, 40-50% will develop type 2 diabetes (T2DM). Evidence demonstrates that structured lifestyle intervention for pre-diabetes can reduce progression to T2DM by up to 58% with two key changes ie by 1. achieving > 7% weight loss and 2. undertaking >150 minutes of physical activity per week. Higher risk individuals may also benefit from pharmacotherapy.

Aim

To improve early detection of T2DM and prediabetes and implement a lifestyle intervention that includes a structured nurse practitioner (NP) /transitional nurse practitioner (TNP) led diabetes prevention program targeting high risk individuals in hospital and primary care settings.

Method

This initiative will employ a 0.2FTE Endocrinologist and 1.0FTE NP/TNP for a four-year period to deliver a comprehensive prevention service. Key referral pathways include:

1. Inpatient and Emergency Department screening to increase opportunistic detection of pre-diabetes and T2DM
2. Structured post-partum referral for women with previous gestational diabetes
3. GP referrals through collaboration with the primary care diabetes steering group to enhance community-based risk identification.

Individuals diagnosed with pre-diabetes (HbA1c 5.7-6.4%) or an AUSDRISK score > 12 will be enrolled in a structured 8 week online program incorporating NP/TNP coordination, endocrinologist oversight and, dietitian developed resources and exercise guidance. Participants will be reviewed at 3, 6 and 12 months, including a review by an endocrinologist at 3-6 months for non-responders for potential pharmacotherapy intervention including GLP1/GIP commencement.

Results

Evaluation measures will include improvements in fasting glucose, HbA1c, blood pressure and weight, patient experience, sustainability and program acceptability.

Conclusion

This innovative nurse led prevention model aims to reduce the **incidence of diabetes in the population**, strengthen hospital and primary care integration by improved screening for pre-diabetes and showing an improvement in evaluation measures including reduction in weight, HbA1c and program acceptability.

Evaluation of C-LINK (case-based learning and interaction for knowledge) and D-MAP (diabetes mentorship and advancement program) education models for junior doctors in inpatient diabetes management

Iqbal F^{1,2}, Parameshwaran K¹, Chalak S¹, Ahmed H¹, Gamble J¹, Shi H¹, Moradi B¹, Cohen R¹, Alleyn R¹, Hicks R², Simmons D², Wong T¹, Abdo S^{1,2}

¹Bankstown-Lidcombe Hospital, Sydney, Australia, ²Western Sydney University, Sydney, Australia

Background & Aim: Inpatient diabetes management is a key area for improvement. This mixed methods pilot study evaluated two education models—C-LINK and D-MAP—on junior medical officers' (JMOs) knowledge and confidence. Data were collected across Terms 1–4.

Methods: JMOs rotating through Bankstown-Lidcombe Hospital in 2025 participated in C-LINK (structured group teaching), D-MAP (individual mentorship), or both. C-LINK was delivered during protected teaching in Terms 1 and 4 and comprised five weekly sessions for 30–50 JMOs. D-MAP involved fortnightly one-on-one mentorship with a consultant for up to six JMOs per term, recruited during clinical interactions. Participants completed a 10-domain knowledge quiz and confidence survey before and after the intervention. Distinct quizzes were used to minimise recall bias. Changes in quiz scores and survey results were analysed. Qualitative data were collected via Microsoft Forms interviews, with thematic analysis ongoing.

Results: 43 JMOs completed pre-intervention quizzes (C-LINK n=28, D-MAP n=15) and 34 completed post-intervention quizzes (C-LINK n=17, D-MAP n=17). Baseline knowledge scores were higher among D-MAP participants (mean 7.20 vs 5.29). Overall quiz scores changed minimally (C-LINK 5.29→5.53; D-MAP 7.20→7.06), with a small difference favouring C-LINK (+0.38). Domain-level analysis demonstrated improvements in several areas. In C-LINK, the largest gains were seen in peri-operative diabetes management (0.39→0.82) and initiating/titrating insulin (0.64→0.82). In D-MAP, improvements were observed in initiating/titrating insulin (0.60→0.94), HbA1c interpretation (0.47→0.71), and pump management (0.67→0.88). Self-reported confidence increased across most domains, particularly in hypoglycaemia management, hyperglycaemic emergency recognition, and insulin prescribing.

Discussion / Conclusion: Both C-LINK and D-MAP improved JMOs' confidence and domain-specific diabetes knowledge. Although overall quiz scores changed little, targeted improvements were seen in insulin prescribing, peri-operative diabetes management, and hypoglycaemia management. In this pilot cohort, knowledge gains were similar between models. Larger studies are needed to evaluate the impact of structured teaching and mentorship on inpatient diabetes capability among JMOs.

Support around diabetic ketoacidosis prevention and management for people with type 1 diabetes - a needs analysis

James S^{1,2,3}, Watts S⁴, Hatt A⁴, Gittens C⁴, Frakking T^{4,5}, James O⁶, Broadbent M⁷, Furlong K⁴, Perry L^{8,9}, Lowe J¹⁰, Clark S⁴

¹University Of The Sunshine Coast, Petrie, Australia, ²University of Melbourne, Parkville, Australia, ³Western Sydney University, Campbelltown, Australia, ⁴Caboolture Hospital, Caboolture, Australia, ⁵Griffith University, Southport, Australia, ⁶University of Queensland, St. Lucia, Australia, ⁷University of the Sunshine Coast, Sippy Downs, Australia, ⁸University of Technology Sydney, Ultimo, Australia, ⁹South-Eastern Sydney Local Health District, Randwick, Australia, ¹⁰University of Toronto, Toronto, Canada

Background and aim:

Australia has one of the highest rates of type 1 diabetes (T1D) worldwide. A previous study described patterns of presentation for diabetic ketoacidosis (DKA) in patients with T1D to Caboolture Hospital Emergency Department (ED) in Queensland, between 2015-2019. From an estimated local population of 317 people with T1D, over half (n=165, 52.1%) had an index ED presentation for DKA, over half of which (n=92, 55.8%) occurred outside usual business hours (9am-5pm).

Our study sought to explore perceived experiences and views of the support available to people with T1D for DKA prevention and management in Caboolture, and perceptions around service improvements.

Methods:

This was a concurrent mixed methods study: 1.) a survey of healthcare professionals (HCPs); 2.) semi-structured HCP interviews; and 3.) a survey of people with T1D (or carers). Advertisement involved electronic newsletters, posters and direct contact.

For surveys, variable relationships were examined using Fishers Exact, Chi-square or t-tests. Data from interviews were analysed using Gibbs thematic framework.

Results:

Study 1: 90 participants; nurses (64.4%) and physicians (23.3%) [overall mean±SD age=38.9±11.0years]. *Study 2:* 13 interviews (nurses [69.2%], physicians [23.1%], and a pharmacist [7.7%]). *Study 3:* 10 participants; 70% people with T1D and 30% carers [patient age=38.5±14.8years].

Collectively, findings indicate that both HCPs and people with T1D (or carers) overwhelmingly perceived the need for further support for people with T1D, which could be in the form of a designated video-conferencing portal or telephone support via a designated funded hotline.

Conclusion:

Study findings can help to inform development of evidence-based solutions that can be tested in later projects, with the aim of reducing DKA episodes (and subsequent ED presentations and hospital admissions).

The perceived support and technology-related knowledge needs in diabetic ketoacidosis of people living with type 1 diabetes, their family and healthcare professional carers

James S^{1,2,3}, Watts S⁴, Hatt A⁴, Gittens C⁴, Frakking T^{4,5}, Broadbent M⁶, Furlong K⁴, Perry L⁷, Lowe J⁸, James O⁹, Clark S⁴

¹University of the Sunshine Coast, Petrie, Australia, ²University of Melbourne, Parkville, Australia,

³Western Sydney University, Campbelltown, Australia, ⁴Caboolture Hospital, Caboolture, Australia,

⁵Griffith University, Southport, Australia, ⁶University of the Sunshine Coast, Sippy Downs, Australia,

⁷University of Technology Sydney, Ultimo, Australia, ⁸University of Toronto, Toronto, Canada,

⁹University of Queensland, St. Lucia, Australia

Background and aim

Australia has among the highest global rates of type 1 diabetes (T1D), increasing vulnerability to diabetic ketoacidosis (DKA). This study aimed to 1) identify the perceived support needs of people with T1D and their carers for avoiding and managing DKA, and 2) examine the diabetes technology-related knowledge needs of healthcare professionals involved in DKA care.

Methods

A two-phase mixed-methods study was conducted using anonymous Qualtrics™ surveys. Phase One recruited people with T1D presenting to the study hospital, and carers, identified through daily clinical information system review and hospital-wide advertisements. Phase Two recruited healthcare professionals from the Emergency Department and broader care continuum with experience managing DKA, identified by clinical leads. Quantitative data were analysed using chi-square, Fisher's exact tests, and t-tests. Qualitative responses were analysed thematically using Gibb's reflective framework.

Results

Phase One yielded 38 responses (68.4% from people with T1D; mean±SD age 44.5±22.3 years; T1D duration 19.0±15.4 years). Phase Two produced 51 healthcare professional responses (62.7% nurses, 23.5% doctors; mean±SD age 39.7±11.2 years; professional experience 12.9±11.4 years; T1D care experience 10.1±9.6 years). Across both phases, findings converged to show substantial perceived gaps in DKA-related support, including difficulties recognising early deterioration, limited access to timely advice, and uncertainty in navigating technology-assisted management. Healthcare professionals reported significant needs for further training in diabetes technologies, including insulin pumps, continuous glucose monitoring, and sick-day adjustment protocols.

Conclusion

This study demonstrates that both people with T1D and their carers perceive unmet needs in support for DKA prevention and management, while healthcare professionals identify important knowledge gaps related to diabetes technologies. Addressing these issues through targeted education, improved clinical pathways, and strengthened communication across the care continuum may enhance early recognition and management of DKA, and reduce preventable acute presentations.

Determinants of health-related quality of life among people living with type 1 Diabetes in a resource limited setting: A Multicentre Study in Sri Lanka

Jayawickreme K^{1,2}, Gunathilake S², Subasinghe C³, Garusinghe C⁴, Arambewela M^{5,6}

¹Royal North Shore Hospital, Sydney, Australia, ²National Hospital Kandy, Kandy, Sri Lanka, ³Colombo North Teaching Hospital, Ragama, Sri Lanka, ⁴Colombo South Teaching Hospital, Kalubowila, Sri Lanka, ⁵University of Sri Jayawardenepura, , Sri Lanka, ⁶Royal Darwin Hospital, Darwin, Australia

Background

Assessing health-related quality of life (HRQoL) in people with type-1-diabetes (T1D), in resource-limited settings like Sri Lanka, is important in improving diabetes care.

Methods

Among patients in the database for young onset diabetes in Sri Lanka (DYOD-SL), 300 patients aged 16 years and above were randomly selected, HRQoL was assessed using the culturally adapted and validated Sinhala language version of the ViDa1 questionnaire, which generates a total HRQoL score and subscale scores for interference with life (INF), self-care (SLF), wellbeing (WLB), and worry about disease (WOR). Higher scores indicate poorer HRQoL.

Results

The median age of the cohort was 26 years (IQR 8). The median total HRQoL score of the cohort was 84 (IQR 18) [moderate]. On subgroup assessment, median score for INF was 28 (IQR 10) [mild effect], SLF24 (IQR 5) [mild], WLB 13 (IQR 5) [mild], and WOR and 19 (IQR 2) [severe] Increasing age ($p=0.001$) and duration of T1D ($p=0.006$) was positively correlated with total HRQoL score. Age at diagnosis was not associated with HRQoL. Unemployed individuals had higher median HRQoL score than those who were schooling ($p=0.049$) and engaged in higher education ($p=0.025$). Individuals practicing carbohydrate counting and insulin titration had lower median HRQoL score than those who did not ($p=0.010$). Total daily dose of insulin positively correlated with HRQoL score ($p=0.007$). Those who had mild total HRQoL scores had a higher median frequency of self-monitoring of capillary blood glucose (SMBG) per week than those who had moderate total HRQoL scores ($p=0.046$). HbA1c showed no correlation with HRQoL.

Conclusion

Older age, longer duration of T1D, unemployment and high insulin dose requirement were associated with adverse HRQoL, while carbohydrate counting, insulin titration and frequent SMBG were associated with better HRQoL. We anticipate that current ongoing initiatives to improve patient management will lead to enhanced HRQoL in this population.

Usability, psychological mechanisms, and behavioral barriers in a digital self-management support system for Type 2 diabetes: A multicenter mixed-methods study

Jiang X¹, Zhou Q¹, Lin Y², Ye C¹, Yan Y¹, Wu V³

¹Hainan Medical University, Haikou, China, ²The Second Affiliated Hospital of Hainan Medical University, Haikou, China, ³National University of Singapore, Singapore, Singapore

Background & Aim: Digital self-management technologies offer scalable potential to improve outcomes in type 2 diabetes, while the psychological and behavioral mechanisms shaping usability and medium-term adoption remain insufficiently understood. This study is aim to evaluate the real-world usability of Digital Self-Management Support System (DiSMAS), identify psychological mechanisms and behavioral barriers influencing patient engagement, and inform system optimization.

Methods: We conducted a multicenter mixed-methods study from April to August 2025 across four tertiary hospitals in Haikou, China. Adults with type 2 diabetes who had used DiSMAS for at least six months (n = 282) completed the Post-Study System Usability Questionnaire (PSSUQ). A purposive subsample (n = 26) participated in semi-structured interviews. Quantitative usability outcomes were summarized descriptively, and qualitative data were analyzed using reflexive thematic analysis to generate theory-informed explanatory themes.

Results: Perceived usability was high (mean PSSUQ score: 82.87 ± 6.59), with all subscale scores exceeding established benchmarks for system quality and user satisfaction. Three themes were identified: (1) perceived system usability and value, (2) facilitators and barriers to sustained engagement, and (3) user-identified needs for system optimization. Engagement was facilitated by trust in professional information sources, encouraging feedback, and social reference, whereas continued use was limited by competing responsibilities and time constraints, financial and practical concerns, and cognitive, technical or privacy-related challenges. Participants highlighted the need for dynamically updated, stage-appropriate content, clearer information presentation, improved system stability, expanded functionality, and broader service support to enhance long-term use.

Discussion / Conclusion: DiSMAS demonstrated good usability and user acceptance in routine clinical care. This study shows that sustained engagement with digital self-management tools is influenced not only by technological usability but also by patients' psychological experiences and everyday life constraints. These findings provide practical guidance for optimizing digital self-management systems to support more durable and patient-centered chronic disease management.

From crisis to control: DE-led 12-month pathway for a young adult with T1D, intellectual disability, and recurrent DKA (single-case improvement evaluation)

Jones H¹

¹Austin Health, Ivanhoe, Australia

Background & Aim:

Young adults living with type 1 diabetes (T1D) who also experience cognitive or psychosocial complexity commonly present with highly unstable glycaemia and frequent diabetic ketoacidosis (DKA). Engagement with traditional clinic-based models is often inconsistent, leading to repeated episodes of acute metabolic decompensation. This case describes a 19-year-old young adult with T1D, diagnosed at age 14, who also has an intellectual disability (IQ 58) and is a new parent. At intake to the Young Adult Diabetes Service (YADS), the patient demonstrated extreme dysglycaemia with CGM Time-in-Range (TIR) 0%, Very High 97%, estimated GMI ~12.3%, and three DKA events across January–May 2025. The aim of this evaluation was to examine the impact of a structured, diabetes-educator-led (DE-led) 12-month pathway on glycaemia, engagement, and safety.

Methods:

A single-case service-improvement design was used within YADS. The intervention consisted of weekly DE phone contact for 12 months, supplemented by two-monthly team reviews and ad-hoc endocrinology registrar input for safety concerns. Education focused on sick-day management, ketone management, insulin adjustment, and CGM interpretation. Data included CGM summaries (Dexcom/Glooko), pump downloads, and clinical documentation. The patient transitioned to YpsoPump on 16 February 2026.

Results:

Substantial glycaemic improvement occurred from baseline to pump start and through to current data (March 2026). TIR increased from 0% to 75%, with Very High glucose decreasing from 97% to 1%. No further DKA episodes occurred following early 2025, with one self-initiated ED presentation for illness in October 2025. Pump therapy resulted in a physiological insulin distribution (60% basal / 40% bolus) and improved bolus consistency.

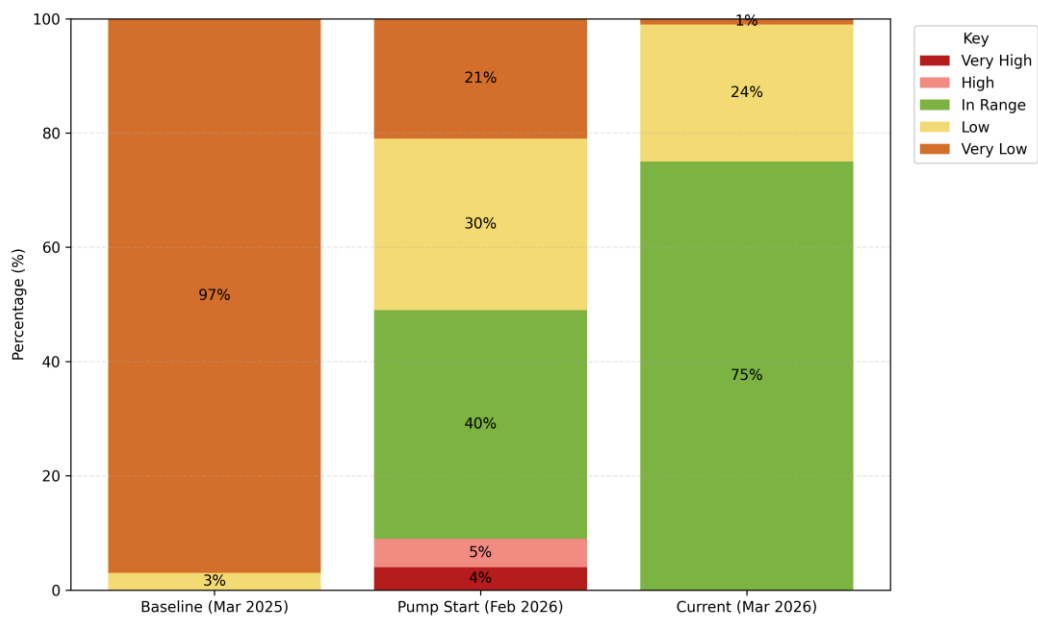


Figure 1. CGM distribution across time points.

Conclusion:

A high-frequency DE-led model supported significant stabilization of glycaemia, reduced acute presentations, and improved self-management behaviours in a young adult with cognitive vulnerability. Findings highlight the potential of proactive outreach and flexible pump pathways for complex young adults.

Evaluation of a Dietetic Diabetes in Pregnancy (DDIP) Clinic in Australia: A retrospective audit comparing patient characteristics and management with national benchmarks.

Kahkonen L¹

¹Northern Health, Melbourne, Australia

Background & Aim:

Diabetes in pregnancy is increasingly prevalent and associated with adverse maternal and neonatal outcomes. In Australia, it affects 18% of pregnancies. At a metropolitan hospital in Melbourne, Victoria, Australia, prevalence reached 25.1% of births - over 7% higher than the national rate. This disparity suggests a potentially higher-risk patient population and increased demand on specialised services. Evaluating the DDIP clinic is critical to better understand patient characteristics, assess management practices, service and demands to inform targeted quality improvement and optimise clinic care.

Aim: To compare patient characteristics and management in the DDIP clinic with national benchmarks to identify priorities for quality improvement and service optimisation.

Methods:

A retrospective audit of clinic activity over a one-month period was conducted using the patient management system to identify all bookings (n=125) in the DDIP clinic. Demographic and clinical data were extracted from electronic medical records, de-identified, recorded and consolidated in Excel by a single dietitian.

Results:

Women with Gestational Diabetes Mellitus (GDM) (n=116):

- More than double the national rate of previous GDM: 46% vs 21%
- Increased dietetic support with previous GDM: 65% vs 35% required ≥ 4 visits.
- Nearly double the national rate of insulin use: 74% vs 40%.
- Increased dietetic support with insulin: ≥ 3 dietitian visits were required in 41% of insulin-managed patients vs 15% with lifestyle management.
- Early diagnosis (57% diagnosed ≤ 24 weeks) more likely required insulin: 79%.
- Language disparity: 10.4% required an interpreter. Of these, 92% required insulin compared with 62% of English-speaking women.

Discussion / Conclusion:

Women attending the DDIP clinic have higher rates of previous GDM and insulin use compared with national benchmarks, reflecting a more complex patient cohort and increased dietetic service demand. These findings support targeted service planning, resource allocation, and optimisation of care to improve service efficiency and patient care.

Post-Discharge telehealth insulin stabilisation program: Impact on glycaemic profiles and hospital readmission rates, and predictors of success

Kang R¹, Clifford L¹, Kim A¹, Do K², Fenton B¹, Snape L¹, Layton M¹, Joshi T^{1,3}

¹Department of Endocrinology, Gosford Hospital, Central Coast Local Health District, Gosford, Australia, ²Diabetes and Endocrine Service, Liverpool Hospital, South Western Sydney Local Health District, Liverpool, Australia, ³University of Newcastle, Newcastle, Australia

Background & Aim

The post-discharge period is high-risk for patients with diabetes, with hypoglycaemia rates approaching 20% within two weeks and 30-day readmission rates exceeding 30%. While telehealth interventions show promise, data identifying which patients benefit most remains limited. The Central Coast Endocrine Department's Insulin Stabilisation Program (ISP) provides twice-weekly phone consultations over 2–4 weeks post-discharge to optimise insulin regimens. We aimed to evaluate the ISP's impact on glycaemic profiles and hospital readmissions, and identify predictors of program success.

Methods

A retrospective cohort study of 297 ISP participants in 2024 included patients new to insulin, newly diagnosed, with labile glucose, or changed regimens. Primary outcomes were HbA1c change, hypoglycaemic events, and hospital representations. Logistic regression identified outcome predictors.

Results

Participants (mean age 60.4±17.1 years) had predominantly type 2 diabetes (78.1%). Mean HbA1c decreased from 10.59±2.60% to 8.13±2.00% (mean difference 2.46%, 95% CI 1.91–3.01, $p<0.001$). Median hypoglycaemic events were zero (71.5% experienced none). Hospital representations occurred in 60.6% overall but only 7.1% were glycemia-related. Insulin-naïve patients had six-fold higher odds of achieving ≥1% HbA1c reduction (OR 6.02, 95% CI 2.29–19.02, $p<0.001$). First-time ISP participation was protective against hospital representation (OR 0.25, 95% CI 0.09–0.58, $p<0.001$). Type 1 diabetes predicted hypoglycaemia (OR 5.94, 95% CI 3.12–11.65, $p<0.001$).

Discussion/Conclusion

The ISP achieved clinically significant HbA1c reduction (2.46%) with minimal hypoglycaemia, representing an effective and safe model of care. Insulin-naïve patients and first-time participants demonstrated superior outcomes, providing evidence-based guidance for patient selection. Telehealth insulin stabilisation programs should prioritise these groups while developing alternative pathways for repeat enrollees.

Combined effects of post-meal exercise and time-restricted eating on appetite sensations in adults with type 2 diabetes: secondary outcomes from a randomised controlled trial

Khodabandeh S¹, Bravo-Garcia A¹, Radford B¹, Hall R¹, Broome S¹, Tee N¹, Arthur B¹, Janssens K¹, Johnston R^{2,3,4}, Devlin B⁵, Hawley J^{1,6}, Parr E¹

¹Centre for Human Metabolism and Performance, Mary MacKillop Institute for Health Research, Australian Catholic University (ACU), Melbourne, Australia, ²Sports Performance, Recovery, Injury and New Technologies (SPRINT) Research Centre, Australian Catholic University (ACU), Melbourne, Australia, ³School of Behavioural and Health Sciences, Australian Catholic University (ACU), Brisbane, Australian, ⁴Carnegie Applied Rugby Research (CARR) Centre, Carnegie School of Sport, Leeds Beckett University, Leeds, United Kingdom, ⁵School of Human Movement and Nutrition Sciences, University of Queensland, St Lucia, Australian, ⁶Department of Sport and Exercise Sciences, Manchester Metropolitan University Institute of Sport, Manchester, United Kingdom

Background & Aim: Type 2 diabetes (T2D) is associated with altered appetite regulation, including appetite parameters and appetite sensations. Both exercise and time-restricted eating (TRE) independently improve appetite regulation. However, the combined effects of these two interventions on appetite regulation in adults with T2D remain unclear. We examined how TRE, post-meal exercise, and their combination influence appetite sensations in adults with T2D.

Method: Fourteen adults with T2D (5 F, 9 M, Hb1Ac: 7.6±1.0%, BMI: 32.6±4.9 kg/m²) completed four conditions in a randomised crossover design: (1) a 12-h eating window (CON; meals 0800, 1400, 2000 h), (2) CON plus 15-min of post-meal exercise (CON+EX), (3) an 8-h eating window (TRE; meals at 1000, 1400, 1800 h), and (4) TRE plus 15-min of post-meal exercise (TRE+EX). Appetite sensations (hunger, desire to eat, satisfaction, and fullness) were assessed every 2-h from 0800 to 2200 h and the next morning (0800 h) using validated visual analogue scales (VAS). Overall appetite was derived by averaging the four measures at each time point, reversing both satisfaction and fullness. Data were analysed using linear mixed models, with statistical significance set at $p < 0.05$.

Results: There was no main effect of condition on appetite sensations ($p = 0.23$). An interaction effect was observed ($p < 0.001$), where at 1000 h overall appetite scores were higher in TRE and TRE+EX, who were still fasting, compared with CON ($\Delta = 37$ mm, $p < 0.001$; $\Delta = 34$ mm, $p < 0.001$; respectively) and CON+EX ($\Delta = 39$ mm, $p < 0.001$; $\Delta = 35$ mm, $p < 0.001$; respectively), who were postprandial. A similar effect was seen at 2000 h, appetite scores were higher in CON and CON+EX before dinner compared with TRE ($\Delta = 43$ mm, $p < 0.001$; $\Delta = 31$ mm, $p < 0.001$; respectively) and TRE+EX ($\Delta = 42$ mm, $p < 0.001$; $\Delta = 30$ mm, $p < 0.001$; respectively) who were postprandial.

Conclusion: TRE, post-meal exercise, and their combination produced expected timing-related appetite responses, with higher overall appetite scores before meals and lower in the postprandial periods.

Effectiveness of intermittent real-time continuous glucose monitoring on glycemic and psychological outcomes in people with Type 1 Diabetes

Yeh K¹, Cho C²

¹Nursing Department, Taoyuan General Hospital, Ministry of Health and Welfare, Taoyuan, Taoyuan City, Taiwan, ²Department of Pediatric Endocrinology, Taoyuan General Hospital, Ministry of Health and Welfare, Taoyuan, Taiwan, Taoyuan City, Taiwan

Objectives

To evaluate the effectiveness of intermittent real-time continuous glucose monitoring (rt-CGM) combined with structured hypoglycemia problem-solving education on glycemic control and psychological outcomes in people with type 1 diabetes mellitus (T1DM).

Methods

A quasi-experimental design with purposive sampling was applied. Participants were people with T1DM from a regional hospital who had never used continuous glucose monitoring. Thirty-three patients were enrolled, and 27 completed two rounds of rt-CGM follow-up. The intervention was delivered by an interdisciplinary team and included structured hypoglycemia problem-solving education and telecare support. rt-CGM was applied at baseline and after the educational intervention. Outcomes were assessed at baseline, 3 months, and 6 months, including glycated hemoglobin (HbA1c), fasting plasma glucose (FPG), and ambulatory glucose profile (AGP) metrics: time in range (TIR, 70–180 mg/dL), time below range (TBR1, 54–70 mg/dL and TBR2, <54 mg/dL), and time above range (TAR1, 180–250 mg/dL and TAR2, >250 mg/dL). Hypoglycemia problem-solving ability and diabetes distress were also evaluated.

Results

HbA1c significantly improved at both 3 and 6 months after the intervention ($p = 0.0287$; $p = 0.0033$). The second rt-CGM assessment demonstrated a significant increase in TIR ($p = 0.008$), while TAR1 and TBR1 decreased significantly across all phases ($p < 0.05$). No emergency department visits or hospitalizations occurred during the study period. In addition, participants showed significant improvements in hypoglycemia problem-solving ability ($p = 0.027$) and significant reductions in diabetes-related psychological distress ($p = 0.019$).

Conclusions

Intermittent application of rt-CGM combined with structured education can improve glycemic control and enhance T1DM ability to interpret glucose data and manage hypoglycemia.

Co-designing diabetes care for adults living with Cystic Fibrosis: Aligning consumer and clinician priorities

Kumar S^{1,2}, Moore V¹, Smith D^{1,2}, Matson A¹

¹Adult Cystic Fibrosis Centre, The Prince Charles Hospital, Metro North, Queensland Health, Chermside, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, St Lucia, Australia

Background & Aim:

With the introduction of cystic fibrosis (CF) modulator therapies, adults with CF are living longer and CF-related diabetes is expected to increase in prevalence. Services caring for this population are being forced to adapt. The aim of this study was to co-design and implement a nested CF-diabetes service within a large adult CF centre and ensure alignment of priorities between consumers and pre-existing CF multi-disciplinary team (MDT) members to guide service design for CF-diabetes prevention and management.

Methods:

A prospective quality improvement initiative using mixed methods implementation science ((Project ID: 103775; EX/2023/MNHB/103775) at the Adult CF Centre, Prince Charles Hospital, Queensland, Australia. Adults attending the service were invited to complete an anonymous online survey with items informed by Consolidated Framework for Implementation Research. In parallel, an MDT survey was distributed. Findings were fed back iteratively to end-users, followed by facilitated state/future workshops to co-design referral pathways, workflows and role clarity for integrated diabetes care.

Results:

19% of adults (71/365) attending our centre attempted the survey with 68 completed. Leading consumer diabetes priorities were i) access to diabetes technology notably CGM (49%), ii) practical education on lifestyle optimisations (13%) and mental health support for diabetes distress (13%). 24 MDT members responded with strong alignment to consumer priorities. Operationally, MDT reported high confidence in feasibility and integration, while highlighting the need to refine referral processes and address clinic space constraints.

Discussion / Conclusion:

Co-design with consumers and MDT end-users identified three diabetes-specific priorities of improving CGM access, tailored education and diabetes-distress support. These were translated into actionable service components i) investigator-initiated study evaluating CGM in CF-diabetes, ii) co-consultations and case conferencing between endocrinology and diabetes education, dietitian, physiotherapy and iii) psychology. These findings support a scalable framework for redesigning CF-diabetes care.

Two-year diabetes service activity evaluation for the Central Food Hub: a virtual multidisciplinary model-of-care for adults living with diabetes-related foot disease in Central Queensland

Kumar S^{1,2}, Cawte A¹, and The Central Foot Hub and Partners¹
¹Queensland Health, Brisbane, Australia, ²University of Queensland, St Lucia, Australia

Background

Central Foot Hub (CFH) operationalised in February 2024 provides virtual-local integrated multidisciplinary team (MDT) services from Royal Brisbane & Women’s Hospital to three hospital and health services (HHS) across Central Queensland. The model-of-care aims to improve outcomes for adults with diabetes-related foot disease (DFD) by combining specialist input (endocrinology, vascular surgery, infectious disease) and allied health (diabetes education, dietetics, podiatry, psychology, health workers). Our aim was to evaluate service activity for diabetes care.

Methods

CFH-MDT composition evolved over time. Service activity (excluding Vascular Surgery) was analysed 2-years post-operationalisation. All outputs were extracted from Power BI clinical activity dashboard.

Results

412 CFH referrals were received since operationalisation, of whom 40 (9.7%) identified as Indigenous. Majority were male (71%) with mean age of 66.9years. Most referrals originated from Wide Bay HHS. Endocrinology and Diabetes Education/Dietetics delivered 952 service events with low failure to attend rates, providing a high level of clinical contribution that was disproportionate to their allocated Full-Time Equivalent (FTE) resources within the CFH model-of-care.

Conclusion

Endocrinology and Diabetes Education/Dietetics were high-volume virtual service providers delivering disproportionately large proportion of clinical care relative to FTE. Sustainability of CFH requires aligning FTE across MDT disciplines with service activity.

Discipline	FTE	Commenced	Concluded	Service Duration (years)	Service Events (total)	Average service events per 0.1 FTE	FTA
MDT Case Conferencing	n/a	February 2024	Current	2.0	532	n/a	n/a
Endocrinology	0.3	February 2024	Current	2.0	518	2.0	16.9%
Diabetes Education	0.6	January 2025	Current	1.1	434	1.4	16.5%
Podiatry	3.0	February 2024	Current	2.0	217	0.08	0.91%
Psychology	0.5	March 2024	October 2025	1.6	139	0.37	17.3%
Social Work	0.2	November 2024	June 2025	0.5	79	1.68	15.9%
Infectious disease	0.2	April 2025	Current	0.8	10	0.13	0%

Racing for awareness: An "Amazing Race" sport challenge as an indirect tool for diabetes education among youth

Kurniawan R^{1,2}, Machrosin M¹, Romadlon D³, Tricaesario C^{1,4}, Yuliana S^{1,5}

¹Sobat Diabet Community, Jakarta Pusat, Indonesia, ²Diabetes Connection Care, Eka Hospital, Bumi Serpong Damai, South Tangerang, Indonesia, ³Faculty of Nursing, Chulalongkorn University, Bangkok, Thailand, ⁴Internal Medicine Department, Faculty of Medicine, Universitas Indonesia, Jakarta Pusat, Indonesia, ⁵Faculty of Design, Pelita Harapan University, Tangerang, Indonesia

Background & Aim:

Diabetes is increasingly affecting younger populations, underscoring the need for innovative preventive education strategies. Engaging youth in meaningful health promotion remains challenging. This study evaluated an "Amazing Race", inspired sport challenge as an indirect, gamified approach to diabetes education among young adults.

Methods:

A quasi-experimental study was conducted among 48 participants aged 18–35 years. Teams of three completed multiple challenge stations within a 5-km radius, integrating physical activity, problem-solving tasks, and embedded diabetes education (nutrition literacy, lifestyle modification, risk awareness, and prevention). Engagement and acceptability were assessed through structured feedback.

Results:

Diabetes knowledge, measured using the Diabetes Knowledge Questionnaire, significantly improved from 62.4 ± 10.8 to 81.7 ± 9.5 ($p < 0.001$). Participants also reported stronger intention to adopt healthier lifestyles, improved teamwork, and better understanding of preventive concepts.

Discussion / Conclusion:

Gamified, sport-based experiential learning is a promising strategy to enhance youth engagement in diabetes prevention. By integrating movement, teamwork, and education, this scalable model supports knowledge acquisition and behavioral motivation in community settings.

Knowledge and practices of physicians in the management of diabetes among Muslim Filipinos during Ramadan fasting in the Philippines

Labbay S¹, JIMENO C¹, FOJAS M¹, LUSICA P¹, PEREZ C¹

¹Philippine General Hospital, Manila City, Philippines

Background & Aim: Ramadan fasting is a significant religious practice observed by Muslims worldwide, including individuals living with diabetes. Despite potential health risks, many patients continue to fast, often without adequate medical guidance. Physician awareness and management strategies are key to optimize diabetes care during this period, however, local Philippine data remain limited. This study assessed physicians' knowledge and clinical practice on diabetes and Ramadan fasting among Muslim Filipinos.

Methods:

A cross-sectional analytical study was conducted in two phases: (1) questionnaire validation and (2) its subsequent administration. Data were obtained via a self-administered, expert-validated online questionnaire disseminated nationwide through digital platforms to recruit physicians across the Philippines. Descriptive statistics summarized participant characteristics, and inferential analyses examined associations between participant variables with knowledge scores and clinical practice.

Results:

A total of 196 physicians participated (median age 33.7 years). Most were females (58.7%), non-Muslim (62.8%), internists (50.0%), in the first 5 years of practice (59.7%), and working in public hospitals in Mindanao. The mean composite knowledge score was 56.3% (SD 14.8), with 52.0 % of participants scoring below this value. Higher scores were observed in cultural/religious considerations and technology/monitoring (median 75%), while lower scores (median 50%) were noted in pre-Ramadan risk stratification, nutrition and lifestyle, and management of special populations and emergencies. Muslims scored higher than non-Muslim physicians (58.99% vs 54.76%, $p=0.038$). Religion as the only sociodemographic factor significantly associated with knowledge. In multivariable analysis, non-Muslim status remained independently associated with lower knowledge scores ($\beta -6.997$, $p=0.015$). Clinical practices were heterogeneous and often suboptimal. More consistent Ramadan-specific practices were seen among internists and endocrinologists.

Discussion / Conclusion:

Physicians demonstrated moderate knowledge but significant gaps in key areas of Ramadan-focused diabetes care with clinical practices inconsistently applied. Targeted, guideline-based educational interventions are needed to enhance culturally sensitive and evidence-based diabetes care for Muslim Filipinos who fast during Ramadan.

Improving access to Diabetes technology through a Specialized clinic: An experience from a University Hospital in Bangkok, Thailand

Laichuthai N¹, Jitchana J¹

¹King Chulalongkorn Memorial Hospital, Bangkok, Thailand

Background & Aim: Diabetes technology is the standard of care for people with Type 1 Diabetes (T1D). Thailand introduced the CGM reimbursement program under the Universal Coverage Health Care Scheme, yet uptake remains slow due to limited skilled diabetes care teams and lack of specialized infrastructure for technology support. This study aims to evaluate the implementation and impact of a structured program and workflow to enhance service delivery and access to technology.

Methods:

Our center established the Advanced Diabetes Clinic (ADM), focused on adults using CGM and automated insulin delivery (AID) systems. The clinic provided a specific care model and dedicated consultation time by staff experienced in diabetes technology.

Outreach efforts targeted all people with T1D in the adult endocrinology clinic, providing information on diabetes technology. Staff training and optimized clinical workflows were implemented. A support program with charitable funding was initiated for those needing CGM but unable to afford it. Data on CGM access, hypoglycemia (Time Below Range (TBR), severe hypoglycemia) were retrospectively collected from people with T1D enrolled in this clinic.

Results: Of 120 adults with T1D at our center, from 2023 to 2025, CGM access increased significantly from 44.1% in 2023 to 68.3% in 2024 and further to 90.5% in 2025. Hypoglycemia incidents significantly improved in CGM users; 46.3% in 2024 and further to 89.5% in 2025, with most showing decreased time below range (TBR). Over 90% of patients reported reduced diabetes distress and enhanced quality of life.

Conclusion: A structured clinic specializing in diabetes technology significantly promotes access and improves care during the early phase of technology implementation. Broader adoption of technology is expected, necessitating integration into general services beyond specialized diabetes care. Ensuring access through patient programs and reimbursement is crucial.

Workforce instability as a barrier to Type 1 Diabetes care in remote settings

Lamech H¹

¹Healthy Living NT- Alice Springs, Alice Springs, Australia

Background and Aim

People living with type 1 diabetes in remote and very remote settings face ongoing challenges accessing consistent, specialist-informed care. Workforce instability and reliance on short-term staffing models contribute to fragmented care and inequitable outcomes. This work aims to describe workforce-related barriers impacting continuity, trust, and diabetes technology support for people living with type 1 diabetes in remote settings, informed by extensive clinical practice.

Methods

This work is informed by longitudinal clinical experience supporting over 100 people living with type 1 diabetes in remote and regional settings to commence and manage insulin pump therapy and continuous glucose monitoring. Practice-based observations were used to identify recurring workforce and system-level barriers affecting care delivery.

Results

Key Issues Identified

- Heavy reliance on fly-in fly-out (FIFO) clinicians on short-term contracts, including endocrinology services
- Limited opportunity for clinicians to build therapeutic relationships and cultural understanding
- High staff turnover leading to repeated loss of trust and care disruption
- Variable clinician confidence and experience with insulin pumps and continuous glucose monitoring
- Loss of expertise when upskilled clinicians leave, limiting sustainable capacity building

Conclusion

Short-term workforce models undermine continuity of care and effective technology support for people living with type 1 diabetes. Sustainable improvements require long-term workforce investment, relationship-based models of care, and retention of diabetes technology expertise within remote health services.

Evaluating a dual diabetes educator and dietitian model in tertiary paediatric diabetes care: Workforce and quality improvement initiative

Laroiya M¹

¹Queensland Children's Hospital, South Brisbane, Australia

Background & Aim:

Paediatric diabetes management requires coordinated medical nutrition therapy and structured diabetes self-management education. In tertiary paediatric services, increasing clinical complexity associated with Type 1 Diabetes, Type 2 Diabetes, and secondary metabolic and chronic comorbidities, alongside rising service demand, challenges traditional models of separate Diabetes Educator and Dietetics appointments.

Separate referral pathways and inconsistent therapeutic messaging may contribute to duplication, service inefficiencies, ineffective education, increased appointment burden, and reduced continuity of care.

This quality improvement initiative evaluated implementation of a dual Diabetes Educator-Dietitian role within a tertiary paediatric diabetes service. The aim was to determine service need, assess workforce impact, and explore potential benefits to patient experience and care delivery.

Methods:

A pilot dual Diabetes Educator-Dietitian position, supported through Queensland Health purchasing incentive funding aimed at expanding the diabetes educator workforce, was embedded within a tertiary paediatric multidisciplinary diabetes team. Service need and role justification were assessed through analysis of outpatient occasions of service over a 12-month period, referral patterns, and clinical demand data.

Results:

Over 12 months, the dual role delivered approximately 300 outpatient occasions of service, demonstrating substantial demand. Gaps in referral pathways were identified across endocrinologist, diabetes educator, dietitian, and self-referral streams. The integrated model streamlined consultations, improved continuity, and reduced duplication, supporting establishment of the role as ongoing. Following confirmation of sustained demand and demonstrated workforce value, the position transitioned to permanent recurrent funding.

Discussion / Conclusion:

The dual Diabetes Educator-Dietitian model demonstrated workforce value and improved care integration within a high-complexity tertiary service. By consolidating diabetes education and medical nutrition therapy within a single clinician, the model enhanced continuity and service efficiency without additional workforce expansion. Ongoing evaluation will determine long-term impact and sustainability, with potential applicability across similar public diabetes services.

From isolation to connection: Evaluating effectiveness of peer-led 24/7 WhatsApp community of practice to pioneer diabetes educator development for emerging credentialled diabetes educators.

Lee A¹, Hart B², Nguyen K³, Evans S⁴, Beard D⁵, Charman L⁶, Soo B⁷, Weeratunga P⁸, Hernandez E⁹, Chima E¹⁰, Moore B¹¹

¹Rest & Regulate Health, , Australia, ²Private Practice & Braidwood Multipurpose Service, , Australia, ³Private Practice & Aged Care, , Australia, ⁴For Health Medical & Dental Centre, , Australia, ⁵Metabolic Health, , Australia, ⁶Hunter New England Health, , Australia, ⁷Rockingham General Hospital, , Australia, ⁸Northern Hospital & Hume Council, , Australia, ⁹EH Medication Management, , Australia, ¹⁰Goulburn Base Hospital, , Australia, ¹¹Bairnsdale Regional Health Service & Latrobe Regional Health, , Australia

Background:

In Australia, shortages of specialist diabetes professionals highlight the need for innovative workforce development approaches that support professional learning and capability building¹. The diabetes educator workforce has evolved from a nursing-based role to a multidisciplinary allied health workforce². While this expansion supports collaborative practice, it introduces greater complexity in professional roles and competencies, reinforcing importance of shared learning and professional identity development². Mentorship and peer support are recognised strategies for promoting professional growth, knowledge exchange and confidence among health professionals^{3,4,5,6}.

Aim:

To evaluate the effectiveness of a peer-led WhatsApp-based Community of Practice (CoP) on the confidence, motivation, and support for emerging Credentialled Diabetes Educators (CDEs).

Methods:

A semi-structured peer-led CoP was established using WhatsApp and bimonthly virtual meetings, shared resources and collaborative problem solving. Participation was voluntary and included clinicians at different stages of the initial credentialling pathway. An experience survey designed and completed by group members assessed effectiveness of the CoP. Closed-ended questions were analysed using Likert Scales. Open-ended questions were analysed deductively using thematic analysis.

Results:

Of 72 CoP members, 30 completed the survey. Participants included nurses, midwives, pharmacists, dietitians, exercise physiologists and physiotherapists. 27% worked in rural or remote settings. Participants represented diverse healthcare sectors. All responses were positive, rating the CoP as valuable or extremely valuable. Analysis of open-ended responses identified themes including reduced isolation, safe space, encouragement, shared learning, collective problem solving, increased motivation, and improved confidence toward initial credentialling processes.

Conclusion:

A peer-led WhatsApp-based CoP provides a feasible and effective strategy to support emerging CDEs. Integrating peer support into credentialling pathways strengthen confidence, increase motivation, reduce isolation and support workforce development within Australia's multidisciplinary diabetes educator workforce. Results suggest the Australian Diabetes Educator Association explore mechanisms to support establishment of digital peer-led CoPs to enhance peer connection, shared learning, professional development, and multidisciplinary collaboration among emerging CDEs.

Addressing distress in patients from Diabetes foot programme

Lee K¹, Tng J¹, Lee X¹, Chew M¹

¹Woodlands Hospital, Singapore, Singapore

Background & Aim: Foot ulcers in diabetes impose substantial psychological burden on patients, with distress, anxiety, and depression significantly impacting self-management behaviours and clinical outcomes. Poor psychological wellbeing correlates with delayed wound healing and increased amputation risk. This study evaluated the effectiveness of systematic distress screening using validated tools to facilitate timely, targeted psychosocial interventions and improve patient outcomes.

Methods: This ongoing prospective study administered Distress Thermometer (DT) and Hospital Anxiety and Depression Scale (HADS) to 120 patients within the Diabetes Foot Programme at Woodlands Hospital, a tertiary hospital Singapore. Patients scoring ≥ 8 on HADS Depression or Anxiety subscales received Medical Social Worker (MSW) interventions. Clinical records were analysed to evaluate intervention effectiveness and inform optimal care pathways.

Results: Among 47 patients assessed, 26 (55.3%) demonstrated clinically significant depression and/or anxiety (HADS ≥ 8). Single MSW sessions successfully addressed most mild-to-moderate psychological concerns. Patients with severe HADS scores showed meaningful anxiety reduction within two weeks, though depression scores remained elevated, indicating need for extended support.

Discussion / Conclusion: Findings support implementing a stratified screening model with dual intervention thresholds: nursing staff managing mild-to-moderate distress whilst MSWs provide intensive support for severe cases. This tiered approach optimises resource allocation, ensures appropriate skill matching, and enables systematic psychosocial care integration within diabetes foot services, ultimately supporting enhanced self-management and improved clinical outcomes for this vulnerable population.

A cost efficient dietitian diabetes educator model of care for gestational diabetes mellitus: A prospective service evaluation in a Tertiary Maternity Hospital

Lee M^{1,2}, Orazio L¹, Chancellor S¹, Laurie J^{1,3}, Wilkinson S^{1,3}, Mutsekwa R¹

¹Mater Mothers' Hospital, Brisbane, Australia, ²Logan Endocrine and Diabetes Services, Logan, Australia, ³The University of Queensland, Brisbane, Australia

Background & Aim: Gestational diabetes mellitus (GDM) affects up to one in five pregnancies in Australia and contributes substantially to increasing workload and cost pressures in maternity diabetes services. Traditional GDM care commonly involves separate consultations with a credentialled diabetes educator (CDE) and an accredited practising dietitian (APD), resulting in duplicated education, fragmented care, and increased staffing costs. With a growing workforce of dietitians dual-credentialled in diabetes education, a Dietitian Diabetes Educator (DDE) model offers an opportunity to improve efficiency without compromising care quality. This study aimed to evaluate the clinical outcomes and cost impact of a DDE model compared with the traditional dual-clinician approach.

Methods: A prospective service evaluation was conducted at Mater Mothers' Hospital, South Brisbane. Women diagnosed with GDM were managed under a DDE-led clinic during a 12-week pilot period. The DDE delivered integrated diabetes education, medical nutrition therapy, blood glucose monitoring support, and escalation pathways. Outcomes assessed included timeliness of care, early glycaemic control at Day 7 and Day 14, pharmacotherapy initiation, maternal and neonatal outcomes, patient satisfaction, and staffing cost analysis

Results: Twenty-five women were managed under the DDE model. Most were reviewed within 7 days of diagnosis with high completion of Day 14 follow-up. Mean fasting and post-prandial blood glucose readings improved between Day 7 and Day 14, and fasting readings within target by Day 14. Rates of insulin and metformin initiation were consistent with expected GDM populations, with no adverse maternal or neonatal safety signals observed. Patient satisfaction was high. Cost analysis demonstrated a 34% reduction in staffing costs and an improved service margin compared with the traditional dual-clinician model. Outcome data forthcoming as participants continue to deliver.

Discussion/Conclusion: The DDE model delivers clinically safe and effective GDM care while substantially reducing service delivery costs, supporting a scalable, value-based workforce solution for maternity services

Understanding psychosocial distress in diabetes foot care through a social determinants lens

Lee X¹, Lee K¹, Tng J¹, Chew M¹

¹Woodlands Hospital, Singapore, Singapore

Background & Aim: Emotional and psychological factors significantly influence diabetes self-management and clinical outcomes, yet psychosocial screening is rarely integrated into routine diabetic foot care. Within Singapore's multi-ethnic population, diabetes-related distress varies by cultural beliefs, employment status, and social support. This study examined how social determinants shape diabetes-related distress among Diabetic Foot Programme (DFP) patients using validated screening tools to inform targeted, culturally responsive medical social work interventions.

Methods: This cross-sectional study administered the Distress Thermometer and Hospital Anxiety and Depression Scale (HADS) to 120 DFP patients at Woodlands Hospital. Distress was defined as HADS-Anxiety or Depression scores ≥ 8 . Social determinant patterns were analysed between distressed and non-distressed groups.

Results: Preliminary analysis of 47 participants revealed 55.3% screening positive for distress. Risk factors included: male gender (61% males vs 36% females), unemployment (68% unemployed vs 20% employed), Malay ethnicity (65% Malay vs 44% Chinese, 56% Indian), amputation history (37% had undergone amputation vs 25% had not had any amputation), and higher educational attainment. Males predominantly reported practical concerns relating to finances and self-care whilst females reported emotional concerns. Employment and the ability to retain physical capabilities emerged as the strongest protective factor against distress.

Discussion/ Conclusion: Social determinants significantly influenced diabetes-related distress, with males and unemployment as key predictors, likely reflecting breadwinner role disruption and challenges with emotional regulation. Material, economic, and practical concerns appear to be prioritised over social or spiritual issues for most patients. Medical social work interventions should address gender-specific coping needs, with patients requiring amputations receiving comprehensive physical, practical, and emotional support. Upstream interventions preserving employment and sense of purpose may better motivate patients in the treatment journey and reduce need for surgical intervention.

Effective interventions to support medication taking in adults with Type 2 Diabetes Mellitus: a systematic review of randomised controlled trials.

Li M¹, Lin R¹, Gaca M², Zhou K¹, Seah J¹, Baqar S¹, Ekinici E^{1,2}, Naderpoor N^{1,2}

¹Austin Health, Heidelberg , Australia, ²The University of Melbourne Australia, Melbourne, Australia

Background & Aim:

Medication taking is essential for improved outcomes in patients with Type 2 Diabetes Mellitus (T2DM). This systematic review aimed to identify effective interventions for improving medication taking.

Methods:

Systematic search of key databases including CENTRAL (Cochrane Central Register of Controlled Trials), Embase, MEDLINE, PsycINFO, Emcare and Global Health were conducted to identify randomised controlled trials published between 1 January 2013 until 16 February 2025 to update a previous systematic review. The review is registered on the PROSPERO database (Registration No: CRD420251028555). Using Covidence, two reviewers independently screened, performed risk of bias and extracted data.

Results:

Of the 4,548 titles screened, 144 articles met the inclusion criteria. The literature exhibited marked heterogeneity regarding intervention types and duration, facilitators delivering interventions, and the scales used to evaluate medication taking. The interventions were categorised to education based (n = 91), psychological/behavioural (n = 30), and technology-driven interventions (n = 48). While many interventions were clinically led by pharmacists (n = 40) and nurses (n = 18), technology-based approaches represent the most rapidly evolving sector in the field. Morisky Medication Adherence Scales and Summary of Diabetes Self-Care Activities were the most often used questionnaires to measure medication taking. Metanalysis is underway for small subsets of data.

Discussion / Conclusion:

Since 2013, there has been a marked increase in research evaluating interventions to enhance medication taking. Heterogeneity in study designs and outcome measures limits the ability to identify and compare effective interventions. Effectiveness has been demonstrated for multicomponent community and allied health-led interventions. The incorporation of technology has also aided in intervention delivery and improved access. Interventions must be tailored to the specific needs of the population, address barriers and incorporate cultural and social determinants of health.

Psychosocial distress and glycemic levels in Type 2 Diabetes: A large primary care study

Lee J¹, **Li P**¹, Lee Y¹

¹Lee's Clinic/ Tacd, Pingtung city, Taiwan, Taiwan

Background & Aim:

Psychosocial factors may influence glycemic outcomes in people with type 2 diabetes, yet they are often under-assessed in routine primary care. This study examined the association between psychosocial distress and HbA1c among people with type 2 diabetes receiving primary care.

Methods:

A cross-sectional study was conducted among people with type 2 diabetes attending a primary care clinic between January and December 2025. Demographic characteristics, psychosocial measures, and biochemical indicators were collected, including the Chinese version of the Short Form Problem Areas in Diabetes scale (SF-PAID), Patient Health Questionnaire (PHQ), Pittsburgh Sleep Quality Index (PSQI), and social support scores. Pearson correlation and multivariable linear regression analyses were used to examine factors associated with HbA1c.

Results:

A total of 4,769 people with type 2 diabetes were included (mean age 63.6 ± 13.2 years; mean diabetes duration 13.0 ± 9.6 years; mean HbA1c $7.45 \pm 1.31\%$). HbA1c was positively associated with diabetes duration, BMI, lipid profiles, SF-PAID, and PHQ scores (all $p < 0.01$) and negatively associated with age ($p < 0.001$). Sleep quality and social support were not significantly associated with HbA1c. Multivariable analysis showed that diabetes duration, triglycerides, LDL cholesterol, and SF-PAID scores remained significantly associated with HbA1c.

Discussion / Conclusion:

Diabetes-related distress measured by SF-PAID is associated with HbA1c levels in people with type 2 diabetes. Integrating psychosocial assessment into routine primary care may support more comprehensive diabetes management.

Nutrition and healthy lifestyles for children and adolescents with early-stage type 1 diabetes: a narrative review and proposed clinical guidance

Li X^{1,2}, Smart C^{3,4,5}, Millard K⁶, Bell K^{1,2}

¹Charles Perkins Centre, the University of Sydney, , Australia, ²Sydney Medical School and the Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, the University of Sydney, , Australia, ³Department of Paediatric Diabetes and Endocrinology, John Hunter Children's Hospital, New Lambton Heights, Australia, ⁴School of Health Sciences, University of Newcastle, New Lambton Heights, Australia, ⁵Mothers and Babies Research Program, Hunter Medical Research Institute, Newcastle, Australia, ⁶Private practice dietitian, Sydney, Australia

Background & Aim:

Increasingly children and adolescents are being identified with early-stage type 1 diabetes (T1D), requiring clinical monitoring and care. International guidelines recommend nutrition and lifestyle education, however evidence-based guidance is lacking. Therefore, we aimed to summarise current evidence and propose clinical guidance for children and adolescents with early-stage T1D.

Methods:

A literature review was conducted in PubMed, up to May 2025. Where data was lacking, evidence and clinical advice regarding the impact of nutrients/lifestyle on glycaemic excursions, insulin resistance or glycaemic control in stage 3 diabetes and overall general health benefits was summarised to provide practical guidance.

Results:

There were no randomised controlled trials of diet or lifestyle interventions delaying progression to stage 3 T1D. Observational data is mixed, but identifies potential health benefits associated with fruit and vegetables, low glycaemic index carbohydrates, probiotics, vitamin D, omega-3 fatty acids and moderate levels of physical activity. Increased risk was associated with rapid weight gain/overweight and added sugar.

Discussion / Conclusion:

Dietitians play a key role in supporting nutrition education and should be part of the multidisciplinary team supporting children with early-stage T1D and their families. In the absence of strong evidence, we propose nutrition and lifestyle interventions in early-stage T1D should emphasize reducing beta-cell stress, and promote general healthy eating principles, meal time routines and positive relationships with food. There is a clear need for adequately powered randomised controlled trials to address this gap and guide future practice.

Living with Type 1 Diabetes: Investigating age-related differences in diabetes distress among adults with Type 1 Diabetes: A cross-sectional study

Boon Ling Heng¹, Luor Shyuan Maudrene Tan², Nursyafiqah A Yazid¹, **Liangcui Mao¹**, San San Oh¹, Chunyan Lang¹, Chieu Leng Teoh¹, Hui Min Zhang¹, Suan Tee Lim¹, Yue Ling Chung², Run Ting Chin², Shih Ling Kao²

¹Nursing Department, National University Hospital, , Singapore, ²Division of Endocrinology, Department of Medicine, National University Hospital, , Singapore

Background & Aim:

Diabetes distress (DD) is a common psychosocial burden that undermines self-management and quality of life in individuals with type 1 diabetes (T1D). This study compares the prevalence and characteristics of DD between younger and older adults with T1D to identify areas of distress

Methods:

Adults aged 21 and above with T1D in a national continuous glucose monitoring subsidy program were recruited from National University Hospital (NUH) Diabetes Centre. Demographic, glycaemic and DD data were collected using the 20-item Problem Areas in Diabetes (PAID) scale. Scores in four PAID subdomains were computed. PAID score ≥ 35 indicate high DD. Mann-Whitney U test was used to compare younger (<45 yrs) and older adults (≥ 45 yrs). Logistic regression was used to examine the association between age group and high DD, adjusted for gender and T1D duration.

Results:

We analysed 85 participants (mean age 39.7 ± 15.3 years; 68% female; 72.4% Chinese]. 59.1% of the population was <45 years old. Baseline mean glycated haemoglobin (HbA1C) was $8.4 \pm 1.8\%$ and duration of T1D 15.6 ± 12.2 years. Overall, mean PAID score was 32.4 ± 19.0 , and 41.2% had high DD (PAID ≥ 35). Among the four PAID subdomains, the greatest distress were food-related concerns (14%) followed by emotional problems (9.4%).

Younger adults reported significantly higher DD than older adults (mean PAID 32.4 ± 19.0 vs 23.6 ± 16.8 , $p=0.032$), particularly in domains of emotional (median score 22 vs 13; $p=0.035$) and social support problems (2 vs 0; $p=0.003$). Older adults were 70% less likely to experience high DD. There was no significant difference in HbA1c between the two groups (8.59 vs 8.06% , $p=0.123$).

Discussion / Conclusion:

Younger adults with T1D experience substantially higher DD in emotional and social support domains. These findings highlight the need for age-tailored psychological and educational interventions

Diabetes educators should integrate routine screening for DD into nursing assessments for earlier identification and intervention.

Insulin self-management practices in adult acute care hospitals: A scoping review of documents

Lin P¹, Peddle M¹, Hagger V¹

¹ Deakin University Institute for Health Transformation, Centre for Quality and Patient Safety Research, School of Nursing and Midwifery, Deakin University, Geelong, Australia

Background & Aim:

People living with insulin-managed diabetes mellitus often encounter inconsistent approaches to insulin self-management (ISM) when admitted to hospitals. This review aims to compare the consistency and content of ISM guidelines and related documents from Australia and countries with comparable health systems.

Methods:

Databases including CINAHL, Google Scholar, Web of Science, and PubMed were searched between 2000 and 2025 using search terms “*insulin AND inpatient AND diabetes AND self-management.*” Websites of relevant diabetes associations were hand-searched.

Results:

A total of 16 documents were included in the review, including policies (n=1), procedures (n=1), guidelines (n=11), charts (n=2), and protocols (n=1). Extracted data were coded to seven categories, including: Levels of ISM; Type of technology addressed; Agreement regarding ISM: Initial ISM assessment – staff and methods; Ongoing ISM assessment; Glucose monitoring and Insulin storage. Six documents (37%) clearly differentiated ISM levels, with pumps and injections included in 56% (n=9) and 50% (n=8) of documents, respectively. Most documents identified that written consent is required (68%, n=11); however, in 62% (n=10) of documents, no details were reported regarding the initial assessment for ISM. Assessment of ISM was undertaken equally on admission, daily and as required in 18% (n=6) of the documents. Documents identified that staff oversight of glucose monitoring and insulin (87%, n=14) injections (12%, n=2) is required, with insulin storage the responsibility of staff (62%).

Discussion / Conclusion:

Approaches to ISM vary widely, with few commonalities noted across documents. Only a small number of sources address technology integration, and information is limited on patient assessment including who and what is required. Additionally, documents require nursing oversight for many aspects of insulin administration and storage, which may cause delays that lead to dysglycaemia and negative patient outcomes, negating potential benefits of ISM.

Clinical practice guide for integrating diabetes-specific nutritional formulas into diabetes care: Evidence review and expert consensus

Lin S¹, Deed G¹, Khoo C², Murfet G¹

¹University Of Technology Sydney, Sans Souci, Australia, ²Western Sydney University, ,

Background & Aim:

Achieving optimal glycaemic management through wholefood dietary approaches remains challenging for many people with type 2 diabetes (T2D), due to barriers including limited time, food literacy, access, and medication-related factors. Diabetes-Specific Nutritional Formulas (DSNFs) have demonstrated efficacy in improving glycaemic and metabolic outcomes; however, practical, evidence-based guidance for their integration into routine care is limited. This project aimed to develop a clinically relevant Clinical Practice Guide (CPG) to support the structured and person-centred use of DSNFs in diabetes management. This work builds on the Australian consensus statement on DSNFs by translating evidence into practical guidance for implementation

Methods:

A multidisciplinary expert working group, including representatives from the Australian Diabetes Society, Australian Diabetes Educators Association, and Royal Australian College of General Practitioners, developed the CPG through a structured literature review and iterative consensus process. Evidence was critically appraised and synthesised into practical recommendations, with emphasis on clinical applicability and implementation across diverse care settings.

Results:

The CPG outlines a pragmatic three-step clinical pathway: (1) *Assess suitability* (clinical indications, contraindications, individual preferences); (2) *Tailor the Approach* (dose, timing, alignment with glycaemic patterns, weight goals, and lifestyle care); and (3) *Monitor Progress*, including early review (2–4 weeks) and ongoing assessment of glycaemic outcomes, weight or body composition, and medication use.

Discussion / Conclusion:

This CPG provides the first structured, multidisciplinary framework to guide integration of DSNFs into routine diabetes care. By bridging the evidence-to-practice gap, it enables consistent, personalised implementation and supports clinicians to optimise glycaemic management when wholefood strategies alone are insufficient. The guide has immediate clinical relevance and potential to improve outcomes in diabetes care.

Workforce capability, safety and participation in Early Childhood Education Centres (ECEC) for children with Type 1 Diabetes - Evidence from a national parent survey

Liston-McCaughley A¹, Boyer T², Goss P³, Goss J³, Pitman L⁴, Edwards T¹

¹Type 1 Foundation, Geelong , Australia, ²National Type 1 Diabetes Council , Ivanhoe , Australia ,

³Team Diabetes Geelong , Geelong , Australia , ⁴Type 1 Voice , Adelaide , Australia

Aim

This study aimed to examine parent-reported experiences of participation, safety and workforce capability in Australian ECEC for children with type 1 diabetes (T1D).

Background

Children with T1D require continuous clinical care and emergency treatment. International guidance, including 2024 Position Statement of the International Society for Pediatric and Adolescent Diabetes (ISPAD), emphasises children with T1D must safely participate in ECEC environments with trained support. In Australia, ECEC services operate within a regulatory environment that includes the Work Health and Safety Act 2011 (Australia), disability discrimination legislation and the ECEC National Quality Framework, which collectively impose duties relating to child safety, prevention of foreseeable harm and safe systems of work. However, workforce capability to support complex medical care is not embedded within the ECEC sector and empirical data in this context is limited.

Methods

A national cross-sectional survey of parents and carers of children with T1D was conducted using an online structured questionnaire. Eighty-three respondents from all Australian states and territories participated. Quantitative responses were analysed using descriptive statistics and qualitative responses reviewed using thematic analysis.

Results

Most respondents (78.3%) reported their child experienced challenges participating in ECEC services, affecting the ability of 80.7% of families to work. Confidence in staff capability was limited: 36.1% were not confident staff could manage daily diabetes care and 62.7% were not confident staff could respond to diabetes emergencies. Safety concerns resulted in 83.1% of parents keeping their child home from childcare. Support for formal diabetes training for educators was universal (96–98%).

Conclusion

Parents report substantial barriers to safe participation of children with T1D in ECEC settings. These findings suggest a misalignment between workforce capability arrangements and safety and inclusion expectations under Australian workplace safety, disability and education frameworks. Establishing nationally recognised workforce training for diabetes management should improve safety, participation and regulatory compliance.

Patients' perspectives on an integrated mHealth and health coaching model to support patient empowerment in Type 2 Diabetes: A qualitative study in a multiethnic community

Liu M¹, Zhang Y², **Loh H**², Ng J², Kong J², Xu Y³, Yoon S⁴, Kwan Y⁵, Low L⁶

¹Duke-NUS Medical School, Singapore, Singapore, ²Centre for Population Health Research and Implementation, Singapore Health Services, Singapore, Singapore, ³Division of Population Health & Integrated Care, Singapore General Hospital, Singapore, Singapore, ⁴Signature Research Programme in Health Services Research & Population Health, Duke-NUS Medical School, Singapore, Singapore, ⁵Department of Rheumatology and Immunology, Singapore General Hospital, Singapore, Singapore, ⁶Department of Family Medicine and Continuing Care, Singapore General Hospital, Singapore, Singapore

Background & Aim:

mHealth is increasingly used to support type 2 diabetes mellitus (T2DM) self-management, but sustaining long-term engagement remains challenging. Integrating mHealth with human support may strengthen patient empowerment, motivation, and accountability. The EMPOWER-COMMUNITY care model integrates the EMPOWER+ app with health coaching delivered by community nurses and wellbeing coordinators in community settings, where EMPOWER+ uses AI for lifestyle tracking, personalised nudges, health educational resources, progress summaries, and rewards. This study explored patients' experiences and how this care model supported self-management in practice.

Methods:

Semi-structured interviews were conducted with 16 adults with T2DM who had used both components of EMPOWER-COMMUNITY for at least six months. Interviews explored participants' experiences, perceived benefits and challenges, as well as suggestions for improvement. Interviews were audio-recorded, transcribed verbatim, and analysed using reflexive thematic analysis.

Results:

Participants generally viewed EMPOWER-COMMUNITY positively. The mobile application supported self-monitoring of behaviours such as diets and physical activity; while health coaching provided personalised education and guidance to support patient empowerment. Many participants reported increased awareness of their daily lifestyle and greater confidence in self-management. Several participants noted that knowing that a health coach might review their progress encouraged them to be more mindful of their choices.

However, the perceived usefulness varied across individuals. Participants with long-standing diabetes or higher baseline knowledge sometimes felt coaching added limited value when discussions focused mainly on information they already knew. Practical barriers included scheduling difficulties and technical limitations such as accuracy of food logging within the app.

Participants suggested that the model may be most effective when tailored to individual needs and readiness for change, and when extended beyond medical information to address broader lifestyle and wellbeing issues.

Discussion / Conclusion:

These findings highlight practical considerations for implementing mHealth and human support in diabetes care, and may offer insights for designing more responsive and patient-centred care models in routine practice.

Dietary behavior with common breakfast foods and lifestyle attitudes among patients with Diabetes: Attending outpatient follow-up in Cambodia

Putheara L¹, Kimkhun S², Videm C³

¹Chenla University, Phnom Penh, Cambodia, ²MopoTsyo Patient Information Centre, Phnom Penh, Cambodia, ³Cambodia China Freindship Preahkossamak Hospital, Phnom Penh, Cambodia

Background:

Dietary modification is crucial for diabetes management, and breakfast composition strongly influences postprandial glycaemia. Evidence on real-world breakfast practices among Cambodian adults with diabetes is limited.

Objective:

To examine breakfast food consumption and lifestyle attitudes among adults with diabetes attending outpatient follow-up in selected Cambodian hospitals.

Methods:

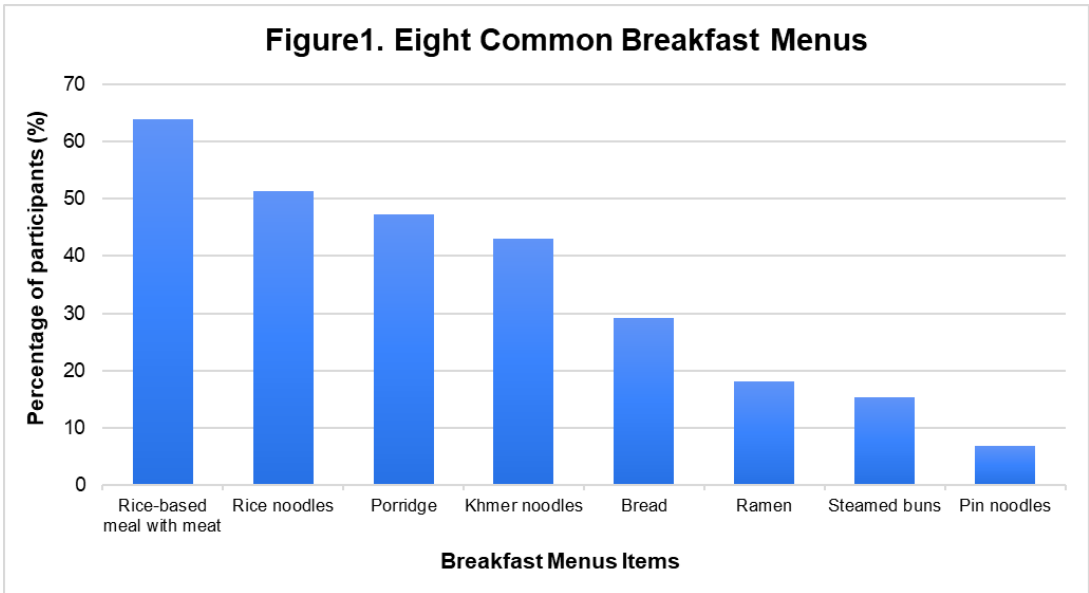
A cross-sectional study included 72 adults with diabetes. Breakfast intake over the previous seven days was assessed using a Food Frequency Questionnaire. Data on demographics, BMI, diabetes duration, physical activity, breakfast frequency, and eating attitudes were analyzed using descriptive statistics.

Results:

Participants had an average age of 56 years and were mainly female (56.9%), with 59.7% having diabetes for 1–5 years. BMI was normal in 52.78% and overweight/obese in 43.05%. Physical activity was low: 59.7% engaged in under 30 minutes daily, and only 1.4% exceeded 150 minutes. Rice-based breakfasts predominated; rice with meat and egg was consumed 4–6 times weekly by 63.9%. Rice noodles (51.4%), porridge (47.2%), and Khmer noodles (43.1%) were eaten 1–3 times weekly, while bread (29.2%), ramen (18.1%), steamed buns (15.3%), and pin noodles (6.9%) were less frequent. Most participants reported regular meals (71.4%) and balanced intake (65.7%), but only 35.7% limited carbohydrate portions.

Conclusion:

High-carbohydrate breakfasts and low physical activity persist despite generally positive dietary attitudes. Culturally tailored nutrition education during outpatient follow-up may enhance glycemic control among Cambodian adults with diabetes.



Formalising and streamlining home-based services for people requiring insulin administration and supervision on discharge from hospital.

Loughran J¹

¹Northern Health, Bundoora, Australia

Background & Aim: Current NDSS data indicates more than 180,000 people aged over 70 years require insulin, with an unknown number of people requiring home nursing support following discharge from hospital. Our health service has six discharging streams, all offering different support for people with diabetes. Recent increases in diabetes-related readmissions promoted review of the services.

The aim of this review was to examine current discharging services, identify gaps/duplication and reduce adverse outcomes by allocating clients to the correct service.

Methods: A review of hospital incident reports identified deficiencies in the discharging system. For example, people on twice daily insulin were allocated only daily support and no clear guide or coordination for insulin titration.

Utilising key stakeholders, a multi-pronged strategy was produced clarifying the diabetes-specific services available for nursing and medical support in the community to enhance communication and coordination.

Results: A review of hospital incident reports identified deficiencies in the discharging system. For example, people on twice daily insulin were allocated only daily support and no clear guide or coordination for insulin titration.

Utilising key stakeholders, a multi-pronged strategy was produced clarifying the diabetes-specific services available for nursing and medical support in the community to enhance communication and coordination.

Discussion/Conclusion: Streamlining services is complex in large organisations. There are numerous programs involved to support older people transitioning from hospital to home. Involving key stakeholders and teamwork is essential to change practice.

This guideline is now imbedded within hospital policy.

Developing Scalable Digital Social Prescribing to Support Diabetes Care

Lynch C^{1,2}, Cao Y², Alemu Desse T¹, Oldenburg B^{1,2}, Connect4Health¹

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²La Trobe University, Melbourne, Australia

Background: People living with diabetes often experience social, behavioural, and psychosocial challenges that influence disease management and health outcomes. Social prescribing programs aim to connect individuals with community-based resources that support lifestyle changes, well-being, and self-management. However, most social prescribing initiatives are locally implemented and difficult to scale within routine diabetes care. Digital health platforms offer an opportunity to support coordinated referral pathways, personalised engagement, and integration between healthcare providers and community services.

Aim: To develop and implement a scalable digital social prescribing system to connect people living with diabetes with community-based health and well-being support.

Methods: Connect4Health is a digital-enabled social prescribing system that integrates community referral pathways with multidisciplinary healthcare services for people with diabetes. The system links individuals, healthcare providers, and community organisations. Individuals enter the pathway through a structured health and social needs assessment conducted in primary care or community clinic settings. Assessment data inform personalised social prescriptions that connect users with relevant community and digital support services. The platform incorporates artificial intelligence and natural language processing to support personalised recommendations, monitor engagement, and identify individuals requiring additional human support. Digital communication tools enable coordination between users, healthcare providers, and community services.

Results: We anticipate that integrating digital technologies into social prescribing will facilitate coordinated referrals to community-based services, improve access to non-clinical support, and strengthen the integration between the healthcare and community sectors involved in diabetes care.

Discussion: Digitally enabled social prescribing systems may offer a scalable approach to addressing social and behavioural determinants of diabetes management. Integrating digital referral infrastructure with multidisciplinary care services has the potential to strengthen coordination across health and community sectors and support more holistic diabetes care.

Families' perspectives and experiences of screening and monitoring of early-stage type 1 diabetes in Australia: a qualitative exploration

Majstorovic M¹, McGorm K^{2,3}, Huynh T⁴, Wentworth J⁵, Penno M², Cameron F⁶, Craig M⁷, Davis E⁸, Haynes A⁹, Sawyer A¹, Soldatos G¹⁰, Vuillermine P¹¹, Oxlad M¹, Couper J^{2,3}

¹School of Psychology, Adelaide University, Adelaide, Australia, ²Adelaide Medical School, Adelaide University, Adelaide, Australia, ³Endocrinology and Diabetes Department, Women's and Children's Hospital, Adelaide, Australia, ⁴Department of Endocrinology and Diabetes, Queensland Children's Hospital, Brisbane, Australia, ⁵Department of Diabetes and Endocrinology, Royal Melbourne Hospital, Melbourne, Australia, ⁶Department of Endocrinology and Diabetes, Royal Children's Hospital, Melbourne, Australia, ⁷Institute of Endocrinology and Diabetes, Children's Hospital at Westmead, Sydney, Australia, ⁸Department of Endocrinology and Diabetes, Perth Children's Hospital, Perth, Australia, ⁹Children's Diabetes Centre, The Kids Research Institute Australia, Perth, Australia, ¹⁰Diabetes and Vascular Medicine Unit, Monash Health, Melbourne, Australia, ¹¹Child Health Research Unit, Barwon Health, Geelong, Australia

Background & Aim: Clinical type 1 diabetes is an autoimmune condition in which early, presymptomatic stages are detectable through screening and monitoring programs. Such programs are being modelled in Australia and internationally. Input from children with early-stage type 1 diabetes and their caregivers ensures these initiatives are guided by their needs and preferences. However, minimal research exists on this topic. The Australian QuEST (Qualitative experiences of Early-Stage Type 1 diabetes) study is the most comprehensive exploration of children's, caregivers' and healthcare professionals' perspectives on screening and monitoring of early-stage type 1 diabetes globally. Here, we exclusively present data from families.

Methods: We are employing a qualitative design. Children aged 9-18 years monitored for increased risk of developing clinical type 1 diabetes (as indicated by ³ 1 islet autoantibody), along with their caregivers, were recruited from Australian first-degree-relative cohorts: ENDIA (Environmental Determinants of Islet Autoimmunity) and Type1Screen. We additionally recruited caregivers of children with islet autoimmunity aged under 9 years old. Semi-structured interviews were conducted. Information power guided sample size. As of January 2026, 35 children and 49 caregivers have been interviewed.

Results: Formal data analysis is expected to be completed by August 2026, guided by Braun and Clarke's reflexive thematic analysis. Preliminary review reveals data on children's testing experiences; the setting, organisation and delivery of monitoring; barriers to monitoring engagement (including equity issues); psychological responses to children's risks of developing clinical type 1 diabetes; relationships and support from healthcare professionals; and considerations regarding intervention trial participation.

Discussion/Conclusion: Insights from the QuEST study will shape screening and monitoring programs for early-stage type 1 diabetes in Australia and internationally, ensuring they reflect families' voices. The findings will be relevant to policymakers, researchers, and clinicians, as they have the potential to guide healthcare practice and policy improvements in this area.

Impact of short duration Continuous Glucose Monitoring Program on Glycaemic Control and Patient Engagement in Adults with Type 2 Diabetes: A retrospective data analysis

Au-Yeung Y¹, Mannar Mannan J^{1,2}, Sukumar R², Nayak J²

¹North Canberra Hospital, Bruce, Australia, ²The Canberra Hospital, Garran, Australia

Background & Aim: People with type 2 diabetes mellitus frequently experience suboptimal glycaemic control despite guideline-based management. Continuous glucose monitoring (CGM) has demonstrated improvements in glycaemic outcomes and treatment optimisation in controlled studies and is increasingly supported for individuals with T2DM. However, the wider use of CGM in Type 2 diabetes mellitus is limited. This study aimed to evaluate the effects of a short-duration CGM pilot program on glycaemic outcomes in adults with T2DM

Methods: A retrospective observational analysis was conducted within a secondary diabetes service implementing a pilot CGM program utilising Freestyle Libre 2 Plus® sensors. Adults with T2DM were offered on opt-in basis a 15-day CGM trial between June and December 2025. Descriptive analyses were performed on demographic characteristics, baseline and follow-up HbA1c, CGM-derived average glucose levels, percentage time in range (TIR; 3.9–10.0 mmol/L), and self-funded continuation of CGM after the trial

Results: Fifty-one adults (mean age 57.5 years, range 21–86; median diabetes duration: 10 years) completed the 15-day CGM trial. In paired analyses, HbA1c decreased by 0.99 percentage points (n=34; 66.7%), average glucose declined by 0.91 mmol/L (n=19; 37.3%), and TIR improved by 10.55 percentage points. Eighteen participants (35.3%) continued CGM beyond the pilot period. Among continuers, average glucose decreased by 0.93 mmol/L, TIR increased by 10.4 percentage points, and HbA1c fell by 1.29 percentage points

Discussion/Conclusion: This observation demonstrated that CGM use in adults with T2DM was associated with clinically meaningful improvements in glycaemic control. Real-time glucose insights improved understanding of glycaemic patterns, supporting individualised medication management, improved concordance, and beneficial lifestyle modifications. These findings underscore the clinical value of CGM within routine care for T2DM and support broader access to CGM technologies in this population.

Six-month audit of hypoglycaemia kits: Compliance, sustainability, and staff engagement in a Principal Tertiary Referral Hospital

Marhava L¹, Cryer S¹

¹Royal North Shore Hospital, St Leonards, Australia

Background & Aim

Hypoglycaemia is a common inpatient complication that requires timely, standardised treatment. Updated hypoglycaemia kits were introduced in 2025 to improve treatment consistency, align with NSLHD procedures and support rapid response to low blood glucose events. Six months post-implementation, this audit aimed to assess compliance with kit standards, sustainability of routine checks, and staff awareness of associated procedures across inpatient wards and units.

Methods

A point-in-time audit was undertaken on 22 January 2026 across inpatient wards and units. Audit criteria examined kit availability, completeness, integrity, expiry dates, storage location, presence of the RNSH Hypoglycaemia Treatment Pathway and evidence of documented checks. Staff knowledge regarding hypoglycaemia procedures and kit replacement processes was assessed. Compliance rates were calculated for each criterion and compared across wards to identify high- and low-performing areas.

Results

Overall compliance was 75%, with considerable variation across criteria. Highest-performing areas included access to glucose gel (96%), staff awareness of the NSLHD hypoglycaemia procedure (93%), and prompt kit location (85%). The lowest-performing areas were documentation of regular kit checks (26%), awareness of the replacement process (56%), completeness of kit items (59%) and attachment of the treatment pathway (63%). Ward-level compliance ranged from 23% to 100%

Discussion / Conclusion

The audit identifies key opportunities to strengthen hypoglycaemia management. Priorities include reinforcing regular, documented kit checks, improving staff education on kit replacement and ordering processes, and ensuring all kits consistently include the required treatment pathway. Additional support for lower-performing areas such as ICU and ED will help strengthen understanding of the important role of maintaining complete, correctly stocked kits to ensure safe and timely hypoglycaemia management. Embedding these improvements into routine practice will enhance reliability, timeliness and safety of hypoglycaemia treatment.

Awareness of diabetes stigma and advocacy among medical students and residents: The first real-world survey in Japan

Matsushiro M¹, Murakami T¹, Motohashi K¹, Uchiyama S², Nakamura Y², Yoshida H¹, Sakaki K¹, Keidai Y¹, Wada N¹, Taura D¹, Ikeguchi E¹, Sone M², Miyoshi T³, Kataoka H³, Jenkins A⁴

¹Department Of Diabetes, Endocrinology And Nutrition, Graduate School Of Medicine, Kyoto University, Kyoto, Japan, ²Department of Metabolism and Endocrinology, St. Marianna University School of Medicine, Kawasaki, Japan, ³Center for medical education and internationalization, Kyoto University, Kyoto, Japan, ⁴Baker Heart and Diabetes Institute, Melbourne, Australia

Background & Aim: Stigma means a “negative label” placed on someone because of a certain characteristic or condition. It happens when people have misunderstandings or prejudice about that person or group. Diabetes stigma is a global concern, yet recognition remains limited. To address this, clarifying the level of awareness of diabetes stigma and advocacy among future physicians is essential.

Methods: We conducted a questionnaire-based survey between July 2024 and March 2025 among medical students at three training stages (preclinical, clinical lectures, and clinical training group) and residents from two universities and university hospitals in Kyoto University and St. Marianna University School of Medicine.

Results: Among Japanese medical students and residents, 57.0% and 25.9% reported awareness of diabetes stigma and advocacy. Awareness increased with training stage, yet nearly half across all stages held misconceptions and limited knowledge, such as “diabetes is always a hereditary disease” and “people with diabetes always have a shorter life expectancy”. Participants who were aware of diabetes stigma were significantly more likely to recognize that healthcare professionals and they themselves could contribute to diabetes stigma.

Discussion / Conclusion: In Japan, awareness of diabetes stigma and related advocacy activities remains limited. Awareness improves after clinical lectures, but no significant differences in awareness were observed across training stages after clinical lectures. Without adequate understanding, future physicians may foster stigmatizing attitudes. Moreover, because participants who recognized diabetes stigma were more likely to acknowledge that healthcare professionals and themselves may contribute to diabetes stigma, it is important to promote awareness of diabetes stigma together with accurate knowledge about diabetes to reduce stigma. These findings highlight the need to provide appropriate education at each stage of training.

Insulin pump access and impact on diabetes burden – A case study advocating for change

McGregor F¹

¹Bendigo Health, Bendigo, Australia

Background & Aim: In Australia access to an insulin pump or pod is limited to people living with type 1 diabetes who can afford private health insurance, can privately fund an insulin pump or who meet eligibility criteria for charity funded pumps.

Ms CP is a 35-year-old woman who has been managing type 1 diabetes since 2017. She is a mother of four children, aged between 2 and 12 years, works part-time, and is unable to afford private health insurance due to financial constraints. Before her referral to the Endocrinology and Diabetes team at Bendigo Health, her HbA1c was 13.3% and continuing to rise.

This Australian case study evaluates how access to an insulin pump affects diabetes distress, glycaemic control, and overall wellbeing.

Methods: Utilising the type 1 diabetes distress scale during assessment and education for hybrid closed loop insulin pump initiation and post initiation of hybrid closed loop insulin pump therapy allowed the diabetes nurse educator to use a validated tool to measure the persons level of diabetes distress. HbA1c, time in range and use of the Minimed 780G Smart Guard feature compare and measure the rate of change in glycaemic profile between multiple daily injection therapy and hybrid closed loop insulin pump therapy.

Results: This case study undertaken at Bendigo Health highlights the real impact that access to a compassionate pump can have on a person's emotional wellbeing, and glycaemic profile for improved quality of life and diabetes related complication risk reduction.

Discussion / Conclusion: Practice implications include improving mental health funding and support to influence insulin pump funding policy in Australia; further work is needed.

Clinician perspectives on barriers and facilitators in the management of peripheral artery disease in people with diabetes-related foot ulcer

McIllhatton A^{1,5}, Gerrard J¹, Sadler S¹, Ibrahim W¹, Twigg S^{2,3}, Chuter V^{1,4}

¹School of Health Sciences, Western Sydney University, Campbelltown, Australia, ²Department of Endocrinology, Royal Prince Alfred Hospital Sydney, Sydney, Australia, ³Sydney Medical School and Charles Perkins Centre, Sydney, Australia, ⁴Wardliparingga Aboriginal Health Equity Unit, South Australia Health and Medical Research Institute, Adelaide, Australia, ⁵School of Health Sciences, University of Newcastle, Ourimbah, Australia

Background & Aim:

Diabetes-related foot ulcer (DFU) outcomes are most effectively managed within interdisciplinary high risk foot services (iHRFS). Timely diagnosis and stratified management of peripheral artery disease (PAD) is essential to improving outcomes of DFU within these services. This research investigated clinician perspectives on strengths and challenges in providing DFU care to those with PAD in iHRFS.

Methods:

A qualitative descriptive study was undertaken to establish the perspectives of clinicians relating to care to people with PAD and DFU. Semi-structured interviews were conducted with health professional staff working in iHRFS across four Local Health Districts in regional and metropolitan New South Wales. Data were analysed via the six-phase reflective thematic analysis of challenges and barriers to providing care to those with PAD and DFU. Themes were then reviewed and compiled to form a narrative synthesis.

Results:

Twenty health professionals from podiatry, nursing, dietetics, diabetes education and medical specialisations (endocrinology and vascular surgery) were interviewed. A variety of service delivery models were reported with 50% from a national accredited iHRFS. Challenges affecting delivery of care to those living with PAD and DFU were consistently reported as: inadequate assessment and treatment time (n=18, 90%), workforce shortages (n=20, 100%), inadequate funding (n=20, 100%), and limited access to both essential and more advanced vascular services and infrastructure (n=18, 90%). Strengths of services included strong interdisciplinary relationships and interprofessional skills sets.

Discussion / Conclusion:

There is high demand for iHRFS-related PAD assessment and care. Collective barriers reported from clinicians included time constraints, limited workforce capacity, fragmented service delivery and inadequate infrastructure, affecting access to further vascular investigations and revascularisation, impacting DFU outcomes. This highlights the need for further investment in iHRFS to aid resourcing, expansion of referral rights and better interprofessional and health systems understanding in the role of iHRFS in improving outcomes of those with PAD who have DFU.

Diabetes foot care education provided to people living with diabetes: A qualitative investigation of public sector podiatry and interdisciplinary high-risk foot services.

McIllhatton A¹, Hussaini F¹, Gerrard J¹, Sadler S¹, Ibrahim W¹, Twigg S^{2,3}, Chuter V^{1,4}

¹School of Health Sciences, Western Sydney University, Campbelltown, Australia, ²Department of Endocrinology, Royal Prince Hospital, Sydney, Australia, ³Sydney Medical School and Charles Perkins Centre, University of Sydney, Sydney, Australia, ⁴Wardliparingga Aboriginal Health Equity Unit, South Australia Health and Medical Research Institute, Adelaide, Australia

Background & Aim:

Diabetes-related foot disease (DFD), including diabetes-related foot ulcer (DFU) is a leading cause of non-traumatic amputation, hospitalisation and premature death. Diabetes foot care education is central to prevention and management of DFU. This study investigated foot care education content and delivery methods used by podiatrists for people at risk or living with DFU as well as the factors affecting education provision.

Methods:

Fourteen podiatrists from four public sector podiatry and interdisciplinary high risk foot services (iHRFS) (two nationally accredited) participated in semi-structured interviews from January of 2024 to October of 2025. Reflexive thematic analysis was used to identify common themes/subthemes related to the content of education provided to patients at risk or living with an active DFU, delivery methods of education, including availability of culturally responsive materials and clinician perceived challenges to education provision.

Results:

Diabetes foot care education for those at risk of a DFU focused on increasing understanding of diabetes (n=12, 86%) and preventative foot care including daily foot checks and first aid (n=14, 100%) and appropriate footwear (n=12, 86%). For those with an active DFU, education related to wound management, which included offloading adherence and wound dressing (n=14, 100%). Verbal education was the dominant mode of delivery with verbal and written education the most common form of multimodal education. Participants reported limited access to resources to support culturally responsive foot care education.

Discussion / Conclusion:

Public sector podiatrists regularly provide patient specific diabetes foot care education that aligns with national and global clinical care guidelines, with targeted personalised education that differs in emphasis in those at high risk of, compared with those with, an active DFU. Limitations to education provision were time constraints, lack of clarity, documentation of diabetes foot care education, resources to support education and limited availability of culturally responsive resources.

Values and components of Indigenous models of diabetes care: A scoping review to inform equitable, Whānau-centred Health System design

McIntosh B¹, Hikaka J¹, Anderson A¹, Kremer L²

¹Waipapa Taumata Rau, University Of Auckland, Auckland, New Zealand, ²Ōtakau Whakaihu Waka, University of Otago, Dunedin, New Zealand

Background & Aim: Indigenous peoples experience disproportionate burdens of type 2 diabetes and poorer health outcomes globally. While many diabetes programmes aim to improve clinical management and self-management education, less attention has been given to the underlying values and service structures that enable culturally safe and effective care. Indigenous models of health emphasise relational, holistic, and community-embedded approaches to wellbeing, yet these principles are not consistently translated into service design.

The aim of this scoping review was to identify the key values and practical service components that underpin Indigenous models of diabetes care and may inform the development of more equitable diabetes services.

Methods: A scoping review of peer-reviewed literature describing Indigenous diabetes programmes and service models was conducted. Databases were searched for studies reporting Indigenous-led or Indigenous-informed diabetes care interventions. Studies were screened and extracted using an Indigenous-informed analytical approach. Data were synthesised to identify (1) foundational Indigenous values shaping care delivery and (2) key service components used to operationalise these values within diabetes programmes.

Results: Thirty-eight studies describing Indigenous diabetes programmes across Aotearoa New Zealand, Australia, the USA and Canada. Analysis identified a set of core Indigenous values underpinning care, including relationality, cultural integrity, respect for Indigenous knowledge, empowerment, and community self-determination. Programmes operationalised these values through a range of service components, including culturally safe service environments, community governance and leadership, Indigenous workforce involvement, family-centred education, integrated care partnerships, and community-based health promotion. These elements worked together to support engagement, strengthen trust, and improve diabetes self-management support.

Discussion / Conclusion: Indigenous diabetes care models are characterised not only by specific programme activities but by an underlying value base that shapes how services are designed and delivered. Identifying both values and practical service components provides a framework for translating Indigenous health principles into implementable diabetes services. Integrating these elements into diabetes education and service design may support more culturally safe, effective, and equitable care for Indigenous communities.

Beyond culture: Mapping the components of Indigenous models of diabetes care

McIntosh B¹, Hikaka J¹, Anderson A¹, Kremer L²

¹Waipapa Taumata Rau, University Of Auckland, Auckland, New Zealand, ²Ōtakau Whakaihu Waka, University of Otago, Dunedin, New Zealand

Background & Aim: Indigenous peoples experience a disproportionate burden of type 2 diabetes and associated complications. Programmes are often described as culturally grounded, community-led, or holistic; however, the specific components that constitute Indigenous models of diabetes care are not consistently described in the literature. This lack of clarity limits health systems' ability to understand, replicate, or adapt successful approaches.

The aim of this scoping review was to identify and map the key components of Indigenous models of diabetes care reported internationally.

Methods: A scoping review of peer-reviewed literature describing Indigenous-led or Indigenous-focused diabetes care models was conducted using systematic searches across multiple databases. Studies were included if they described programmes, interventions, or models of care designed for Indigenous populations living with type 2 diabetes. Data were extracted and charted to identify recurring components relating to governance, workforce, service delivery, community engagement, and systems infrastructure. A descriptive mapping approach was used to summarise patterns across studies.

Results: Thirty-eight studies describing Indigenous diabetes programmes across multiple countries were included. Analysis identified several recurring components underpinning Indigenous models of care. These included culturally grounded foundations, community-led governance and partnerships, locally delivered self-management education, equity-oriented service design, Indigenous and community-based workforce roles, integrated care pathways, and enabling systems such as monitoring and data infrastructure. Across programmes, services were commonly delivered within community settings and emphasised relational, whānau- or family-centred approaches to diabetes education and support.

Discussion / Conclusion: Indigenous models of diabetes care are characterised by culturally relevant education approaches and by broader service components that shape how care is organised, delivered, and governed. Clarifying these components provides a foundation for health services seeking to design or strengthen diabetes programmes that better support Indigenous communities. Mapping these components may assist clinicians, educators, and health systems to more intentionally embed Indigenous approaches within diabetes care and quality improvement initiatives.

Whānau-Informed medicines reviews: A Kaupapa Māori study to improve pharmacist support for Māori living with Type 2 Diabetes

McIntosh B¹, Hikaka J¹, Anderson A¹, Kremer L²

¹Waipapa Taumata Rau, University Of Auckland, Auckland, New Zealand, ²Ōtakau Whakaihu Waka, University of Otago, Dunedin, New Zealand

Background & Aim: Type 2 diabetes disproportionately affects Māori in Aotearoa New Zealand, yet many health services remain designed around Western models of care that may not align with Māori values or lived experiences. Medicine reviews conducted by pharmacists have the potential to improve medication safety, understanding, and self-management, but little research has explored how these services should be designed to work well for whānau Māori. This study aims to explore the experiences and perspectives of Māori living with, or supporting someone with, type 2 diabetes to inform the development of culturally safe pharmacist-led medicine review services.

Methods: This qualitative study is guided by Kaupapa Māori research principles. Māori living with type 2 diabetes, or supporting a whānau member with the condition, are invited to share their experiences with medicines and pharmacy care through semi-structured interviews or small group wānaka (focus groups). Interviews may occur face to face, online, or by phone, and wānaka are facilitated to support culturally safe group discussion. Conversations are audio-recorded with consent and transcribed, with participants able to review interview transcripts prior to analysis. Data are de-identified and analysed to identify themes relating to culturally safe and effective pharmacist services.

Results: The study will identify key themes regarding how medicines and pharmacy care fit within the everyday lives of whānau Māori, including factors influencing trust, cultural safety, communication, and whānau involvement in medication management. Insights are expected to highlight practical elements that make pharmacist interactions feel respectful, mana-enhancing, and aligned with whānau aspirations for hauora.

Discussion / Conclusion: Understanding whānau perspectives is critical to designing diabetes services that support equitable outcomes. Findings from this study will inform the development of culturally safe pharmacist-led medicine review models that better support Māori self-management of diabetes, strengthen therapeutic relationships, and embed whānau-centred approaches within pharmacy practice. Such insights may contribute to improving the quality and equity of diabetes care in Aotearoa New Zealand

Co-designing a whānau-centred pharmacist-facilitated medicines review model informed by Indigenous health frameworks, whānau experiences, and stakeholder engagement for people living with type 2 diabetes.

McIntosh B¹, Hikaka J¹, Kremer L², Anderson A¹

¹University of Auckland, Auckland, New Zealand, ²University of Otago, Dunedin, New Zealand

Background & Aim:

Māori experience disproportionately high rates of type 2 diabetes (T2DM) and diabetes-related complications in Aotearoa New Zealand. Existing medicines review services are often fragmented, clinically focused, and insufficiently aligned with Māori models of health or the realities shaping medicines use for whānau (families). This research aimed to co-design a whānau-centred pharmacist-facilitated medicines review model informed by Indigenous health frameworks, whānau experiences, and stakeholder engagement.

Methods:

This Kaupapa Māori doctoral research used a multi-phase qualitative design. A scoping review examined international models of Indigenous diabetes care to identify key values and components underpinning effective Indigenous care. Semi-structured interviews with whānau Māori explored experiences with medicines, diabetes care, and healthcare systems. Stakeholder interviews and wānaka (focus groups) with pharmacists, clinicians, and health leaders investigated current medicines review practices, barriers to culturally safe care, implementation considerations, and opportunities for system redesign. Findings across all phases were analysed using Indigenous-informed qualitative approaches and synthesised into an emerging pharmacist-facilitated medicines review model.

Results:

The emerging model positions medicine reviews as relational, whānau-centred, and culturally grounded processes rather than isolated medication optimisation activities. Key elements included continuity of care, trust-building, whānau involvement, cultural-clinical integration, recognition of structural barriers affecting medicines use, flexible community-based delivery, and Indigenous governance principles. Stakeholders highlighted the importance of interdisciplinary collaboration, culturally safe workforce capability, relationship-based practice, and system-level support to enable meaningful implementation and long-term engagement.

Discussion / Conclusion:

This research proposes a co-designed pharmacist-facilitated medicines review model informed by Indigenous evidence, whānau experiences, and stakeholder perspectives. The model provides a potential framework for more culturally responsive and equitable diabetes care for Māori and may support future service redesign, implementation, and evaluation efforts to improve long-term diabetes outcomes in Aotearoa New Zealand.

Because insulin is hard enough: simplifying inpatient paediatric diabetes documentation

McIver F¹, Sellars F², Snars K³

¹Queensland Department Of Health, Brisbane, Australia, ²Torres and Cape Hospital and Health Service, Queensland Health, Weipa, Australia, ³South West Hospital and Health Service, Queensland Health, Roma, Australia

Background & Aim:

Inpatient diabetes management for children relies on accurate and timely documentation that supports safer care. Despite emergence of electronic medical records, paper forms are required for facilities yet to transition or in system downtime. Human factors feature significantly in medication errors. Standardisation and point of care decision support can be effective mitigation strategies.

This project aimed to improve usability and safety of the statewide paediatric diabetes management form, aligning with contemporary practice and guidelines.

Methods:

The knowledge to action framework was used to drive form review.¹ This included identification of medication safety risks, issues and opportunities to support paediatric diabetes inpatient management. Key stakeholders guided, reviewed and tested form iterations until consensus was reached. Post-implementation usability evaluation will be undertaken and medication error report trends analysed to assess impact on patient safety.

Results:

The form was updated to support current international guidelines.² Consultation and testing revealed strong support for improved glucose and ketone trend visibility, and the need to individualise sick day and ketone management. Hypoglycaemia management utilises the simplified 'Identify, Treat, Prevent' approach.³

Discussion / Conclusion:

An updated, functional, paediatric insulin dosing and monitoring form was created. The redesigned form incorporates sensor glucose monitoring and flexible insulin dosing meeting current clinical standards, with improved visual cues and decision support.

¹ Graham ID, Logan J, Harrison MB, Straus SE, Tetroe J, Caswell W, Robinson N. Lost in knowledge translation: time for a map? *J Contin Educ Health Prof.* 2006 Winter;26(1):13-24. doi: 10.1002/chp.47. PMID: 16557505.

² 2022 Clinical Practice Consensus Guidelines. International Society for Pediatric and Adolescent Diabetes (ISPAD). Updated Sep 2024. Accessed March 13th 2026. <https://www.ispad.org/resources/ispad-clinical-practice-consensus-guidelines/2022-ispad-clinical-practice-consensus-guidelines/ispad-cpcg-2022-english.html>.

³ Abraham MB, Karges B, Dovc K, Naranjo D, Arbelaez AM, Mbogo J, Javelikar G, Jones TW, Mahmud FH. ISPAD Clinical Practice Consensus Guidelines 2022: Assessment and management of hypoglycemia in children and adolescents with diabetes. *Pediatr Diabetes.* 2022 Dec;23(8):1322-1340.

Improving diabetes education and quality of care through telemedicine-enabled remote health models: An Apollo Telehealth quality improvement initiative

Mohammed M¹, Nazneen A¹, Thaploo V¹

¹Apollo Hospitals, Apollo Telehealth, Hyderabad, India

Background & Aim: Diabetes mellitus remains a major public health challenge in India, with persistent gaps in patient education, continuity of care, and quality monitoring, particularly in underserved and remote populations. Conventional in-person care models often struggle to deliver standardized education, timely follow-up, and outcome tracking at scale. Apollo Telehealth, a digital health and telemedicine arm operating under Apollo Hospitals, implemented a telemedicine-enabled remote diabetes care framework integrating structured patient education, standardized clinical workflows, and continuous quality improvement (QI) mechanisms.

The aim of this project was to evaluate the impact of a telemedicine-based diabetes education and QI program on patient engagement, glycemic monitoring, and adherence to evidence-based care processes.

Methods: This quality improvement initiative was conducted over a one-year period across Apollo Telehealth-supported digital care platforms. More than 500 adult patients with type 2 diabetes receiving teleconsultations were enrolled. The intervention included structured virtual diabetes education, standardized clinical protocols, remote monitoring of glycemic parameters, EMR-based documentation, and periodic quality audits. Care was delivered by multidisciplinary teams comprising physicians, diabetes educators, and nurses. Process and outcome indicators, including follow-up compliance, patient education uptake, and glycemic trends were tracked longitudinally.

Results: The telemedicine-enabled care model resulted in improved patient engagement with diabetes education, enhanced follow-up adherence, and more consistent documentation of care processes. Patients demonstrated better understanding of lifestyle modification, medication adherence, and self-monitoring practices. Over the one-year period, favorable trends in glycemic control and continuity-of-care indicators were observed.

Discussion/Conclusion: This quality improvement initiative demonstrates that telemedicine-driven diabetes education integrated within structured QI frameworks can enhance chronic disease management at scale. The Apollo Telehealth model illustrates how remote education, digital clinical workflows, and continuous monitoring, leveraging the clinical governance ecosystem of Apollo Hospitals can address gaps in diabetes care delivery. Such scalable telehealth-based interventions hold significant potential to improve quality, accessibility, and outcomes in diabetes care, particularly in resource-constrained and geographically diverse settings.

Lived experiences and perceptions of social support in diabetes self-management in Ethiopia.

Molla I^{1,2}, Hagger V¹, Rothmann M^{1,3,4}, Rasmussen B^{1,3,4,5}

¹The Centre for Quality and Patient Safety, School of Nursing and Midwifery, Faculty of Health, Institute of Health Transformation, Deakin University, Melbourne, Australia, ²Jimma University, Institute of Health, School of Nursing, Jimma,, Ethiopia, ³Steno Diabetes Centre Odense, Odense University Hospital, , Denmark, ⁴Department of Clinical Research, Faculty of Health Science, University of Southern Denmark, , Denmark, ⁵Department of Public Health, Faculty of Health and Medical Science, University of Copenhagen, , Denmark

Background & Aim

Diabetes is a major health challenge in Ethiopia, with widespread misconceptions about its causes and treatment. This study aimed to explore the experiences and perceptions of social support in managing type 2 diabetes among individuals and their families in Ethiopia.

Methods

A phenomenological study approach was utilised through in-depth interviews and focus group discussions with purposive sampling of 22 participants, including individuals with type 2 diabetes, their families, friends, and caregivers. Reflexive thematic analysis was used to analyse the data.

Results

A total of twenty-two individuals participated in the study, including 15 with type 2 diabetes, 2 family members or caregivers, 2 friends, and 3 neighbours. Three major themes were identified regarding the perception and experiences of social support and self-management: 1. Cultural and perceptual understanding of type 2 diabetes and its self-management. 2. Supportive environment and psychosocial dynamics in diabetes self-management. 3. Challenges in diabetes self-management. Perceptions of diabetes management were shaped by social circumstances and cultural beliefs, often leading to conflicting advice from social networks and pressure to abandon prescribed treatments. Engagement with families and community organisations improved coping and self-management, but challenges included economic pressures, inadequate access to medications, dysfunctional health insurance, inadequate instruction from healthcare providers, and cultural factors further hindered effective management.

Discussion/Conclusion

The study reveals that diabetes experiences and perceptions are influenced by cultural beliefs, traditional practices, and understandings, underscoring the need for educational interventions in diabetes care. Family and community members play crucial roles in managing diabetes, while religious practices aid in coping mechanisms and lifestyle changes.

Community organisations' role in diabetes self-management in Ethiopia: A phenomenological study.

Molla I^{1,2}, Hagger V¹, Rothmann M^{1,3,4}, Rasmussen B^{1,3,4,5}

¹The Centre for Quality and Patient Safety, School of Nursing and Midwifery, Faculty of Health, Institute of Health Transformation, Deakin University, Melbourne, Australia, ²Jimma University, Institute of Health, School of Nursing, Jimma, Ethiopia, ³Steno Diabetes Centre Odense, Odense University Hospital, Denmark, ⁴Department of Clinical Research, Faculty of Health Science, University of Southern Denmark, Denmark, ⁵Department of Public Health, Faculty of Health and Medical Science, University of Copenhagen, Denmark

Background & Aim

Diabetes is a significant public health issue in Ethiopia that necessitates medical intervention and ongoing community support for effective self-management. This study explored how community organisations contribute to social support and self-management for individuals with type 2 diabetes in the country.

Methods

A phenomenological study was conducted using in-depth interviews and focus group discussions with 25 participants, including community members, leaders of local organisations (Idir, Equb, Tsewa, or Mahiber), and members of the diabetes association. Reflexive thematic analysis was used for data analysis.

Results

Twenty-five individuals participated in the study, including community members, leaders, and representatives from community organisations and various groups.

Three major themes were identified regarding the role of community organisations in providing social support and facilitating self-management: 1. Community cultural perceptions and diabetes awareness. 2. Community support and social networks in managing diabetes. 3. Collaboration and strategies to overcome systemic challenges in diabetes management within the community. A holistic and collaborative approach among community organisations helps support individuals with diabetes by providing essential resources. These include organising transportation to medical appointments, mobilising financial resources for treatments, and offering emotional and spiritual support, all of which enhance diabetes management. Despite these positive contributions, structural and cultural barriers persist. Religious views on diabetes influence support from faith-based institutions, with some leaders rejecting biomedicine in favour of faith-based healing.

Discussion/Conclusion

Community organisations play a crucial role in providing social support and facilitating self-management for individuals with diabetes in Ethiopia. They help overcome obstacles, mobilise resources, and fill gaps in formal healthcare by promoting healthier lifestyles. However, the effectiveness of community organisations is hampered by a lack of knowledge and awareness of effective diabetes management.

Development and nationwide implementation of the JADEC card system to support people with diabetes in Japan

Nagafuchi M¹, Anzai K², Douguchi S³, Osonoi T³, Hotta H⁴, Yasui Y⁴, Seino Y⁴

¹Department of Lifelong Developmental Nursing, Faculty of Medicine, Saga University, Saga, Japan,

²Imari Arita Kyoritsu Hospital, Saga, Japan, ³Naka Kinen Clinic, Ibaraki, Japan, ⁴Japan Association for Diabetes Education and Care, Tokyo, Japan

Background & Aim

The Japan Association for Diabetes Education and Care (JADEC) developed the JADEC Card System to strengthen individualized support and ensure continuity of care for people living with diabetes in Japan. Since nationwide dissemination began in 2016, JADEC has implemented structured training programs.

The JADEC Card System comprises approximately 100 support cards outlining essential components of diabetes self-management, self-management education materials linked to each card, support check sheets, and instructional manuals. By selecting and tailoring cards according to an individual's clinical status, knowledge, interests, and lifestyle, the system enables personalized self-management support plans.

It also promotes a shared understanding among care teams and facilitates timely adjustments to support strategies.

Methods

JADEC implemented a tiered training program to encourage nationwide adoption. The basic program consists of online videos introducing the principles of diabetes self-management support and card use.

The advanced program is a three-hour in-person course providing practice in developing individualized support plans and conducting scenario-based simulations. Training workshops were conducted to prepare regional instructors for dissemination within local communities.

Results

Seminars were held in 40 of the 47 prefectures (85.1%). As of January 2026, 85 trainer workshops had produced 656 certified trainers. A total of 3,928 healthcare professionals from 1,638 facilities completed the training program. Over the past decade, 46 research reports (including five peer-reviewed articles) using this system have been published. Reported outcomes included improved glycemic management, reduced diabetes distress, and enhanced professional engagement. Challenges included limited support time and the need to enhance providers' knowledge and skills.

Discussion/Conclusion

Nationwide dissemination has facilitated widespread use of the JADEC Card System. Future efforts should focus on strengthening providers' competencies and refining training to improve diabetes self-management support.

Co-designed digital storytelling to strengthen empathic communication in diabetes care

Ng A^{1,2}, Tunks Leach K³, Holmes-Truscott E^{4,5}, Lin S², Peng W², Murfet G^{2,6,7}, Levett-Jones T²

¹Monash Centre for Health Research and Implementation, Monash University, VIC, Australia, ²Faculty of Health, University of Technology Sydney, NSW, Australia, ³School of Nursing, Midwifery and Paramedicine, Australian Catholic University, ACT, Australia, ⁴Australian Centre for Behavioural Research in Diabetes, Diabetes Victoria, VIC, Australia, ⁵School of Psychology, Institute for Health Transformation, Deakin University, VIC, Australia, ⁶School of Nursing, UTAS Health, University of Tasmania, TAS, Australia, ⁷Hospitals North West, Tasmanian Health Service, TAS, Australia

Background

Empathic communication is a core capability for healthcare professionals (HCPs), as it fosters effective engagement, and supports self-management for people with diabetes, who may often face negative interactions with HCPs due to stigma. This project aimed to co-design and evaluate a set of digital stories and reflective activities to increase HCPs' capacity to provide empathic, person-centred care.

Methods

Three digital stories and one animation were co-designed with people with lived experience alongside educator toolkits to support implementation. The stories focused on: gestational diabetes (GDM), type 2 diabetes in young adulthood with mental illness (YA-T2D), type 2 diabetes in older adults from culturally and linguistically diverse backgrounds (T2D-CALD) and type 1 diabetes with complex comorbidities (T1D). People with lived experience informed the storyboard and visual production to ensure the content's accuracy and authenticity. Digital stories and toolkits were piloted with undergraduate nursing students, postgraduate diabetes education students and broader HCPs with participants self-selecting modules of interest. Pre- and post-evaluation data were collected using the Comprehensive State Empathy Scale (CSES) and the Learner Satisfaction with eLearning Resources tool.

Results

749 people engaged with one or more of the digital stories and animations. Of these, 55% (n=414, 84% female) completed the survey. Significant improvements in empathy scores (all $p < .001$) were observed immediately following exposure to three modules (YA-T2D, T2D-CALD and GDM). The T1D story demonstrated a positive, non-significant upward trend, though noting a low response rate (n=23) therefore underpowered. Learner satisfaction exceeded 4.0/5 for all modules, indicating high perceived relevance, usefulness, and applicability to practice.

Discussion

Co-designed digital stories aimed to provide meaningful insights into diabetes lived experiences and offered HCPs opportunities to reflect on and strengthen their communication approach. Embedding digital storytelling within healthcare workforce development initiatives may support more empathic communication and improve the quality of diabetes education across diverse care settings.

Sick day management knowledge in adults with Type 1 and Type 2 Diabetes: A cross-sectional survey

Ng R¹, Schofield D², Gan S^{3,4}

¹South Metropolitan Health Service, Murdoch, Australia, ²Diabetes WA, Subiaco, Australia,

³Department of Endocrinology & Diabetes, Royal Perth Hospital, Perth, Australia, ⁴Medical School, The University of Western Australia, Nedlands, Australia

Background & Aim:

Acute illness is a common precipitant of metabolic complications in individuals with Diabetes. Appropriate medication counselling and sick day (SD) management, including medication adjustments, ketone monitoring and signs of complications are essential to reduce risk of complications such as Diabetic Ketoacidosis (DKA). This study aimed to assess SD management knowledge and practices in adults with Type 1 and Type 2 Diabetes Mellitus (T1DM, T2DM).

Methods:

An anonymous, cross-sectional online survey was administered to adults with T1DM and T2DM using Qualtrics. The survey link was disseminated through email, newsletters and social media. Participants were routed to Diabetes-type specific survey branches assessing Diabetes management, including medication use and SD management. Within the T2DM branch, subgroup analysis was performed for participants utilising sodium-glucose co-transporter 2 inhibitors (SGLT2i), assessing knowledge of medication-related adverse effects (AE) and SD practices.

Results:

262 participants (Female=55.7%; T1DM=26.3%; T2DM=72.9%) completed the survey, with 59% reporting diabetes duration greater than 10 years. Among participants with T1DM, 46% used automated insulin delivery and 38% used insulin injections with continuous glucose monitoring. 58% reported having a SD management plan, most commonly accessed via memory or written instructions. 23% did not check ketones during illness or significant hyperglycaemia. Among participants with T2DM, 24% were treated with insulin and 53% reported SGLT2i use. Awareness of SGLT2i-associated DKA was limited, with only 20% identifying ketoacidosis as an AE. 33% of participants reported no awareness of ketoacidosis. Among those aware of DKA, fewer than 40% were able to identify precipitating factors, indications for ketone testing, or strategies to minimise risk of ketoacidosis. Only 7% had a SD management plan in place.

Discussion / Conclusion:

Despite availability of SD management guidelines, implementation and recall is suboptimal across T1DM and T2DM, particularly among individuals treated with SGLT2i. This highlights the need for improved patient education and reinforcement around SD management and medication AE.

Knowledge, attitudes, and practices (KAP) regarding diabetes-related hearing loss among providers and patients: a scoping review

Nisar M¹

¹The University of Queensland, Brisbane, Australia

Aim/s

Hearing loss remains significantly under-recognised as a complication, despite people living with diabetes experiencing double the risk of sensorineural hearing impairment. This review synthesised healthcare provider and patient knowledge, attitudes, and practices (KAP) concerning diabetes-related hearing loss.

Methods

Using Arksey and O'Malley's framework and PRISMA-ScR guidelines, systematic searches were conducted across five databases (PubMed/MEDLINE, Embase, Scopus, Web of Science, Cochrane Library) through August 2025. Eligible studies examined KAP among healthcare professionals and people living with diabetes.

Results

Five studies from four countries reported KAP findings, encompassing 2,813 healthcare providers. Only one study included KAP data from people living with the condition. Knowledge deficits were pronounced: American provider awareness ranged 25.6–44.5%, contrasting with >94% awareness of other complications. Only 24.3% of Chinese providers demonstrated a complete understanding, while 59.7% of South African practitioners remained unaware of auditory complications. Knowledge among people with diabetes was similarly limited (21% recognition). Attitudes showed moderate engagement, with 68–75% of Chinese practitioners accepting management responsibilities. Barriers included unfamiliar guidelines and restricted audiological access. Practices were suboptimal: 16.9% conducted routine screening, and 64.9% never discussed hearing risks.

Conclusion

Substantial KAP deficits exist regarding diabetes-related hearing loss. Recognition disparities compared to established complications represent lost opportunities for early intervention. Urgent needs include standardised assessment instruments and comprehensive educational programs to integrate hearing health into standard management protocols.

Exercise knowledge, self-efficacy, and support needs of Australian females living with type 2 diabetes: a cross-sectional survey

O'Gorman S¹, Desjardins B², Keske M^{1,3}, Way K^{1,3,4}

¹Institute for Physical Activity and Nutrition, School of Exercise and Nutrition Sciences, Deakin University, Burwood, Australia, ²Faculty of Arts and Education, School of Humanities and Social Sciences, Deakin University, Burwood, Australia, ³Baker Heart and Diabetes Institute, Melbourne, Australia, ⁴Exercise Physiology and Cardiovascular Health Lab, Division of Cardiac Prevention and Rehabilitation, University of Ottawa Heart Institute, Ottawa, Canada

Background & Aim: Regular exercise is a core component of type 2 diabetes (T2D) self-management, yet most females with T2D do not meet recommended physical activity (PA) levels, and female-specific factors influencing exercise self-management remain poorly characterised. This project aimed to examine exercise knowledge, self-efficacy, and support needs of Australian females living with T2D.

Methods: A cross-sectional survey was conducted in Australia among females aged ≥ 18 years with self-reported T2D. Survey items assessed exercise-related self-management, including PA levels, self-efficacy, knowledge, information sources, barriers, facilitators, preferences, and goals. Data were analysed descriptively, with exploratory comparisons by age group (younger: 18–54 years; older: ≥ 55 years).

Results: Of 119 participants ($n=36$ younger, $n=83$ older), 57% indicated they were meeting PA guidelines, yet reported an average of 70 mins/week of moderate-to-vigorous PA. Most recognised exercise as important for weight management and glycaemic control but had limited knowledge of other exercise benefits, and lacked self-management skills, including monitoring exercise intensity and blood glucose, and recognising hypoglycaemic or hyperglycaemic events. General practitioners were the primary source of exercise information; few had engaged with exercise specialists or diabetes education and support programs, and 27% had never received exercise guidance. Exercise self-efficacy was low, with fewer than half believing they could meet PA guidelines. Common barriers included low motivation, time, and cost; younger females more often cited time and transport constraints, while older females highlighted insufficient social support and uncertainty around how to start exercising.

Discussion / Conclusion: Australian females with T2D have substantial gaps in PA guideline literacy, self-management skills, and self-efficacy, alongside limited access to specialist exercise support. These gaps may limit safe and effective exercise self-management, highlighting the need for exercise education and referral pathways that target females living with T2D. Delivery and support strategies should be tailored to age-specific barriers.

Patient-centred diabetes care by integrating eye, hearing, and foot health services

O'Shea C^{1,2}, Ramke J¹, Manuel A¹, Te Ao B¹

¹University Of Auckland, Auckland, New Zealand, ²Health New Zealand - Te Whatu Ora - Waikato Hospital, Hamilton, New Zealand

Background and Aim:

People with diabetes navigate complex care pathways across many providers. This complexity creates barriers to care, leading to increased complications. Integrated care is a key strategy for reducing the burden of care-seeking. This project aimed to explore audiology, optometry, podiatry provider perspectives of integrated care across diabetes, eye, hearing and foot health in Aotearoa New Zealand.

Methods:

Key informant interviews were conducted with audiology, optometry, and podiatry practitioners from three regions of Aotearoa New Zealand. Template analysis, a form of thematic analysis, was undertaken to identify the main themes. Interview questions explored views on integrated care, access and workforce.

Results:

Nineteen participants were interviewed: 7 Audiologists, 6 Optometrists, and 6 Podiatrists. Two themes were actively constructed from interviews, including '*Patient-centred management of complex conditions, through health education, care pathways and professional roles*' and '*Fragmented communication between providers; and consumers and providers*'. Providers identified the importance of delivering effective health education to improve awareness of conditions such as diabetes. Interviewees noted that primary care providers, such as GPs, have a limited understanding of allied health care pathways and referral processes, often resulting in referrals that were delayed or to the wrong service. Furthermore, the inefficient record sharing between providers is largely due to incompatible computer systems across the levels of care. For consumers, the scheduling of appointments was often unclear and complicated.

Discussion / Conclusion:

Changes to the delivery of care for consumers include improving communication through simple measures, such as telephone appointment reminders. Among providers, there were similarities regarding in-person contact to improve understanding of care pathways, the skills of allied health professionals, while trying to develop shared care opportunities, such as electronic health records. Integrating sensory health into diabetes care will improve patient-centred care and reduce the burden of further complications for people with diabetes.

Support provided to primary school staff caring for students with type 1 diabetes across Australia

Parke S¹, James S¹, Paterson M¹, Craft J²

¹School of Health, University of the Sunshine Coast, Petrie, Australia, ²School of Health, University of the Sunshine Coast, Caboolture, Australia

Background and Aim:

For children with type 1 diabetes (T1D) to achieve optimal glycaemic control during school hours, school staff must be adequately trained in related management. This study aimed to identify the training that school staff receive and related perceptions.

Methods:

Data were collected via an anonymous online questionnaire, advertised to Government primary and combined (primary and secondary), independent, and Catholic schools across Australia, via direct email. Associations with metropolitan vs. non-metropolitan locations were determined through Chi-square, Fishers Exact (using Bonferroni corrections when needed), and t-tests.

Results:

Fifty-five responses (85.5% female) were received from school staff (most involved in T1D management) across six Australian States; mean±SD age of children with T1D receiving care was 11.0±3.3 yrs. Respondents were employed at Government (32.7%) and private schools (67.3%); 26 were (47.3%) in metropolitan settings.

Training practices occurred yearly for most (71.4%); training from a clinician was more common in metropolitan settings (83.3% v 68.0%), with training also provided via online learning (57.1%) and from parents (53.0%). Some (n=10, 20.4%) learnt about T1D management through self-study.

Most advised their schools had T1D management plans relating to hypo- (95.9%) and hyperglycaemia (95.5%). Despite this, many reported not being able to administer Glucagon if needed (25.5%); the availability of at least one staff member at the school trained to administer this differed between non-metropolitan and metropolitan settings (72.0% v 27.3%, p=0.003).

Almost half (49.0%) had awareness of legal implications associated with providing T1D-related care. A similar proportion (44.4%) did not consider having students with T1D at their school to be a major challenge.

Discussion/ Conclusion:

Findings suggest that students with T1D may receive inconsistent related care across geographical settings, underscoring the need for more equitable support structures for school staff.

Continuous glucose monitoring–assisted remote dietetics for Type 2 Diabetes (CARE-T2D): Protocol for a randomised controlled trial

Tang W¹, Siviour Z¹, Roberts-Thomson K¹, D'Elia G¹, MacRae M¹, Sanderson B¹, Stewart J¹, Maggacis K¹, Flint S², Ng A³, Francois M⁴, Johnston R^{5,6,7}, McCaffrey T⁸, Holmes-Truscott E^{9,10}, Brennan L¹¹, Watson L¹², Silvestro V^{13,14}, Gibson A¹⁴, Hawley J^{1,15}, Forsyth A¹⁶, Hutchison A^{17,18}, Devlin B¹⁹, Parr E¹

¹Centre for Human Metabolism and Performance, Mary MacKillop Institute for Health Research, Australian Catholic University, Melbourne, Australia, ²Diabetes Technology Research Group, Department of Medicine, The University of Melbourne, Melbourne, Australia, ³Monash Centre for Health Research and Implementation (MCHRI), Monash University, Clayton, Australia, ⁴Faculty of Science, Medicine and Health, School of Medical, Indigenous and Health Sciences, University of Wollongong, Wollongong, Australia, ⁵School of Behavioural and Health Sciences, Australian Catholic University, Brisbane, Australia, ⁶SPRINT Research and Faculty of Health Sciences, ACU, Brisbane, Australia, ⁷Carnegie Applied Rugby Research Centre, School of Sport, Leeds Beckett University, Leeds, United Kingdom, ⁸Department of Nutrition, Dietetics and Food, Monash Univ, Clayton, Australia, ⁹School of Psychology and Institute for Health Transformation, Deakin University, Geelong, Australia, ¹⁰Australian Centre for Behavioural Research in Diabetes, Diabetes Victoria, Carlton, Australia, ¹¹School of Psychology and Public Health, La Trobe University, Wodonga, Australia, ¹²Northern Adelaide Local Health Network (NALHN), Adelaide, Australia, ¹³Western Sydney Diabetes, Integrated and Community Health, Western Sydney Local Health District, Westmead, Australia, ¹⁴Leeder Centre for Health Policy, Economics and Data, School of Public Health, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia, ¹⁵Department of Sport and Exercise Sciences, Manchester Metropolitan University Institute of Sport, Manchester, United Kingdom, ¹⁶School of Behavioural and Health Sciences, Australian Catholic University, Melbourne, Australia, ¹⁷School of Medicine, Adelaide University, Adelaide, Australia, ¹⁸Lifelong Health Theme, South Australian Health and Medical Research Institute, Adelaide, Australia, ¹⁹School of Human Movement and Nutrition Sciences, The University of Queensland, Brisbane, Australia

Background & Aim: Type 2 diabetes (T2D) is a chronic condition requiring intensive self-management to support optimal glycaemic outcomes and wellbeing. Continuous glucose monitoring (CGM) provides real-time feedback, that, when combined with education and support, may enhance T2D self-management. This study aims to evaluate the effect of CGM plus dietetic support (CGMD) versus dietetic support alone (DIET) on glycaemic management in adults with T2D over 26 weeks.

Methods: Guided by multidisciplinary investigator and community advisory groups, CARE-T2D is a two-arm, parallel-group randomised controlled trial recruiting 156 adults with T2D (HbA1c $\geq 7.0\%$) across Australia (NCT06888687). Social media and investigator contacts are used to disseminate study information prior to registering interest online. Eligible participants are randomised to CGMD or DIET groups, stratified by HbA1c and sex. Both groups receive four telehealth dietetic consultations over 16-weeks. Blinded CGM-sensors (FreeStyle Libre Pro iQ) are worn at baseline and post-intervention, with an additional mid-intervention CGM-sensor for DIET-group. The CGMD-group are provided unblinded sensors (FreeStyle Libre 2Plus) continuously (weeks 0-12) then intermittently (weeks 14-24). Assessments including blood tests, questionnaires, and diet recalls (Intake24-AUS) are collected at baseline, week-13, and week-26. The primary outcome is change in HbA1c at week-26. Secondary outcomes include change in HbA1c at week-13, and changes in CGM-derived metrics, and person-reported outcomes (e.g., dietary intake, diabetes distress) at 0-26 weeks.

Results: Recruitment opened in April 2025. As of March 2026, ~1400 individual responses have been received and 128 participants (82% of final cohort; ~9% of enquiries) have been randomised, with recruitment projected to be complete by end of March 2026.

Conclusion: Results from this study will determine whether CGM-assisted dietetic telehealth support is superior to telehealth dietetic care alone in improving HbA1c, as well as secondary clinical and person-reported outcomes, over 26-weeks in adults with T2D.

Diabetes and Wellness (DAWN): A co-designed digital pathway integrating mental wellbeing support into diabetes care

Partridge A¹, Rich J¹, Sampson D¹, Hure A¹, Taylor R¹, Southwell A², Parsons M², Acharya S²

¹University Of Newcastle, Callaghan, Australia, ²Hunter New England Health, New Lambton Heights, Australia

Background & Aim

People living with diabetes experience higher rates of depression and anxiety, than the general population, yet psychological wellbeing remains inconsistently integrated into diabetes care. In Australia, access to mental health support is limited by workforce shortages, geographic barriers, and stigma around help-seeking. The Diabetes Alliance Program Plus (DAP+) is a clinical and educational platform connecting specialist clinicians, general practitioners, and people with diabetes to support holistic care. DAWN is a DAP+ initiative: a digital wellbeing support for people living with diabetes.

Methods

DAWN; developed through a multidisciplinary co-design process involving clinicians, researchers, and people with lived experience of diabetes. Input from people with diabetes included a structured review of existing digital mental health programs with written feedback and a face-to-face consultation exploring needs and preferences.

Development was further shaped through consultation with the DAP+ Aboriginal Reference Group to review concepts and designs. Additional feedback came from demonstrations and discussions at engagement events and consultation with allied health, general practitioners, and mental health researchers.

Where stakeholder input was limited, decisions were guided by published literature and prior digital mental health research by the team. DAWN incorporates cognitive behavioural therapy, mindfulness, and motivational interviewing through interactive exercises, mood-tracking tools - brief self-guided modules.

Results

Consultation informed several key design changes. Mental health exercises were prioritised to provide immediate access to practical tools. Language was refined for sensitivity. Modules and activities were structured for flexible, non-linear use to reduce participation barriers. Visual imagery was diversified to reflect the diabetes community, and support services were manually curated to ensure relevant help-seeking pathways.

Discussion / Conclusion

DAWN illustrates how wellbeing support can be embedded within multidisciplinary diabetes care. Implementation within the DAP+ will assess engagement, use, and participant feedback.

Beyond blood sugar: Integrating digital mental health support into Diabetes Care Pathways

Partridge A¹, Rich J¹, Sampson D¹, Parsons M², Acharya S¹

¹University Of Newcastle, Callaghan, Australia, ²Hunter New England Health, Newcastle , Australia

Background & Aim

People living with diabetes experience disproportionately high rates of depression and anxiety, yet psychological wellbeing remains inconsistently addressed within routine diabetes care. In Australia, diabetes management is largely delivered through GP-led models that prioritise biomedical indicators such as HbA1c, blood pressure, lipid profiles, kidney function markers, and body weight, often leaving psychosocial needs under-recognised. Emerging evidence suggests that integrated and technology-assisted models of care may improve access to mental health support within diabetes services. This project aimed to examine existing models of care for adults with Type 2 diabetes and coexisting mental health concerns, and to translate these findings into the development of a digital mental health pathway for diabetes care.

Methods

A narrative scoping review was conducted following PRISMA-ScR guidelines to identify models of care addressing both diabetes management and mental health support in Australia. Peer-reviewed and grey literature published between 2015 – 2025 were searched across Scopus, Medline, EBSCO, and Australian health databases. Evidence was synthesised into three categories: GP-led care, integrated multidisciplinary models, and technology-assisted interventions.

Results

Thirty-five sources were included. GP-led care was widely implemented but often lacked capacity to address psychosocial needs due to time and resource constraints. Integrated multidisciplinary models improved psychological wellbeing and care coordination but were resource-intensive and unevenly distributed, particularly in rural and regional areas. Technology-assisted approaches, including telehealth, mobile health applications, and web-based cognitive behavioural therapy, demonstrated strong potential to improve accessibility, scalability, and patient engagement. These findings informed the development of DAWN (Diabetes and Wellness), a digital platform delivering low-intensity psychological support integrated within diabetes care pathways.

Discussion / Conclusion

Current literature finds that hybrid models combining clinical care with accessible digital support may strengthen person-centred diabetes care. Platforms such as DAWN offer a scalable approach to integrating mental health support into routine diabetes management and addressing the psychological burden of living with diabetes.

An integrated workforce support model for rural Diabetes care

Pascoe L¹, Mcdonell K¹

¹Rural Doctors Network, Dubbo, Australia

Background and Aim

Diabetes prevalence across Western and Far West NSW exceeds the national average, yet access to diabetes-skilled health professionals is limited. Rural clinicians face substantial barriers to postgraduate diabetes education. The Care Partnership - Diabetes program was established through collaborative commissioning to address these workforce constraints. This study examined how an integrated workforce support model influenced training progression and workforce readiness in rural and remote NSW.

Methods

A mixed-methods evaluation was conducted between 2023 and 2025 across Western and Far West NSW. The workforce model combined postgraduate scholarships with structured wraparound support, including mentoring, placement coordination, study-leave and travel bursaries, and locally delivered professional development. Aboriginal governance was embedded through co-designed diabetes education workshops delivered with Aboriginal health organisations and a university partner. Service-enhancement grants supported locally led models of care, including immersive mentoring, shared medical appointments, continuous glucose monitoring pilots, and patient re-engagement initiatives. A regional professional network supported peer learning and reduced professional isolation during training.

Results

Twenty health professionals commenced postgraduate diabetes education, with fourteen completing the qualification, an eighty percent progression rate. Six clinicians are practising as Credentialed Diabetes Educators, contributing to a projected 80% increase in regional credentialed capacity by 2026. Four Aboriginal Health Practitioners were supported through training pathways, including the first in the region to complete the qualification and progress toward credentialing hours. Outcomes included reduced withdrawal related to financial, logistical and placement barriers; increased completion of mandatory clinical placements; improved clinician confidence; strengthened cultural capability; and enhanced local service capacity, including improved re-engagement of people living with type 2 diabetes.

Conclusion

An integrated workforce support model improved workforce capacity and training progression in rural New South Wales, supporting more equitable access to diabetes care.

The person with diabetes – Understanding their inpatient experience

Payk M¹, Wang C¹, Hng T²

¹Western Sydney University, Campbelltown, Australia, ²Blacktown Mt Druitt Hospital, Western Sydney Local Health District, Blacktown, Australia

Background & Aim:

There is a high prevalence of diabetes in Western Sydney (13%) and inpatient estimates can vary between 12-45%. Inpatient management is challenging for clinical and non-clinical reasons. Hypoglycaemia remains a concern, particularly in individuals requiring insulin. The patient experience is not always at the forefront with sparse data available. We aim to understand the experience of the person with diabetes in hospital.

Methods:

English speaking adults with diabetes treated with insulin were targeted. Candidates were identified through the diabetes surveillance system and consented for a bedside survey which was based on the Queensland Inpatient Diabetes Survey. Data was stored in RedCap. Questions around communication, insulin therapy, diet, staff knowledge and involvement of care teams were assessed

Results:

50 individuals participated (24 female), 82% with Type 2 diabetes. Predominant ethnicities were Caucasian (50%), Asian (18%) and Pacific Islander (16%). Median age was 69 years. Participants were “very” (68%) or “somewhat” (20%) satisfied with their care. Self-injections, timing of insulin delivery, meal choices and communication were raised as issues.

Discussion/Conclusion:

The inpatient experience was overall positive. Exclusion of non-English speakers was a limitation. Areas for improvement were identified (communication, opportunities for self-injection, education). Feedback to staff will be implemented to improve future experiences.

Improving care for children with Type 1 diabetes living in rural Australia using a hybrid workforce model of care

Pedruzzi R², Smith C¹, Zurynski Y¹, Sotutu V⁵, Wijekulasuriya S¹, Huynh T⁴, West E⁵, Lee-Wesner C⁵, Carrigan A³

¹Macquarie University, North Ryde, Australia, ²Perth Children's Hospital, Nedlands, Australia, ³The University of Sydney, Sydney, Australia, ⁴Children's Health, Queensland Clinical Unit and Faculty of Medicine, The University of Queensland, , , Australia, ⁵Mount Isa Hospital, , Australia

Background & Aim: Diabetes contributes significantly to the burden of chronic disease in rural communities, where access to specialist services and multidisciplinary care is often limited. Hybrid workforce models that combine locally-based health professionals with fly-in clinicians from metropolitan centres are increasingly used to address workforce shortages in rural areas. This study evaluated a rural diabetes model of care delivered through collaboration between local staff and visiting metropolitan clinicians and explored the experiences of caregivers of children living with Type 1 diabetes and service staff.

Methods: Semi-structured interviews were undertaken with caregivers and staff involved in diabetes care. The model of care involved locally-based clinicians providing ongoing care, supported by fly-in diabetes specialists from a metropolitan health service. All staff and caregivers were invited to participate. Interviews explored experiences of the model of care, including access to services, collaboration between local and visiting clinicians, and barriers and enablers to service delivery. Interview transcripts were analysed using inductive and deductive thematic analysis.

Results: All six staff and three caregivers (38% of eligible caregivers) were interviewed. Strengths of the model of care included increased collaboration between local and visiting clinicians fostering strong team integration and supporting multidisciplinary care, as well as knowledge sharing and upskilling of local staff. Caregivers reported improved access to specialist expertise and education for diabetes self-management. Clinicians and caregivers identified the physical space available for service delivery as a challenge. Service staff also highlighted difficulties arising from incompatible data systems between the local and visiting health services, which affected information sharing and care coordination.

Discussion / Conclusion: A hybrid workforce model of care combining local staff with fly-in metropolitan clinicians can strengthen multidisciplinary care and access to diabetes specialist expertise. Addressing infrastructure and data system integration may further enhance the effectiveness and sustainability of rural diabetes services.

Resources to support families navigating early-stage Type 1 Diabetes: Outcomes from a scoping review and critical appraisal

Pedruzzi R^{1,2}, Boggiss A^{1,2}, Black S^{1,3}, Bebbington K^{1,2}, Smith C⁴, Tully A¹, Cromb L¹, Taplin C^{1,3,5}, Zurynski Y⁴, Davis L^{1,3,5}, Haynes A^{1,2}

¹Children's Diabetes Centre, The Kids Research Institute Australia, Nedlands, Australia, ²Centre for Child Health Research, The University of Western Australia, Perth, Australia, ³Department of Endocrinology and Diabetes, Perth Children's Hospital, Nedlands, Australia, ⁴Centre for Healthcare Resilience and Implementation Science, Australian Institute of Health Innovation, Macquarie University, Sydney, Australia, ⁵Paediatrics, UWA Medical School, The University of Western Australia, Perth, Australia

Background & Aim: Advances in understanding of type 1 diabetes (T1D) natural history have enabled screening for islet autoantibodies and the detection of pre-symptomatic (early-stage T1D) prior to clinical presentation and the need for insulin replacement therapy. As screening programs expand, increasing numbers of children are being identified with early-stage T1D creating a pressing need for relevant, accessible, evidence-based educational resources. Due to the rapidly changing paradigm of T1D care in such settings, many healthcare professionals currently lack awareness or guidance on which educational resources to recommend to families. To date, no review has systematically identified and evaluated educational resources for families navigating early-stage T1D or healthcare professionals supporting them. This scoping review aims to: (1) systematically identify and evaluate educational resources for early-stage T1D, (2) assess their readability, understandability, quality, and credibility, (3) create an inventory of resources consistent with current care and health literacy guidelines, and (4) identify resource gaps and priorities for future development

Methods: A comprehensive search of peer-reviewed and grey literature databases (MEDLINE, Google, professional organizations, advocacy groups, research consortiums, and screening programs) is currently underway to identify English-language resources (factsheets, websites, videos, infographics). Eligible resources will undergo standardised assessment using validated tools for readability, understandability, information quality, and credibility.

Results: Expected outputs include descriptive summaries and structured appraisal findings across readability, understandability, information quality, and credibility. The review will begin in March 2026, with completion expected by August 2026.

Discussion / Conclusion: This study is the first scoping review to systematically compile and appraise educational resources for early-stage T1D. The findings will offer a clear overview of the current resource landscape, identify gaps, and provide a foundation for future development and co design of fit for purpose materials.

Predictors of medication adherence among family caregivers of people with schizophrenia and type 2 diabetes mellitus in Thailand

Phoosuwan N¹, Detworawatin P², Srichaijaroonpong S²

¹Faculty of Public Health, Thammasat University, Pathum Thani, Thailand, ²Faculty of Public Health, Kasetsart University, Sakon Nakhon, Thailand

Background & Aim: Medication adherence is a challenge in treatment of people with schizophrenia and type 2 diabetes mellitus (T2DM). Family caregivers (FCGs) are responsible persons for medical management and need known predicting factors to their medical adherence. Therefore, predictors of medical adherence among FCGs of people with schizophrenia and T2DM were identified.

Methods: An institution-based cross-sectional study was carried out among 530 FCGs of people with schizophrenia and T2DM receiving psychiatric care in community hospitals in seven Northeast provinces in Thailand. Data were collected using a validated questionnaire to identify predictors (i.e sociodemographic characteristics, patient factors, and caregiver-related psychosocial factors) of medical adherence as an outcome. Analysis was subjected to multivariable linear regression with a significance level of 0.05.

Results: Predictors for medical adherence among FCGs included patient predictors (marital status, monthly income), FCG predictors (monthly income, information from internet, mental health literacy, gender, sense of coherence) and treatment predictor (appropriate treatment regimen). This model could explain 42% of predictors for FCG medical adherence.

Discussion / Conclusion: Medication adherence of FCGs are influenced by patient factors, FCG factor, and treatment factors. To improve medical adherence among FCGs, interventions targeting the FCGs are in need, such as self-efficacy improvement program among FCGs. Income factors both the patients and FCGs need to be considered in long term, while socioeconomic contexts and community mental health should be improved.

Implementing and evaluating a Diabetes Nurse Practitioner (DNP) led diabetes clinic at Western Health

Preston C^{1,2}, Zhao S¹, Barmanray R^{1,2}, Kevat D^{1,2}

¹Western Health, Melbourne, Australia, ²The University of Melbourne, Melbourne, Australia

Background & Aim:

The prevalence of diabetes is increasing, affecting 8.3% of adults globally, and an even higher proportion of patients from lower socioeconomic backgrounds. This contributes to delayed access to care, particularly in health services serving culturally diverse populations. Nurse-led models of care, implemented alongside standard outpatient services, can improve equitable healthcare delivery, and expedite care in more severe cases. This study aimed to design and implement a novel DNP-led clinic at Western Health, to improve the delivery of care to people living with diabetes in Melbourne's west.

Methods:

The study was prospectively approved by the Western Health Low Risk Ethics Panel (LR/24/WH/112960) and the clinic co-designed with key stakeholders. Patients are seen up to three times by a credentialed DNP to initiate and optimise best-practice, guideline-directed diabetes care, prior to either returning to primary care or being transferred for ongoing specialist care as required. A clinical audit was designed to describe the patient cohort at baseline and their final visit, alongside an optional patient survey. Changes over time in clinical parameters and medication prescribing will be analysed, along with survey responses assessing patient satisfaction with the service.

Results:

The clinic commenced in October 2025, initially operating monthly, then increasing to fortnightly from early 2026. Here we will present our interim results to August 2026, comprising baseline patient demographics and early optimisations to patient care, including glycaemic control and other clinical parameters, along with changes in diabetes distress.

Discussion / Conclusion:

The demand for diabetes care is currently growing faster than the capacity of existing models of care to accommodate new patients. Novel approaches are therefore required to address this issue, with DNP clinics offering one potential, scalable solution. Data collection is ongoing, and will enable valuable insights into the feasibility, efficacy, and acceptability of such models of care.

Factors predicting social support, self-care management, sense of coherence, and attitude among persons with type 2 diabetes mellitus in Thailand

Pusuwan P³, Phoosuwan N⁴, Nonthunha N², Phoosuwan N¹

¹Faculty of Public Health, Thammasat University, Pathum Thani, Thailand, ²Faculty of Public Health, Kasetsart University, Sakon Nakhon, Thailand, ³University of Phayao, Phayao, Thailand, ⁴Pathum Thani Provincial Administrative Organization, Pathum Thani, Thailand

Background & Aim: Globally, the prevalence of persons with type 2 Diabetes Mellitus (T2DM) remains increasing, including Thailand. Challenges among persons with T2DM include: lack of social support (SS), low self-care management (SCM), low sense of coherence (SOC), and low attitude towards diabetes management, resulting in glucose management. This community-based cross-sectional study identified factors predicting SS, SCM, SOC and attitude among persons with type 2 diabetes mellitus in Thailand.

Methods: There were 276 persons with type 2 diabetes mellitus recruited from a rural community in Northeast province in Thailand. Data were collected using a questionnaire and were analysed using descriptive (e.g. mean, frequency) and inferential statistics (e.g. multivariable regression analysis). A significance level set at 0.05.

Results: Factors associated with social support included treatment with two types and having family history of diabetes, whilst with self-care management were having employment, having no complication, and regular weekly exercise. Oral medication, regular weekly exercise, and smoking were associated with sense of coherence, whereas a better attitude was associated with lower education, no employment and higher income.

Discussion / Conclusion: There are many modifiable factors associated with social support, self-care management, sense of coherence, and attitude, especially regular weekly exercise. Therefore, an intervention targeting lifestyle modifications is essential, while socioeconomic characteristics play main role for persons with T2DM and need community-based health consideration.

Surveys of health concerns of adults with Type 1 diabetes (T1D)

Rahman A^{1,3,13}, Seger M^{3,2,4,1}, Ryan C^{2,1}, Januszewski A^{5,6,7}, Kilov G^{1,7,8,9}, MacIsaac R^{3,5,10}, Ludvigsson J⁴, O'Neal D^{3,5,10}, Vinkatesh N¹, Elghattis Y¹, Huang M¹, Nanayakkara N¹, Boyle E¹, Senevirathna P¹, Cohen N¹, Jenkins A^{3,2,1,5,10,11}

¹Baker Heart & Diabetes Institute, Melbourne, Australia, ²University of Melbourne, Faculty of Medicine, St Vincent's Clinical School, Fitzroy, Australia, ³Dept. of Endocrinology and Diabetes, St. Vincent's Hospital, Fitzroy, Australia, ⁴Crown Princess Victoria Children's Hospital and Div of Pediatrics, Dept of Biomedical and Clinical Sciences, Linköping University, Linköping, Sweden, ⁵University of Melbourne, Department of Medicine, St. Vincent's, Fitzroy, Australia, ⁶NHMRC Clinical Trials Centre, The University of Sydney, Camperdown, Australia, ⁷Sydney Pharmacy School, The University of Sydney, Camperdown, Australia, ⁸University of Melbourne, Department of General Practice, Parkville, Australia, ⁹Launceston Diabetes Clinic, Launceston, Australia, ¹⁰Australian Centre for Accelerating Diabetes Innovations, School of Medicine, University of Melbourne, Parkville, Australia, ¹¹Monash University, Faculty of Medicine, Melbourne, Australia, ¹²School of Public Health and Preventive Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, ¹³School of Biomedical Sciences, Faculty of Medicine, University of Melbourne, Parkville, Australia

Background: Understanding the health concerns of people with T1D is critical for informing patient-centred care, resource allocation, health policy and research, yet few studies have been conducted. Investigators and adults with T1D developed a survey regarding 16 areas of health and free text comment options for completion by paper or digital format. We aimed to assess the health concerns of adults with T1D.

Methods: Ethics approval was obtained. Adults ≥18y.o. attending clinics at St. Vincent's Melbourne or the Baker Heart and Diabetes Institute completed an anonymous 16-question survey. They ranked their concern about each factor using a Likert Scale from 1 (not worried) to 5 (extremely worried). Data were stored in REDCap™ databases.

Results: In an ongoing survey initial results are from 139 adults, 58% female, median (IQR) age 44 (33-57) years, T1D duration 25 (13-37) years, 58% insulin pump users, 94% continuous glucose monitor users.

TABLE: Top nine health concerns for all and by age group tertiles

	ALL (n=143)	18-36 yrs, n=48	37-51 yrs, n=48	≥52 yrs, n=47
1	Eye Damage	Mental Health	Eye Damage	Eye Damage
2	Affording Care	Affording Care	Affording Care	Kidney Damage
3	Mental Health	Eye Damage	Kidney Damage	Glucose Levels
4	Kidney Damage	Glucose Levels	Memory Problems	Heart Health
5	Independence loss	In-hospital glucose	In-hospital glucose	Independence loss
6	Heart Health	Kidney Damage	Mental Health	Memory issues
7	In-hospital glucose	Heart Health	Independence loss	Affording Care
8	Glucose Levels	Independence loss	Heart Health	Stroke
9	Memory Problems	Foot Complications	Glucose Levels	In-hospital glucose

Conclusion: Top concerns included end-organ damage, mental health and affording care. Generally, younger adults were most concerned about mental health, care affordability and chronic complications. Older adults were most concerned about chronic complications, care affordability and glycaemia.

Early outcomes, retention, and programmatic impact of newly established CDiC Centres for Childhood Diabetes in Bangladesh

Rahman M¹, Habib M², Huda K¹, Ahmed B¹, Zabeen B¹

¹BADAS-PDRC, Diabetic Association of Bangladesh, Dhaka, Bangladesh, ²BADAS TB Initiative Program, Diabetic Association of Bangladesh, Dhaka, Bangladesh

Background & Aim:

Evidence on the performance of newly decentralized childhood diabetes services in resource-limited settings remains limited. This study aimed to evaluate early clinical outcomes, retention, and programmatic impact during the first year of operation of four newly established Changing Diabetes in Children (CDiC) centres in Bangladesh.

Methods:

This prospective observational study included 216 participants enrolled from March 2024 onward and followed for up to one year. Outcomes assessed before and after six months of follow-up included glycated haemoglobin (HbA1c), total daily insulin dose (TDD), diabetic ketoacidosis (DKA), mortality, and program retention. Paired analyses assessed within-participant changes, and multivariable logistic regression identified factors associated with retention beyond six months.

Results:

Most participants had type 1 diabetes (93.1%), and females constituted the dominant group (63%). Among those with paired HbA1c measurements (n=76), mean HbA1c improved significantly from 11.5% to 10.1% (p<0.001). Participants with paired insulin dose data (n=119) showed a significant reduction in TDD (mean decrease -3.53 units/day; p=0.026). The proportion experiencing DKA declined from 5.6% to 0.9% (p<0.001). Retention beyond six months was 44%, and overall mortality was 1.4%. Program-supported HbA1c testing was used by 68.1% of participants, compared with 3.7% undergoing self-funded C-peptide testing. HbA1c monitoring was independently associated with retention beyond six months (OR 11.7; p<0.001).

Conclusion:

Newly established CDiC centres achieved early improvements in glycaemic control and reductions in acute complications. The substantially higher uptake of program-supported diagnostics highlights the critical role of financial support in sustaining engagement and retention in decentralized childhood diabetes care in resource-constrained settings.

Risk factors associated with delivery of small-for-gestational-age (SGA) infants in women with Gestational diabetes Mellitus (GDM)

Rajanayagam S¹, Premaratne E^{1,2,3}, Choong C¹

¹Northern Health, , Australia, ²Austin Health, , Australia , ³University of Melbourne , , Australia

Background:

Small-for-gestational age is associated with higher morbidity and mortality as well as increased risk of metabolic disease in adulthood. However, management of GDM is largely focused on glycaemic control, with a view to reduce the occurrence of large-for-gestational-age (LGA) infants. Despite the clinical importance of SGA outcomes, risk factors for SGA delivery among women with GDM remains insufficiently understood.

Aim:

The primary aim of this study was to identify risk factors associated with having a SGA infant in GDM pregnancies.

Methods:

We conducted a retrospective audit of 425 GDM pregnancies resulting in live births at a single tertiary hospital between 1 February 2024 and 31 December 2024. The cohort consisted of 60% Asian (mean BMI 27.3), 20% Caucasian (mean BMI 33.3) and 19% Middle Eastern (mean BMI 29.9) women. Infants were classified as SGA if their birth weight was <10th percentile for gestational age and sex according to WHO growth standards. Multivariable logistic regression analysis was performed to identify independent risk factors associated with the delivery of a SGA newborn.

Results:

11.8% of women delivered SGA infants. A prior history of SGA was associated with a subsequent SGA baby (OR 17.09, P <0.001, 95% CI: 4.39-66.46). The first live born of a GDM pregnancy also had a higher association with SGA (OR 10.13, P 0.001, 95% CI: 2.71-37.86). Lower pre-pregnancy body mass index was associated with SGA in univariate analysis; but not after multivariable adjustment. Gestational weight gain, smoking, and oral glucose tolerance test values were not associated with SGA outcomes.

Discussion and Conclusion:

The strongest associations of a delivery of a SGA infant in this study was a prior history of a SGA infant and being the first live-born of a mother with GDM.

Inter-service collaboration to improve diabetes care for Aboriginal communities in Western Sydney: A six-year process evaluation

Ratnayake A¹, Cashman B², Gupta A^{3,4}, Tolar H¹, Meyerowitz-Katz G^{1,5}, Maberly G^{1,5}

¹Western Sydney Diabetes, Integrated & Community Health, WSLHD, Blacktown, Australia,

²Aboriginal Executive Unit, WSLHD, Westmead, Australia, ³Department of Diabetes and Endocrinology, Blacktown Mt Druitt Hospital, WSLHD, Blacktown, Australia, ⁴University of Western Sydney, Campbelltown, Australia, ⁵University of Sydney, Sydney, Australia

Background & Aim:

Western Sydney has one of Australia's largest urban Aboriginal populations and a diabetes prevalence approximately 50% higher than non-Aboriginal communities. Prior to 2019, diabetes services were fragmented across health and community sectors. In response, an Aboriginal-led Diabetes and Aboriginal Health Steering Committee was established to coordinate culturally safe prevention and care. This study reports a mixed-methods process evaluation of implementation, reach and system integration from 2019–2025.

Methods:

Quantitative data were extracted from routine service records, attendance registers and program reports, including education sessions, community events and clinical outreach. Qualitative data from meeting minutes, program documentation and stakeholder feedback were thematically analysed to examine governance, partnerships and enablers of collaboration.

Results:

Over six years, more than 100 education and engagement activities were delivered, reaching approximately 550 Aboriginal community members and over 50 healthcare providers. Coordinated service outputs included monthly diabetes-in-pregnancy outreach clinics (>120 visits), diabetes education programs at Aboriginal Medical Service, Elders groups and NAIDOC events, community engagement at Elders Olympics, Koori Cook-Off, Western Sydney Koori Interagency and Literacy for Life Foundation (>350 participants) and a Close the Gap Day 2024 with expo, diabetes detection through HbA1c and a walk (>100 participants). System developments included culturally tailored nutrition programs, establishment of a dedicated Aboriginal diabetes clinic, integration of Aboriginal health priorities into professional education, and establishing the Diabetes Yarning program funded by National Diabetes Services Scheme. Qualitative findings identified Aboriginal leadership, shared governance and sustained inter-organisational relationships as central to implementation success.

Conclusion:

An Aboriginal-led, multi-sector collaboration can shift fragmented services toward coordinated, culturally safe pathways for diabetes prevention and management in urban settings. While this evaluation focuses on service reach and system integration rather than clinical outcomes, the model aligns with Closing the Gap priorities and integrated care reforms, providing a practical framework for strengthening access and engagement through community-governed partnerships.

Enabling virtual diabetes care using the COM-B Model in a high-need population

Ravi S^{1,2}, Ayre J², McCaffery K², Maberly G^{1,2}, Bonner C²

¹Western Sydney Diabetes, Western Sydney Local Health District, Blacktown, Australia, ²Sydney Health Literacy Lab, Faculty of Medicine and Health, The University of Sydney, Camperdown, Australia

Background

Virtual diabetes care has rapidly expanded during and following COVID, however sustained engagement and effectiveness vary. In Western Sydney, a multicultural region with a high diabetes burden, virtual care was implemented as a multi-component integrated model including: a Diabetes Priorities Questionnaire (DPQ) to capture patient needs; virtual GP specialist case conferencing involving patients; short-term continuous glucose monitoring (CGM); a self-management app; and delivery of tailored digital education. The COM-B (Capability, Opportunity, Motivation - Behaviour) model was applied to synthesise the evidence to understand implementation and outcomes.

Methods

Mixed methods across linked studies undertaken between 2021 and 2025:

- (1) A systematic umbrella review of virtual diabetes care interventions;
- (2) Codesign of the DPQ with patients and clinicians; and
- (3) Real-world evaluation of model uptake, patient priorities and clinical outcomes.

Quantitative outcomes included HbA1c, weight and DPQ completion metrics. Qualitative outcomes were mapped to COM-B domains.

Results

Capability related barriers identified for patients through the DPQ included limited diabetes knowledge, difficulties managing hypoglycaemia, fear of injections and high emotional burden (56% (n=136) reporting stress), illustrated the types of behavioural challenges revealed through this model. Opportunity enablers included community-based access, virtual case conferencing, CGM informed care and digital tools associated with significant improvements in HbA1c (-1.3%) and weight (-2 kg) at 3 months (n=110). Technology usability and virtual communication remained ongoing challenges. Motivation was enhanced through shared decision-making, multidisciplinary care, and codesigned digital tools that prioritised patient concerns; 64% (n=136) of studied patients requested targeted education.

Conclusion

Effective virtual diabetes care requires simultaneous attention to behavioural capability, system opportunity and motivational drivers. Behaviourally informed, codesigned digital tools embedded within integrated virtual care models can identify and address implementation barriers and support sustainable engagement and clinical improvement in high-need communities.

Exploring participants' experiences in a diabetes self-management education program in Trinidad and Tobago

Richards Adams I¹, Granderson I², Martin J³

¹The Ohio State University, Columbus, United States, ²The University of the West Indies, St. Augustine, Trinidad, ³University of Kentucky, Lexington, United States

Diabetes represents a major public health concern in the Caribbean, with Trinidad and Tobago (T&T) reporting an adult diabetes prevalence of 12.4%, contributing to significant healthcare costs and reduced quality of life. Diabetes Self-management Education (DSME) programs support the prevention and management of type 2 diabetes mellitus (T2DM), yet culturally relevant DSME interventions remain limited in T&T. This project explored participant experiences living with diabetes and perceptions of the “Taking Ownership of Your Diabetes” (TOYD) program following previously demonstrated improvements in diabetes self-management behaviors.

The TOYD curriculum was based on the National Diabetes Education Program, 4 Steps to Control Your Diabetes. For Life., the Stages of Change Model, and a critical thinking framework. Originally developed through the University of Kentucky Cooperative Extension Service, the curriculum was culturally adapted and translated for adults living with T2DM receiving care at health centers in Trinidad’s North Central and Eastern regions. Participants attended six interactive diabetes education sessions focused on understanding diabetes, healthy eating, blood glucose monitoring, and routine diabetes care.

An exploratory qualitative follow-up using focus groups was conducted with a purposive subsample of participants (n=4). Data were analyzed using inductive content analysis to better understand participant experiences living with diabetes and participation in the TOYD program.

Four themes emerged: (1) emotional distress and fear following diagnosis; (2) family history and intergenerational experiences with diabetes; (3) increased awareness and self-management confidence; and (4) appreciation for the supportive and interactive nature of the program. Participants described improved understanding of diabetes, healthier food choices, greater use of food labels, and increased confidence managing their condition. Participants also valued the nonjudgmental and supportive learning environment and expressed a desire for continued follow-up and support.

Future programs should emphasize cultural relevance and provide emotional, behavioral, interactive, and ongoing support for people living with diabetes.

Listening to and learning from voices of adults living with type 1 diabetes who took part in an online program to reduce fear of hypoglycaemia.

Robinson A^{1,2}, Halliday J^{1,2}, Cadzow P³, CriadoPerez C³, Rogers C³, Sladic J³, Skinner T^{2,4}, Holmes-Truscott E^{1,2}, Speight J^{1,2}

¹The Australian Centre for Behavioural Research in Diabetes, Diabetes Victoria, Carlton, Australia,

²Institute for Health Transformation and School of Psychology, Deakin University, Burwood,

Australia, ³HypoPAST T1D Lived Experience Steering Group, Australia, ⁴School of Psychology, Deakin University, Burwood, Australia

Background & Aim:

Fear of hypoglycaemia (FoH) is common among people with type 1 diabetes (T1D), associated with severe hypoglycaemia, and negatively affects quality of life and diabetes self-management. HypoPAST – an online, self-paced, self-directed psycho-educational program for adults with T1D – was developed as an alternative to conventional group-based, in-person FoH support. In a 6-month, two-arm, parallel-group, hybrid type 1 randomised controlled trial (RCT, n=219), HypoPAST reduced severe hypoglycaemia and daily insulin units, despite no effect on FoH. This qualitative sub-study aimed to explore users' engagement with and perceptions of HypoPAST.

Methods: Australian adults with T1D reporting worries about hypoglycaemia were eligible for the HypoPAST RCT. Intervention arm participants (n=108) were eligible for this qualitative sub-study if they engaged in at least two (of eight) program modules (n=25). Semi-structured, audio-recorded telephone interviews were conducted at end-trial with 18 participants (median age: 40 (range: 25-81) years; T1D duration: 15 (0-62) years). Interview transcripts were analysed inductively and thematically.

Results: Five key themes were identified. Engaged participants 1) fit the program into their lives; 2) tailored their access to the program; 3) chose which modules to access; 4) chose how to interact with program content, with wide variation in preferences; and 5) used learnings from the program to enhance their diabetes self-management in varied ways.

Discussion / Conclusion: Adults with T1D and FoH who engaged with HypoPAST appreciated its self-directed design and selectively engaged with content aligned with their priorities. This pattern reflects these participants' well-developed health decision-making and information appraisal skills, perhaps shaped by living with a predominantly self-managed condition. Findings support accessible, flexible, and self-directed designs of online psycho-educational interventions for adults with T1D, although noting engagement was variable and results reflect the experiences of participants who engaged in the program.

OzDAFNE@home: Increasing the reach of evidence-based type 1 diabetes education and support.

Robinson J¹, Cox M¹

¹Diabetes Victoria, Carlton, Australia

Background & Aim: DAFNE stands for Dose Adjustment For Normal Eating. Developed in the UK, it was introduced in Australia as OzDAFNE in 2005 and is coordinated in Australia and New Zealand by Diabetes Victoria.

OzDAFNE is the only evidence-based structured group education program for adults living with type 1 diabetes available in Australia.

OzDAFNE has been shown to:

- reduce hospitalisations for DKA
- reduce severe hypoglycaemia
- reduce HbA1c in those above target
- Improve quality of life.

Until 2021 the program was only available face-to-face, providing limited opportunity to those hindered by geography, cost of travel, work hours, family commitments and of course the Covid pandemic.

In 2021, Diabetes Vic undertook a project to develop an online OzDAFNE program, aiming to increase the reach of OzDAFNE whilst maintaining positive outcomes for participants.

Reference:

Speight J, Holmes-Truscot, E, Harvey DM., Hendrieckx C, Hagger V.L., Harris SE, Knight BA., McIntyre HD. Structured type 1 diabetes education delivered in routine care in Australia reduces diabetes-related emergencies and severe diabetes-related distress: The OzDAFNE program. Diabetes Res Clin Pract 2016:65-72

Methods; The curriculum, resources and online learning modules were developed by experienced OzDAFNE Facilitators based on best practice principles for online learning, DAFNE UK curriculum and resources, and in consultation with an expert reference group which included OzDAFNE graduates with lived experience. Three pilot programs were delivered in 2021/22. Pre- and post-program evaluation and PAID questionnaires were conducted

Results: Program evaluation indicated high levels of satisfaction with the facilitators and group support; increased confidence in carbohydrate counting and insulin assessment and adjustment; and importantly a decrease in diabetes burden.

Discussion/Conclusion: These outcomes are reflective of the positive impacts of the OzDAFNE program for participants, while increasing reach and accessibility.

Following the pilot, OzDAFNE@home was added to the suite of OzDAFNE programs. Since 2021, 203 people have participated. Positive feedback continues, with a Net Promoter Score of 89.

We continue to seek funding to complete an audit of the biomedical and psycho-social outcomes.

Pilot testing of the DiabHQ app to support families living with T1D: A mixed methods study

Rojas Wood E¹, Pedruzzi R¹, Clapin H¹, Jones T^{1,2,3}, Davis E^{1,2,3}

¹Children's Diabetes Centre, The Kids Research Institute Australia, Nedlands, Australia, ²Department of Endocrinology and Diabetes, Perth Children's Hospital, Nedlands, Australia, ³Division of Paediatrics within the Medical School, the University of Western Australia, Crawley, Australia

DiabHQ is an app designed to support Western Australian families living with Type 1 Diabetes (T1D). DiabHQ offers functionality including data visualisation (HbA1c trend, growth charts, pathology results), access to educational resources, appointment management, and triage support. Prior to widespread launch, 38 individuals were recruited to pilot the app over a 16-week period. Mixed methods research assessed acceptability, usability, and perception of the impact of DiabHQ on aspects of T1D management. To date, 28 caregivers (Mean age = 44.96, *SD* = 6.35; 96% female) have provided pilot data. System Usability Scale results suggest an 'excellent' usability rating with a median score of 82.50 (range 62.50-100). Participant ratings regarding the impact of DiabHQ are shown in Table 1. App usage statistics and interview data indicate that caregivers most frequently use DiabHQ to prepare for appointments and to access T1D resources. Participants have emphasised the need to integrate two-way communication and additional data sources (diabetes devices, activity monitors) into the app. DiabHQ has demonstrated high usability and acceptability among participants - likely related to the iterative co-design approach used throughout development. Future iterations of DiabHQ should be trialled more broadly to determine how well the app meets diverse patient needs.

Table 1.

Frequency table for items used to evaluate the impact of DiabHQ

	Strongly Disagree / Disagree	Neither Disagree nor Agree	Agree / Strongly Agree
Statement	n (%)	n (%)	n (%)
I have been using DiabHQ		2 (7%)	26 (93%)
DiabHQ has made it easier to find trusted information and resources about T1D	2 (7%)	6 (21%)	20 (72%)
DiabHQ has made it easier to access the help I need from the clinic team	2 (7%)	9 (31%)	17 (62%)
DiabHQ has made it easier to keep track of test results related to T1D		2 (7%)	26 (93%)
DiabHQ has made it easier to share information about T1D management when I need to	1 (3%)	13 (45%)	14 (52%)
DiabHQ has improved my confidence managing T1D	3 (10%)	15 (55%)	10 (34%)
DiabHQ helps me feel prepared when I attend clinic appointments	2 (7%)	7 (24%)	19 (69%)
I have concerns about the security or privacy of DiabHQ	25 (86%)	3 (14%)	
Using DiabHQ is more efficient than what I did previously		4 (17%)	24 (83%)

A new era in diabetes education: Qualitative insights into diabetes educators' recognition of and response to Type 5 Diabetes

Romadlon D¹, Kurniawan R²

¹Faculty Nursing of Chulalongkorn University, Bangkok, Thailand, ²Diabetes Connection Care, Eka Hospital Bumi Serpong Damai, Tangerang, Indonesia

Background and Aim: The formal recognition of type 5 diabetes by the International Diabetes Federation in 2025 presents significant implications for healthcare professionals, particularly diabetes educators. This study investigates educators' perspectives and adaptive responses to this emerging category, emphasizing its relevance among undernourished populations in low-resource contexts.

Methods: This study adopted a qualitative descriptive design, utilizing semi-structured interviews with 16 certified diabetes educators in Indonesia, including nurses, nutritionists, pharmacists, and physicians. Data collection took place in April and May 2025, and thematic analysis was performed in accordance with Braun and Clarke's methodological framework. The study received ethical approval (Approval No. 3161/UN25.8/KEPK/DL/2025).

Results: Four themes were identified: (1) *Early-Stage Awareness*, in which educators were initially unfamiliar with the classification yet recognized comparable clinical presentations; (2) *We're Not Prepared*, underscoring deficiencies in training and resources; (3) *Context Matters*, associating type 5 diabetes with malnutrition and socioeconomic disparities; and (4) *Ready to Respond, If Equipped*, reflecting educators' willingness to respond effectively if supported with appropriate training. Participants also stressed the importance of national educational initiatives, culturally tailored materials, and cross-sector collaboration.

Discussion/Conclusion: Despite limited preparedness, educators demonstrate a clear willingness to engage. Strategic training, culturally responsive materials, and coordinated support are vital to optimizing educational efforts. Further research is needed to evaluate the effectiveness of these approaches in varied settings.

Keywords: *Type 5 diabetes; malnutrition-related diabetes; diabetes education; qualitative research; health equity*

Integrating education and quality improvement within the Diabetes Alliance Program Plus to improve diabetes care in general practice

Ross-Evans S¹, Acharya S¹, Hure A², Southwell A¹, Parsons M¹, Joseph M¹

¹Hunter New England/ Diabetes Alliance Program +, Newcastle, Australia, ²University of Newcastle, Newcastle, Australia

Background and Aim

The Diabetes Alliance Program Plus (DAP+) was developed to strengthen diabetes care in general practice through an integrated model combining multidisciplinary case conferencing, structured clinician education, and data-driven quality improvement (QI). This evaluation examines the uptake, acceptability, and early impact of lunch-time education and QI activities embedded within DAP+ case conferencing clinics, with a focus on improving care for people living with diabetes.

Methods

DAP+ is implemented across general practices within the Hunter New England Local Health District (HNE-LHD). During each practice's case conferencing day, a structured lunch-time education and feedback session is delivered to the practice team. De-identified PenCAT audit reports are reviewed, identifying gaps in care, and practices select priority QI activities tailored to their patient cohort. These actions are embedded into routine workflows. Six-month follow-up clinics include repeat case conferencing and review of updated data. Program uptake, clinician engagement, and evaluation feedback are being collected, with data collection ongoing.

Results

In 2025 alone, over 220 clinicians across the HNE LHD participated in DAP+ case conferencing clinics with integrated lunch-time education and QI activities. Early findings demonstrate strong uptake and high acceptability. Since evaluation commenced, all participating GPs (100%, n=9) and Practice Nurses (100%, n=3) reported increased confidence in managing diabetes. The lunch-time session received a mean satisfaction rating of 9.7/10 (n=14). Most clinicians reported increased capacity to initiate insulin therapy (10/14) and optimise other diabetes medications (11/14), supporting timelier guideline-based care. Six-month PenCAT review demonstrated sustained engagement with selected QI priorities and continued goals to improve regular clinical monitoring.

Conclusion

Embedding structured education and practice-specific QI within case conferencing clinics is a feasible and acceptable approach to strengthening diabetes care in general practice. The DAP+ model enhances clinician confidence, builds medication management capability, and supports quality improvement, supporting more consistent, high-quality diabetes care for patients across the HNE-LHD.

Effectiveness of diabetes camps on glycemic control among youth living with Type I Diabetes in the Maldives: a quasi-experimental study.

Saeed A¹, Faiz R¹, Shiruhana A¹, Subbaram K²

¹Diabetes Society Of Maldives, K. Male', Maldives, ²The Maldives National University, K. Male', Maldives

Background & Aim: Diabetes camps aimed at educating youth living with type I diabetes in the self-management of diabetes have been conducted systematically since 2012. The camps also provided a platform for experience sharing and creating networks for psychosocial support among the youth living with type 1 diabetes in the Maldives community. Nevertheless, little is known about the effectiveness of these camps in achieving glycemic targets. The aim of this study was to examine the changes in HbA1c, weight, total daily dosage of insulin and cholesterol levels, 1 year after completion of the diabetes camp, among youth living with type I diabetes in the Maldives.

Methods: . A quasi-experimental study was conducted involving a total of 44 youth, between the ages 13 and 25 years, as participants of 3 consecutive diabetes youth camps (from 2016, 2018 and 2022). Data was collected pre-camp and 12 months post-camp and analyzed.

Results: The results demonstrated a significant reduction in HbA1c (pre-camp median HbA1c: 9.95 [IQR:8.15-11.90] and post-camp median HbA1c: 8.80 [IQR:7.60-10.20], $p<0.05$) and a significant increment in weight gain at 12 months post-camp (pre-camp median weight: 50.20 [IQR: 43.45-61.68] and post-camp median weight: 53.20 [IQR:44.30-63.28], $p<0.001$).

Discussion / Conclusion: However, HbA1C reduction and weight gain were not associated with any of the studied variables; gender, age, duration of diabetes, residing in rural or urban areas, type of DM, occupation or camp year. The results demonstrated empirical evidence on the benefit of camps for youth for the management of diabetes, and the need to expand the focus of research to include wider aspects of glycaemic control among youth.

Digital LOOP® Application for people with Type 2 Diabetes in Bali, Indonesia: Opportunities and real-world challenges in engagement and metabolic outcomes

Saraswati M^{1,2}, Devinta M¹, Putri W³, Anasyua F³

¹Faculty of Medicine Udayana University, Denpasar Bali Indonesia, Denpasar, Indonesia, ²Ngoerah Hospital, Denpasar, Indonesia, ³LOOP Health Application, Jakarta, Indonesia

Background & Aim:

Digital health interventions are increasingly promoted to enhance self-management and continuous support for people with diabetes. In Indonesia, high smartphone penetration offers unique opportunity to bridge gaps in diabetes education. However, real-world engagement and sustainability remain uncertain. This project aimed to evaluate the perceived benefits and early outcomes of implementing the LOOP® digital application among people with type 2 diabetes (T2D), and to identify barriers to its adoption.

Methods:

A real-world implementation project was conducted in Bali, Indonesia among people with T2D. The LOOP® application enables glucose logging, nutrition and physical activity tracking, weight monitoring, and real-time interaction with a health coach without waiting for scheduled clinic visits. Socialization was conducted through a WhatsApp-based diabetes community group, followed by an in-person information session for interested individuals. Of 43 people expressing initial interest, 12 consented to join. Engagement was evaluated based on sustained active use of the application for self-monitoring and interaction with the coach. Metabolic parameters, including HbA1c and metabolic profile, were observed descriptively among active users.

Results:

Only 5 of 12 enrolled participants remained active users. Active participants demonstrated improvements in HbA1c and overall metabolic profiles. Limited engagement was primarily attributed to several factors: (1) age-related differences, as most non-active participants were digital immigrants; (2) limited digital literacy and lack of confidence in independently navigating the application; (3) concerns that technology use would increase daily burden; and (4) prior negative experiences with similar applications that did not yield meaningful improvements in glycemic control or body weight.

Discussion / Conclusion:

The LOOP® application shows potential to improve metabolic outcomes among engaged users; however, adoption remains a major challenge. Digital health tools may be more suitable for younger, digitally fluent individuals or those at risk of diabetes. Structured onboarding, digital literacy support, and integration with familiar social media platforms may enhance engagement and clinical impact.

Beyond targets: preventative care through hospital and community collaboration for a Medicare ineligible person with type 1 diabetes

Schubert D¹, Furlanos S¹, Wentworth J¹, Seymour C¹

¹Royal Melbourne Hospital, Parkville, Australia

Background & Aim:

Over 120,000 Australians live with type 1 diabetes (T1D). Medicare card holders and other select cohorts manage the cost of insulin, other diabetes medications and consumables through government funding. Medicare-ineligible people face significant barriers to accessing insulin and care, increasing preventable hospital presentations and costs. This case describes collaborative preventative and ongoing care for a no-income Medicare-ineligible person with T1D.

The aims of preventative and ongoing care for this case study were to prevent death, hospital presentations and re-admissions; ensure continued engagement with health services; enable diabetes nurse educator (DNE) access in both hospital and community and save the cost of possible emergency treatment.

Methods:

A 40-year-old overseas-born man, diagnosed with T1D following an admission for diabetes ketoacidosis to Royal Melbourne Hospital (RMH) in September 2023, was referred to the Hospital Admission Risk Program (HARP) DNE. Despite reporting a history of auditory hallucinations, no mental health issue was found by the inpatient psychiatric team. He had no income, visa, or housing and was ineligible for Medicare. RMH arranged funded insulin supplied through a local community pharmacy and waived emergency department (ED) and outpatient costs. The HARP DNE coordinated GP care, regular community follow-up, and monitored pharmacy arrangements. Housing, mental health, and legal supports were provided through a homeless and housing community service.

Results:

The patient consistently accessed insulin and demonstrated effective self-management, with blood ketones <0.6 at each DNE review. After diagnosis, he presented to the ED 10 times (the first before HARP involvement) with a total six days in hospital; he did not present between September 2024 and February 2026.

Discussion/Conclusion:

Integrated hospital, HARP, and community collaboration enabled ongoing engagement, self-management, and avoidance of ED presentations for over 12 months for this man. This case highlights the value of prevention and ongoing care with the potential to benefit others in similar circumstances.

Diabetes prevention program for Bangladeshi young adults aged 16–35 Years

Selim S¹, Lona H², Rana M³, Mahmood S⁴

¹Bangladesh Medical University, Dhaka, Bangladesh, ²Medical College for Women and Hospital, Dhaka, Bangladesh, ³Institute of Water and Flood Management, Dhaka, Bangladesh, ⁴Dhaka Medical College Hospital, Dhaka, Bangladesh

Background & Aim: Type 2 diabetes mellitus is an increasing public health problem worldwide. Individuals at high risk of developing diabetes need effective prevention strategies. Previous studies suggest that lifestyle modification and medicines such as metformin and pioglitazone may help delay or prevent the development of type 2 diabetes. The aim of this study is to compare the effectiveness of lifestyle modification alone, lifestyle modification with metformin, and lifestyle modification with pioglitazone in preventing type 2 diabetes among high-risk individuals.

Methods: This prospective interventional study was conducted from 2020 to 2023 among 16-35-year-old Bangladeshi Adults. A total 1,405 participants were randomly assigned to lifestyle modification alone, lifestyle modification + metformin, and lifestyle modification + pioglitazone groups, respectively. The level of statistical significance was set at $p > 0.05$.

Results: The incidence rate of diabetes was significantly higher in the LSM group than in the LSM+Met and LSM+Pio groups. The incidence rate per 100 person-years was 10.1, 6.4, and 5.0, respectively. The adjusted hazard ratio was 0.63 (95% CI, 0.52 to 0.76) for the LSM+Met group and 0.49 (95% CI, 0.40 to 0.60) for the LSM+Pio group. All groups showed a significant reduction in weight, BMI, and waist circumference. However, a greater reduction in weight was noted in the LSM+Met group than in the other groups. The reduction in weight was -5.2 ± 2.1 kg, -3.5 ± 1.5 kg, and -3.3 ± 1.5 kg, respectively. A reduction in HbA1c and FBS was noted in all three groups. However, a greater reduction in HbA1c and FBS.

Discussion/Conclusion: Both metformin and pioglitazone added significantly to the preventive effect of lifestyle modification against diabetes, and LSM+Pio had the lowest incidence of diabetes and the largest improvements in metabolism. However, safety profiles differ and should inform treatment choices.

Developing a simplified sick day management tool to prevent DKA in consumers with low health literacy: A statewide quality improvement initiative

Sellars F^{1,2}, Linjawi A^{1,3}, Shann K¹, Snars K^{1,4}

¹Queensland Diabetes Clinical Network, , Australia, ²Torres and Cape Hospital and Health Service, Weipa, Australia, ³West Morton Hospital and Health Service, Ipswich, Australia, ⁴Central West Hospital and Health Service, Roma, Australia

Background & Aim: Managing sick days in type 1 diabetes is critical in preventing diabetic ketoacidosis (DKA). However, standard sick day resources often assume health literacy levels not held by all consumers. This project aimed to develop and implement a simplified low health literacy sick day management tool to support consumers and prevent avoidable hospital presentations, while complementing existing guidelines.

Methods: The tool was co-designed with input from consumers, diabetes educators, clinicians, and a health literacy expert. It uses simplified language, pictorial cues, and colour coding. A clinician section on the back page supports communication of insulin regimen and doses with Queensland Ambulance Service, emergency departments, or phone support. The tool was trialled across three Queensland Health sites, with structured education delivered by Diabetes Educators. Informal feedback was collected from clinicians and consumers, together with expert review, informed final refinements, including incorporation of flow-chart features to enhance actionability.

Results: Consumers across all trial sites engaged positively, with many requesting to take the tool home. Clinicians reported that the tool may have prevented hospital presentations and improved confidence in self-management. One caregiver described feeling empowered to manage ketones for the first time. The tool was endorsed by health literacy experts and is now available via the Clinical Excellence Queensland website: https://www.health.qld.gov.au/__data/assets/pdf_file/0031/1433983/sick-day-management-plan-for-high-glucose-ketones.pdf

Discussion/Conclusion: This tool improves consumer engagement and supports safer sick day management, helping reduce DKA risk in vulnerable populations. Designed to complement structured education, it addresses a clear service gap for consumers with low health literacy and will undergo ongoing review to ensure alignment with best practice and clinical relevance.

Influence of culture and religion on type 2 diabetes self-management in South Asian migrants

Selvaratnam N^{1,2}, Koo F^{3,4}, Ekanayake K⁵, Arora A^{1,2,6,7,8,9}

¹School of Medicine, Faculty of Health, Western Sydney University, Campbelltown, Australia, ²Health Equity across Lifespan (HEAL) Research Lab, Campbelltown, Australia, ³School of Nursing and Midwifery, Faculty of Health, Western Sydney University, Hawkesbury, Australia, ⁴Susan Wakil School of Nursing, Faculty of Medicine and Health, The University of Sydney, Camperdown, Australia, ⁵University of Sydney Library, The University of Sydney, Camperdown, Australia, ⁶Translational Health Research Institute, Western Sydney University, Campbelltown, Australia, ⁷Discipline of Child and Adolescent Health, Faculty of Medicine and Health, The Children's Hospital at Westmead Clinical School, The University of Sydney, Westmead, Australia, ⁸Oral Health Services, Sydney Local Health District and Sydney Dental Hospital, NSW Health, Surry Hills, Australia, ⁹Aureolin Research, Consultancy & Expertise Development (ARCED) Foundation, Dhaka, Bangladesh

Despite the high prevalence of type 2 diabetes (T2D), research exploring the inter-relationship of diabetes self-management, culture, and religion in South Asian migrants remains limited. We aimed to investigate the influence of culture and religion on self-management behaviours of South Asian migrants with T2D. A mixed-methods systematic review was conducted. Five electronic databases, Medline (Ovid), Embase (Ovid), Cumulative Index to Nursing and Allied Health Literature (CINAHL) (EBSCO), Scopus, and Web of Science (Clarivate), were searched systematically using pre-determined inclusion criteria. Two reviewers independently assessed the full texts of the articles retrieved. The methodological quality of articles was assessed using the Mixed Methods Appraisal Tool. Data synthesis was guided by thematic analysis. A total of 22 studies (18 qualitative and 4 mixed-methods) were included. Five themes were identified: (1) Adapting to diabetes: Impacts on food habits and dietary choices; (2) Diabetes threatens cultural conventions and identity; (3) Religious beliefs, practices, and prohibitions complicate diabetes management; (4) Social support and awareness to promote self-care, and (5) Individuals seek multiple sources for diabetes management. Among South Asian migrants, traditional food and dietary practices, family and community support, traditionally constructed gender roles, stigma, religiosity, and spirituality have significant impacts on diabetes self-management behaviours. The influences are often multifaceted. Improvements may be initiated at the organisation level to benefit all levels of individual, family and friends, organisation, community, and program development. Healthcare professionals should be encouraged to understand both the diversity and universality of cultural and religious beliefs and practices, gender roles, the symbolic role of food, and the complexities surrounding self-management in daily life for South Asian migrants. However, the narrative is primarily driven by South Asian migrants from India, Pakistan, and Bangladesh. Therefore, future qualitative research may include underrepresented South Asian migrants, creating a more representative population, providing a better, deeper understanding.

Improving diabetes care in Western Sydney primary care: a PenCS-enabled audit and continuous quality improvement program

Serrano J¹, Murugesan A¹, Dick H¹, Seldom M², Meyerowitz-Katz G^{1,3}, Shahidi M¹, Chi W¹, Jayaballa R^{1,5}, Maberly G^{1,4}

¹Western Sydney Diabetes, Western Sydney Local Health District, Sydney, Australia, ²Western Sydney, Primary Health Network, Western Sydney, Australia, ³University of Wollongong, Wollongong, Australia, ⁴University of Sydney, Sydney, Australia, ⁵Macquarie University, Macquarie, Australia

Background & Aim: Type 2 diabetes (T2D) places a substantial clinical and operational burden on general practice in Western Sydney. In partnership with Western Sydney Primary Health Network (WSPHN), we co-designed a PenCS-enabled audit and practice support program to identify care gaps and embed pragmatic continuous quality improvement (CQI).

To quantify gaps in clinical documentation, metabolic monitoring, and evidence-based therapeutics for people living with T2D, and to inform targeted, practice-level CQI.

Methods: Cross-sectional audits were conducted using PenCS across seven general practices (November 2024–April 2025). Data were extracted for active patients living with T2D, including HbA1c monitoring (within 12 months; HbA1c >7%), cardiometabolic risk documentation (body mass index [BMI], waist circumference), glucose-lowering therapies (sulfonylureas [SU], SGLT2 inhibitors [SGLT2i], GLP-1 receptor agonists [GLP-1 RA]), and structured care planning (MBS 721 GP Management Plan). Data are shown as weighted shares, including inter-practice variance.

Results: Cross-sectional audits were conducted using PenCS across seven general practices (November 2024–April 2025). Data were extracted for active patients living with T2D, including HbA1c monitoring (within 12 months; HbA1c >7%), cardiometabolic risk documentation (body mass index [BMI], waist circumference), glucose-lowering therapies (sulfonylureas [SU], SGLT2 inhibitors [SGLT2i], GLP-1 receptor agonists [GLP-1 RA]), and structured care planning (MBS 721 GP Management Plan). Data are shown as weighted shares, including inter-practice variance.

Discussion/Conclusion: This audit identified major gaps in cardiometabolic risk documentation, underuse of cardio-renal protective therapies, and inconsistent structured care planning. Findings are informing a co-designed CQI program incorporating practice feedback, case conferencing, clinician education, and digital tools (GoShare), linked to the Western Sydney “Changing Diabetes – 2kg Challenge”. A repeat audit in 2026 will evaluate impact. This scalable model may be generalisable to other high-burden primary care settings.

Insulin IQ: Assessment and educational intervention to improve insulin-related knowledge among nurses in a South Indian Tertiary Hospital.

Shabbir A¹, VISHWANATHAN A¹, Sukumaran H¹, S P S¹

¹Tambaram Medical Center, CHENNAI, India

Background & Aim:

Insulin is a high-alert medication, yet nurses often lack consistent training, leading to preventable medication errors, hypoglycemia, and patient harm. Hospitals rarely mandate standardized insulin education. Assessing nurses' baseline knowledge and empowering them through structured training is crucial to ensure safe insulin administration and strengthen inpatient diabetes care quality. The aim of study to assess baseline knowledge of insulin therapy and administration among registered nurses and to evaluate the effectiveness of a structured educational intervention in improving insulin-related knowledge in a tertiary care hospital in Chennai, India.

Methods:

A two-phase assessment-and-intervention study was conducted among 250 registered nurses. Phase 1 used a structured questionnaire to assess baseline insulin-related knowledge. Phase 2 involved a structured educational intervention followed by reassessment using a validated 17-point questionnaire. Paired t-test, and chi-square test evaluated associations and pre–post intervention changes. Ethical standards were observed.

Results:

In Phase 1, 250 nurses participated (80.0% female), with a mean clinical experience of 4.8 ± 5.8 years. The mean baseline insulin knowledge score was 13.8 ± 2.5 , with 53.2% classified as excellent, 30.0% good, 13.6% moderate, and 3.2% basic. No significant association was observed between knowledge and educational qualification or experience. In Phase 2, 207 nurses completed post-intervention assessment. The mean knowledge score improved significantly to 15.39 ± 1.55 ($t(206) = 9.62$, $p < 0.001$). The proportion of nurses with excellent knowledge increased to 70.5% ($\chi^2 = 32.49$, $df = 3$, $p < 0.001$). Improvement was independent of qualification and experience.

Conclusion:

The structured educational intervention led to significant improvements in knowledge scores and shifted most nurses into the excellent knowledge category. These findings strongly recommends the routine implementation of mandatory standardized insulin education programs for all nurses, periodic competency reassessment, and integration of insulin safety modules into continuing nursing education and hospital induction programs.

Implementing a hospital protocol to improve Glycaemic management of people with diabetes on bolus enteral feeding: A novel report

Sharda P¹, Lin X¹, Choo K¹, Zhang D¹, Tan Q¹, Khairil Anwar N¹, Wee Z¹, Chiam P¹, Koh A¹, Wong C¹, Luah H¹, Lim J¹, Chen L¹

¹Sengkang General Hospital, , Singapore

Background & Aim: Managing glycaemic control for people with diabetes receiving multiple bolus enteral feeds is challenging. In an acute hospital in Singapore, there were no guidelines on monitoring of capillary blood glucose (CBG) and administration of oral glucose lowering agents or insulin for people on enteral bolus feedings. The practice ambiguity amongst healthcare providers led to ineffective glycaemic control. An audit of 80 participant's Electronic Medical Record (EMR) found inappropriate timings of CBGs and subsequent medication administration, resulting in hypoglycaemia (3.85%) and hyperglycaemia (43.6%). The aims of this study are to evaluate hypoglycaemia and hyperglycaemia incidences and nurses' knowledge after implementation.

Methods: The protocol co-designed by Diabetes nurse educators (DNE) and endocrinologists was launched in July 2024. 8 inpatient wards were selected for pilot, where nurses received in-service training on the protocol. Knowledge of nurses was measured with a 9-point questionnaire at pre-post training and again at 3 months. Incidences of hypoglycaemia and hyperglycaemia episodes were measured at baseline and during the 3-month implementation period.

Results: Following intervention, 251 participants were observed. The proportion of participants with hyperglycaemia in the implementation wards reduced from 43.6% to 10.5%, while hypoglycaemia decreased to 2.7% from 3.85%. A binary logistic regression analysis showed the odds of participants having hyperglycaemia reduced by 81%, after controlling for protocol adoption rates by doctors and nurses (OR = .19, 95% CI = .088 - .411). An 18% reduction in inappropriate capillary blood glucose testing by nurses was also observed, falling from 61% to 43%. Appropriate adoption of the protocol by nurses was identified as a significant predictor, reducing the likelihood of hyperglycaemia by 73.6%. Knowledge scores of nurses in the implementation wards were significantly higher than those in the control wards.

Conclusion: A standardised protocol for people with diabetes on enteral bolus feeding demonstrated positive outcomes in lowering hyperglycaemia and hypoglycaemia risks.

Transitioning to automated insulin delivery system therapy for neurodiverse child with Type 1 Diabetes and creating new routines in child's daily practices.

Shipp S¹

¹Bendigo Health Diabetes Services, Kennington, Australia

Background/Aim

Children with neurodiversity may experience sensory, behavioural, or emotional challenges that can create barriers to the uptake of automated insulin pump therapy, limiting equitable access to this technology.

The aim of this case study is to think innovatively about encouraging interest in automated insulin pump therapy for children with neurodiversity challenges providing support to assist with access. This case study explored the use of a simulated insulin pump for a neurodiverse child, with individual triggers identified and carefully considered in the selection and introduction of the insulin pump.

Aims:

- Increased Time in Range
- Reduction of Hba1c values post initiation of the insulin pump commencement
- Decreased phone interactions per week with carers and family members
- Reduction in hypoglycaemic fear within family members

Methods:

With informed consent from the family and approval from the endocrinologist, a simulated insulin pump was developed. The simulated pump was created to match the specifications of the Ypso insulin pump, which is currently available through the Breakthrough T1D pump program. The Ypso pump was identified as an appropriate option for this child due to its size, lockable features, and durability.

Results:

The simulator currently worn continuously throughout the day and only removed for a shower. Attachment by the child to the simulation pump, giving it a name. The child has accepted the wearing of the simulation pump as normal everyday behaviour and their routine at this stage of the study

Discussion/ Conclusion:

This case study commenced with a single child, with the aim of improving pathways for other neurodiverse children to accept insulin pump therapy through collaborative work addressing individual triggers and challenges.

Currently the child is wearing the simulation pump and has modified behaviour subtly without the previous aggression and refusal known to this child.

By creating a person-centred approach to trialling insulin pumps, this case study aims to optimise engagement without causing harm or additional expense, with the goal of improving potential health outcomes and positively influencing the long-term trajectory of diabetes for individuals with diverse needs.

Is wearing a continuous glucose monitor enough to trigger lifestyle change in Type 2 Diabetes?

Silvestro V^{1,2}, Maberly G^{1,2}, Shahidi M¹, Jayaballa R¹, Gibson A²

¹Western Sydney Diabetes, Blacktown, Australia, ²Sydney University, Sydney, Australia

Background & aim: Dietary and exercise lifestyle behaviours are critical to glucose management. Continuous Glucose Monitors (CGM) measure glucose levels continuously through interstitial fluid over a 10–15-day period. Time in range (TIR) is a CGM metric, which represents the percentage of time of the glucose levels in the desired range. Lower TIR is associated with an increased risk of complications, as well as all-cause mortality. CGMs provide real-time feedback of glucose trends, which is predicted to stimulate behaviour change. This exploratory study examined whether CGM exposure alone, prior to formal education, was associated with self-reported lifestyle change and differences in TIR.

Methods: 73 patients with complex type 2 diabetes referred to Western Sydney Diabetes (WSD) wore a CGM as part of standard care. Participants completed both qualitative and quantitative surveys about lifestyle behaviours following CGM use, prior to the WSD case conference. Participants were grouped according to their self-reported survey lifestyle changes. TIR was then compared across groups, and survey responses analysed.

Results: Most participants (70.8%, n=51/72) reported making lifestyle changes while wearing CGM. Noticing food-related glucose effects was reported by 71.2% (n=52/73); these patients demonstrated a 10.2% greater TIR compared with those who reported not noticing food-related effects. Additionally, 32.9% of patients (n = 24/73) reported discontinuing consumption of specific foods due to their impact on glucose levels and had a 13% greater TIR than those who did not. Grains were the most identified food group both noticed (34%) and avoided (34%). Most patients (88.7%, n = 63/71) reported no changes in physical activity while wearing the CGM.

Conclusion: CGMs are transforming diabetes management by providing real-time feedback on the effects of diet, and exercise on glucose level. This feedback was associated with independent self-reported dietary behaviour change, representing a useful behavioural catalyst within complex diabetes care.

Type 1 Diabetes child safety project subtitle: Improving outcomes for children with Type 1 Diabetes in out-of-home care

Tarczynski S¹, Snars K, Sellars F

¹Healthcare Improvement Unit - Queensland Health, Brisbane, Australia

Objective: This project aimed to improve care and quality of life for children with Type 1 Diabetes (T1D) involved with the Child Safety system by strengthening care coordination, supporting timely carer education, increasing diabetes awareness, updating resources, and informing system and policy reforms to reduce avoidable hospital admissions.

Methods: Data-collection processes were used to estimate the number of children aged ≤18 years with T1D under Child Safety supervision and living in out-of-home or residential care. Sources included clinical case examples and anecdotal information from Expert Reference Group (ERG) members. A literature review identified limited global evidence specific to this cohort. Existing research highlights the impact of limited kinship support on health outcomes and the emotional and psychological consequences for children in care. Thematic analysis emphasised the need for coordination among foster, kinship, and residential carers, Child Safety staff, and multidisciplinary Paediatric and Young Adult Diabetes teams.

Results: Collaboration between the ERG and Child Safety representatives identified key challenges and strengths across care placements. These insights informed development of a structured resource toolkit to enhance decision-making and promote consistent, informed, and safe care practices. The toolkit aims to optimise health outcomes, improve care quality, and reduce long-stay hospital admissions through early intervention and effective management. Project staff also progressed updates to the Child Safety Practice Manual, strengthening guidance for officers supporting children with T1D through consultations with the Office of the Chief Practitioner and Queensland Health.

Discussion / Conclusion: A significant gap is the lack of a clear policy or framework to guide Child Safety Officers when placing children with complex health conditions. Existing guidance is fragmented, and health-related assessment tools are inconsistently applied. Delayed assessments and incomplete handover of chronic conditions increase risk during placement. A cross-sector framework for identifying and managing chronic and life-threatening conditions before placement is essential to ensure safe, appropriate, and coordinated care.

Reducing inpatient hypoglycemia in hospitalized patients with diabetes: A multidisciplinary quality improvement initiative

Su G^{1,2}, Lee C¹, Lee P¹, Chiang P¹, Lin P¹, Lin L¹, Shen J¹, Ko H¹, Lo H¹, Liao S¹, Hwu C^{1,2}

¹Taipei Veterans General Hospital, Taipei City, Taiwan, ²National Yang Ming Chiao Tung University School of Medicine, Taipei City, Taiwan

Background & Aim: Inpatient hypoglycemia is a critical acute complication that may lead to falls, arrhythmias, or neurocognitive impairment. In the endocrinology ward of Taipei Veterans General Hospital, the baseline hypoglycemia incidence was 2.03%, primarily attributed to inadequate identification of high-risk patients, lack of standardized insulin adjustment during fasting, inconsistent post-event monitoring, limited accessibility of emergency treatment supplies, and variable staff proficiency. This quality improvement (QI) initiative aimed to reduce the hypoglycemia rate by at least 20%.

Methods: Conducted from March to September 2025, this project implemented a multidisciplinary "bundle" intervention including: (1) visual bedside identification for high-risk patients; (2) standardized insulin titration protocols for fasting states; (3) a mandatory 15-minute post-event glucose reassessment protocol (the "Rule of 15"); (4) centralized hypoglycemia emergency kits; and (5) structured simulation-based training for the medical team. The primary outcome was the number of hypoglycemia events per 100 glucose tests. Intervention effects were evaluated using Poisson regression.

Results: The hypoglycemia rate decreased from 2.03 to 1.00 events per 100 tests—a 51% reduction that significantly exceeded the initial 20% improvement target. Patient-day-adjusted analyses demonstrated a similar reduction. Poisson regression confirmed a significant decrease in hypoglycemia events (incidence rate ratio [IRR] 0.48; 95% CI, 0.35–0.66; $p < 0.001$).

Discussion / Conclusion: A structured, multidisciplinary quality improvement program significantly reduced inpatient hypoglycemia. Standardizing insulin management, improving risk visibility, and strengthening staff competency can substantially enhance patient safety and provide a scalable model for inpatient diabetes care improvement.

A preventative diabetes foot care program using tele-education to enhance patient self-awareness

Tam K¹

¹The Hong Kong Pamela Youde Nethersole Eastern Hospital, Hong Kong, Hong Kong SAR

Background

Diabetic foot disease is a clinical manifestation of diabetic neuropathy and peripheral artery disease. Many patients with diabetes neglect early symptoms, which lead to irreversible consequences. Education and care strategies represent the most cost-effective approaches in preventing the development of diabetic foot diseases. Nevertheless, existing studies have often overlooked the importance of behavioral change and adherence levels among diabetic patients. Therefore, a foot self-care tele-education program is necessary to promote and enhance patients' foot self-care awareness and prevent diabetic foot disease.

Aims and Objectives

1. Enhance diabetic patients' knowledge, attitude, and practice toward diabetic foot care and disease prevention.
2. Enhance patients' adherence and self-efficacy to foot self-care practices.
3. Develop a foot self-care habit and educational leaflets to promote foot care.

Methodology

Participants were recruited through purposive sampling during Metabolic Risk Assessment (MRA) at the Diabetes Centre. The tele-education program was divided into two phases: (1) a tele-educational talk teaching patients about diabetic foot care, and (2) a motivational interview promoting foot self-care adherence. Both phases were evaluated using a validated pre- and post-questionnaire.

Results

The intervention included 30 diabetic patients aged 18 or above with foot care problems. After implementing the program, the mean score assessing participants' knowledge (Pre-test: 2.8/6; Post-test: 5.6/6), attitude (Pre-test: 2.3/4; Post-test: 3.7/4), and practice (Pre-test: 5.7/12; Post-test: 10.4/12) of diabetic foot care have greatly improved. Also, participants have formed a habit of foot self-care after receiving motivational interviewing, as evidenced by the increased mean score of the self-reported habit index from 2.2/5 to 3/5.

Conclusion

This program is essential for disseminating evidence-based diabetic foot care knowledge and employing motivational interviewing technique to promote sustained foot self-care practices among community-dwelling patients. Ultimately, to improve patients' quality of life, strengthen therapeutic nurse-patient relationships, and reduce the long-term healthcare burden.

Improving continuity of Diabetes care through a chatbot-enabled follow-up model in a low-resource Ugandan hospital

Tamale E¹

¹University of Cambridge, CAMBRIDGE, United Kingdom

Background & Aim:

Diabetes contributes largely to morbidity and premature mortality in sub-Saharan Africa, where many people living with the condition experience fragmented care and limited follow-up. In Uganda, awareness of diabetes status remains low, and current health systems lack structures to support sustained engagement and self-management. At St Mary's Hospital Lacor in Northern Uganda, many individuals missed scheduled reviews, presenting later with advanced diabetes-related complications. This project assessed whether a low-cost, chatbot-enabled follow-up model could strengthen continuity of diabetes care and support understanding and self-management.

Methods:

A mixed-methods implementation study was conducted in a diabetes clinic at St Mary's Hospital Lacor. Medical record reviews and interviews with people living with diabetes and healthcare professionals explored follow-up challenges, communication gaps, and information needs. A chatbot-enabled follow-up system was co-designed through stakeholder engagement and training of six clinicians on its use. Delivered via WhatsApp and USSD, it provided appointment reminders, tailored self-care messages, and diabetes education in local languages, with outcomes assessed using clinic data and thematic analysis.

Results:

Within twelve months, loss to follow-up among people enrolled in the diabetes clinic decreased from approximately 90% to 35%. Participants reported improved understanding of diabetes, increased confidence in daily care decisions, and clearer communication with healthcare teams. Four qualitative themes emerged: (1) beliefs and lived experiences of diabetes, (2) communication and information needs, (3) health system barriers to continuity of care, and (4) empowerment through accessible digital engagement.

Conclusion:

Chatbot-enabled follow-up systems can strengthen continuity of diabetes care in low-resource settings when designed to be accessible, respectful, and collaborative. By improving communication and supporting informed choices rather than assigning blame, such digital tools can enhance engagement and contribute to more equitable diabetes care, with potential for scalable adoption across similar contexts.

From acute care to home care: Increase in diabetes admissions and the evolving role of diabetes nurse educators.

Tanaka J¹, Krenzin G¹, Steele C¹

¹Western Health, Melbourne, Australia

Background & Aim

Diabetes-related hospital admissions continue to rise, increasing pressure on acute health services. Hospital in the Home (HITH) provides an alternative model for selected patients requiring acute diabetes management. Understanding the factors underlying inpatient diabetes admissions and HITH utilisation is essential to inform service planning and Diabetes Nurse Educator (DNE) workforce development. This study examined trends in inpatient diabetes admissions, HITH activity and implications for DNE practice.

Methods

A retrospective descriptive analysis was conducted using the Inpatient Management System (iPM) and HITH administrative data from 2022 to 2025. Diabetes-related admissions were identified using diabetes-specific Diagnosis-Related Groups. Annual admission numbers, patient demographics, and year-on-year trends were analysed alongside diabetes-related HITH episodes and length of stay. Data collection prioritised admissions where diabetes was recorded as the principal diagnosis. Data was collected on the number of referrals for diabetes self-management education.

Results

Inpatient diabetes admissions increased by 20.3% from 311 episodes in 2022 to 374 in 2025. The sample consisted primarily of older adults, with median ages ranging from 55 to 69 years; approximately 70% of patients were male. Within the context of a public hospital with 290 inpatient beds, diabetes-related admissions accounted for a substantial and growing component of acute activity. Diabetes-related HITH utilisation also increased, with rising episode numbers and bed days. Median HITH length of stay ranged from one to four days, reflecting high patient turnover. Each patient requires an average of 90-120 hours of diabetes education input.

Discussion & Conclusion

The rising burden of inpatient diabetes admissions highlights the impact of the diabetes epidemic on acute care services. Increasing HITH utilisation suggests a shift toward home-based diabetes care. These trends underscore the expanding role of Diabetes Nurse Educators in delivering safe, coordinated diabetes care across hospital and community settings.

Transforming diabetes care for Indigenous Communities: Integrating peer support and cultural governance within the Diabetes Alliance Program Plus (DAP+) model.

Southwell A¹, **Taylor R**¹

¹Hunter New England Local Health District, Newcastle, Australia

Background & Aim: Diabetes Alliance Program Plus (DAP+) enhances diabetes outcomes by improving access to culturally appropriate, evidence-based care within General Practices and Aboriginal Medical Services (AMS) across Hunter New England LHD. Strengthening cultural equity and safety, DAP+ introduced an Aboriginal Health Worker role into the program and established an Aboriginal Reference Group (ARG), marking a shift toward formalised cultural governance within the program.

Methods: The DAP+ ARG provides ongoing leadership and cultural oversight of patient-facing resources, model-of-care delivery and advocacy. Comprised of 10 Aboriginal community representatives and guided by a Terms of Reference, the ARG meets quarterly to inform program design, implementation, evaluation, resource development and research.

The AHW role ensures cultural connection and peer support is offered to DAP+ Indigenous patients throughout their journey, which includes pre- and post-case conferencing appointment care. Program insights are gathered through patient kinship, community and stakeholder feedback, and routine quality improvement processes.

Results: Since 2015, 208 general practices, including 11 AMS's, and over 8200 patients have participated in DAP+ with significantly improved clinical outcomes. Of these participants, 9% identify as Aboriginal and/or Torres Strait Islander.

DAP+ ARG has convened 8 times, providing formal feedback on program documents and enabling the development of culturally appropriate resources for Indigenous people.

Additionally, DAP+ has secured ethical approval from the Aboriginal Health & Medical Research Council (AHMRC), led by the ARG, to support further research into DAP+ impacts for Indigenous people.

Discussion/Conclusion: DAP+ demonstrates how successful integration of cultural governance, peer support and community-led care can improve access to best-evidenced care for Aboriginal and/or Torres Strait Islander people. Ongoing feedback and ethical oversight strengthen integration of diabetes specialist care within AMSs and General Practices. AHMRC approved research will now analyse the clinical outcomes and experience of care of this cohort of patients in relation to their participation in the DAP+ program.

Detecting and managing fraudulent survey responses in an online dietary reporting study for adults with Type 2 Diabetes

Asher R^{1,2}, van Lunteren L^{1,3}, **Taylor R**^{1,2}, Collins C^{1,2}

¹The University Of Newcastle, Callaghan, Australia, ²Hunter Medical Research Institute, New Lambton Heights, Australia, ³Wageningen University and Research, Wageningen, Netherlands

Background & Aim: Dietary intake reported by people with type 2 diabetes is essential for primary care providers to deliver patient-centred diabetes care. Online research increases exposure to potentially fraudulent survey responses, threatening data integrity and wasting research funds. In an observational online study to assess feasibility and acceptability of dietary reporting methods, suspicious response patterns were observed following social media recruitment. We aimed to create a protocol to differentiate genuine from suspicious responses.

Methods: Study data was collected using six Research Electronic Data Capture (REDCap) surveys, an online food frequency questionnaire (FFQ) and two four-day food diaries: Easy Diet Diary and Traditional paper-based diary. Participants were initially recruited from a database of previous study participants, followed by social media. Participants were reimbursed for their time. Suspicious indicators included non-Australian and/or invalid phone numbers, placeholder and/or mismatched postcodes, rapid survey completion time, inconsistent reporting and implausible energy intakes. Estimated basal metabolic rate (BMR) was calculated using the Mifflin-St Jeor equation and compared to Goldberg cutoffs (physical activity level=1.55) to flag under/over-reporting, ≥ 3 indicators were flagged as suspicious.

Results: Across 161 respondents who consented, 47 completed ≥ 1 diary. Thirty-nine completed records were flagged as suspicious, 64% with ≥ 3 suspicious indicators and 26% with ≥ 5 . In responses following social media recruitment (n=43), median FFQ energy intake was 25280 kJ/day (71% under/over-reporters) compared to 8270 kJ/day (25% under/over-reporters) recruited pre social media promotion (n=4). Twenty-six percent completed the FFQ in less than half the median time. Diary anomalies included extreme portion sizes and improbable food combinations (e.g., '50 servings fish fillets').

Discussion / Conclusion: Careful consideration of online survey design and recruitment strategies can potentially reduce survey fraud in online diabetes research. Institutional guidance and consensus reporting standards for online research are urgently needed to ensure data integrity and ethical approaches to research.

Preparedness and expectations during the transition to adult care for young people with Type 1 Diabetes in Hungary

Tesch Z¹, Ujhazi T¹, Buzas N¹

¹Department of Health Economics, University of Szeged, Szeged, Hungary

The transition from pediatric to adult diabetes care is challenging because person- and family-centred approaches give way to a more condition-focused model. Variations in young people's readiness and expectations can increase the uncertainty of the transition. We aimed to assess young people's preparedness for transition and their expectations of adult care to emphasize the importance of a successful transition and to identify potential challenges.

We developed a self-administered questionnaire based on international surveys and our own questions, which was completed by young people aged 16–21 who were about to transition (n=309) with the help of care providers. The data were analysed using frequency indicators, cluster analysis, and partial least squares (PLS) path analysis.

The average age of respondents was 17.2 years, and the average time since diagnosis was 8.1 years. Their health literacy and independence were generally high, their relationship with the doctor was strong, and anxiety levels were low. We identified two more confident, better prepared groups and one group reporting higher levels of anxiety and uncertainty. Many young people are uncertain about decisions related to adult care: although 34% consulted their pediatric diabetologist about choosing a future adult physician, only 9.4% know who they will turn to. PLS analysis showed that anxiety related to diabetes is directly influenced by the relationship with the current physician, the young person's problem-solving skills, and transition-related concerns. Problem-solving skills and autonomy decrease anxiety, while transition concerns increase it; physician trust indirectly reduces anxiety through autonomy.

Based on cluster analysis, young people's readiness for transition varies. Those with less confidence need extra support. It's crucial that adult care enhances the doctor–patient relationship and promotes independence and problem-solving skills. Our findings emphasize the importance of transition preparation and lay a foundation for further research to better support young people during their transition.

Effectiveness of a pharmacist-led telemedicine intervention in improving medication adherence among people living with Type 2 diabetes

Thelikada Palliya Guruge A¹, Subasinghe H¹

¹University Of Ruhuna, Matara, Sri Lanka

Background & Aim: Sustained medication using behaviour is a key determinant in effective management of type 2 diabetes. However, regular medication use remains challenging for many people living with diabetes. Telemedicine based interventions have shown significant impact on improving medication adherence and diabetes self-management, yet evidence from Sri Lanka remains limited. This study aimed to evaluate the effectiveness of a pharmacist-led telemedicine intervention in improving medication adherence among people with type 2 diabetes.

Methods: The study was conducted at a Divisional Hospital, Sri Lanka. 88 adults with type 2 diabetes who had been followed up at the clinic for at least six months and prescribed at least one antidiabetic medication were recruited. Both groups received usual care, while the intervention group additionally received text message reminders every two days and weekly telephone follow-ups to encourage medication use and identify medication related problems. These interventions were conducted for two months by a trainee pharmacist. Medication adherence was assessed at baseline and post-intervention. Fasting blood glucose levels were recorded. Changes between baseline and post-intervention were compared within and between groups.

Results: Medication adherence improved significantly in the intervention group ($p < 0.001$), with median adherence score decreasing from 21(18.25-24) to 20(16.25-22) and the proportion with low adherence was reduced from 61.4% to 34.1%. Control group showed no meaningful change in adherence scores (19[17-20] to 19.5 [16-21.75]). Median FBS level decreased from 119 mg/dL (99-181.75) to 106 mg/dL (90.75-134.75) in the intervention group, whereas it slightly increased in the control group from 112.5 mg/dL (98.25 122.75) to 113 mg/dL (97-148).

Discussion / Conclusion: This study shows that a pharmacist-led telemedicine intervention can effectively improve medication adherence and short-term glycaemic outcomes among people with type 2 diabetes. Such low-cost, scalable interventions highlight the important role of pharmacists in supporting diabetes self-management in resource-limited settings.

Clinician digital engagement and an AI-enabled CGM app improve time-in-range: Early experience from an iteratively co-developed integrated diabetes model

Thevarajah A^{1,2}, Serrano J^{1,2}, Maberly G^{1,2,4}, Jayaballa R^{1,2,3}

¹Western Sydney Diabetes, Sydney, Australia, ²Western Sydney Local Health District, Sydney, Australia, ³Macquarie University, Sydney, Australia, ⁴The University of Sydney, Sydney, Australia

Aims:

Western Sydney has a high burden of type 2 diabetes, requiring scalable models that support self-management between visits. The Western Sydney Diabetes (WSD) service embedded the Health2Sync mobile app into routine care to integrate continuous glucose monitoring (CGM), clinician messaging, education and shared data review. This program is being iteratively developed in close partnership with app developers, with recent additions including artificial-intelligence (AI)–supported food recognition, meal analysis and CGM-linked feedback. This study aims to evaluate early implementation of an app-enabled CGM pathway and examine associations between clinician–patient digital engagement and glycaemic outcomes.

Methods:

Between September 2024 and June 2025, 103 patients commenced CGM within the digital pathway. 68 with >70% active sensor wear were included in the glycaemic analysis to ensure data reliability. Time in range (TIR) during the first five CGM days was compared with the final five days. App engagement and clinician messaging frequency were recorded. From early 2026, AI-supported food and glucose analytics, surveys and co-design feedback have informed ongoing platform refinement.

Results:

Mean TIR improved by 7.08% across the analytic cohort over approximately four weeks. Greater clinician engagement was associated with larger improvements: ≥1 message was associated with a 4.71% TIR increase, ≥10 messages with an 11.88% increase, and the highest-engagement group (≥22 messages) with a 30.30% increase. App engagement was high, with >60% of users opening the app on >10 days during a 14-day CGM period. Early feedback suggests integrated CGM, messaging and AI-supported food analysis improved understanding of food–glucose relationships and supported behaviour change.

Conclusion:

Embedding a co-developed mobile app-based education within an integrated diabetes model of care is feasible and associated with improved glycaemic outcomes. This is an iterative program, with further AI-enhanced analyses and expanded outcome data to follow.

A structured post-discharge diabetes education pathway strengthens transitional care communication with primary health care providers: a quasi-experimental quality improvement study

Thevarajah J¹

¹Nsw Health, Blacktown, Australia

Background: Consecutive patients admitted with an HbA1c greater than 9% are automatically flagged in Blacktown Diabetes Inpatient Surveillance - PBI and clinically reviewed by a credentialed diabetes educator during their hospital admission. Although these patients receive inpatient insulin education and post-discharge follow-up by the diabetes education team, previously there has been no established transitional care communication pathway to notify the primary health care team about the patient's post-discharge diabetes management plan.

Aims: This study aims to provide standardised post discharge diabetes education and strengthen the effectiveness of communication with general practitioners in the community.

Methods: A retrospective clinical audit of routinely collected electronic medical records was conducted to evaluate a post-discharge insulin education follow-up in adults aged between 16 -80 years within a single-centre diabetes service at Blacktown Hospital, (Western Sydney), as well as the associated communication pathways, from September to November 2025.

Results: The study included 39 admitted patients who commenced insulin.

Most patients did not bring their blood glucose monitoring equipment or recorded glucose data to their follow-up appointments. Additionally, one-third of patients (30.8%, n=12) did not attend their scheduled post-discharge review. The audit also identified a lack of documented evidence that post-discharge management plans were communicated to general practitioners in the community.

Discussion/Conclusion: There are significant gaps in post-discharge follow-up and transitional care communication, highlighting opportunities to strengthen continuity of care with primary care team appropriately and improve patient engagement by utilising diabetes technologies.

CGM use and driving safety: what diabetes health professionals need to know

Trawley S¹, Stephens A², McAuley S³

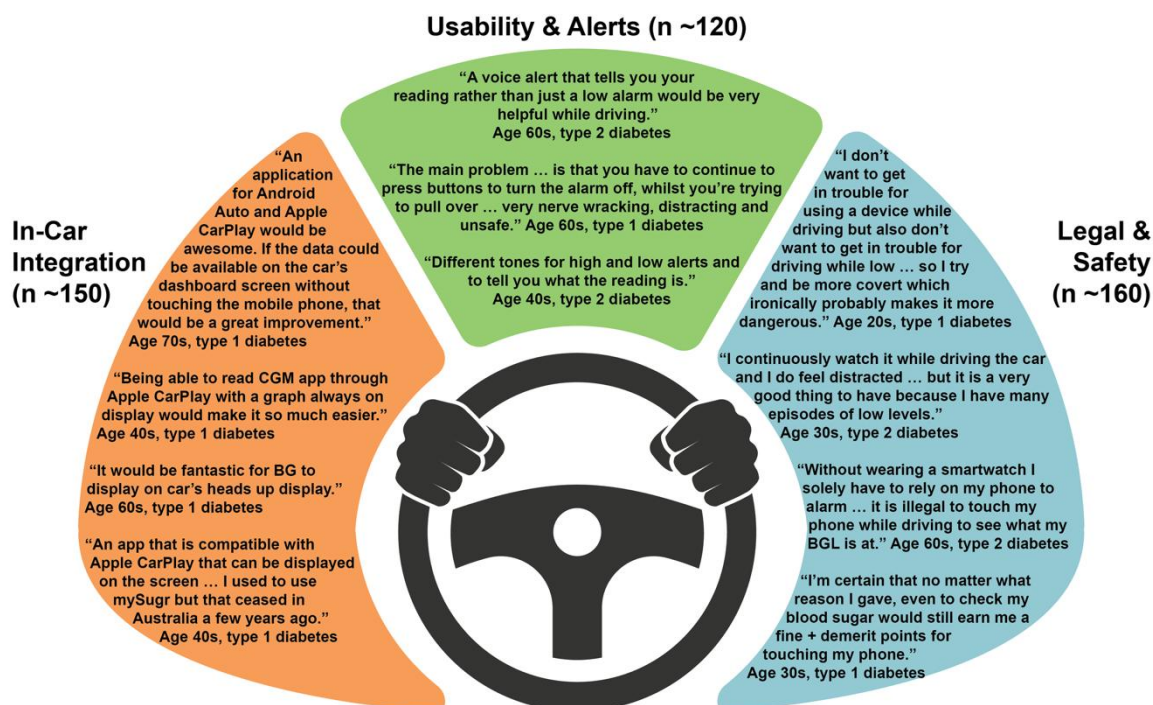
¹The Cairnmillar Institute, Melbourne, Australia, ²Monash University Accident Research Unit, Melbourne, Australia, ³School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

Aims: To examine associations between continuous glucose monitoring (CGM) use and self-reported hypoglycaemia while driving among people with diabetes, and to identify barriers and desired features for safe in-car CGM use relevant to clinical practice.

Methods: A national survey of 1,209 Australian drivers with diabetes treated with glucose-lowering medication (Q3 2025). Logistic regression examined associations between CGM use and driving hypoglycaemia, adjusting for demographic, clinical, and driving factors. CGM users reported on device use, alert settings, and desired improvements.

Results: Participants had a mean age of 55 (SD 15) years; 47% used CGM; 39% had type 1 diabetes. Twenty-eight percent reported hypoglycaemia while driving in the past 12 months. After adjustment, CGM use was associated with over three times the odds of reporting driving hypoglycaemia (adjusted OR: 3.61, 95% CI: 2.29–5.68), likely reflecting improved detection. Regular pre-drive glucose checking was associated with lower odds of driving hypoglycaemia (adjusted OR: 0.67, 95% CI: 0.46–0.98). Among CGM users, only 15% had adjusted alert thresholds for driving, half reported difficulty using CGM while driving, and 43% were uncertain about the legal status of in-car CGM use (Figure 1).

Conclusion: CGM improves driving hypoglycaemia detection, but current devices lack driving-specific features. Health professionals can support safer driving by discussing CGM alert optimisation, encouraging pre-drive glucose checking, and informing people with diabetes that updated Australian Road Rules permit mounted devices to monitor a health condition while driving (although state-specific laws should be checked).



The never-asked: low rates of emotional health enquiry despite high diabetes distress in a national Australian sample

Hare K¹, McAuley S², Trawley S¹

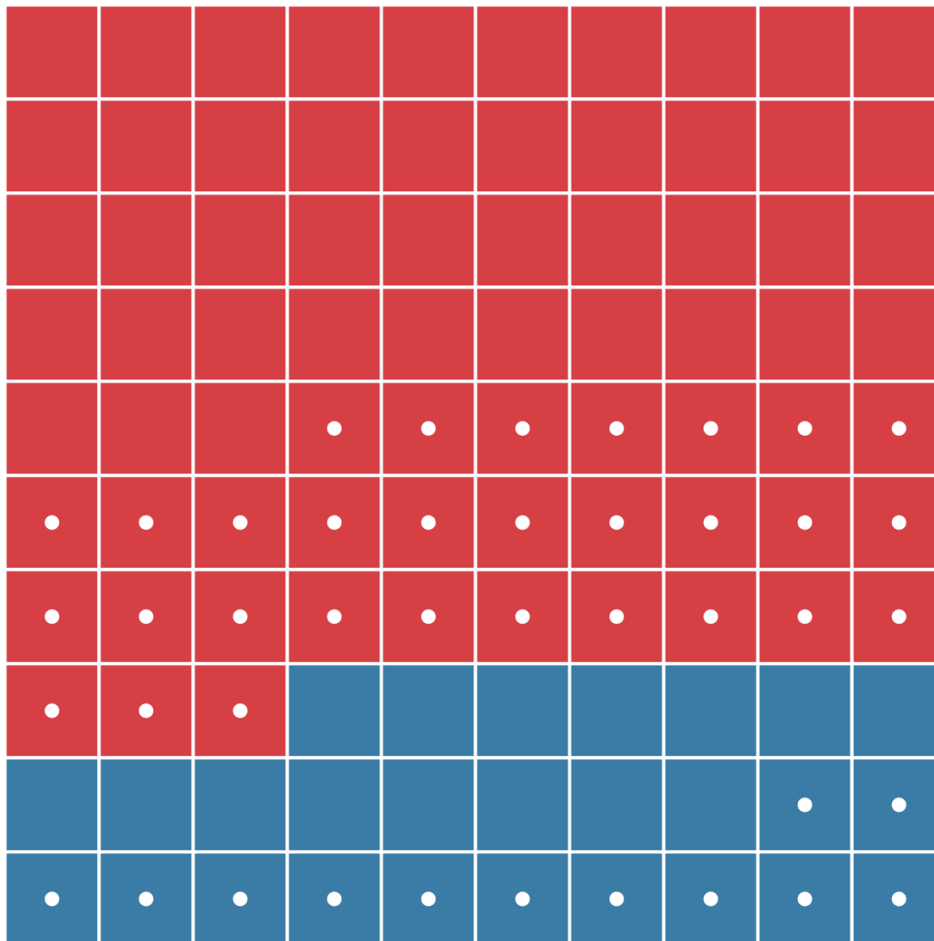
¹The Cairnmillar Institute, Melbourne, Australia, ²School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

Aims: Diabetes distress affects approximately one-third of adults living with diabetes and is associated with poorer health outcomes, yet routine emotional health screening by health professionals remains uncommon. This study examined patient-reported experiences of emotional health screening.

Methods: Adults living with diabetes (N = 1,092) completed an online cross-sectional survey that asked “*Has your diabetes healthcare professional ever asked you about your emotional health related to living with diabetes?*”. Participant characteristics were compared by screening status. A pre-specified multivariable logistic regression identified demographic and clinical predictors of never being asked. Open-text responses were analysed using thematic analysis.

Results: Most participants (73%) reported never being asked about their emotional health by their health professional. Approximately 42% reported elevated diabetes distress (PAID-5 ≥ 8), and this was similarly prevalent regardless of screening status (Figure 1). Logistic regression identified continuous glucose monitoring use as the strongest predictor of being asked, with CGM users having approximately half the odds of never being asked compared with non-users (OR = 0.52, 95% CI 0.32–0.84, $p = 0.007$). Higher socioeconomic advantage and older age were also associated with never being asked. Seven qualitative themes emerged, highlighting the emotional burden of diabetes and participants’ desire to be asked about emotional wellbeing.

Conclusion: Despite guideline recommendations, most Australians living with diabetes are not asked about their emotional health. Elevated diabetes distress is common yet remains under-identified. Systemic changes are needed to integrate routine screening into diabetes care.



Emotional health enquiry ■ Not asked (n=797; 73%) ■ Asked (n=295; 27%)

Diabetes distress ● PAID-5 ≥ 8

Each square represents approximately 1% of participants (N=1092). White dots indicate elevated diabetes distress (PAID-5 ≥ 8).

Type 1 Diabetes and drugs: The literature and lived experience

Tribe L¹

¹Baker Heart and Diabetes Institute, Melbourne, Australia

Background & Aim:

Searching the sites of major diabetes advocacy organisations in Australia for information on illicit drugs provides little to no information and yet, we know from the Australian Alcohol and Drug Foundation that around 1 in 6 Australians use illicit drugs.

The aim of this presentation is to discuss drug use in Australia, the drugs used and how they can affect people with type 1 diabetes. Whether it is alcohol or amphetamines, being informed allows us to educate others and, for those with lived experience, make choices to minimise long term consequences of recreational drug use.

Methods:

Anecdotes from online diabetes forums were combined with a PubMed literature review to get a comprehensive picture of the effects from a first hand and clinical perspective. This was then combined with guidance from advisory sites such as DARTA (Drug and Alcohol Research and Training Australia), diabetes educators, and other health care professionals to provide a framework for advice for recreational drug users with type 1 diabetes.

Results:

The result is a comprehensive review of likely drug use in the type 1 community and evidence-backed advice on the likely effects and mitigation strategies for harm minimisation.

Discussion / Conclusion:

With drug use being a 'taboo' subject, the presentation seeks to shine a light on the facts behind recreational drug use in the type 1 diabetes community ensuring diabetes educators and other health care professionals can provide the best possible advice when consulting with their patients.

A definitive diabetes flow diagram for diagnosis and treatment

Tribe L¹

¹Baker Heart And Diabetes Institute, Melbourne, Australia

Background & Aim:

Of the 550 million adults living with diabetes, almost half are undiagnosed with many others misdiagnosed. These issues have been previously identified, and consensus reports created for diagnosis and treatment, but these generally focus on a single type. Merging three of these reports into one comprehensive guide for the diagnosis and treatment of diabetes would be a powerful tool in fighting this disease.

Methods:

This work completes that merge by taking the diagnosis and treatment diagrams from international consensus reports for type 1, type 2, and LADA diabetes, reconciling differences and filling gaps in flow, to provide two flow diagrams. The first gives the healthcare professional a clear path for diagnosis of monogenic diabetes, type 1/LADA, and type 2. The second provides guidance on treatment for types 1/LADA and type 2. It is hoped that through using these flow diagrams, areas of consistent misdiagnosis and treatment can be identified.

Results:

Our reconciled flowchart starts with a patient showing typical symptoms of diabetes. Moving through provides a diagnosis of type 1/LADA, type 2, or MODY diabetes and, in the case of a provisional diagnosis of type 2, a cadence for checking c-peptide levels to allow for movement to a definitive diagnosis. For a diagnosis of types 1/LADA and 2 we move on to a treatment flowchart which provides guidance on therapies depending on co-morbidities and, in the case of LADA, a cadence for reviewing when insulin therapy should be considered.

Discussion / Conclusion:

With consolidated flowcharts for the treatment and diagnosis of a wide range of diabetes types, health care professionals can make consistent decisions, reducing the rate of misdiagnosis and ensuring optimal treatment is received.

Impact of continuous glucose monitoring in people with type 2 diabetes receiving basal or pre-mixed insulin: findings from a semi-systematic review and online listening

Trojčakova I¹, Keighron C², Roetschke J³, Moceris S³, Kar P⁴

¹Roche Diagnostics, Ltd., Rotkreuz, Switzerland, ²International Diabetes Federation European Region, Brussels, Belgium, ³Roche Diabetes Care GmbH, Mannheim, Germany, ⁴Diabetes Centre, Portsmouth Hospitals NHS University Trust, Portsmouth, UK

Introduction: Continuous glucose monitoring (CGM) allows people with diabetes to monitor their blood glucose levels in real time, to manage their glucose levels and improve their clinical outcomes. However, these systems still carry some burden for the person with diabetes and unmet needs remain. This analysis aimed to assess the impact of CGM on outcomes in people with type 2 diabetes (T2D) taking either basal or pre-mixed insulin.

Methods: A semi-systematic literature review and online listening were performed in 2025, focusing on studies and online mentions that reported on CGM, T2D and basal/pre-mixed insulin. Population, intervention, comparator, outcomes and study type (PICOS) eligibility criteria were used to determine studies for inclusion. Searches were conducted in the Embase, MEDLINE and Cochrane Library databases, supplemented by findings from relevant congresses, and social media platforms (X, YouTube, Reddit), podcasts and blogs.

Results: Overall, 26 studies and 79 online mentions that reported CGM impact in T2D were identified. Of these, 20/26 studies and 56/79 online mentions reported on CGM impact on users' outcomes. Specific features that impacted users' outcomes were categorised into: ease of use, educational, motivation, clinical performance of CGM, data sharing, real-time observation, frequency of use and other. Reporting on burdens and unmet needs was not the primary focus of any study. Reported burdens associated with current CGM systems from the patient's perspective included difficulty in interpreting data, psychological (alarm fatigue and sleep disturbance), tolerability and emotional burdens. Potential unmet needs mentioned implicitly were related to language, diabetes type and complications, and type of data reportable in CGM applications. The main barrier associated with current CGM was access (eg cost, health insurance and availability).

Conclusion: Further research and real-world data are needed to evaluate the impact and burden of CGM in people with T2D receiving basal or pre-mixed insulin.

Comparing maternal and fetal pregnancy complications in women with pre-existing diabetes based on planning status: A retrospective audit.

Tun-Ismael A¹, Gul H², Lakshmanaswami S³, Black K^{4,5}, Hao E⁶, Rodrigo N^{2,3}, Cameron J³, Yong H³, Hibbert E^{2,3,4}

¹Department of Medicine and Endocrinology, Campbelltown Hospital, CAMPBELLTOWN, Australia,

²Nepean Clinical School, Sydney Medical School, Faculty of Medicine and Health, the University of Sydney, KINGSWOOD, Australia, ³Department of Endocrinology, Nepean Hospital, KINGSWOOD, Australia, ⁴Central Clinical School, Sydney Medical School, Faculty of Medicine and Health, the University of Sydney, CAMPERDOWN, Australia, ⁵Charles Perkins Centre, the University of Sydney, CAMPERDOWN, Australia, ⁶Department of Endocrinology, Wollongong Hospital, WOLLONGONG, Australia

Introduction

Pregnancies with pre-existing diabetes mellitus are associated with increased maternal and neonatal complications, particularly when peri-conception glycaemic control is suboptimal. Although preconception planning improves early glycaemia and pregnancy outcomes, engagement with pre-conception care remains low.

Aim

To describe pregnancy outcomes in women with pre-existing diabetes delivering at Nepean Blue Mountains Local Health District (NBMLHD) and examine associations between pregnancy planning, glycaemia and adverse outcomes.

Methods

We conducted a retrospective audit of electronic medical records for women with pre-existing diabetes delivering at NBMLHD between 2020–2025. Continuous variables are presented as mean $\pm$ SD or median (IQR), and categorical variables as number (percentage). Data collection is ongoing.

Results

Among 178 births in 150 women, 47% had type 1 diabetes (T1DM) and 53% had type 2 diabetes (T2DM). 60.1% of pregnancies were unplanned. Planning status was similar between T1DM and T2DM (50.7% vs 49.3%). Planned pregnancies were associated with earlier antenatal clinic engagement (median gestation at first antenatal visit 12.6 vs 14.0 weeks) and lower pre-pregnancy HbA1c (median 6.8% vs 7.6%) and first trimester HbA1c (median 6.8% vs 7.1%).

Among women with T1DM, 59% used closed-loop insulin pump therapy during pregnancy. Teratogenic medication exposure at first antenatal visit was more common in T2DM than T1DM (15% vs 7%) and similar between planned and unplanned pregnancies (12.7% vs 10.3%). Maternal complications occurred in 54.7% of planned pregnancies and 35.6% of unplanned pregnancies. Fetal complications were common across both groups (88.1% planned vs 75.2% unplanned), with perinatal mortality occurring in 8.6% and 3.8% respectively.

Conclusion

Unplanned pregnancy remains common among women with pre-existing diabetes and is associated with poorer peri-conception glycaemic control and delayed antenatal engagement. Despite better glycaemia in planned pregnancies, maternal and fetal complications were high across both planned and unplanned groups. Routine contraception counselling, preconception care, and pregnancy planning support are needed to improve outcomes.

Incidence and impact of fasting during Ramadan in patients attending the Diabetes in Pregnancy Clinics (DIP) at a metropolitan Melbourne hospital

Ulrich E¹

¹Northern Health, Epping, Australia

Background & Aim: Northern Health is a major provider of antenatal care for the outer Northern suburbs of Melbourne where there is a culturally diverse population. Patients who identify as Muslim are a significant portion of the patient group that Northern Health (NH) services.

Pregnant patients with diabetes are known to be at higher risk of maternal and foetal adverse outcomes and those who fast for Ramadan, may be at an increased risk. Although during pregnancy, people are exempt from fasting for the month of Ramadan, some may choose to fast for either part or all of Ramadan.

This project aims to identify the prevalence of patients with DIP who identify as Muslim, and in particular, which portion of these patients fast for a period during Ramadan.

Methods: This prevalence survey was completed over a five year period from 2018-2022.

Medical files of patients attending the antenatal clinics who have DIP and who identify as Muslim were reviewed retrospectively following the period of Ramadan to collect general demographics, fasting days during Ramadan, BGL checks, medication changes and maternal hypoglycaemia.

Results: 1 in 5 women who accessed the service at NH identified as Muslim. Most had GDM, although a small number had T2DM. Main country of birth was Australia, with Lebanon being the second. Most spoke English (68-79% range), the second most common language was Arabic. 47% of patients fasted for all or part of Ramadan. Fasting length ranged from 1-30 days. 64% did not complete all required BGL checks. Maternal hypoglycaemia occurred more frequently in those that fasted. Medication changes were required for 51% of those that fasted.

Discussion / Conclusion: Overall, these findings suggest that fasting during Ramadan is common among DIP and should be routinely discussed in antenatal diabetes care. Incorporating culturally sensitive education and multidisciplinary support may help optimise maternal glycaemic control and reduce potential risks during Ramadan for this population.

Steroid-induced hyperglycaemia in patients receiving chemotherapy treatment

Vigus S¹, Edmondston S¹, Cranfield A¹, Feeney K^{1,2,3}

¹St John Of God Hospital, Murdoch, Warwick, Australia, ²Edith Cowan University, Perth, Australia,

³Notre Dame University, Fremantle, Australia

Introduction: Monitoring blood glucose levels (BGLs) is an important element of care for patients having chemotherapy treatment with concomitant corticosteroids. However, the prevalence of hyperglycaemia in this patient group is poorly understood and treatment strategies are applied with varying effectiveness, in part due to a lack of standardised guidelines for hyperglycaemia screening and treatment.

Aim: The aims of this study were to assess the prevalence of diabetes in people receiving cancer treatment, the prevalence of hyperglycaemia during treatment (for people with and without a diagnosis of diabetes) and the incidence of steroid induced diabetes in patients having chemotherapy treatment with adjuvant corticosteroids.

Method: This was a prospective observational study of 148 participants receiving chemotherapy with corticosteroids, of which 41 participants (28%) had a diagnosis of diabetes at baseline. Participants measured three post-prandial BGLs on the day after chemotherapy, at baseline, 6 weeks and 12 weeks. Hyperglycaemia was defined as a BGL of 11.1mmol/L or higher. Glycated haemoglobin (HbA1c) was measured at baseline and 12 weeks.

Results: Participants with pre-existing diabetes recorded higher BGLs than those with no diabetes at all time-points. Seven participants with no diabetes at baseline developed steroid-induced diabetes at 12 weeks (HbA1c of $\geq 6.5\%$).

Conclusion: People living with co-morbid diabetes and cancer may benefit from additional support and monitoring, as cancer treatment can negatively impact diabetes management. Additionally, these findings highlight that cancer treatment with adjuvant corticosteroids can cause diabetes in people without pre-existing diabetes. Therefore BGL monitoring is an important part of the comprehensive care strategy for patients having chemotherapy treatment combined with corticosteroids. Screening and treatment protocols for this patient population need further development in the Australian health care setting.

SMART-CRF: Automating Clinical Data Integration to improve accuracy and efficiency in clinical research

Vishwanathan A¹, Shabbir A¹, Sukumaran H¹, S P S¹

¹Tambaram Medical Center, Chennai, India

Background

Traditional clinical research workflows rely on manual case report form (CRF) data entry, which is time-consuming, error-prone, and resource intensive. This study aimed to develop and evaluate a SMART-CRF system that automates EMR data extraction and integration to improve data quality and operational efficiency in clinical research.

Methodology

A SMART-CRF system was developed to automatically extract, match, standardize, and populate structured EMR data into CRFs. Prescription and laboratory datasets, including HbA1c records, were uploaded and patient records matched across sources. Automatically generated CRFs were compared with manually entered CRFs. Agreement was assessed using intraclass correlation, Bland–Altman analysis, paired t-tests, and Wilcoxon tests. Data were analyzed using SPSS.

Results

The SMART-CRF system successfully integrated fragmented EMR data, including prescription and HbA1c laboratory records, into unified research-ready CRFs. Validation using 10,000 prescription records and corresponding laboratory data demonstrated excellent agreement between automated and manual CRF entries. Key variables such as patient identifiers, drug exposure, and baseline and follow-up HbA1c values were accurately mapped. Intraclass correlation coefficients exceeded 0.90, indicating strong concordance. Bland–Altman analysis showed no systematic bias, and paired t-tests and Wilcoxon tests confirmed no statistically significant differences between SMART-CRF and manual entries ($p > 0.05$). Minor mismatches were primarily due to missing identifiers or unmatched dates. Overall, SMART-CRF substantially reduced manual data-entry time, minimized transcription errors, and improved data completeness and consistency.

Conclusion

SMART-CRF demonstrates that automated EMR-to-CRF integration can reliably replace manual data entry without loss of accuracy. By reducing transcription burden and improving data consistency, the system enables faster study completion and supports high-quality clinical research. SMART-CRF also transforms fragmented EMR data into analytics-ready datasets, supporting quality monitoring and future AI-driven research. Broader adoption may improve efficiency across single- and multi-center studies, while future work will focus on expanding data sources, advanced analytics, and large-scale implementation.

The Glycemic wheel: A visual dietary tool to enhance dietary and diabetes self-management and education and improve glycemic control in Type 2 diabetes mellitus.

Vishwanathan A¹, Shabbir A¹, Sukumaran H¹, S P S¹

¹Tambaram Medical Center, Chennai, India

Background & Aim:

Dietary self-management education(DSME) is essential in type 2 diabetes, and glycaemic index-based diets have been shown to reduce HbA1c. However, conventional counseling is often difficult to apply to daily food choices. This study aimed to develop and validate a visual DSME tool, the Glycemic Wheel, to simplify dietary decision-making and improve glycaemic outcomes in adults with type 2 diabetes.

Methods:

This 12-week interventional study enrolled adults with type 2 diabetes who received standardized DSME using the GI Wheel. Pre- and post-intervention dietary adherence, HbA1c, and patient feedback were evaluated. Descriptive statistics, paired t-tests, and chi-square analyses were used to assess outcomes

Results:

A total of 3,185 patients completed follow-up assessment of GI Wheel-based DSME effectiveness. Dietary adherence improved from 32% at baseline to 72% post-intervention. Paired t-test analysis demonstrated a statistically significant reduction in HbA1c (mean difference = -1.9%), $t(1,253) = 12.4$, $p < 0.01$. High patient acceptability was observed: 2,465 patients (77.4%) reported that the wheel made GI differences very clear, while 719 (22.6%) found it somewhat clear. For diet planning, 2,691 patients (84.5%) rated the tool very useful and 493 (15.5%) useful. Comprehension was strong, with 2,200 patients (69.1%) rating the information very easy to understand.

Conclusion:

The Glycemic Index Wheel is an effective tool that significantly improves dietary adherence, patient understanding, and glycemic outcomes. Given its strong clinical impact, high usability across literacy levels, and significant HbA1c reduction, we strongly recommend routine integration of standardized GI Wheel-based DSME into outpatient diabetes care, with periodic reinforcement to sustain long-term glycemic control and it is easily reproducible across diverse cultural and community food practices and languages, and so it is scalable for integration into broader community-based activities.

Adherence to prescribed glucose monitoring in surgical patients - a comparison of continuous glucose monitoring systems and fingerstick glucose monitoring

Vorup Mortensen M^{1,2}, Bastholm Olesen T^{1,2}, Linding-Joergensen U^{1,2}, Schultz H^{2,3}, Abrahamsen L³, Donslund Nielsen T³, Schousboe^{1,2}

¹Steno Diabetes Center Odense/Odense University Hospital, Odense, Denmark, ²Clinical Institute, University of Southern Denmark, Odense, Denmark, ³Department of Surgery, Odense University Hospital, Odense, Denmark

Background

Glucose monitoring is essential for inpatient management of dysglycaemia. However, adherence to prescribed fingerstick glucose monitoring (FSGM) is often suboptimal due to workflow demands. Continuous glucose monitoring systems (CGMS) may offer a more practical alternative that could improve adherence.

Aim

To compare the percentage of completed versus prescribed glucose measurements (prescription adherence) during surgical admissions between patients monitored with CGMS and FSGM, respectively.

Method

A prospective comparative before-after CGM intervention study, GLUCOSENS, was performed at the general surgical ward at Odense University Hospital. Adults (≥ 18 years) with diabetes or hyperglycaemia were included. Patients were monitored in the same ward during two different time periods: 104 patients using FSGM (Period 1) and 82 patients using CGMS (Period 2). The smaller sample size in Period 2 reflects that data collection had not been fully completed at the time of analysis. Adherence was assessed by comparing the number of prescribed versus performed glucose measurements across hospitalization days. Using a linear mixed-effects model accounting for repeated measurements within individuals adjusted for age and sex. Adherence was defined as the ratio of performed to prescribed glucose measurements and assessed daily.

Results

The participants were on average 67.0 years old and 48.4% were female. The average duration of hospital stay was 9.1 days.

CGM was associated with significantly higher adherence to prescribed glucose monitoring compared with FSGM. Average adherence per day was higher in the CGM group compared to the FSGM group (71.1% vs. 58.2%, $p=0.000$)

Conclusion

Compared with FSGM, CGM was associated with higher adherence to prescribed glucose monitoring during surgical hospitalization. These findings suggest that CGM may be an effective strategy to improve adherence to inpatient glucose monitoring protocols by reducing missed measurements.

Mapping primary care workflows for patients with type 2 diabetes mellitus to improve cardiovascular and kidney disease risk management: the REVERSE process mapping study

Straiton N^{2,3,4}, **Wallace H**¹, Holman T^{2,3,4}, Kostyrka B¹, Gregory V¹, Campain A¹, Katz I⁸, Kotwal S^{1,7}, Rajaratnam R⁹, Si L¹⁰, Simmons D^{10,11}, Tai E¹³, Usherwood T^{1,12}, Gallagher M^{1,5,6}, Jun M^{1,5}

¹The George Institute for Global Health, Sydney, Australia, ²Nursing Research Institute, St Vincent's Health Network Sydney, St Vincent's Hospital Melbourne, Australian Catholic University, Sydney, Australia, ³St Vincent's Hospital, Sydney, Australia, ⁴School of Nursing, Midwifery and Paramedicine, Australian Catholic University, Sydney, Australia, ⁵University of New South Wales, Sydney, Australia, ⁶Liverpool Hospital, Sydney, Australia, ⁷Prince of Wales Hospital, Sydney, Australia, ⁸St George Hospital, Sydney, Australia, ⁹Cardiovascular Stream, South-Western Sydney Local Health District, Sydney, Australia, ¹⁰Western Sydney University, Sydney, Australia, ¹¹Macarthur Diabetes Endocrinology and Metabolism Service (MDEMS) Campbelltown and Camden Hospitals, South Western Sydney Local Health District, Sydney, Australia, ¹²Faculty of Medicine and Health, University of Sydney, Sydney, Australia, ¹³Riverina Nephrology, , Australia

Background & Aim: People with type 2 diabetes (T2DM) have an increased risk of cardiovascular disease (CVD) and chronic kidney disease (CKD), however early detection and preventive strategies remain inconsistently applied in primary care. Workflow analysis offers an opportunity to identify barriers and inform targeted interventions. We mapped primary care workflows for the management of T2DM to identify behavioural and environmental barriers, and corresponding areas for improvement.

Methods: Process mapping was undertaken in 3 general practices. Interviews and workflow observations informed generic and site-specific process maps. Variations were systematically analysed to identify barriers and enablers, which were coded to Theoretical Domains Framework (TDF) and linked to corresponding Behaviour Change Techniques (BCT).

Results:

In 2025, three general practices in Sydney, Australia were enrolled. 15 participants were recruited, including 8 general practitioners, 5 nurses and 2 administrative personnel. The most common care pathway barriers were coded to corresponding TDF domains and associated BCTs:

- 1) Variable T2DM care coordination (*Social/professional role and identity; Social influences*)
 - BCTs: Audit and feedback; Social support; Modelling
- 2) Financial constraints in relation to medications and external consultations/tests (*Environmental context and resources*)
 - BCTs: Environmental restructuring; Problem solving
- 3) Knowledge and skill gaps (*Knowledge; Skills*)
 - BCTs: Instruction; Demonstration; Prompts/cues
- 4) High workload and limited consultation time leads to missed or opportunistic care (*Environmental context and resources*)
 - BCTs: Prompts/cues; Action planning; Workflow restructuring
- 5) Low patient engagement in care further exacerbated by cultural and social factors (*Environmental context and resources; Social influences; Knowledge; Skills; Beliefs about capabilities*)
 - BCTs: Information about health consequences; Instruction on how to perform the behaviour; Social support; Action planning

Discussion / Conclusion: Workflow process mapping revealed key care gaps and opportunities to improve CVD and CKD risk management for patients with T2DM. A multi-component intervention targeting knowledge deficits, workflow inefficiencies, integrated care and patient engagement is needed.

Annual check-up attendance and clinical diabetes outcome measures in a rural prospective diabetic cohort in Shaoguan, southern China

Wang H¹, Li Y¹, Li Y², Huang W²

¹School of Public Health, Sun Yat-sen University, Guangzhou, China, ²Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China

Background & Aim: While integral to diabetes management, implementation of and adherence to follow-up care remains challenging in resource-limited rural health-care settings. We aimed to assess whether annual check-up attendance is beneficial in clinical diabetes outcome measures.

Methods: We recruited a community cohort of adult patients with type 2 diabetes (T2D) in a rural area in Guangdong province, China. Free-of-charge, follow-up care was provided by community-based public health practitioners in the nationwide basic public health (BPH) service delivery framework. Diabetes management protocol incorporated annual health assessments, diabetes education, tailored recommendations on lifestyles, and individualised blood glucose monitoring to support patients in developing glucose-lowering plan, evaluating therapeutic effects, and optimising therapeutic regimens to achieve glycaemic goals. Comparative analyses were conducted to assess differences in metabolic parameters between T2D patients who attended annual check-up and non-attendees, with subgroup stratification by obesity status (body mass index [BMI] ≥ 28 kg/m²).

Results: The study cohort comprised 2,723 participants with T2D (44.6% male; 47.0% aged over 65 years). We observed significantly lower levels of haemoglobin A1c ($P=0.014$) and fasting plasma glucose ($P=0.037$) in obese T2D patients who attended annual check-up compared to non-attendees. Meanwhile, significantly lower levels of triglycerides ($P=0.042$) were found in T2D patients with normal BMI who attended annual check-up compared to non-attendees.

Discussion / Conclusion: Our findings indicate that having attended the annual check-up appears to be beneficial in achieving better glycaemic and lipid outcomes among T2D patients. These results underscore the importance of structured follow-up care in rural practice as a critical component of effective diabetes management within resource-constrained settings.

Clinicians' perspectives on electronic medical records use in diabetes outpatient Care: A qualitative study

Wang W¹, Sullivan C¹, McLeod D¹, Puri G¹, Samadbeik M¹, Lobo E¹, Duong T¹, Kirwa T¹

¹Queensland Health, Mount Gravatt East, Australia, ²The University of Queensland, Brisbane, Australia

Background and Aim:

Electronic medical records (EMRs) are intended to improve efficiency, safety, and quality of care. However, their impact in outpatient diabetes services remains underexplored. This study examined clinicians' perspectives on EMR use in a diabetes outpatient setting.

Methods:

This qualitative study, conducted in accordance with COREQ guidelines, involved four focus groups with 22 clinicians (medical, nursing, and allied health) at a metropolitan diabetes service in Queensland, Australia. Data were analysed using deductive content analysis informed by the Quintuple Aim and the Technology Acceptance Model/Unified Theory of Acceptance and Use of Technology frameworks.

Results:

Clinicians described mixed impacts across Quintuple Aim domains. Perceived benefits included improved efficiency, access to patient information, and prescribing safety, reflecting perceived usefulness and positive attitudes towards EMR adoption. Barriers included complex navigation, technical issues, alert fatigue, and inadequate training, which reduced usability and workflow efficiency. Tensions related to documentation demands and patient expectations further shaped experiences. Despite these challenges, EMRs were considered essential to contemporary practice.

Discussion and Conclusion:

EMRs improved safety, information access, and some aspects of efficiency, but also introduced workflow and wellbeing burdens. In outpatient diabetes care, limited integration of glycaemic data highlighted gaps in supporting complex chronic disease management. EMR implementation should be approached as an ongoing quality improvement process, supported by role-specific training, reliable infrastructure, and clinician engagement in system optimisation. Future research should prioritise usability, integration, and inclusion of both clinician and patient perspectives in digital health transformation.

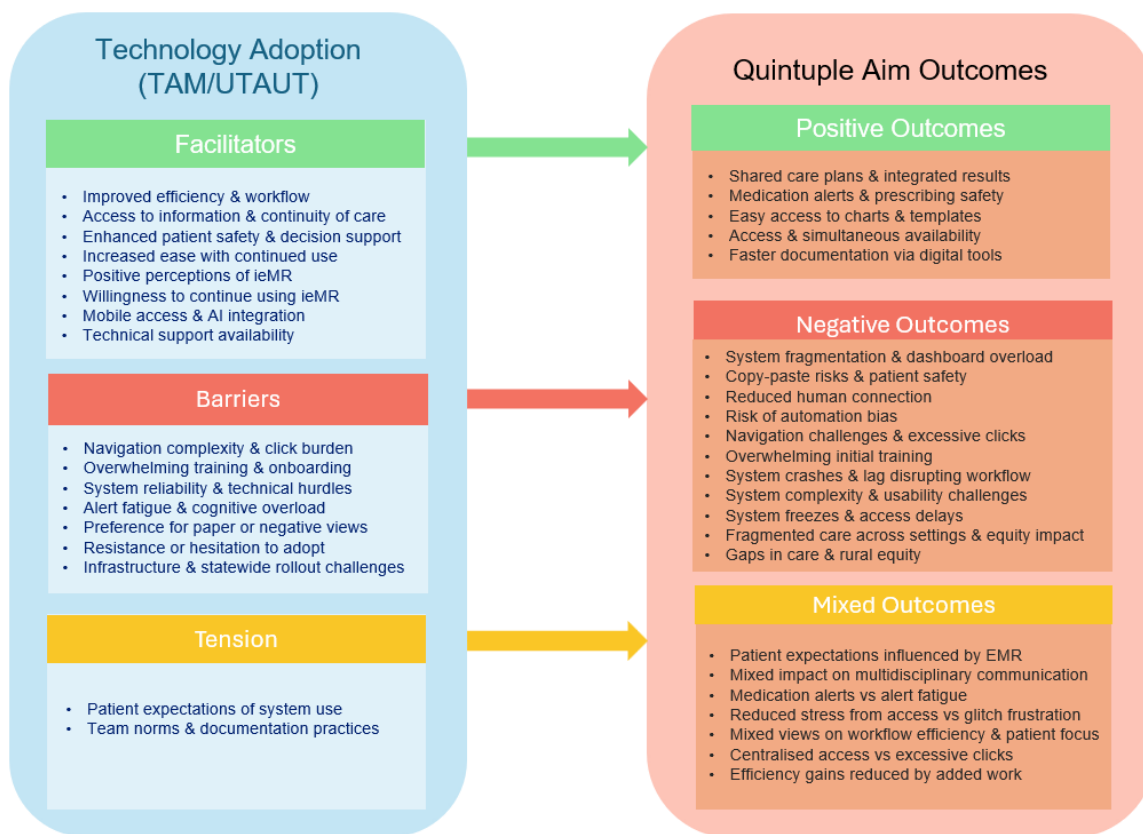


Figure 1. Conceptual Framework of EMRs impacts in outpatient diabetes care

Setting the benchmark: Implementing national standards and accreditation for interdisciplinary high risk foot services across Australia.

Watts M^{1,2}, Wischer N¹, Andrikopoulos S³, Twigg S^{1,4}

¹National Association of Diabetes Centres (NADC), Forest Hill, Australia, ²Eastern Health, Box Hill, Australia, ³Australia Diabetes Society (ADS), Sydney, Australia, ⁴Royal Prince Alfred Hospital, Camperdown, Australia

Background/Aim

Diabetes-related foot disease remains a leading cause of hospitalisation, lower-extremity amputation, and healthcare utilisation. Variability in service structure and access to interdisciplinary care contributes to inconsistent outcomes across health systems. National service standards and accreditation frameworks provide a mechanism to promote evidence-based practice, enable service benchmarking, and support continuous quality improvement. This project aimed to develop and implement Australian Interdisciplinary High Risk Foot Service (iHRFS) Standards and a national accreditation program designed to strengthen service delivery and improve outcomes for people with diabetes-related foot complications.

Methods

The National Association of Diabetes Centres (NADC) developed the Collaborative Interdisciplinary High Risk Foot Service Standards, released in 2018, with the accompanying accreditation program launched in 2019. Services may apply for accreditation as either a Core iHRFS or a Centre of Excellence. Applications undergo a structured, independent peer-review process incorporating service self-assessment, documentary evidence, and evaluation against eight national standards addressing interdisciplinary care, governance, access, clinical pathways, and outcome monitoring. Successful services are awarded accreditation for a four-year period and are required to undertake quality improvement initiatives aligned with identified service gaps.

Results

As of March 2026, 66 services across Australia have engaged with the accreditation program. Of these, 24 services achieved Centre of Excellence status and 23 achieved Core accreditation. One-third of accredited services have subsequently completed reaccreditation, demonstrating sustained engagement with the program. Fifteen percent of services withdrew during the process, most commonly citing workforce capacity and time constraints, while 13% did not meet accreditation requirements following committee review.

Conclusion

The NADC iHRFS accreditation program provides a national quality framework to standardise interdisciplinary care for diabetes-related foot disease. By embedding service standards, peer review, and quality improvement processes, the program supports benchmarking, strengthens clinical governance, and offers a scalable model to improve service delivery and patient outcomes nationally.

“We want to get this done”: A qualitative study of factors that facilitate Aboriginal families’ engagement in a childhood diabetes prevention program in Central Australia

Weaver E¹, McKay D^{1,2}, Kelaart J¹, Mack S¹, Brown J³, Borland K³, Stuart L³, Boffa J³, Dabelea D⁴, McCarthy L¹, Maple-Brown L^{1,2}, Kirkham R¹

¹Menzies School of Health Research, Alice Springs, Australia, ²Department of Endocrinology, Royal Darwin Hospital, Darwin, Australia, ³Central Australian Aboriginal Congress, Alice Springs, Australia, ⁴University of Colorado Anschutz, Aurora, United States

Background and Aim:

Aboriginal and Torres Strait Islander youth in Central Australia arguably have the highest rates of youth-onset diabetes globally. Healthy lifestyle programs are considered best practice for preventing obesity and type 2 diabetes (T2D) among youth, although international evidence indicates their success depends on the engagement and retention of families. Understanding factors that facilitate family engagement in programs is therefore critical to improve T2D outcomes in the region.

Methods:

Embedded within a randomised waitlist-controlled trial with a planned sample size of 150 children across 10 communities in Central Australia, this qualitative study is underpinned by the methodological principles of phenomenology and explores implementation factors of a 10-week diabetes prevention program with children aged 6-11 years and their participating caregiver. It includes semi-structured in-depth interviews with three participant groups: caregiver participants, community stakeholders and implementation staff. Reflective notes and observations by implementation staff were also analysed.

Results:

Interviewees (n= 35) reported the social determinants of health as barriers affecting families’ engagement in the program (*“Life got in the way... people are dealing with that much”*). Facilitators of engagement included implementation staff building respectful relationships with families, working flexibly and adapting the program to each community (time, location and content), harnessing participant motivations (*“We want to get this done”*) and drawing on local community strengths and language (*“They was interpreting what we was saying to their kids. So they get the full understanding of what we are bringing.”*). Participation enablers included providing practical support: transport, a shared meal, and a family-friendly gathering space.

Discussion:

Study findings reinforce how deeply connected youth-onset obesity and T2D are to the social determinants of health. Healthy lifestyle programs in Central Australia need to be holistic and adaptable to the complex daily realities for participants, provide practical support, be driven by community priorities and value local leadership and knowledge.

From clinical observation to care gap: A reflective practice analysis of communication and collaboration challenges in supporting preschool children with Type 1 Diabetes

Weeratunga P¹

¹Northern Health, EPPING, Australia, ²Hume City Council, CRAIGIEBURN, Australia

Background & Aim

A clinical observation arising from nursing practice in Victoria highlighted a potential gap in diabetes care for preschool-aged children attending early childhood education settings. Children diagnosed with type 1 diabetes receive hospital-based education before discharge, equipping parents to manage insulin administration, glucose monitoring, nutrition and physical activity. Less clarity exists regarding how diabetes care is supported when children attend kindergarten. This abstract aims to highlight an observed gap in communication, collaboration and support between hospital diabetes services and preschool educators.

Methods

A reflective practice analysis was undertaken based on clinical observations arising within a Victorian early childhood education context. The reflection considered questions raised by families and educators about diabetes care during kindergarten hours, including insulin administration, glucose monitoring, communication pathways and service responsibility.

Results

Educators expressed willingness to undertake training to support children during kindergarten hours and reduce the need for parents to attend the service to assist with insulin administration. Uncertainty remained regarding responsibility for educator training, clinical governance and ongoing support in preschool environments. Communication pathways between hospital diabetes services and early childhood education services appeared limited, contributing to gaps in care collaboration. Compared with school-aged settings, systems for training and governance in preschool settings appeared less clearly defined.

Discussion/Conclusion

This clinically derived observation highlights a potential quality improvement opportunity in diabetes education and care coordination for preschool children. Clearer governance, defined training pathways and stronger communication between health and education sectors may reduce burden on families, enhance children's safety and strengthen educator confidence within early childhood settings.

Evaluating a live glucose dashboard supported model of care to mitigate hypoglycaemia hospital-acquired complications in hospitalised patients with diabetes

Wright J¹, Wong T^{1,2,3}, Massey S⁵, Le Q¹, Marimuthu R^{1,4}, Barnes R^{2,6}, Abdo S^{1,2}

¹Department of Diabetes and Endocrinology, Bankstown-Lidcombe Hospital, Bankstown, Australia,

²School of Medicine, Western Sydney University, Sydney, Australia, ³Faculty of Medicine, University of New South Wales, Sydney, Australia, ⁴Faculty of Medicine & Health, The University of Sydney, Sydney, Australia, ⁵Nursing and Midwifery Services, Bankstown-Lidcombe Hospital, Sydney, Australia,

⁶South Western Sydney Local Health District Clinical Stream Office, Sydney, Australia

Background & Aim:

Hypoglycaemia hospital-acquired complications (Hypo-HACs) remain a common yet preventable adverse event among inpatients with diabetes, despite routine blood glucose level (BGL) monitoring. Hypoglycaemia contributes to significant patient harm and incurs substantial healthcare penalties. We piloted an interventional study implementing a nurse practitioner (NP) led model of care (MOC) that leveraged a Live Glucose Dashboard (LGD) embedded in the electronic medical record (eMR) to:

- (1) identify inpatients with diabetes at-risk of hypoglycaemia (BGL 4.0–4.9 mmol/L) receiving insulin and/or sulphonylureas;
- (2) facilitate timely therapeutic interventions; and
- (3) compare Hypo-HAC rates pre and post-implementation.

Methods:

This three-month pilot (19/05/2025–18/08/2025) was conducted by a Diabetes-NP using the LGD to monitor routine inpatient BGLs (2–3 times weekly) and identify patients at-risk of hypoglycaemia (BGL 4.0–4.9 mmol/L). Treating medical teams were contacted promptly to facilitate review/adjustment of diabetes therapy. A retrospective clinical audit captured patient characteristics and NP-initiated interventions. Hypo-HAC events during intervention period were extracted from the hospital's Quality Improvement Data System and compared with the corresponding period in 2024 to assess the impact of the MOC.

Results:

During the pilot, 2,317 inpatients with diabetes (mean=63/day) were monitored. Of these, 59.7% required insulin (54%) and/or sulphonylurea therapy (17%) and 14% (n=331) were identified as being at-risk of hypoglycaemia. NP-led interventions were implemented in 39% of at-risk patients. During the intervention period, 37 Hypo-HACs were reported, compared with 44 events during the same period in 2024 (pre-implementation), representing a 16.4% reduction (OR=0.84; 95%CI=0.54–1.29; p=0.49) and an estimated annual cost saving of \$46,000.

Discussion / Conclusion:

Embedding LGD monitoring within the eMR enables earlier identification of inpatients at-risk of hypoglycaemia and supports timely therapeutic adjustments. This NP-led MOC promotes safer inpatient diabetes management, enhances clinician awareness, and demonstrates potential to reduce Hypo-HACs and associated healthcare costs.

Defining success and best practice in diabetes paediatric to adult transition in healthcare - The Diabetes PATH Project

Wu D^{1,2}, Goldstein R¹, Lin S³, Barlow S⁴, Naderpoor N¹, Pease A⁵, Ng A¹

¹Monash Centre for Health Research and Implementation, Melbourne, Australia, ²General Medicine, Monash Health, Melbourne, Australia, ³Faculty of Health, University of Technology Sydney, Sydney, Australia, ⁴Diabetes and Endocrine, Townsville Hospital and Health Service, Townsville, Australia,

⁵Diabetes, Monash Children's Hospital, Melbourne, Australia

Background & Aim:

A key challenge for young persons with type 1 diabetes (T1D) is the transition between paediatric and adult care. However, there is limited evidence on which models are most effective, and how care can be tailored to meet the needs of young persons with T1D.

This project aims to explore best practice in paediatric to adult diabetes transition care in Australia for young persons with T1D.

Methods:

A mixed methods study with a national survey and interviews with young persons with T1D aged 16-35 years, family members/caregivers and diabetes healthcare professionals is currently underway. A reference group was established with stakeholder groups to co-design study methods, data collection tools, support participant recruitment, analysis interpretation and dissemination.

The COM-B Model for Behaviour Change and RE-AIM framework as part of the Consolidated Framework for Implementation Research informed the development of survey and interview guides. Template (thematic) analysis of qualitative data will identify key themes and synthesise recommendations. Quantitative data will be descriptively reported.

Results:

Qualitative preliminary findings are presented in the table below.

Survey and Interview Preliminary Findings			
	Diabetes healthcare professionals	Parents/caregivers	Young persons with T1D
N =	36	23	36
Key Themes	Key education topics: Risk behaviour, logistics with diabetes management (CGM and insulin pump consumables etc), travel, driving	Financial support, employment rights, access to non-judgemental support	Key education topics: Travel, driving Barriers to attending clinic: Time limitations and costs of attending, judgement from healthcare professionals Mental health not explicitly a focus during clinic. Lack of peer support.

Discussion/Conclusion:

Early findings suggest the importance of consistent, structured yet flexible, and holistic interdisciplinary care to facilitate a successful transition from paediatric to adult diabetes care. There should be a particular focus on mental health and peer support.

Diabetes distress and acceptance amongst women attending a pre-pregnancy diabetes clinic in Western Sydney

Wu K¹, Rodrigo N¹

¹Nepean Hospital, Kingswood, Australia

Background

Women with pre-existing diabetes planning pregnancy face intensive glycaemic targets alongside substantial psychosocial demands. Diabetes distress and acceptance are recognised determinants of self-management and engagement with specialist care. Understanding patient-reported experiences is essential to ensure pre-pregnancy diabetes services are effective and responsive to barriers affecting engagement and adherence to pre-conception recommendations.

Aims

To describe baseline diabetes distress, diabetes acceptance, and the clinic experience of women attending a pre-pregnancy diabetes clinic.

Methods

This prospective pilot study included women attending a tertiary pre-pregnancy diabetes clinic in Sydney, Australia. Baseline demographic and clinical data were collected. Diabetes distress was assessed using the validated Problem Areas in Diabetes (PAID) questionnaire, and psychological acceptance and motivation using the Diabetes Acceptance Scale (DAS). Patient-reported experience and confidence in diabetes self-management were also captured. Analyses were descriptive, with results reported as medians (interquartile ranges) or counts (percentages).

Results

Six women were included in this preliminary analysis. Median glycosylated haemoglobin (HbA1c) was 6.9% (IQR 6.43–7.23), median time in range was 61.5% (IQR 54.75–70.50), and median average glucose was 9.4 mmol/L (IQR 9.3–10.0). Approximately one-third of participants demonstrated high diabetes distress (PAID score ≥ 40). Distress was most frequently related to concerns around food and eating behaviours, feelings of anger about living with diabetes, and worry regarding future complications. No participants demonstrated low diabetes acceptance scores, indicating generally successful integration of diabetes into daily life. Patient-reported experience of the clinic was uniformly positive, with all participants reporting clear explanations of diabetes management and appropriate addressing of concerns.

Conclusion

In this pilot cohort of women attending a pre-pregnancy diabetes clinic, diabetes distress was present despite high diabetes acceptance and positive patient-reported experience. These findings suggest that positive diabetes acceptance and patient-reported experience do not preclude significant diabetes distress, underscoring the importance of psychological support alongside glycaemic optimisation in pre-conception diabetes care.

Nursing effect of needle-free exosome injection for Type 2 diabetes with peripheral neuropathy

Wu Q¹

¹Beijing Hospital, National Center For Gerontology, Beijing, China

Aim To evaluate the effect of comprehensive nursing intervention for patients with type 2 diabetes peripheral neuropathy (DPN) receiving needle-free injection of iPSC-derived exosomes.

Methods This study included 40 DPN patients treated with needle-free exosome injection from September 2025 to January 2026. Full-course nursing was performed: pretreatment included skin assessment, injection site preparation, glucose control and health education; during treatment, standardized injection parameters, site rotation and operation were applied; post-treatment included pain evaluation, hemorrhage and infection prevention. Pain score, nerve conduction velocity and adverse reactions were analyzed.

Results All 40 patients completed 2-month treatment. NRS pain score decreased by 42% ($P < 0.001$). Motor nerve conduction velocity increased by 15.6% and sensory nerve conduction velocity increased by 12.3% (both $P < 0.05$). Mild subcutaneous ecchymosis occurred in 7.5% and slight hemorrhage in 10.0% of patients. No severe adverse events or infection were reported. All local reactions resolved within one week.

Conclusion Targeted comprehensive nursing effectively improves safety, tolerance, pain relief and nerve function recovery in DPN patients undergoing needle-free exosome injection. It supports clinical application of this novel therapy.

The Royal Prince Alfred (RPA) Hospital “Frontiers of GP Diabetes”: a targeted education initiative for GPs with a special interest in diabetes

Wu T^{1,2}, McGill M^{1,2}, Wong J^{1,2,3}, Ross G^{1,2}, Twigg S^{1,2,3}

¹Diabetes Centre, Department of Endocrinology, Royal Prince Alfred Hospital, Camperdown, Australia, ²Sydney Medical School, Faculty of Medicine and Health, University of Sydney, Sydney, Australia, ³The Charles Perkins Centre, University of Sydney, Sydney, Australia

Background: Rising diabetes prevalence across the Western Pacific Region (WPR) is placing increasing pressure on already limited specialist services. As a result, primary care/general practitioners (GP) must assume a greater role in diabetes management. In Australia, a cohort of GPs with a special interest in diabetes (GPWSID) has emerged as a key resource for peer education. However, their specific educational needs are not adequately addressed by mainstream GP or specialist diabetes conferences.

Methods: “The RPA Frontiers of GP Diabetes” was established to address this gap. Independently developed and delivered by a multidisciplinary team at a hospital-based diabetes centre, the program is tailored for GPWSIDs. The two-day face-to-face meeting is deliberately limited in size to foster interaction and discussion. It is scheduled shortly after major international diabetes conferences to facilitate timely dissemination of emerging evidence and clinical advances. Developed with input from the GPWSIDs, the topics include interpretation of clinical trials, guideline development and review, atypical diabetes and diabetes in pregnancy.

Results: Since its inception in 2013 (excluding 2020–21 due to COVID-19), “Frontiers” has been held annually, with attendance ranging from 21 to 35 participants. Peak attendance occurred in the immediate post-COVID years. Approximately half of attendees have been from rural or regional areas, and there is a near-even distribution between participants from New South Wales and other Australian states. The average participant has 18.1 years of clinical experience (SD 10.3). Satisfaction ratings are consistently high, with a mean score of 4.94 out of 5 (SD 0.25, scored 1–5).

Conclusion: The RPA “Frontiers” meeting is a novel and highly effective educational model that addresses the unique learning needs of GPWSIDs. By facilitating peer-to-peer training through these thought leaders, “Frontiers” contributes meaningfully to strengthening diabetes management at the primary care level. This model can be adapted across the WPR.

Leveraging population data to drive diabetes care improvements in general practice: A 12-month review

Xu X¹

¹Hamilton Harbour Medical Centre, Hamilton, Australia

Background & Aim:

Nurses play a central role in coordinating and delivering diabetes care within general practice. Although population data extraction tools have been used in Australian primary care for over a decade, limited evidence exists on their effectiveness in improving diabetes monitoring and outcomes. This project aimed to evaluate whether systematic use of Primary Sense—a population data extraction and clinical decision-support tool—by a practice nurse could improve diabetes outcomes over an initial 3-month period and assess the sustainability of these improvements over 12 months.

Methods:

This quality improvement project was undertaken in a general practice. Adult patients with a confirmed diagnosis of diabetes were identified using Primary Sense. A nurse-led, structured data review process was implemented, generating monthly diabetes reports detailing key clinical measures, including HbA1c, urine albumin-creatinine ratio, and estimated glomerular filtration rate (eGFR). Identified care gaps were addressed through recalls, phone outreach, follow-up appointments, and coordination of pathology and diabetes review visits. The primary outcome was the proportion of patients with a current HbA1c result. Outcomes were assessed over a 3-month intervention period, with a retrospective 12-month review planned to determine longer-term sustainability.

Results:

Following implementation of monthly data reviews and targeted outreach, the proportion of patients with a current HbA1c result increased by 10% over 3 months. Preliminary 12-month analysis indicates similar improvements in the completeness of other monitoring parameters, including urine albumin-creatinine ratio and eGFR, with full data review ongoing.

Discussion / Conclusion:

Integrating a population data extraction tool into a nurse-led workflow was associated with measurable improvements in diabetes care delivery. The observed 10% increase in current HbA1c results demonstrates the value of proactive identification of care gaps and structured outreach. Early findings suggest that Primary Sense can support more timely and comprehensive diabetes monitoring, with the extended review expected to provide further insight into long-term sustainability.

Continuous glucose monitoring in radiotherapy: A case demonstrating strategies to maintain device integrity, safety, and cost efficiency in diabetes care

Yamineni S¹, Mahony J¹, Triay J¹

¹Gold Coast University Hospital, Gold Coast , Australia

Purpose and Aim:

Use of continuous glucose monitors (CGMs) is increasingly common in diabetes management. Guidance regarding their management during radiotherapy remains limited and conservative, recommending device removal due to potential radiation damage. Device removal may lead to unnecessary sensor disposal, prolonged interruption of automated insulin delivery (AID), increased patient costs, and impact patient independence with daily diabetes management. We report a case where patient-clinician collaboration enabled CGM sensor repositioning outside the radiation field and review the impact.

Target Population:

People with diabetes using CGM and requiring radiotherapy.

Project Team:

Endocrinologists, diabetes nurse educators, diabetes nurse practitioners, oncologists, and radiographers.

Project Description and Outcomes:

An independent 89-year-old man with immunotherapy-induced Type 1 diabetes mellitus self-managed his diabetes using a Medtronic 780G insulin pump with Guardian Connect 4 sensor with SmartGuard AID. He received planned radiotherapy to the chest for lung cancer. The CGM sensor, initially placed on the left upper arm, became corrupted and failed to communicate with the insulin pump when reconnected following treatment. For subsequent radiation fractions, the sensor was repositioned to the lower body outside the radiation field. Subsequent glucose readings and communication with the insulin pump were monitored and confirmed to function appropriately without device malfunction. The insulin pump was disconnected and stored outside the radiotherapy room for each treatment.

Learnings for the Future:

We believe this is the first reported case of CGM use in vivo during radiotherapy, demonstrating positioning outside the radiation field may be feasible. This may minimise unnecessary device removal, prolonged interruptions to pump therapy, and unreimbursed replacement costs. These findings support more flexible, patient-centred approaches across radiotherapy fractions or prolonged imaging procedures. In 2024, the U.S. FDA approved the FreeStyle Libre 2 and 3 systems for in situ use during certain diagnostic scans, including X-ray and CT. Further research is required to evaluate different CGM systems and guide practice.

Mapping patient inquiry needs in diabetes management: A mixed-methods analysis of online health platforms in China

Yang X¹, Yuan L¹, An K¹, Li J¹, Li S¹

¹West China Hospital, Sichuan University, Chengdu City, China

Background & Aim:

Diabetes poses a growing public health burden in China, yet gaps persist in patient awareness, treatment adherence, and glycemic control. Patient versions of guidelines (PVGs) are promising tools to enhance health literacy, but their development often lacks a systematic understanding of real-world patient concerns. Online health platforms offer a rich, patient-generated data source to capture these unmet needs. This study aimed to identify latent topics in diabetes-related patient inquiries and synthesize essential knowledge points to inform the development of PVGs and AI-driven patient education tools.

Methods:

We collected patient-initiated inquiries from Haodf.com, a leading online health platform in China, spanning 2014 to 2025. Text preprocessing involved vocabulary standardization, word segmentation, and removal of stop words and irrelevant characters using multiple medical lexicons and custom dictionaries. A two-stage Latent Dirichlet Allocation (LDA) model was applied to identify coarse- and fine-grained topics. Subsequently, descriptive qualitative content analysis was conducted to extract and categorize core patient education knowledge points.

Results:

A total of 53,700 inquiries were retrieved, with 48,149 valid texts retained after preprocessing. Analysis revealed six major thematic stages of diabetes management: diagnosis (8,230, 16.6%), monitoring (2,975, 6.01%), pharmacological treatment (25,580, 51.39%), non-pharmacological treatment (479, 0.82%), complications/comorbidities (8,940, 17.26%), and prevention (3,819, 7.93%). Within these, 26 fine-grained topics and 247 distinct knowledge points were identified. The majority of inquiries centered on medication regimens, treatment decision-making, and complication management, whereas non-pharmacological approaches were markedly underrepresented. Recurrent themes also included emotional distress and patient aspirations for disease reversal.

Discussion / Conclusion:

This study delineates a comprehensive, patient-centered framework of knowledge needs across the diabetes care continuum. By surfacing the topics and concerns most salient to patients, these findings provide an empirical foundation for developing PVGs and AI-powered educational tools that are more accessible, responsive, and supportive of shared decision-making. Embedding this real-world knowledge base into digital health interventions may empower patients, address psychosocial needs, and ultimately improve self-management and clinical outcomes.

From 301 kg to Surgery: A Case of Weight Loss with Semaglutide in Obesity Hypoventilation Syndrome and Heart Failure with Preserved Ejection Fraction

Yap R¹, Williams K^{1,2}

¹Nepean Blue Mountains LHD, Kingswood, Australia, ²Charles Perkins Centre - Nepean, The University of Sydney, Kingswood, Australia

Background & Aim

Clinical obesity is associated with high disease burden. Nonetheless, access to affordable specialist obesity management is extremely limited, especially in rural/regional settings. This leads to delayed management of obesity-related complications, hospitalisation and premature death. Timely referral to multidisciplinary team (MDT) and medical therapy can significantly improve health.

Case Presentation

A 55-year-old male from rural/regional NSW with extreme obesity, and prior hospitalisations for respiratory decompensation due to obesity-hypoventilation syndrome (OHS) and heart failure with preserved ejection fraction (HFpEF). He was referred to a metropolitan specialised obesity clinic in July 2024 with initial appointments conducted via virtual care. He was discharged on home oxygen, diuretics and SGLT2i therapy with ongoing review virtually and in-person. Over 18 months of MDT care, incorporating low energy diet, physical activity and subsidised GLP1-receptor-agonist therapy (GLP-1 RA, semaglutide up to 2.0mg), marked weight reduction of 136kg, associated with functional improvement and cessation of oxygen and diuretics therapy was achieved. He underwent bariatric surgery in November 2025 without the need for high dependency post-operatively.

Discussion

This case highlights the feasibility of achieving substantial weight loss with clinically meaningful improvements in health outcomes and quality of life, as well as surgical candidacy, in a patient with severe clinical obesity, OHS and HFpEF following acute cardiopulmonary decompensation. Despite significant geographical barriers to specialist care, supported MDT-led outpatient metabolic rehabilitation allows sustained community-based optimisation and eventual bariatric surgery. In contrast to prior inpatient-focused case reports demonstrating substantial weight loss and quality-of-life improvement, this supports the feasibility of MDT-led outpatient metabolic care models for high-risk patients.

Conclusion

This case demonstrates the potential benefit of GLP1-RA therapy within MDT care for severe clinical obesity complicated by advanced cardiorespiratory disease, including as pre-operative optimisation. Virtual care facilitated access to specialist metabolic services for a patient in a regional, low-mobility setting without compromising outcomes.

Clinical audit of nurses' insulin injection practices in a public hospital: Evaluating adherence to evidence-based injection technique guidelines

Yiannoullou I¹

¹SA Health, Modbury, Australia

Background & Aim:

Diabetes is frequently documented as a comorbidity in hospitalised patients, with insulin therapy commonly required during acute illness. Correct insulin injection technique is essential for optimal glycaemic management, as poor technique can lead to inconsistent insulin absorption, lipohypertrophy, and increased risk of hypo or hyperglycaemia. While patient injection practices have been widely studied, there is limited evidence examining insulin administration practices among hospital nursing staff. This clinical audit aimed to evaluate nurses' self-reported insulin injection practices and determine their adherence to current evidence-based guidelines.

Methods:

A prospective clinical audit was conducted in a 178-bed tertiary public hospital across inpatient units including medical, rehabilitation, emergency, mental health, and high-dependency wards. Nursing staff involved in subcutaneous insulin administration via syringe were selected using simple random sampling. Data were collected using an anonymous self-administered questionnaire assessing knowledge, confidence, and reported clinical practice related to insulin injection technique. The survey included multiple-choice and closed-ended questions aligned with established guidelines. Thirty questionnaires were distributed, with 27 completed responses returned (90% response rate). Data were analysed using descriptive statistics and reported as frequencies and percentages.

Results:

Most respondents (78%) had more than four years' experience administering insulin. Adherence to best-practice recommendations varied. Correct identification of recommended syringe needle length was reported by 48% of respondents, while only 30% correctly identified recommended pen needle length. In contrast, 85% reported routinely assessing body habitus and injection site prior to administration. Routine inspection and documentation of injection sites for lipohypertrophy were reported by 55% and 51% of respondents respectively. Although 78% of nurses reported feeling somewhat confident in their technique, 96% indicated a need for further education or refresher training.

Discussion / Conclusion:

The audit identified significant knowledge gaps and inconsistencies in insulin injection practices among nursing staff, particularly regarding recommended syringe needle length and routine assessment for lipohypertrophy. These findings highlight the need for targeted education, updated clinical protocols, and improved visibility of best practice guidelines. Addressing these gaps may improve consistency in insulin administration and support safer glycaemic management for hospitalised patients requiring insulin therapy.

Impact of flourishing on benefit finding in T2DM based on the triadic reciprocal determinism theory: The serial mediating roles of social support and coping styles

Yingxia Z¹

¹Ruijin Hospital affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Abstract Objective To explore the impact of flourishing on benefit finding among patients with type 2 diabetes mellitus (T2DM) based on the Triadic Reciprocal Determinism Theory and the serial mediating roles of perceived social support and coping styles. It provides empirical evidence for improving the benefit finding level of T2DM patients.

Methods A cross-sectional survey was conducted from June 2025 to October 2025. Using convenience sampling, 207 T2DM patients were recruited from the outpatient and inpatient departments of the Endocrinology Division at a tertiary hospital in Shanghai. Participants completed the General Information Questionnaire, Flourishing Scale, Multidimensional Scale of Perceived Social Support, Coping Style Questionnaire, and Benefit Finding Scale. Univariate analysis, correlation analysis, and serial mediation effect tests were performed using SPSS 26.0 and PROCESS 3.2. A total of 207 valid questionnaires (100.00%) were collected.

Results The mean scores for benefit finding, flourishing, perceived social support, and coping styles were (51.11±11.07), (45.80±7.70), (65.26±14.47), and (0.00±1.40), respectively. Univariate analysis revealed statistically significant differences in benefit finding scores according to educational level, primary caregiver, marital status, living status, and glycosylated hemoglobin level ($P < 0.05$). Correlation analysis showed that flourishing, perceived social support, and coping styles were positively correlated with benefit finding ($r = 0.517 \sim 0.672$, $P < 0.01$). Flourishing demonstrated a total effect of 0.744 on benefit finding, with a direct effect of 0.227. Indirect effects were observed through three pathways: “perceived social support → benefit finding” (0.222), “coping styles → benefit finding” (0.090), and “perceived social support → coping styles → benefit finding” (0.206), accounting for 69.5% of the total effect.

Conclusion The level of benefit finding in T2DM patients needs to be improved. Based on the Triadic Reciprocal Determinism Theory, medical staff should implement targeted interventions after clarifying the characteristics and influencing factors of benefit finding in T2DM patients, so as to enhance their benefit finding level.

Effects of transitional care model–based continuity nursing on glycemic control and self-management in patients with Type 2 diabetes: A prospective controlled study

Yu Y¹

¹Beijing Jishuitan Hospital / Capital Medical University, Peking, China

Background

Patients with type 2 diabetes mellitus (T2DM) often achieve satisfactory glycemic control during hospitalization; however, glycemic control and treatment adherence frequently decline after discharge due to insufficient self-management and lack of continuity of care. The Transitional Care Model (TCM) emphasizes coordinated, continuous care across healthcare settings and may improve post-discharge diabetes management.

Aim

To evaluate the effectiveness of TCM-based continuity nursing on glycemic control and self-management behaviors in patients with T2DM after hospital discharge.

Methods

This is a prospective, single-center, non-randomized controlled study. A total of 224 hospitalized patients with T2DM who meet discharge criteria will be enrolled from January 2026 to December 2027. Participants will be allocated to either a control group receiving routine discharge education or an intervention group receiving a 6-month TCM-based continuity nursing program. The intervention includes individualized discharge planning, structured follow-up, activation of family support, and coordination with outpatient services.

The primary outcome is the proportion of patients achieving glycated hemoglobin (HbA1c) < 7.0% at 6 months after discharge. Secondary outcomes include fasting plasma glucose, 2-hour postprandial glucose, diabetes self-management behaviors, and healthcare utilization.

Results

It is hypothesized that patients receiving TCM-based continuity nursing will demonstrate better glycemic control and improved self-management behaviors compared with those receiving routine care.

Conclusions

This study will provide evidence on the effectiveness of a TCM-based continuity nursing model for improving post-discharge diabetes management and may inform the development of structured transitional care programs for patients with T2DM.

Keywords

Type 2 diabetes mellitus; Transitional Care Model; continuity nursing; transitional care; self-management

Development of an active health knowledge, attitude, and practice questionnaire for first-degree relatives of patients with Type 2 Diabetes Mellitus

Yuan L¹, Niu S¹, Li R¹, Yang X¹, Zhang Q¹, Ye Z¹

¹West China Hospital, Sichuan University, Chengdu City, China

Background & Aim:

First-degree relatives of patients with type 2 diabetes mellitus (T2DM) are at high risk for developing diabetes themselves. Assessing their active health status is crucial for early prevention, yet no specific instrument exists for this population. Based on the Knowledge-Attitude-Practice (KAP) theory and the Health Belief Model (HBM), this study aimed to develop a questionnaire to evaluate the active health knowledge, attitude, and practice levels among first-degree relatives of patients with T2DM.

Methods:

An initial questionnaire was developed through literature review, group discussions, Delphi expert consultations, and a small-sample pilot test. A convenience sample of 285 first-degree relatives of patients with T2DM was recruited from the outpatient department of a tertiary hospital in Chengdu, Sichuan Province. Item analysis was conducted using critical ratio method and homogeneity tests. Reliability was assessed by Cronbach's α coefficient, split-half reliability, and test-retest reliability. Validity was evaluated through content validity and construct validity (exploratory and confirmatory factor analyses).

Results:

The final questionnaire comprised 3 dimensions, 14 subdomains, and 46 items. The Cronbach's α coefficients for the total questionnaire and the knowledge, attitude, and practice dimensions were 0.946, 0.838, 0.917, and 0.919, respectively. The test-retest reliability coefficients were 0.934, 0.947, 0.921, and 0.984, and the split-half reliability coefficients were 0.768, 0.759, 0.779, and 0.787. The item-level content validity index ranged from 0.78 to 1.00, and the average scale-level content validity index was 0.946. Exploratory factor analysis for the knowledge and practice dimensions extracted factors consistent with the theoretical framework, explaining 69.249% and 75.444% of the total variance, respectively. Confirmatory factor analysis for the attitude dimension showed good model fit ($\chi^2/df=1.854$, RMSEA=0.055, GFI=0.923, AGFI=0.887, TLI=0.976, IFI=0.982).

Discussion / Conclusion:

The developed Active Health Knowledge, Attitude, and Practice Questionnaire for first-degree relatives of patients with T2DM demonstrates good reliability and validity. This instrument can serve as a useful tool for clinical assessment of active health levels in this high-risk population, potentially facilitating early identification and targeted interventions for diabetes prevention.

Impact of revised gestational diabetes diagnostic criteria on diabetes educator and higher-risk service delivery and treatment intensity

Zhang W¹, Padmanabhan S^{1,2}, Song L¹, Uyagu A¹, Cheung N^{1,2}, Rhou Y^{1,2}

¹Westmead Hospital Diabetes & Endocrinology, Sydney, Australia, ²Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

Background & Aim:

Revised Australasian Diabetes in Pregnancy Society 2025 diagnostic criteria for gestational diabetes mellitus (GDM) were implemented at Westmead Hospital in October 2025. The service is a tertiary centre supported by the Health2Sync (H2S) app-dashboard platform, facilitating high proportion as virtual reviews. Service load implications for diabetes educator-led low-risk virtual reviews and escalation to endocrinologist review (higher-risk Diabetes-in-Pregnancy pathway [DIP]) and treatment intensification are unknown. Aims were to evaluate changes in service load, escalation to DIP and treatment intensity following implementation of revised diagnostic criteria.

Methods:

Retrospective pre–post evaluation comparing two 13-week periods: PRE (July–September 2025) and POST (October–December 2025). Data were extracted from electronic booking systems, electronic medical records, H2S extracts and a prospectively-collected GDM database. Outcomes included new GDM referrals, escalation to DIP, weekly H2S reviews, H2S reviews per referral, gestational age at diagnosis and insulin initiation.

Results:

New GDM referrals decreased from 225 to 169 (rate ratio 0.75 [0.61, 0.91], $p=0.005$). Proportion requiring escalation to DIP increased (126/225 [56%] vs 125/169 [74%], $p<0.001$). Total H2S reviews decreased (1,239 vs 829, 0.67 [0.61–0.73], $p<0.001$), with mean weekly reviews falling from 95.3 to 63.8. Increase in diagnoses at <20 weeks' gestation was not statistically significant (28.8% vs 32.5%, $p=0.5$). Insulin initiation among those escalated to DIP remained high (102/126 [81%] vs 102/125 [82%]).

Discussion / Conclusion:

Although overall referral and review volume declined post-revised diagnostic criteria, service load remained high. Proportion escalated to higher-risk pathway and needing treatment intensification increased. Earlier diagnosis may extend monitoring duration; thus evaluation over a longer period is needed to further assess review load per referral. Workforce planning in diabetes in pregnancy should consider service load patterns, higher-risk service implications and treatment escalation alongside changes to total diagnoses.

Impact of a standardised diabetes educator-led virtual review model on service delivery in a tertiary low-risk gestational diabetes service

Zhang W¹, Cheung N^{1,2}, Song L¹, Alina M¹, Dhillon G¹, Thompson K¹, Uyagu A¹, Padmanabhan S^{1,2}, Rhou Y^{1,2}

¹Westmead Hospital Diabetes & Endocrinology, Sydney, Australia, ²Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

Background & Aim:

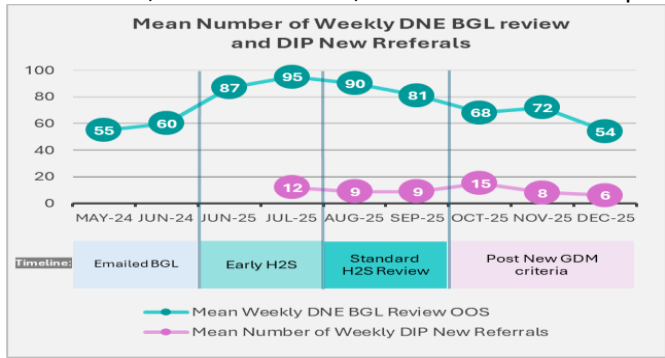
Westmead Hospital implemented the Health2Sync(H2S) app-dashboard platform in 2024 to support virtual monitoring of blood glucose levels (BGLs) in women with diet-controlled gestational diabetes. Diabetes nurse educators(DNEs) use H2S to review BGLs and escalate women to dietitian follow-up or pharmacotherapy to the endocrinologist-led high-risk clinic. While H2S improved visibility of glycaemic data, its impact on DNE workload was unclear. This evaluation examined changes in review volume and care pathways following a standardised H2S review model, alongside revised GDM diagnostic criteria.

Methods:

A retrospective service evaluation compared four two-month periods: pre-H2S (June-July 2024; email-based BGL reporting) and three periods in 2025 (June-November) representing early H2S use, post-standardised H2S review implementation, and post-revised GDM diagnostic criteria. Service activity data were extracted from electronic booking systems and medical records. Outcomes included weekly DNE review occasions of service(OOS), new GDM referrals, high-risk clinic referrals, dietitian follow-up, and insulin initiation.

Results:

Following H2S implementation, mean weekly DNE review OOS increased from 57.5 to 91 (+58%). Introduction of a standardised H2S practice reduced weekly OOS by 6%, with a further 18% reduction after revision of GDM diagnostic criteria. New GDM referrals decreased by 27%, and overall review OOS decreased by 32%. Absolute DIP referrals, insulin initiation, and dietitian follow-up rates remained stable.



Discussion / Conclusion:

Digital monitoring improved identification of women requiring follow-up but increased DNE workload. A standardising DNE-led glucose review model improved service sustainability without compromising escalation or multidisciplinary care

Establishment and clinical experience of an integrated Diabetes Care Center in China

Zhang W¹, Xu X¹, Wang P¹, Cui Y¹, Wang C¹, Chi J¹, Wang W¹, Li B¹, Yang J¹

¹Peking University Third Hospital, Beijing, China

Background & Aim: Diabetes has emerged as a major public health concern in China, often co-occurring with obesity and multiple comorbidities. Traditional single-specialty care is inadequate to meet comprehensive care needs. Under the funding support of the Pilot Program for Public Hospital Reform and High-Quality Development (Haidian District, Beijing), our hospital established an Integrated Diabetes Care Center in March 2024. The center aims to optimize the assessment and treatment system for diabetes and its complications/comorbidities, improve treatment efficiency and chronic care quality.

Methods: A core team comprising diabetes physicians, advanced practice diabetes nurses, and specialized diabetes nurses was formed to implement three innovative models: integrated care services, online home-based remote blood glucose monitoring, and regional three-tier collaborative care. With the endocrinology department at the core, 13 specialty teams including the wound care center and cardiology department were integrated to implement multidisciplinary team (MDT) care. Nurse-led risk assessment and patient empowerment covering neuropathy, diabetic high-risk foot, nutrition, and exercise, et al. A digital remote monitoring platform was established with a multi-channel follow-up system to improve safety in home management. A three-tier collaborative network linking secondary/tertiary hospitals and community centers was created.

Results: The center provided home-based glucose monitoring for 1,041 patients, achieving a 100% response rate to critical glucose values. A closed-loop diabetes management process was completed, significantly improving multidisciplinary collaboration efficiency and reducing waiting times for complex critical cases. A comprehensive regional three-tier diabetes care system was established. This helps promote the downward transfer of high-quality medical resources from tertiary hospitals to community health service centers and secondary hospitals and improving both treatment efficiency and patients' self-management capabilities.

Conclusion: The integrated diabetes care model in China, through multidisciplinary integration, digital remote blood glucose monitoring, and hierarchical coordination, achieves convenient, efficient, and comprehensive diabetes care. This model provides replicable practical experience for regional integrated chronic disease management.

Profiles and practice-related mechanisms of nurses' competence in diabetes self-management education: A multicenter latent profile analysis

Zhang Y¹, Li J¹, Li Y², Zhang M³, Li C⁵, Feng C², Zhang W⁹, Wen L⁷, Zhang X¹⁰, Wu Q⁸, Dong Y⁴, Xiao C⁶, Zhao F²

¹School of Nursing, Chinese Academy of Medical Sciences & Peking Union Medical College, Beijing, China, ²China-Japan Friendship Hospital, Beijing, China, ³Peking University People's Hospital, Beijing, China, ⁴Peking Union Medical College Hospital, Beijing, China, ⁵Beijing Tsinghua Changgung Hospital, Beijing, China, ⁶Beijing First Hospital of Integrated Chinese and Western Medicine, Beijing, China, ⁷Beijing Anzhen Hospital, Capital Medical University, Beijing, China, ⁸National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing, China, ⁹Peking University Third Hospital, Beijing, China, ¹⁰Peking University Shougang Hospital, Beijing, China

Background & Aim: Diabetes self-management education (DSME) is a cornerstone of effective diabetes care, and nurses play a central role in its delivery. However, substantial variation exists in nurses' competence to provide DSME, limiting the development of targeted training and quality improvement strategies. This study aimed to identify distinct profiles of nurses' DSME competence and to explore how practice- and system-level factors shape profile development.

Methods: A cross-sectional, multicenter survey was conducted among 1,799 nurses from 80 hospitals in Beijing, China. Nurses' DSME competence across knowledge, skills, and personal attributes was assessed using the Nurse Health Education Competence Instrument (I-CEpSE). Latent profile analysis (LPA) was applied to identify competence profiles, followed by conditional latent profile analysis (C-LPA) to examine the influence of institutional and practice-related factors on profile membership.

Results: Overall, nurses demonstrated moderate-to-high competence in DSME. Three distinct profiles were identified: a Passive-response group (10.0%) characterized by consistently low competence; a Balanced-development group (45.6%) with moderate and evenly distributed competence; and a Proactive-leadership group (44.3%) exhibiting high competence, particularly in personal attributes. C-LPA showed that external conditions did not alter the underlying profile structure but systematically shaped profile distribution through dimension-specific mechanisms. Practice frequency primarily enhanced knowledge and skills, while participation in multidisciplinary diabetes care teams strengthened personal attributes and facilitated transitions toward higher-level competence profiles.

Discussion / Conclusion: Nurses' DSME competence is structured into distinct and stable latent profiles, with practice-related and institutional factors exerting profile-specific influences. Strengthening structured practice opportunities and interdisciplinary collaboration may support targeted workforce development and quality improvement in diabetes self-management education across diverse and evolving health system contexts.

Stream 3:
Metabolic Diseases 2026 -
Discovery Science in
Diabetes

EZH2-driven epigenetic rewiring of vascular endothelial cells in diabetic atherosclerosis. A translational approach.

Aziz M¹, C Sourris K¹, A Pinzon-Cortes J^{1,4}, J Block T¹, Dai A¹, Maxwell S^{1,3}, Okabe J^{1,3}, C Calkin A³, E Cooper M¹, AM Jandeleit-Dahm K^{1,2}, Khan A¹

¹Monash University Australia, Melbourne, Australia, ²Institute for Clinical Diabetology, German Diabetes Center (DDZ), Leibniz Center for Diabetes Research, Dusseldorf, Germany, ³Baker Heart and Diabetes Institute, Melbourne, Australia, ⁴Diabetes Institute, Division of Metabolism, Endocrinology, and Diabetes, Department of Medicine, University of Washington School of Medicine, Seattle, USA

Background. Atherosclerosis is leading cause of cardiovascular disease(CVD)-related morbidity and mortality in individuals with diabetes, with endothelial-to-mesenchymal transition(EndMT) being key contributing mechanism. While epigenetic regulators are increasingly implicated in atherosclerotic progression, the specific role of Enhancer of Zeste Homolog 2(EZH2), a histone methyltransferase, in EndMT in diabetes-associated atherosclerosis remains unclear.

Aims. This study investigates contribution of EZH2 to EndMT in diabetes-associated atherosclerosis and explores its potential as therapeutic target.

Methods. We assessed EZH2-driven histone H3 lysine 27 trimethylation(H3K27me3) levels in human carotid endarterectomy specimen sections and in aortic endothelial cells from diabetic *Apoe*^{-/-} mouse model. Preclinical intervention studies evaluated effects of EZH2 inhibitor GSK-126 on EndMT and atherosclerosis progression in diabetic *Apoe*^{-/-} mouse model. For mechanistic insight, human aortic endothelial cells(HAECs) were exposed to high glucose (HG) and TNF- α to induce EndMT. Under these conditions, EZH2 activity was inhibited using GSK-126, and its role was further validated via shRNA-mediated knockdown. RNA sequencing identified transcriptional changes. For translational relevance, HAECs were exposed to serum from diabetic and non-diabetic patients with CAD in the presence or absence of GSK-126.

Results. H3K27me3 levels were significantly elevated in plaque sections of diabetic patients and specifically in aortic endothelial cells of diabetic *Apoe*^{-/-} mice. Preclinical intervention studies demonstrated that GSK-126 treatment attenuated EndMT, resulting in reduced atherosclerosis in diabetic *Apoe*^{-/-} mice. In HAECs, GSK-126 and shRNA to EZH2 prevented the increase in H3K27me3 and suppressed EndMT. RNA sequencing identified EZH2 target genes associated with EndMT including collagen. Notably, GSK-126 also mitigated EndMT induced by serum from both diabetic and non-diabetic patients with CAD, highlighting its broad translational relevance.

Conclusion. These findings demonstrate that EZH2 plays pivotal role in promoting EndMT in diabetes-associated atherosclerosis. Pharmacological inhibition of EZH2 represents promising vasculoprotective strategy to counteract EndMT and its pathological consequences such as atherosclerosis as seen in diabetes.

Empagliflozin enhances energy expenditure via activation of hypothalamic orexin neuronal circuits in high-fat diet-induced mice

Bae J^{1,2}, Kim J^{1,2}, Lee M^{1,2}, Khang A^{1,2}, Kim D^{1,2}, Kang Y², Bae J^{1,2}

¹Division of Endocrinology and Metabolism, Department of Internal Medicine, Pusan National University Yangsan Hospital, Pusan National University School of Medicine, Yangsan, Republic of Korea, ²Research Institute for Convergence of Biomedical Science and Technology, Pusan National University Yangsan Hospital, Yangsan, Republic of Korea

Aims: Sodium-glucose cotransporter 2 (SGLT2) inhibitors are widely used for the treatment of type 2 diabetes and are associated with body weight reduction, largely attributed to increased renal glucose excretion. However, the contribution of central nervous system-mediated mechanisms to these metabolic effects remains incompletely understood. This study aimed to determine whether SGLT2 inhibition modulates hypothalamic neuronal circuits regulating energy expenditure under obese conditions.

Methods: Mice were fed a high-fat diet (HFD) for 16 weeks to induce obesity and subsequently treated with empagliflozin (EMPA; 10 mg/kg/day) for 3 weeks. Hypothalamic expression of SGLT transporters was assessed at the mRNA and protein levels. Transcriptomic alterations were analyzed by RNA sequencing. Neuronal activation was evaluated using c-Fos immunohistochemistry following intracerebroventricular EMPA administration. Markers of hypothalamic sympathetic activity and thermogenic gene expression in adipose tissues were also examined.

Results: HFD feeding significantly increased hypothalamic SGLT2 expression at both the mRNA and protein levels, whereas SGLT1 expression was unchanged. EMPA treatment significantly attenuated body weight gain compared with HFD controls without affecting daily food intake. RNA sequencing revealed upregulation of genes associated with hypothalamic neuropeptide signaling, including orexin (Hcrtr) and melanin-concentrating hormone (Pmch), as well as genes involved in sympathetic signaling (Adrb2) and energy metabolism regulation (Ppargc1a). Intracerebroventricular EMPA administration increased c-Fos expression in orexin-positive neurons within the lateral hypothalamus and restored HFD-induced reductions in hypothalamic tyrosine hydroxylase expression. In adipose tissues, EMPA significantly increased thermogenic gene expression in brown adipose tissue, with no significant changes observed in inguinal white adipose tissue.

Conclusions: Empagliflozin reduced body weight gain without altering food intake and was associated with activation of hypothalamic neuronal pathways related to energy expenditure. These findings suggest that central nervous system-mediated mechanisms may contribute, at least in part, to the metabolic effects of SGLT2 inhibition.

Central Activin–NG2 Glial signalling links Hypothalamic Inflammation to Metabolic dysfunction and impaired Glucose Homeostasis

Beddows C¹, Goh P¹, Gregorevic P¹, Dodd G^{1,2}

¹Department of Anatomy and Physiology, The University of Melbourne, Melbourne, Australia,

²Centre for Muscle Research, The University of Melbourne, Melbourne, Australia

Introduction: As next-generation metabolic therapies move beyond appetite suppression alone, Activin signalling has emerged as a promising target for improving body composition and metabolic health. This is exemplified by the Activin receptor antagonist Bimagrumab, which improves insulin sensitivity and glycaemic control in individuals with metabolic disease. However, despite extensive characterisation of peripheral Activin signalling, its role within the central nervous system (CNS) remains poorly understood.

Methods/Results:

We identify Activin signalling as a previously unrecognised inflammatory pathway activated within the mediobasal hypothalamus (MBH) during obesity. Suppressing hypothalamic Activin signalling using AAV-mediated ligand sequestration (Activin-A/B prodomains or Follistatin) protects mice exposed to a high-fat diet from metabolic dysfunction, improving glucose tolerance and insulin sensitivity while reducing weight gain, food intake and impaired energy expenditure. Conversely, AAV-mediated overexpression of Activin-A and -B ligands in the MBH of lean mice drives metabolic dysfunction, including increased adiposity, hyperphagia and impaired glucose tolerance.

Mechanistically, hypothalamic Activin signalling engages NG2 glia, promoting a reactive and proliferative state increasingly implicated in CNS pathology. Selective ablation of proliferating NG2 cells using an HSV-TK suicide gene strategy protects against metabolic dysfunction under obesogenic conditions or following hypothalamic Activin activation. Accordingly, NG2 HSV-TK mice exhibit improved glucose homeostasis and reduced weight gain despite elevated MBH Activin signalling. TurboID proximity labelling further identifies NG2-specific proteomic remodelling linking hypothalamic Activin signalling to systemic metabolic dysfunction.

Conclusion: These findings identify hypothalamic Activin–NG2 glial signalling as a neuroinflammatory pathway linking obesity to metabolic dysfunction and impaired glucose homeostasis, highlighting new central therapeutic targets for metabolic disease.

Homeostatic feeding and reward: investigating the role of a neuronal antenna in obesity.

Bernard A^{1,2,3}, Yue X³, Mifsud F³, Ojeda-Naharro I³, Benois M³, Zhang S³, Reiter J³, Nachury M³, Drew B^{1,2}, Vaisse C³, Brown R², Wang Y^{1,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²University of Melbourne, Melbourne, VIC, Australia, Melbourne, Australia, ³University of California San Francisco, California, USA , San Francisco, USA

Aim: We have recently shown that the melanocortin-4 receptor (MC4R), a master regulator of hunger, localizes to and functions at the primary cilia of neurons. Primary cilia are single, tiny hairlike structures that protrude from the plasma membrane of most cells, including neurons, and serve as antennae to sense their extracellular environment. Defects in neuronal cilia in adult mice lead to obesity, and in humans, disruptions in primary cilia structure or function leads to a group of diseases collectively termed “ciliopathies”, some of which are associated with obesity. Importantly, we showed that MC4R localization to cilia is necessary to control satiety.

While this homeostatic control of feeding is aimed at maintaining a stable body weight over time, the motivation to obtain food and food reward are mediated by the dopaminergic system. There's growing evidence that the melanocortin and dopaminergic systems influence and regulate each other, but how this interplay works is poorly understood. Since MC4R is expressed in a subset of dopamine-sensitive neurons, this project aims at uncovering whether MC4R modulates the dopaminergic system through the primary cilium.

Methods and Results: Weight loss leads to an increased motivation to obtain food to reestablish energy balance. By observing the subcellular localization of MC4R in a mouse model expressing a GFP-tagged MC4R, we showed that MC4R's accumulation within primary cilia reflects an organism's energy status, informing the brain about fat loss and regain following refeeding. We used genetic tools combined with CRISPR technology to delete MC4R or primary cilia specifically in hypothalamic dopamine-sensitive neurons and assessed changes in body weight and reward behaviour to show that ciliary MC4Rs modulate this neuronal population and reward.

Conclusion: Understanding how the homeostatic (melanocortin) and reward (dopaminergic) systems interact will help uncover the mechanisms that drive feeding beyond caloric needs, which contributes to obesity.

Cardiovascular effects of Tirzepatide in concurrent Type 1 Diabetes and overweight or obesity: Protocol for Cardiac MRI substudy within an open label randomised crossover trial

Bilal M^{1,2}, Longfield M^{1,2}, Kozor R^{1,3}, Purcell A¹, Rodrigo N^{1,2}, Glastras S^{1,2}

¹Kolling Institute, University of Sydney, St Leonards, Australia, ²Department of Diabetes, Endocrinology and Metabolism, Royal North Shore Hospital, St Leonards, Australia, ³Department of Cardiology, Royal North Shore Hospital, St Leonards, Australia

In type 1 diabetes (T1D), cardiovascular disease is the leading cause of morbidity and mortality, responsible for 30-50% of deaths, and this risk is 2-4 times higher than the general population (1). Overweight and obesity now affect up to 60% of adults with T1D, mirroring rising global trends (2). The coexistence of obesity and T1D represents an important and potentially modifiable driver of cardiovascular risk. Subclinical cardiac changes, including myocardial fibrosis, left ventricular hypertrophy, and diastolic dysfunction can precede overt heart failure and are detectable using cardiac magnetic resonance imaging (CMR) (3).

This study aims to investigate the effects of tirzepatide on cardiac structure and function in adults with T1D and obesity using advanced CMR, and to determine whether these effects persist following treatment cessation. The study is nested within a prospective, randomised, open-label crossover clinical trial (TZP-T1D 2.0) evaluating tirzepatide in adults with T1D and overweight/obesity. Forty participants will be randomised 1:1 to receive tirzepatide 10mg for 28 weeks or lifestyle advice with usual standard care, followed by a 4-week washout and crossover to the alternate arm. A 3-month post-study follow-up will assess the durability and reversibility of cardiac changes following cessation of tirzepatide. Participants will undergo CMR at baseline, week 28 and week 60 to assess left ventricular structure and function, myocardial tissue characteristics, and exploratory markers.

This study will provide high-resolution, quantitative assessment of the cardiovascular changes in T1D with use of tirzepatide. The collection of glycaemic, weight and body composition data will enable exploration of mechanistic links between metabolic improvement and cardiovascular health. This sub-study will address a major gap in knowledge, providing the first prospective data on the effects of tirzepatide on subclinical cardiac remodelling, LV mass and cardiac function in T1D patients with obesity.

References:

1. de Ferranti, S.D. *et al.* (2014) 'Type 1 diabetes mellitus and cardiovascular disease: A scientific statement from the American Heart Association and American Diabetes Association', *Diabetes Care*, 37(10), pp. 2843–2863. doi:10.2337/dc14-1720.
2. Fang, M. *et al.* (2023a) 'Prevalence and management of obesity in U.S. adults with type 1 diabetes', *Annals of Internal Medicine*, 176(3), pp. 427–429. doi:10.7326/m22-3078.
3. Mavrogeni, S.I. *et al.* (2021) 'Cardiovascular magnetic resonance as pathophysiologic tool in diabetes mellitus', *Frontiers in Endocrinology*, 12. doi:10.3389/fendo.2021.672302.

Chronic mtDNA damage drives muscle wasting through sustained integrated stress response activation and one-carbon metabolic rewiring

Bond S^{1,2,3}, King E^{1,3}, Walker S^{1,3}, Yang C¹, Liu Y¹, Liu K¹, Zhuang A¹, Jurrjens A^{1,3}, Fang H¹, Formosa L⁴, Nath A¹, Carmona S¹, Inouye M¹, Duong T¹, Huynh K^{1,2}, Meikle P^{1,2,3,5}, Crawford S⁶, Ramm G^{4,6}, Doom S⁷, de Souza D⁷, Rudler D^{8,9}, Calkin A^{1,2}, Filipovska A^{8,9}, Greening D^{1,2,3,5}, Henstridge D^{1,10}, Drew B^{1,2,3,5}

¹The Baker Heart and Diabetes Institute, Melbourne, Australia, ²Baker Department of Cardiometabolic Health, University of Melbourne, Melbourne, Australia, ³School of Translational Medicine, Monash University, Melbourne, Australia, ⁴Biochemistry and Molecular Biology, Monash University, Melbourne, Australia, ⁵Baker Department of Cardiovascular Research Translation and Implementation, La Trobe University, Melbourne, Australia, ⁶Monash Ramaciotti Centre for Cryo Electron Microscopy, Monash University, Melbourne, Australia, ⁷Metabolomics Australia, Bio21, Melbourne, Australia, ⁸ARC Centre of Excellence in Synthetic Biology, QEII Medical Centre, Nedlands, Australia, ⁹Telethon Kids Institute, Northern Entrance, Perth Children's Hospital, Nedlands, Australia, ¹⁰School of Health Sciences, University of Tasmania, Launceston, Australia

Aim: To delineate the role of the Integrated Stress Response (ISR) as a core biological driver of cardiometabolic disease and to determine whether targeted modulation of this pathway can modify disease progression.

Method: The ISR is an evolutionarily conserved adaptive signalling network that coordinates cellular processes in response to various stressors. While transient ISR activation is pro-resolving, chronic activation is increasingly recognised as a driver of disease pathologies. Despite growing recognition of ISR involvement across multiple diseases, the mechanistic triggers and downstream effectors remain incompletely defined.

Mitochondrial DNA (mtDNA) instability is a potent stressor of the ISR. mtDNA replication and repair are exclusively mediated by polymerase gamma (PolG), which possesses polymerase, proofreading and base excision repair functions. Impaired PolG activity can thus lead to mtDNA damage and mitochondrial dysfunction. Here, we studied mtDNA damage and ISR activation in skeletal muscle via a unique PolG mutator mouse, that enables temporal and tissue-specific induction of mtDNA mutagenesis. This was achieved by crossing floxed PolG mice with inducible ACTA1-Cre-ERT2 mice, to generate mice with post-developmental, muscle specific PolG insufficiency (SM-PolG^{fl/fl}).

Results: SM-PolG^{fl/fl} mice exhibited significant reductions in weight from ~15 weeks post-induction, without changes in food intake. Circulating FGF21 and GDF15 were markedly elevated, consistent with mitochondrial driven ISR activation. Proteomic and functional analyses revealed reduced respiratory chain complex abundance with impaired complex activity. Furthermore, transcriptomic profiling demonstrated robust ISR activation, with suppression of protein translation and pronounced modulation of one-carbon (1-C) metabolism, demonstrating the utility of this mouse model to dissect ISR driven pathologies and mechanisms.

Conclusion: Our findings identify 1-C metabolism as a central effector of chronic ISR activation in response to mtDNA damage. Given the essential role of 1-C metabolism in cellular processes, targeting this pathway via supplementation with serine or folate derivatives may mitigate chronic ISR-driven disease.

The hepatic stellate cell secretome: Beyond fibrosis to local and systemic metabolic communication

Bowring C¹, Bayliss J¹, Varshney S¹, Wong J¹, Lee O¹, Suriani N¹, Fidelito G¹, Keenan S¹, Parker B¹, Dodd G¹, Watt M¹

¹University Of Melbourne, Parkville , Australia

Aim: Hepatic stellate cells (HSCs) typically reside in a quiescent state but become activated in response to hepatocellular stress, adopting a profibrotic phenotype. Emerging evidence also describes HSCs as a hepatic signalling hub, suggesting functions beyond fibrosis. We therefore **hypothesis** that altered secretion of HSC-derived proteins modulate hepatic and systemic metabolism. Hence, we **aimed** to characterise the HSC-secretome in the context of metabolic dysfunction-associated steatotic liver disease (MASLD) and advanced metabolic steatohepatitis (MASH).

Methods: We generated an HSC-specific secretory TurboID model by crossing Lrat-Cre with LSL-Sec61 β -TurboID mice (LratTurboID). Sec61 β anchors TurboID to the ER membrane with luminal orientation, such that biotin administration labels ER/Golgi-trafficked (classically secreted) proteins. LratTurboID mice were fed a chow (healthy), MASLD or MASH inducing diets for 12 weeks, then given biotin in drinking water for three days. Plasma was collected and precision-cut liver slices were cultured for 16 h to generate conditioned media. Biotinylated proteins were captured by streptavidin enrichment and analysed by mass spectrometry.

Results: Within plasma, 1,016 proteins were identified, of which 771 were unique to MASH and enriched for “Metabolic pathways” and “Fatty acid metabolism”, suggesting a marked endocrine remodelling of HSC-secreted proteins with fibrotic MASH. Extending on this, a striking 1,792 proteins were identified in the conditioned media and comparison of MASLD vs healthy revealed 73 upregulated proteins enriched for similar metabolic pathways to the plasma MASH profile. Comparison of MASH vs healthy revealed 99 upregulated proteins enriched for “IgSF CAM signalling” and “Axon guidance”. This highlights a shift toward non-canonical signalling networks and indicates a broader role for HSC secreted proteins beyond fibrosis

Conclusion: Protein secretion from HSCs is altered in MASH and is predicted to alter process beyond extracellular matrix deposition, most notably metabolism. Ongoing studies will characterise key HSC secreted proteins and their functions, extending our knowledge of HSCs in metabolic liver disease

A novel orally deliverable mimetic peptide improves glycaemic control and β -cell mass in mice with type 1 diabetes.

Chemello K¹, Cochran B¹, Rye K¹

¹University of New South Wales, Sydney, Australia

Aim: To evaluate the therapeutic efficacy of the apolipoprotein mimetic peptide stP2, specifically designed for oral delivery, in reversing hyperglycaemia, improving glucose tolerance and restoring β -cell mass in NOD mice with established type 1 diabetes (T1D).

Methods: *In vitro* studies using INS-1E cells (an insulinoma-derived β -cell line) assessed the effect of stP2 exposure (1 mg/mL) on glucose-stimulated insulin secretion. *In vivo*, NOD mice aged 20 weeks with established T1D received twice-weekly intraperitoneal injections of stP2 (40 mg/kg; n=11) or saline (n=7) for four weeks. Fasting blood glucose was measured, and intraperitoneal glucose tolerance test (IPGTT), insulin response (iAUC), pancreatic insulin-positive area by immunohistochemistry, and preliminary oral gavage administration were evaluated.

Results: In INS-1E cells, stP2 exposure significantly enhanced glucose-stimulated insulin secretion by 70% under both low and high glucose conditions. *In vivo*, stP2 treatment reduced fasting blood glucose compared with controls (17.0 ± 0.56 vs. 21.0 ± 1.63 mM; $p < 0.05$). IPGTT demonstrated markedly improved glycaemic regulation in stP2-treated animals, with a reduced incremental area under the curve (iAUC) (500 ± 117 vs. 1134 ± 128 mM·min for vehicle controls; $p < 0.01$). These metabolic improvements were accompanied by an increased insulin response during IPGTT, as reflected by iAUC (1.54 ± 0.37 vs. 0.20 ± 0.09 ng/mL·min for vehicle controls; $p < 0.05$). Immunohistochemical quantification further revealed that stP2 treatment increased pancreatic insulin-positive area compared with controls ($8.76 \pm 2.33\%$ vs. $2.62 \pm 1.41\%$ of total pancreatic area; $p < 0.001$). Preliminary oral gavage administration reproduced these glycaemic improvements, supporting the translational feasibility of oral delivery.

Conclusion: These findings establish stP2 as a first-in-class orally deliverable peptide therapeutic that improves both glucose homeostasis and pancreatic insulin content in established T1D, highlighting its potential as a disease-modifying therapeutic strategy addressing the fundamental pathophysiology of T1D.

Genetic mapping in MASLD identifies INPP1 as a regulator of hepatic lipid flux and metabolic remodelling

Cheng Z¹, Hofferek V², Lin S¹, Parker B¹, Zhou M^{3,4}, Lu J¹, Leeming M⁵, Seldin M^{3,4}, Williamson N⁵, McConville M², Watt M¹, Dodd G¹, Dong L¹, Montgomery M¹

¹Department of Anatomy and Physiology, The University of Melbourne, MELBOURNE, Australia,

²Department of Biochemistry and Pharmacology, Bio21 Molecular Science and Biotechnology Institute, MELBOURNE, Australia, ³Department of Biological Chemistry, UC Irvine, Irvine, United States, ⁴Center for Epigenetics and Metabolism, UC Irvine, Irvine, United States, ⁵Melbourne Mass Spectrometry and Proteomics Facility, Bio21 Molecular Science and Biotechnology Institute, MELBOURNE, Australia

Abstract content:

Given the rising global burden of metabolic dysfunction-associated steatotic liver disease (MASLD) and limited therapeutic options, identifying metabolic regulators that drive hepatic lipid accumulation remains a major need. MASLD is characterized by dysregulation of hepatic lipid metabolism, including increases in fatty acid uptake and de novo lipogenesis, as well as impairments in fatty acid oxidation and lipid export. This study aimed to identify genetic regulators that confer resistance to MASLD and define their metabolic mechanism of action.

Aim:

To identify genetic regulators that confer resistance to MASLD and interrogate their metabolic mechanism of action.

Methods:

We employed quantitative trait loci (QTL) mapping in eight common mouse strains exposed to a western diet and identified single nucleotide polymorphisms (SNPs) in inositol polyphosphate-1-phosphatase (INPP1) that may confer protection against diet-induced MASLD and liver fibrosis. INPP1 was functionally interrogated using CRISPR-mediated deletion in human hepatocytes and liver-targeted knockdown or overexpression in mice. Metabolic flux was assessed using radiolabelled and stable-isotope tracers, complemented by proteomics, lipidomics, and metabolomics.

Results:

Loss of INPP1 markedly reduced hepatic lipid accumulation (up to 90%) in vitro and in vivo. Metabolic flux analysis revealed profound suppression of fatty acid uptake and glucose-derived de novo lipogenesis, alongside enhanced lipid export. Glucose uptake was increased but preferentially diverted toward glycogen metabolism rather than oxidation. Mechanistically, INPP1 inhibition suppressed inositol phosphate and phosphatidylinositol (PI) availability, impairing glycosyl-phosphatidylinositol (GPI) anchor synthesis and lipid raft-mediated nutrient transport. Restoration of PI content or disruption of GPI-anchored proteins reversed the metabolic changes observed following INPP1 deletion. Hepatocyte-specific INPP1 knockdown improved hepatic steatosis in diet-induced obese mice without adverse systemic metabolic effects, while hepatic overexpression exacerbated lipid accumulation.

Conclusion:

Overall, this study identifies a novel link between inositol phosphate metabolism, lipid raft-mediated nutrient uptake and MASLD pathogenesis, and highlights that targeting INPP1 is likely to simultaneously restore four of the major defects in lipid metabolism in MASLD.

Disruption of the NOX4-NFE2L2 axis in skeletal muscle is associated with ageing and frailty

Xirouchaki C¹, Coughlan E¹, Garcia-Dominguez E^{1,2}, McGrath M¹, Giri S¹, Liang S¹, Wiede F¹, Bigot A³, Sadoshima J⁴, Gomez-Cabrera M⁵, Philp A⁶, Moberg M⁷, Apró W⁷, Roman W^{1,2}, Mitchell C¹, Tiganis T¹
¹Monash University, Melbourne, Australia, ²Australian Regenerative Medicine Institute, Melbourne, Australia, ³Sorbonne University, Paris, France, ⁴Rutgers New Jersey Medical School, Newark, USA, ⁵University of Valencia, Valencia, Spain, ⁶Center for Healthy Ageing, Sydney, Australia, ⁷Swedish School of Sport and Health Sciences, Stockholm, Sweden

Background:

A decline in NFE2L2-orchestrated adaptive homeostasis and the emergence of oxidative distress are hallmarks of ageing. In contracting skeletal muscle, the Reactive Oxygen Species (ROS)-generating enzyme NADPH oxidase 4 (NOX4) acts as a key upstream activator of NFE2L2-dependent adaptive responses.

Aims:

To assess the role of NOX4 and NFE2L2-mediated antioxidant-defence in the ageing process in skeletal muscle.

Methods:

- Analysis of NOX4 expression and NFE2L2-mediated antioxidant defence in published transcriptomic datasets from muscle of young and aged humans, and from aged mice with or without muscle-specific Nox4 ablation (*Mck-Cre; Nox4^{fl/fl}*).
- Confirmation by qPCR and Western Blot of expression changes in key regulators of NFE2L2-mediated antioxidant defence, and assessment of oxidative damage, in aged human muscle.
- Comprehensive phenotypic analysis of the effect of skeletal-muscle *Nox4* ablation in aged mice.

Results:

The KEAP1/NFE2L2 and NFE2L2-mediated antioxidant defence pathways are significantly repressed in ageing human skeletal muscle, accompanied by reduction in Mitophagy and Protein Processing, increase in inflammation, and increased protein carbonylation. Skeletal muscle-specific deletion of NOX4 accelerates age-associated physiological decline, leading to frailty characterised by sarcopenia, physical inactivity, increased adiposity, systemic inflammation, whole-body insulin resistance, and progressive liver disease in 20-month-old chow-fed mice. Transcriptomic analysis of skeletal muscle of these mice recapitulated the reduction in NFE2L2-dependent antioxidant genes and alteration of key pathways observed in human ageing. NOX4 deficiency reduced NFE2L2 protein stability and nuclear localisation, suppressed antioxidant enzyme expression, and increased oxidative damage. Deletion of NOX4 in human iPSC-derived myoblasts and human primary myoblasts confirmed that these effects are cell autonomous and consistent between mouse and human.

Conclusion:

Collectively, these findings identify loss of NOX4-dependent NFE2L2 adaptive signalling as a central mechanism underpinning oxidative distress in ageing human skeletal muscle, positioning the NOX4-NFE2L2 axis as a mechanistically defined target for promoting healthy muscle ageing.

Renal nutrient loss contributes to whole-body metabolic protection against a high fat high sugar diet in mice

Cutler H¹, Diaz Vegas A¹, Fuller O¹, Masson S¹, Madsen S¹, Cooke K¹, Stöckli J¹, James D

¹The University Of Sydney, Camperdown, Australia

Aim

Protection from diet-induced obesity can occur without changes in food intake or energy expenditure in mice, leaving the underlying mechanism tantalisingly unresolved. Here we identified the BXD34 strain as resistant to obesity, ectopic lipid accumulation, and insulin resistance in response to high-fat high-sugar (HFHS) feeding compared to C57BL/6J controls. The study aimed to identify the mechanism underlying the protection of the BXD34 strain compared to C57BL/6J.

Methods

Ex vivo primary muscle culture, metabolic cage studies, urinary metabolomics and tissue proteomics.

Results

Primary myofibres from both strains developed comparable insulin resistance following palmitate exposure ex vivo, suggesting that metabolic protection in BXD34 mice arises from the absence of lipotoxicity in vivo rather than intrinsic cellular resilience. Metabolic cage studies demonstrated that HFHS feeding produced a positive energy balance in both strains. However, increased adiposity was observed only in C57BL/6J mice, indicating that BXD34 mice may dissipate excess energy through an alternative, unmeasured pathway. BXD34 mice consumed approximately twice as much water as C57BL/6J mice, leading to the hypothesis that surplus calories were excreted rather than stored. Urinary metabolomics revealed striking elevations in multiple metabolites in BXD34 mice, with glutarate levels increased approximately 350-fold relative to C57BL/6J concentrations. These changes were accompanied by pronounced differences in renal metabolite transporter abundance and a shift toward fatty acid metabolism in BXD34 kidneys. Despite this apparent metabolic protection, HFHS-fed BXD34 mice exhibited increased reactive oxygen species production, consistent with elevated renal stress. Correspondingly, folic acid-induced kidney injury was 100% lethal in HFHS-fed BXD34 mice, compared with 0% lethality in chow-fed BXD34 mice and only 16% lethality in HFHS-fed C57BL/6J mice.

Conclusion

These findings demonstrate that urinary nutrient loss can uncouple caloric excess from obesity, and challenge the prevailing view that metabolic homeostasis represents protection from HFHS feeding. Instead, they suggest that apparent metabolic protection can mask organ-specific vulnerability.

Insulin orchestrates global plasma membrane proteome remodelling that is disrupted in adipocyte insulin resistance

Diaz Vegas A¹, Zhang Y¹, James D¹

¹The University Of Sydney, Sydney, Australia

Aim: The plasma membrane (PM) is a central metabolic interface that governs nutrient uptake, signalling, and endocrine responsiveness. While insulin-driven GLUT4 translocation is a defining feature of adipocyte insulin action, the broader extent of insulin-dependent PM remodeling and its contribution to insulin resistance remain poorly understood. Here, we aimed to define the insulin-regulated PM trafficking landscape and determine how its disruption may contribute to metabolic dysfunction.

Methods: We conducted a meta-analysis integrating nine independent adipocyte PM proteomic datasets derived from both mouse and human systems using complementary enrichment strategies, including cationic colloidal silica isolation, subcellular fractionation, amino-oxy-biotinylation, and amine-reactive biotinylation. Candidate insulin-regulated cargo proteins were validated using fluorescence microscopy and high-resolution imaging approaches.

Results: This integrative analysis identified 37 insulin-regulated PM proteins detected across multiple datasets, 30 of which had not previously been linked to insulin action. Notably, most cargos were distinct from canonical GLUT4 storage vesicles, indicating broader insulin-controlled trafficking programs. Given the physiological importance of solute carriers (SLCs) in systemic metabolic homeostasis, we identified 52 SLC transporters exhibiting $\geq 20\%$ insulin-dependent changes in PM abundance, encompassing glucose, amino acid, lipid, and ion transport. KCC1 (SLC12A4) and PIT2 (SLC20A2) showed the most consistent insulin-stimulated PM recruitment and displayed strong associations with clinical metabolic phenotypes in humans. Functional knockdown of either PIT2 or KCC1 showed impaired insulin-stimulated glucose uptake. Imaging revealed multi-endosomal localization, PI3K–AKT–dependent trafficking, and insulin dose responsiveness of PIT2 and KCC1 trafficking. Importantly, adipocyte insulin resistance induced by chronic hyperinsulinemia resulted in impaired transporter mobilization and increased perinuclear retention.

Conclusion: These findings reveal that insulin coordinates a systems-level PM trafficking program that extends beyond GLUT4 and is disrupted in insulin resistance. This work identifies defective plasma membrane cargo mobilization as a candidate cellular mechanism linking adipocyte trafficking dysfunction to whole-body metabolic disease.

Genome-wide CRISPR screen identifies CBX4 as a novel regulator of hepatic lipid metabolism

Dong L¹, Liu F¹, Cheng Z¹, Herold M^{2,3}, Montgomery M¹

¹Department of Anatomy & Physiology, University of Melbourne, Victoria, Australia, ²Walter and Eliza Hall Institute of Medical Research, Melbourne, AU, ³Department of Medical Biology, The University of Melbourne, Melbourne, AU

Aim: Metabolic dysfunction-associated steatotic liver condition (MASLD) has served as a major driver of Hepatocellular carcinoma (HCC) due to its great potential for increasing cirrhosis. MASLD is characterised by defective lipid metabolism, which causes hepatic steatosis and inflammation, key events that precede and contribute to fibrosis and are essential for disease progression. Hence, tackling early metabolic defects (i.e., inhibiting hepatic steatosis) is likely to prevent the development of MASH and metabolic co-morbidities.

Method: To systematically uncover novel genes required for hepatic lipid accumulation, we performed five independent, pooled genome-wide screens in HepG2 cells using the human GeCKO CRISPR library. Cells were treated with or without excess fatty acid (FA) to mimic chronic lipid overload, followed by Bodipy lipid staining and fluorescence-activated cell sorting. In Control cells, we selected the highest 10% of cells to identify mutants that retained high levels of lipid due to defects in lipid processing. In contrast, for the FA-treated cells, we selected the lowest 10% of cells, thereby screening for cells bearing mutations in genes necessary for FA-induced lipid accumulation.

Result: Using single gRNA-mediated knockout combined with functional assessment of lipid accumulation, we identified CBX4 (Chromebox 4) as a novel regulator of hepatic lipid metabolism. Deletion of CBX4 in HepG2 cells markedly suppressed fatty acid oxidation in both HepG2 and Huh7 cells. To determine whether hepatic loss of CBX4 confers metabolic benefits in MASLD, lipid nanoparticles (LNPs) were employed to deliver an sgRNA targeting CBX4 in mice expressing Cas9 specifically in hepatocytes. Eight weeks after a single administration of the sgRNA, hepatic CBX4 deletion significantly decreased lipogenesis, fatty acid uptake, and fatty acid oxidation. Future studies will focus on elucidating the molecular mechanisms by which CBX4 regulates hepatic lipid metabolism and contributes to MASLD pathogenesis.

Conclusions: CRISPR screen is a powerful tool for the identification of novel therapeutic strategies. Lipid nanoparticle-mediated, hepatocyte-specific deletion of CBX4 may constitute a novel therapeutic approach to confer metabolic protection against hepatic steatosis.

The role of a cortico-hypothalamic pathway on metabolism and behaviour

Drakopoulos V¹, Feng X^{1,2}, Wust A¹, Paulis D¹, Jeffs L¹, Stark R¹, Stuart G^{1,2}, Foldi C¹, Reichenbach A¹, Andrews Z¹

¹Department of Physiology, Monash Biomedicine Discovery Institute, Monash University, Clayton, Australia, ²John Curtin School of Medical Research, Australian National University, Canberra, Australia

Introduction/Aim

The neural mechanisms controlling food intake and body weight have traditionally been ascribed to neuroendocrine and nutrient feedback. Within this homeostatic framework, activation of agouti-related peptide-expressing (AgRP) neurons in the arcuate nucleus of the hypothalamus increase food intake and bodyweight in response to feedback signals of energy deprivation. However, recent studies show that these hunger-sensing AgRP neurons also receive sensory inputs within the environment from other brain regions that regulate food intake, raising the hypothesis that they may have important roles to override the homeostatic control of feeding behavior and drive maladaptive feeding behaviors. Indeed, this may underlie different pathological states characterised by abnormal feeding behaviour such as obesity or anorexia nervosa. Recently a novel stress-sensitive neural pathway from the medial prefrontal cortex (mPFC) to lateral hypothalamus (LH) was identified to suppress feeding behaviour and to be involved in stress-associated behaviours. Hence, we hypothesised that an interaction between the mPFC-LH pathway and AgRP neurons may affect metabolism and stress behaviour.

Methods/Methods

We show that chemogenetic activation of the mPFC-LH pathway suppressed baseline and ghrelin-induced AgRP activity assessed using *in vivo* calcium imaging. Furthermore, we used optogenetics to demonstrate activation of the pathway on food and stress behaviour. We subsequently used two chronic approaches of caspase-mediated apoptosis and naChBac-mediated activation of this pathway, which resulted in differences in metabolism, as well as stress behaviour and anhedonia.

Conclusions

Our findings establish a novel top-down, cortico-hypothalamic network controlling metabolism and behaviours related to feeding and reward-seeking. Future experiments should examine other neural nodes influencing this circuit and establish its role underlying different pathological states characterised by abnormal feeding behaviour such as obesity or anorexia nervosa.

AI-assisted quantitative image analysis of hepatocyte ballooning in a mouse model of diabetes with metabolic dysfunction-associated steatohepatitis (MASH)

Du W¹, Parry S^{1,2}, Wei Z¹, Huang M³, Fox S¹, Twigg S^{1,2}, Min D^{1,2}

¹The University Of Sydney, Camperdown, Australia, ²Royal Prince Alfred Hospital, Camperdown, Australia, ³St Vincent's Hospital Sydney, Darlinghurst, Australia

Aims:

Hepatocyte ballooning is a key histological feature in metabolic dysfunction-associated steatohepatitis (MASH), yet its quantification remains challenging due to subjective interpretation and morphological overlap with steatosis. This study aimed to develop and evaluate an AI-assisted image analysis pipeline for detecting and quantifying hepatocyte ballooning in hematoxylin and eosin (H&E)-stained liver tissue.

Methods:

Liver tissues from our lab-established mouse model of diabetes with MASH (FaD, n=6) and chow-fed controls (Chow, n=6) were used in this study. Images of H&E-stained liver were used to train an AI model using QuPath (v.0.6.0). Hepatocytes were identified using nuclear features including area, perimeter, maximum and minimum calliper, and stain intensity. Ballooned hepatocytes were manually annotated on independent training slides to develop a supervised classifier in QuPath (v.0.6.0). For evaluation, ballooning assessments (n=3/group) were compared between manual annotations by two independent assessors and AI-assisted outputs. Whole-slide assessments were further compared with pathologist-assigned Brunt ballooning grades.

Results:

The AI-assisted image analysis pipeline reliably distinguished hepatocytes from other liver cell types ($R^2 = 0.9153$), demonstrating reduced hepatocyte counts in FaD mice compared with Chow ($p < 0.05$). Automated AI-assisted ballooning quantification detected no hepatocyte ballooning in Chow and a marked increase in FaD ($p < 0.05$). Manual assessment likewise confirmed absent ballooned hepatocytes in Chow but revealed substantial inter-observer variability in diabetes liver tissues. Notably, AI-assisted ballooning estimates showed consistent alignment with Brunt ballooning grades, with 0% corresponding to B0; ~20% to B1 and >30% to B2 grades.

Conclusion:

AI-assisted image analysis enables rapid, user-friendly detection of hepatocyte ballooning and distinguishes diseased from control liver tissue. Both automated and manual assessments are constrained by morphological overlap between steatosis and ballooning and by variability in tissue processing and staining. These findings highlight the limits of precise severity quantification and the need for standardised quality-control criteria and cautious interpretation of quantitative ballooning metrics.

The effect of metabolic dysfunction-associated steatohepatitis (MASH) - Regulated hepatokines on insulin sensitivity and glucose metabolism in muscle cells and mice

Eniyew M¹, Bayliss J¹, De Nardo W¹, Alexander S², Lamon S², Miotto P¹, Watt M¹

¹The University of Melbourne, Melbourne, Australia, ²Deakin University, Burwood, Australia

Aim: MASH is associated with the development of metabolic co-morbidities, including glucose intolerance and insulin resistance. Our laboratory identified liver-secreted proteins, or 'hepatokines', that were secreted at higher rates from precision-cut liver slices obtained from people with MASH compared with individuals with metabolic dysfunction-associated steatotic liver disease or no pathology. We aimed to understand the actions of these MASH-inducible human hepatokines in regulating processes associated with the pathogenesis of MASH (i.e., glycemic control and insulin sensitivity).

Methods: Primary human skeletal muscle myotubes were incubated with 13 different recombinant proteins (hepatokines) with or without insulin, and insulin sensitivity was measured by immunoblot of pAkt Ser473. Male C57BL/6J mice were fed a high-fat and high-fructose diet supplemented with 2% cholesterol for 15 weeks to induce MASH and then were injected with an adeno-associated virus (AAV) with scrambled cDNA sequences (Control) or AAV short-hairpin RNA (shRNA) targeting Afamin (AFM), Lumican (LUM), or Leucine-rich alpha-2-glycoprotein 1 (LRG1). End-point measurements were obtained 16 weeks after AAV administration and included liver histopathology, glucose and insulin tolerance tests, and glucose uptake in muscle.

Results: Of the 13 hepatokines examined, Galectin-1 significantly increased Akt Ser473 phosphorylation in primary human skeletal muscle myotubes. In contrast, S100A9, Lipocalin-2, and Peroxiredoxin-4 significantly reduced Akt Ser473 phosphorylation. In mice, AFM, LUM, and LRG1 knockdown (~50%) did not affect the development of MASH. LRG1 knockdown did not affect glycemic control or insulin sensitivity, while AFM knockdown impaired glucose tolerance but not markers of insulin action or secretion. LUM knockdown impaired glucose tolerance but, paradoxically, mildly improved whole-body insulin sensitivity in mice. The mechanisms mediating these responses in LUM shRNA-treated mice are presently unknown.

Conclusion: Overall, several hepatokines induced a mild effect on insulin sensitivity in cells *in vitro*. *In vivo*, AFM and LUM silencing impaired whole-body glycemic control independent of insulin action.

Hyperammonaemic encephalopathy following Roux-en-Y gastric bypass

Ephraums L^{1,2}, Flabouris K^{1,2,4}, Chesterman T³, Mah P^{1,2}, Chapman I^{2,4}, Jayadiwangsa E^{4,5}

¹Diabetes and Endocrine Unit, Northern Adelaide Local Health Network, Adelaide, Australia,

²Adelaide University, Adelaide, Australia, ³Flinders University, Adelaide, Australia, ⁴Endocrinology and Metabolic Medicine, Central Adelaide Local Health Network, Adelaide, Australia, ⁵Women's and Children's Metabolic Unit, Central Adelaide Local Health Network, Adelaide, Australia

Case Study:

The obesity epidemic has led to increased rates of bariatric surgery with the gold standard Roux-en-Y gastric bypass (RYGB) resulting in ~30% of total body weight (TBW) loss in the first year postoperatively. A rare and underappreciated complication of RYGB is hyperammonaemic encephalopathy (HAE) with an estimated frequency of 1:1400 and mortality rate of 50%. Potential mechanisms include severe protein malnutrition and inadequate caloric intake, leading to catabolism; nutritional deficiencies causing impairment of the urea cycle; possible bacterial overgrowth of the small bowel and rarely unmasking of an inherited metabolic disorder.

Two cases of HAE following RYGB are presented:

The first is a 52-year-old male who presented with seizures four months after RYGB, with electroencephalography findings consistent with global encephalopathy. His ammonia level peaked at 315 µmol/L (normal <49 µmol/L), necessitating haemodialysis, dietary protein restriction and ammonia scavenger therapy to reduce ammonia levels and seizure frequency, requiring prolonged physical and cognitive recovery following. There was evidence of protein and nutritional deficiency on screening.

The second case is a 60-year-old female with hyperammonaemia eight months following RYGB. She was admitted to intensive care for progressive confusion and memory impairment with an ammonia peak of 170 µmol/L. Management focused on optimising nutritional status and reducing catabolism, with rapid improvement in ammonia levels, though short-term memory loss persisted.

Both patients had significant caloric reduction and weight loss (>30% TBW) prior to presentation. Both patients had uncomplicated RYGB and postoperative recovery, with no evidence of inborn errors of metabolism.

Conclusion:

HAE is an under-recognised and potentially fatal metabolic complication of RYGB. These two cases add to the limited literature describing this condition and highlight the variable presentations. Identifying similarities between the cases represents an opportunity for improvements in post-bariatric surgery surveillance and management.

Characterising the role of hypothalamic TRIM28 in central glucose regulation

Fach J^{1,3}, Bernard A^{1,2}, Yang C¹, Liu H¹, Woo H^{1,3}, Vaisse C⁵, Head G, Drew B^{1,2,3,4}, Wang Y^{1,2,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²Baker Department of Cardiometabolic Health, University of Melbourne, Melbourne, Australia, ³School of Translational Medicine, Monash University, Melbourne, Australia, ⁴Baker Department of Cardiovascular Research Translation and Implementation, La Trobe University, Melbourne, Australia, ⁵Department of Medicine and Diabetes Center, University of California, San Francisco, USA

Aim/s

Type 2 diabetes is a leading global cause of disease-related mortality. The brain, particularly the hypothalamus, plays a critical role in regulating glucose homeostasis, with genetic factors strongly influencing this regulation. One such gene is Tripartite motif containing-28 (Trim28), which encodes an epigenetic co-repressor previously linked to obesity and glucose metabolism. Despite TRIM28's high hypothalamic expression, its central glucoregulatory role remains unclear. Therefore, this study aims to investigate the role of hypothalamic TRIM28 in central glucose homeostasis.

Methods

To characterise the central glucoregulatory role of TRIM28, we utilised a murine model in which *Trim28* was selectively deleted from leptin receptor-expressing neurons, a neuronal population critical for glucose regulation. Knockout mice were compared with wildtype control littermates. Glycaemic control was assessed using glucose and insulin tolerance tests, alongside metabolic phenotyping including body weight, body composition, and food intake.

Results

We demonstrated that *Trim28* deletion improved central glucose regulation. *Trim28* knockout mice exhibited better glycaemic control compared with sex- and diet-matched wildtype littermates, without differences in body weight or composition. Male knockouts showed better insulin sensitivity under high fat diet, whereas female knockouts demonstrated more pronounced metabolic improvements, with enhanced glucose tolerance and insulin sensitivity on both diets.

Furthermore, hypothalamic bulk RNA sequencing identified Peptidoglycan-recognition protein 1 (*Pglyrp1*), a gene encoding an innate immune protein, as significantly downregulated in *Trim28* knockout mice, which was validated by qPCR. Given evidence linking PGLYRP1 to microglia-mediated neuroinflammation, and the established association between hypothalamic inflammation and metabolic dysregulation, we further examined hypothalamic inflammation. Indeed, female *Trim28*-knockout mice exhibited lower hypothalamic microglia count, as assessed by immunofluorescence staining, indicating attenuated neuroinflammation.

Conclusion

We propose that neuroinflammation mediated by the *Trim28-Pglyrp1* pathway in the hypothalamus drives metabolic dysfunction. Thus, deleting *Trim28* ameliorated this hypothalamic inflammation, contributing to better glycaemic outcomes observed in *Trim28* knockout mice.

Effect of diurnal exercise timing on glycaemia and metabolic profiles in individuals with type 2 diabetes

Fairchild T¹, Ogden J¹, Teo S¹, Wall B¹, Kanaley J³, Guelfi K²

¹School of Allied Health, Murdoch University, Murdoch, Australia, ²School of Human Sciences, The University of Western Australia, Crawley, Australia, ³Nutrition and Exercise Physiology, University of Missouri, Columbia, USA

Aims: The primary aim of this study was to determine the effect of diurnal exercise timing on glycaemic parameters in individuals with type 2 diabetes (T2D) undertaking a 12-week multimodal exercise training program. A secondary aim was to examine changes in L-lactate, soluble receptor for advanced glycation end products (sRAGE) and methylglyoxal concentrations to provide mechanistic insight into potential alterations in glucose metabolism.

Methods: Twenty adults (age: 59.7 ± 8.2 years; BMI: 30.8 ± 5.6 kg/m²; women: n=6) with T2D were randomly allocated to either a morning (amEX) or evening (pmEX) exercise training group. The supervised 12-week (3 days/week) training program comprised of four resistance-based exercises (3 sets, 8-12 repetitions each) and 30 mins of moderate intensity walking. Physiological adaptations to the training program were assessed through changes in muscular strength and cardiorespiratory fitness – measured using a cycle-based peak oxygen uptake test ($\dot{V}O_2$ peak test). Outcome measures included changes in glycaemic parameters (postprandial glucose concentrations, PPG; insulin sensitivity, HOMA2-IR) as well as L-lactate, sRAGE and methylglyoxal using plasma samples collected during a mixed-meal tolerance test at baseline and post-intervention.

Results: Exercise training resulted in broad physiological adaptations (Hedges' *g*: 0.60 to 1.68), with no differences between amEX and pmEX. Fasting glycaemic indices (FBG; HOMA2-IR) were unchanged (both $p > .304$) in response to the training intervention, but PPG excursions were reduced (Fig 1; $p < .001$), independent of exercise timing. Exercise training decreased postprandial L-lactate responses ($p = .008$), but there were no changes (both $p > .092$) in methylglyoxal or sRAGE.

Conclusion: A 12-week multimodal exercise training program improved physiological function and PPG values in individuals with T2D. These improvements were independent of diurnal exercise timing. Changes in L-lactate, methylglyoxal, and sRAGE did not provide evidence of alternative pathways contributing to these improvements.

Mapping gene–environment drivers of MASLD progression in genetically diverse mice identifies a potential role for Acyl-CoA Thioesterase 8 (ACOT8) in liver fibrosis

Fuller O^{1,2}, Madsen S^{1,2}, Culter H^{1,2}, Cooke K^{1,2}, Potter M^{1,2}, Masson S^{1,2}, Stöckli J^{1,2}, James D^{1,2}

¹University of Sydney, Camperdown, Australia, ²Charles Perkins Centre, Camperdown, Australia

Aim: This study aimed to map gene–environment (G×E) drivers that shape heterogeneous MASLD/MASH progression and to prioritise causal pathways and therapeutic targets involved in fibrotic disease progression, with a specific focus on assessing ACOT8 as a candidate modifier of liver injury and fibrosis.

Method: We established a genetically diverse mouse population that captures the full spectrum of MASLD pathology under both chow and Western diet conditions to enable rigorous G×E mapping. To quantify subtle histopathology at scale, we developed a machine-learning pipeline to score steatosis, ballooning, inflammation, and fibrosis. Using 395 chow-fed DOz mice, we performed QTL mapping and integrated these results with genetically regulated protein abundance to prioritise candidate genes within associated loci. To test causality for the top fibrosis-linked candidate, we overexpressed *Acot8* via AAV in MASH-susceptible 129X1/SvJ mice and challenged them with a high-fat diet for 24 weeks, assessing body composition, insulin sensitivity, and circulating markers of liver injury.

Result: In chow-fed DOz mice, we identified an early fibrosis QTL peak that included *Acot8* and was uniquely supported by genetically regulated protein abundance, nominating *Acot8* as a high-priority candidate gene. In the intervention study, *Acot8* overexpression reduced body weight and fat mass, improved insulin sensitivity, and lowered AST, consistent with reduced liver injury. Supporting translational relevance, human genetic studies have linked variation at the ACOT8 locus to circulating AST levels.

Conclusion: Genetic mapping in a diverse mouse population nominated *Acot8* as a candidate modifier of early fibrotic pathology, and experimental overexpression data are consistent with a protective role associated with improved metabolic state and reduced biochemical evidence of liver damage. If these findings are validated in additional models and with direct fibrosis readouts, ACOT8 represents a tractable therapeutic target and motivates follow-up work to evaluate pharmacologic activation strategies, analogous to prior successful targeting approaches for other ACOT isoforms.

Synaptophysin: A novel regulator of insulin secretion from pancreatic β -cells

Gates S¹, Kebede M¹, Yau B¹, Norris N¹, Austen N¹, Webster H¹

¹The University Of Sydney, Camperdown, Australia

Aim:

Pancreatic β -cell dysfunction is a defining feature of Type 2 Diabetes (T2D), characterised by impaired insulin secretion that often involves defects in the soluble N-ethylmaleimide-sensitive factor attachment protein receptor (SNARE) complex, which governs insulin secretory granule (ISG) docking and fusion. Current therapies reduce hyperglycaemia but do not correct the exocytotic defects underlying β -cell dysfunction, limiting restoration of physiological insulin secretion. Synaptophysin (SYP), a vesicular membrane protein that regulates calcium-dependent exocytosis in neurons through interactions with the SNARE complex, was recently identified in purified ISGs from mouse β -cells, suggesting an unrecognised role in insulin secretion. This study aimed to investigate the expression and functional significance of SYP in pancreatic β -cells and its relevance to T2D.

Method:

Publicly available human islet proteomic data (Human Islets.com) were analysed to assess SYP abundance in non-diabetic and T2D donors. Immunostaining of pancreatic sections from non-diabetic (n=5) and T2D (n=5) individuals was performed to examine SYP expression in β -cells. Functional studies were conducted using siRNA-mediated knockdown in INS-1 cells and a stable shRNA-mediated knockdown MIN6 cell line. Protein depletion was validated by Western blot and immunofluorescence. Functional consequences were assessed using glucose-stimulated insulin secretion (GSIS) assays, and total proteomic profiling was performed using mass spectrometry following SYP depletion.

Result:

Proteomic analysis revealed significantly reduced SYP abundance in T2D donor islets, correlating with impaired GSIS and poorer glycaemic control. Immunostaining confirmed reduced SYP expression in T2D tissue. In INS-1 and MIN6 models, SYP depletion selectively attenuated GSIS without affecting basal insulin secretion or total insulin content. Proteomic profiling identified alterations in proteins associated with vesicle trafficking, endoplasmic reticulum stress, cytoskeletal organisation, and microtubule dynamics.

Conclusion:

These findings identify SYP as a novel regulator of β -cell stimulus-coupled exocytotic function, implicate its reduction in T2D, and highlight it as a potential therapeutic target to restore physiological insulin secretion.

Intragastric administration of the bitter tastant, quinine, reduces the postprandial plasma glucose response without slowing gastric emptying in healthy individuals

Ghorbaninejad P^{1,2}, Moradi M^{1,3}, Fitzgerald P^{1,2}, Rose B^{1,2}, Anjom-Shoae J^{1,2}, Hatzinikolas S^{1,2}, Jones K^{1,2,4}, Horowitz M^{1,2,4}, Feinle-Bisset C^{1,2}

¹School of Medicine, College of Health, Adelaide University, Adelaide, Australia, ²Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide University, Adelaide, Australia, ³Lifelong Health Theme, South Australian Health and Medical Research Institute (SAHMRI), Adelaide, Australia, ⁴Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia

Introduction and aims: In healthy males, intraluminal administration of quinine stimulates glucoregulatory hormones and slows gastric emptying, key determinants of postprandial plasma glucose. We have now investigated the effects of intragastric quinine on glucoregulatory responses to, and gastric emptying of, a mixed solid-liquid meal.

Methods: Nine healthy males and females (mean age: 51.0±7.8 years, BMI: 22.3±2.2 kg/m²) received intragastric quinine-hydrochloride (QHCl) on 3 separate occasions [0 mg (control), 300 mg (Q300) or 600 mg (Q600)], 60 min before a mixed solid-liquid meal (a 100 g beef burger radiolabelled with ^{99m}Tc-phytate, 150 mL 10% glucose drink radiolabelled with ⁶⁷Ga-EDTA), in randomised, double-blind fashion. Plasma glucose, insulin and glucagon were measured at baseline, for 60 min before, and for 120 min after, the meal. Gastric emptying was measured using scintigraphy.

Results: Q600 and Q300 reduced plasma glucose at t=-5 min (i.e. before the meal; P<0.001) as well as the overall (P<0.04) and peak (P<0.04) postprandial glucose, in a dose-dependent manner. Q600 stimulated insulin at t=-20 min (P=0.04). Peak glucose was inversely related to plasma insulin at t=-20 min (R=-0.51, P=0.02). QHCl did not affect plasma glucagon or gastric emptying [e.g. solid intragastric retention at 100 min (control: 23.2±6.9, Q300: 20.6±6.7, Q600: 22.5±7.3%) and T50 for liquid emptying (control: 35.8±5.8, Q300: 32.3±4.7, Q600: 36.2±6.6 min)]; all P>0.05.

Conclusion: Intragastric QHCl lowers fasting and postprandial glucose in healthy individuals, apparently as a result of preprandial insulin stimulation, without affecting plasma glucagon or gastric emptying.

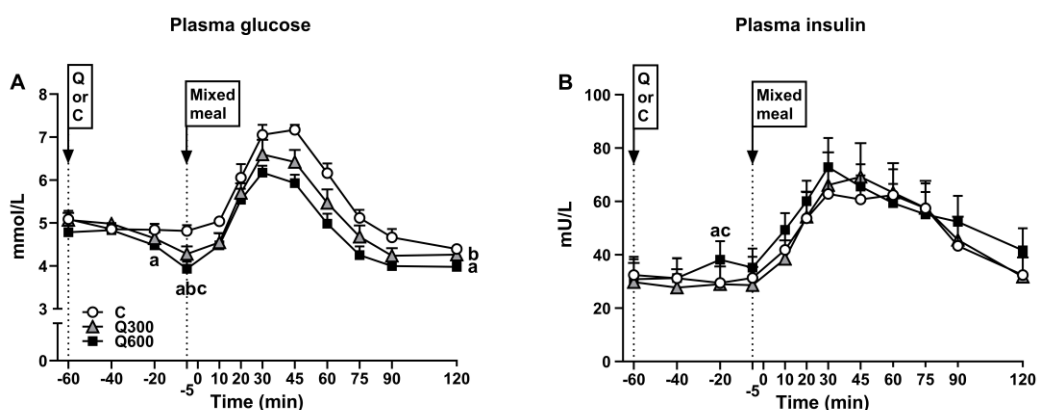


Figure: Effects of intragastric administration of 0 (control), 300 (Q300) or 600 (Q600) mg QHCl on plasma (A) glucose and (B) insulin in healthy individuals (N=9); ^a Q600 vs control; ^b Q300 vs control; ^c Q600 vs Q300 (all P<0.05).

Identification of cold-sensitive ghrelin receptors in the brain

Gillett M¹, Wust A¹, Stark R¹, Andrews Z¹

¹Department of Physiology, Faculty of Medicine, Nursing, and Health Sciences, Monash University, Melbourne, Australia

Introduction/Aim:

The ability of the body to defend against challenges to core temperature is a crucial homeostatic defence mechanism. Core temperature and thermoregulatory responses are controlled centrally within the brain, specifically the hypothalamus, with cold-sensitive neurons (CSNs) defending against cold external temperatures. Due to the high amounts of energy used in producing heat, a key variable influencing thermoregulatory responses to cold is internal energy reserves and hunger. Ghrelin is a hormone that is typically known for signalling hunger; however, decades of research has revealed a wide range of functions in that it is involved. It has been shown that levels of ghrelin increase in response to cold exposure, therefore, to determine whether ghrelin plays a role in modulating thermoregulatory responses to cold exposure, we examined the colocalization between ghrelin receptors (GHSR) and cFos as marker for CSNs.

Methods/Results:

We used a transgenic mouse line that express green fluorescent protein (GFP) in cells that express GHSR and exposed these mice to cold (4 °C) ambient temperature 3 hours to induce cFos expression in CSNs. Mice were exposed with and without food to assess how patterns of cold-induced cFos expression change during fed and fasted states. We observed co-expression of GFP and cFos across a wide range of hypothalamic and extra-hypothalamic regions. Some of these regions include the preoptic area, paraventricular hypothalamus, arcuate nucleus, lateral parabrachial nucleus, and many others. Many regions where co-expression was observed have previously been implicated in the neural control of thermoregulation (such as the preoptic area), demonstrating that ghrelin has the potential to modulate thermoregulatory responses to cold.

Conclusions:

Overall, our data shows that populations of ghrelin receptor-expressing neurons respond to cold ambient temperatures specifically during fasted conditions, suggesting that ghrelin is an integrator between a negative energy balance state and thermoregulation.

The sex-specific link between testosterone and sex hormone-binding globulin with indices of physical function, glycaemic control and body composition in obesity and type 2 diabetes

Healy R¹, Woessner M¹, Vogrin S^{2,3}, Zare N¹, Grossmann M⁴, Ekinci E⁵, Hare D⁶, Levinger I^{1,3}

¹Institute for Health and Sport (IHES), Victoria University, , Footscray, Australia, ²Department of Medicine-Western Health, Melbourne Medical School, The University of Melbourne, Heidelberg, Melbourne, Australia, ³Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, Melbourne, Australia, ⁴Department of Endocrinology, Austin Health and the University of Melbourne, Melbourne, Australia, ⁵The University of Melbourne, Australian Centre for Accelerating Diabetes Innovations (ACADI), Melbourne, Australia, ⁶Department of Cardiology, Austin Health and the University of Melbourne, Melbourne, Australia

Aims: Type 2 diabetes (T2D) is associated with lower testosterone in men, higher testosterone in women, and lower sex hormone-binding globulin (SHBG) in both sexes. Whether this is linked to physical function, glycemic control and body composition in T2D is yet to be demonstrated. We aimed to test the hypothesis that T2D mediated testosterone, free testosterone (fT) and SHBG are associated with poorer physical function, glycaemic control and lean body mass (LBM).

Methods: 26 adults with and 31 without T2D (36 men/21 women, 45-65 years) completed blood sampling (sex hormones, glycaemic control markers), aerobic fitness (VO_{2peak}), muscle strength (1-repetition-maximum (1RM)), and body composition assessments. Data were analysed using linear regressions and univariable analysis.

Results: Men with T2D had lower testosterone, while women with T2D had lower SHBG, compared to sex-matched controls ($p < 0.05$). In men, lower testosterone and fT were associated with lower VO_{2peak} and 1RM respectively ($p < 0.05$), while lower testosterone and SHBG were associated with higher HbA1c levels ($p < 0.05$). In women, higher LBM was associated with lower SHBG ($p < 0.05$), while higher FBG and HbA1c were somewhat associated with testosterone (p 0.089, p 0.063, respectively).

Conclusions: Restoring testosterone should be prioritised as low concentrations were associated with poorer glucose control in men and potentially also women. Physical function and body composition displayed sex-specific links with testosterone and SHBG in men and women respectively, suggesting they may be used as accessible markers of physical status and inform patient treatment. Future studies are needed to validate these findings.

The effects of aerobic exercise training on testosterone concentration in individuals who are obese or have type 2 diabetes: A systematic review and meta-analysis

Healy R¹, Patten R¹, Bauer C¹, Woessner M¹, Bourke M², Grossmann M³, Levinger I^{1,4}

¹Institute for Health and Sport (IHES), Victoria University, Footscray, Australia, ²Nutrition Sciences, The University of Queensland, Brisbane, Australia, ³University of Melbourne Austin Health, Heidelberg, Australia, ⁴Australian Institute for Musculoskeletal Science, University of Melbourne and Western Health, Melbourne, Australia

Aims: Obesity and type 2 diabetes (T2D) are associated with alterations in testosterone concentrations. While evidence indicates that aerobic training can influence testosterone in healthy populations or females with hyperandrogenism, its impact in individuals with obesity or T2D remains unclear. Thus, the aim of this study was to investigate whether aerobic training can influence circulating testosterone concentrations in individuals with obesity or T2D.

Methods: EBSCOhost (CINAHL, MEDLINE, SPORTDiscus), PubMed and Embase were searched for articles published until August 2023. Eligible articles included individuals with obesity or T2D that underwent an aerobic exercise intervention with testosterone concentrations measured at baseline and post intervention. Two reviewers independently screened the seven articles included in this meta-analysis and conducted data extraction and risk of bias assessments.

Results: A total of 103 participants (62 men / 41 women) from three randomised controlled trials, four non-randomised controlled trials were included. Effect sizes were computed with random effects models. Aerobic exercise moderately increased testosterone concentrations in men ($g = 0.565$, 95% CI = 0.307 to 0.822, $p < 0.001$), but had no significant effect in women ($g = -0.523$, 95% CI = -1.541, 0.496, $p = 0.314$). Aerobic exercise had no significant effect on SHBG or markers of insulin sensitivity ($p > 0.05$).

Conclusions: Aerobic training may be used to increase testosterone concentrations in men with obesity or T2D, but potentially has no influence in women. Given the low number of studies, further studies investigating the effect of exercise on circulating sex hormones in men and women with obesity or T2D are needed.

Impact of a digital lifestyle programme on regression of prediabetes in Chinese adults with obesity and prediabetes

Ho M¹, Rong D¹, Chu R¹

¹School Of Nursing, LKS Faculty Of Medicine, The University Of Hong Kong, Hong Kong, Hong Kong

Aims

Lifestyle modification is the first-line intervention for individuals at risks of type 2 diabetes, yet scalable, effective approaches remain limited. This study evaluates the impact of a 1-year culturally tailored digital lifestyle intervention on reversion to normoglycemia among Chinese adults with obesity and prediabetes.

Methods

This digital diabetes prevention program with a pre–post design was conducted in Hong Kong. The intervention comprised a smartphone app and structured online curriculum, guided by the CALO-RE behaviour change taxonomy and tailored to the local context. Eligible participants were adults aged 40–60 years with obesity and prediabetes. During the intensive phase (0–6 months), participants watched weekly online videos on nutrition, physical activity, weight management, and diabetes prevention, and used the app to set goals and action plans, and self-monitor. In the maintenance phase (7–12 months), videos were delivered monthly and self-monitoring continued. The program targeted at least 5% weight loss through lifestyle modification. HbA1c, body weight, and body fat were measured at baseline, 6, and 12 months. Paired t-test and logistic regression were performed.

Results

A total of 298 participants enrolled in the study (mean age= 52.9 years, 66.8% female). After 1-year interventions, mean BMI reduced from 28.24 [SD 3.45] kg/m² to 27.56 [3.48] kg/m² (P<0.001) and body fat % reduced from 36.20 [8.24] % to 35.39 [8.34] % (P=0.041). Around 15% participants achieved clinically meaningful weight loss of ≥5%, and 45% participants lost 0–4.99% of their baseline weight. Of 246 participants completed the 1-year assessment, 13% reversed to normoglycemia. Participants with their baseline HbA1C between 5.7% and 5.9% were more likely to revert to normoglycemia than those with HbA1c ≥6% (OR [95%CI] = 5.45 [1.80, 23.68], P=0.008).

Conclusions

The digital DPP effectively promoted weight loss and reversion to normoglycemia in participants with prediabetes, particularly those with lower baseline HbA1c.

Optimal skeletal muscle mass index and incident cardiovascular events: insights from a longitudinal analysis

Hu T¹, Xu Y¹, Li X¹, Xiao Y¹, Wang Y¹, Ma X¹, Bao Y¹

¹Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Aim: Although several body sizes have been used in the adjustment of skeletal muscle mass (SMM), their predictive ability for cardiovascular events remained unclear. We aimed to assess and compare the predictive performance of SMM indices for cardiovascular events in middle-aged and older population, and evaluate their association according to different body shape subgroups.

Methods: This study included 1374 individuals (43.5% men) aged 50–80 years from four communities. The follow-up was conducted in 2021–2022 with a mean follow-up of 7.5 years. Cardiovascular events were recorded by phone calls and further validated using electronic medical records. Baseline SMM was estimated using a bioelectrical impedance analyzer and adjusted for weight (SMM/Wt), body mass index (SMM/BMI) and visceral fat area (SMM/VFA), respectively. Visceral fat area was measured using magnetic resonance imaging.

Results: During a median follow-up of 7.5 years, 136 participants experienced cardiovascular events (13.7 per 1000 person-year). Adjusted hazard ratios for the lowest tertile of SMM/Wt, SMM/BMI, and SMM/VFA were 1.80 (95%CI 1.17–2.77), 1.83 (95%CI 1.15–2.91), and 1.56 (95%CI 0.99–2.46) compared with the highest tertile, respectively. Regarding C-statistics, net reclassification improvement, and integrated discrimination improvement, the greatest improvement was observed when adding SMM/BMI to the model compared with SMM/Wt or SMM/VFA. Moreover, the association between SMM/BMI and cardiovascular events persisted regardless of age, sex, and different body shape subgroups (all $P < 0.05$).

Conclusion: SMM indices were significantly associated with the incidence of cardiovascular events in the middle-aged and older population. SMM/BMI appeared to be a better muscle-relevant risk factor for cardiovascular events.

The high bioavailability low-calorie sweetener, acesulfame potassium, attenuates insulin secretion and whole-body glucose metabolism in health

Huang W¹, Li T¹, Xie C¹, Bound M¹, Grivell J¹, Sun Y¹, Jones K¹, Horowitz M¹, Young R¹, Rayner C¹, Wu T¹

¹Adelaide University, Adelaide, Australia

Aims

Low-calorie sweeteners (LCS) are increasingly promoted to replace added sugar in foods and beverages. However, epidemiological studies have consistently reported that habitual high intake of LCS is associated with increased risks of type 2 diabetes and mortality. Few prospective randomised placebo-controlled trials have been undertaken to interrogate mechanisms of LCS risk on glucose handling. This study evaluated acute effects of the common and high bioavailability LCS, acesulfame potassium (Ace-K), on insulin secretion and whole-body glucose metabolism during a hyperglycaemic clamp in healthy individuals.

Methods

Ten healthy participants (7M/3F, age 35.1 ± 1.7 years, BMI $25.1 \pm 0.6 \text{ kg/m}^2$, HbA1c $5.2 \pm 0.1\%$) without habitual LCS consumption were evaluated on two separate days in a double-blind, randomised, crossover fashion. On each study day, a hyperglycaemic clamp (10 mmol/L) was maintained between t=0-210min by intravenous 25% dextrose. At t=30min, participants consumed either (i) 900mg Ace-K (below the acceptable daily intake) or (ii) 900mg cellulose (placebo) in gelatin capsules. Venous blood was then collected every 30min between t=30-210min to measure plasma insulin and C-peptide.

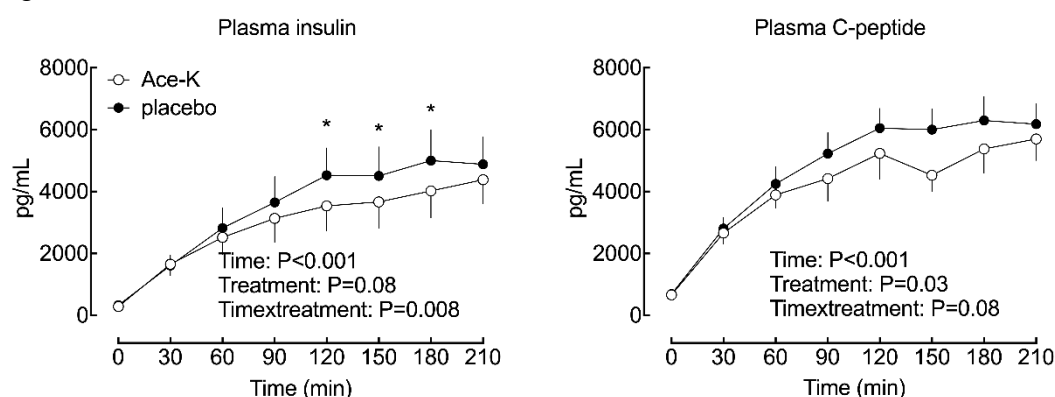
Results

Plasma insulin and C-peptide concentrations increased during hyperglycaemia on both days, with the magnitude of these increments attenuated after Ace-K when compared to placebo (insulin, time×treatment interaction: $P=0.008$; C-peptide, treatment effect: $P=0.03$, Figure). After Ace-K, intravenous glucose requirement during the clamp was also reduced by ~18% compared to placebo ($249.5 \pm 26.1 \text{ g}$ vs. $206.0 \pm 18.0 \text{ g}$, $P=0.03$).

Conclusions

In healthy individuals, acute administration of Ace-K potentially disrupts whole-body glucose disposal, in part, through attenuation of insulin secretion.

Fig 1.



Colesevelam increases ileal L-cell density and GLP-1 secretion to improve glucose tolerance in high-fat diet-induced obese mice

Xiang C¹, Xie C², Huang W², Young R^{2,3}, Horowitz M², Rayner C², Wu T²

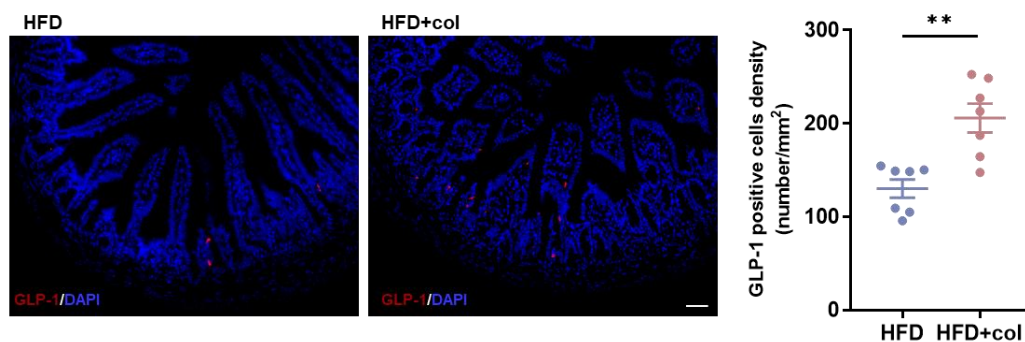
¹Southest University, Nanjing, China, ²Adelaide University, Adelaide, Australia, ³South Australian Health & Medical Research Institute, Adelaide, Australia

Aims: In addition to lowering hypercholesterolaemia, bile acid sequestrants (e.g. colesevelam) improve glycaemic control in type 2 diabetes (T2D), although the underlying mechanisms remain incompletely understood. We recently demonstrated that two weeks of colesevelam treatment attenuated glycaemic excursions during small intestinal bile acid and glucose infusion in individuals with T2D, associated with augmented glucagon-like peptide-1 (GLP-1) secretion. This study investigated the effects of colesevelam treatment on glucose tolerance, ileal L-cell density and bile acid-evoked GLP-1 secretion in mice with high fat diet (HFD)-induced obesity and glucose-intolerance.

Methods: Five-week-old male C57BL/6 mice were fed a HFD (60% fat) for 12 weeks and then randomised to continue the HFD either with colesevelam (2% wt/wt in diet; n=12) or without (HFD control; n=11) for 14 days. Fasting blood glucose and glycaemic responses in an oral glucose tolerance test (OGTT, 1.5 g/kg glucose by oral gavage) were assessed at baseline (Day 0) and Day 15. Ileal tissues were harvested to assess L-cell density by GLP-1 immunostaining (n=7 per group). Freshly isolated ileal segments were incubated with or without taurocholic acid (TCA, 5 mM) in a well-based ex vivo culture system. Supernatants were collected for GLP-1 measurement.

Results: On Day 15, fasting blood glucose and glycaemic responses to oral glucose were reduced after colesevelam compared to Day 0 (all $p < 0.05$), but were unchanged in controls. The ileum from colesevelam-treated mice exhibited ~58% higher L-cell density than controls ($p = 0.001$), and GLP-1 secretion in response to TCA was enhanced ($p = 0.002$).

Conclusion: Short-term colesevelam treatment improves glucose tolerance in diet-induced obese mice, accompanied by increased ileal L-cell density and enhanced BA-evoked GLP-1 secretion.



Socio-economic status associations with multimarkers of inflammation and malnutrition in type 2 diabetes

Januszewski A^{1,2}, Otvos J³, O'Connell R², Li L², Francis H², Mangani A², Simes J², Sullivan D^{4,5}, Best J⁶, Jenkins A⁷, Keech A²

¹University of Sydney, Sydney Pharmacy School, Camperdown, Australia, ²University of Sydney, NHMRC Clinical Trials Centre, Camperdown, Australia, ³University of North Carolina, School of Medicine, Chapel Hill, United States of America, ⁴Royal Prince Alfred Hospital, Department of Chemical Pathology, Camperdown, Australia, ⁵University of Sydney, Faculty of Medicine and Health, Camperdown, Australia, ⁶Nanyang Technological University, Lee Kong Chian School of Medicine, Singapore, Singapore, ⁷Baker Heart and Diabetes Institute, Melbourne, Australia

Background

Metabolomic indices reflecting inflammation and metabolic vulnerability enhance prediction of adverse outcomes in type 2 diabetes (T2D). Whether their profiles are associated with area-level socioeconomic status (SES) remains uncertain.

Methods

We analysed 5,715 Australian participants with T2D enrolled in the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study. Residential addresses were geocoded and linked to Australian Census-derived area-level SES measures: Index of Relative Socioeconomic Disadvantage (IRSD), Index of Education and Occupation (IEO), and Index of Economic Resources (IER), expressed as state-level percentiles. Analyses used Census data from 1996 (preceding trial recruitment) and 2001 (sensitivity).

Baseline plasma NMR-derived indices included MVX (metabolic vulnerability composite index) and its components IVX (inflammation vulnerability) and MMX (metabolic malnutrition). Associations between area-level SES and indices were examined using tertile analyses and multivariable linear regression adjusted for age, sex, diabetes duration, fenofibrate treatment (minimal model) and further for BMI, HbA1c, eGFR, systolic blood pressure and hsCRP (full model).

Results

Across all SES indices, IVX, MMX and MVX differed significantly across area-level SES tertiles (Kruskal–Wallis $p < 0.04$), with progressively lower index values with higher SES (Spearman trend $p < 0.02$). Dunn post-hoc analyses confirmed significant separation across tertiles for IVX and MVX ($p < 0.007$).

In continuous models, each 10-percentile higher area-level SES was associated with lower IVX and MVX after full adjustment ($p < 0.0001$), but not MMX. Compared with unadjusted models, beta coefficients attenuated by 22–37% after minimal adjustment and 49–62% after full adjustment, indicating that conventional cardiometabolic risk factors explained approximately half of the observed gradient, while a substantial independent association remained. Findings were consistent using 2001 SES measures.

Conclusions

Lower area-level SES was independently associated with higher inflammatory and metabolic vulnerability indices in T2D. Together with partial attenuation after adjustment, these findings support a model in which socioeconomic context is reflected in measurable biological vulnerability.

Chronic integrated stress response activation modulates the cardiac secretome in progressive heart failure following mtDNA damage

Jenkinson S^{1,2}, Bond S^{1,2,3}, Drew B^{1,2,3,4}

¹Baker Heart and Diabetes Institute, Melbourne, Australia, ²School of Translational Medicine - Monash University, Melbourne, Australia, ³Baker Department of Cardiometabolic Health - The University of Melbourne, Melbourne, Australia, ⁴Baker Department of Cardiovascular Research Translation and Implementation - La Trobe University, Melbourne, Australia

Aim: To investigate how sustained mitochondrial integrated stress response (ISR) activation in the heart alters the cardiac secretome and contributes to progressive heart failure.

Method: The ISR is an evolutionarily conserved signalling pathway that allows cells to respond to various stresses. While acute ISR activation is protective, chronic activation can drive maladaptive remodelling, particularly in energy-demanding tissues such as the heart. Mitochondrial dysfunction is an effective inducer of the mitochondrial arm of the ISR, linking mitochondrial genome instability to transcriptional and metabolic modulation.

To model mitochondrial ISR activation, we generated an inducible post-developmental cardiac-specific mouse model that accumulates mitochondrial DNA damage in cardiomyocytes, leading to chronic ISR activation. To define secretome remodelling driven by persistent ISR signalling, we used TurboID-based proximity labelling to selectively biotinylate and capture cardiac-derived proteins released into the circulation at defined timepoints following chronic ISR induction, enabling temporal profiling of heart derived factors.

Results: Chronic mitochondrial ISR activation led to progressive cardiac hypertrophy, reduced cardiac output, and premature mortality. Importantly, ISR activation preceded functional declines in cardiac output, suggesting that sustained ISR signalling may act as a causal driver of cardiac dysfunction, rather than as a secondary response.

Interestingly, cardiac hepatopathy was observed in mice with heart-specific ISR activation, pointing to potential signalling from the heart to the liver driven by chronic ISR activation. Temporal proteomic profiling was applied to explore how the cardiac secretome remodels over time and to pinpoint factors that may link cardiac stress to liver injury.

Conclusion: Combining this unique cardiac-specific ISR model with proximity labelling proteomics, provides a powerful platform to define how mitochondrial dysfunction and chronic ISR activation can remodel the cardiac secretome over time. Using this pre-clinical model, we can uncover novel mediators of cardiac-hepatic crosstalk to identify circulating biomarkers and therapeutic targets in heart failure and cardiac hepatopathy.

HDAC3-OPN axis mediates hepatic fibrosis in metabolic dysfunction-associated steatohepatitis

Jeon J¹

¹Ajou University School of Medicine, Suwon, South Korea

Aims

Metabolic dysfunction-associated steatohepatitis (MASH) is characterized by chronic liver injury and progressive fibrosis, a major determinant of disease severity. Although fibrotic remodeling is recognized as a key pathogenic process in MASH, the upstream mechanisms linking metabolic stress to profibrogenic signaling remain incompletely understood. Given its known role in tissue remodeling, we focused on osteopontin (OPN) as a potential molecular link in this process. This study aimed to investigate the functional contribution of OPN to MASH-associated fibrosis and to identify the epigenetic mechanisms, specifically involving histone deacetylase 3 (HDAC3), that drive its induction under metabolic stress.

Methods

Using diet-induced MASH mouse models and complementary *in vitro* systems, we characterized the expression and functional significance of OPN. Molecular and histological analyses were employed to assess gene and protein expression, while cell-based functional assays evaluated the impact on hepatic stellate cell (HSC) activation. The regulation of OPN was investigated using pharmacologic inhibition of HDAC3, and transcriptomic analyses were employed to characterize HDAC3-dependent fibrotic transcriptional programs.

Results

We demonstrate that OPN expression is significantly upregulated in MASH livers and robustly induced under lipotoxic conditions. Functionally, OPN promotes the fibrogenic activation of HSCs. Mechanistically, we identified HDAC3 as an upstream regulator of OPN; pharmacological inhibition of HDAC3 effectively suppressed OPN in response to metabolic stress. *In vivo*, HDAC3 inhibition significantly attenuated high-fat/high-fructose diet (HF/HFr)-induced MASH, leading to marked improvements in hepatic steatosis, liver injury, and fibrosis. These phenotypic improvements were accompanied by a coordinated downregulation of fibrosis-associated transcriptional programs.

Conclusion

Collectively, our findings identify the HDAC3–OPN axis as a pivotal regulatory pathway linking metabolic stress to fibrotic remodeling in MASH. These results highlight HDAC3 inhibition as a promising therapeutic strategy for mitigating the progression of metabolic liver disease.

Genetic mapping in a heterogeneous mouse population identifies *Ets1* as a diet-dependent regulator of adipose insulin-stimulated glucose uptake

Jiang Y^{1,2}, Cooke K^{1,2}, Madsen S^{1,2}, Stöckli J^{1,2}, James D^{1,2,3}

¹School of Life and Environmental Sciences, Faculty of Science, The University of Sydney, Camperdown, Australia, ²Charles Perkins Centre, The University of Sydney, Camperdown, Australia, ³Sydney Medical School, Faculty of Medicine and Health, University of Sydney, Camperdown, Australia

Background & Aim: Adipose tissue is central to systemic energy homeostasis, buffering nutrient excess by storing excess lipids and protecting other tissues from lipotoxic stress. When this capacity is compromised, ectopic lipid accumulation promotes insulin resistance and metabolic disease. A key determinant of adipose-mediated metabolic control is insulin-stimulated glucose uptake (GU), which provides substrate for de novo lipogenesis and lipid storage. However, the genetic and environmental regulators of adipose insulin action remain poorly defined. Therefore, this study aims to leverage the genetic heterogeneity of Diversity Outbred Australia (DOz) mice to map the determinants of adipose insulin action.

Methods: We developed a high-throughput *ex vivo* GU assay to measure insulin action in white adipose tissue of 559 DOz mice maintained on either a chow or Western-style diet. Quantitative trait locus (QTL) mapping was then performed to identify candidate loci, followed by *in vitro* validation of the most promising gene.

Results: QTL mapping identified 32 loci associated with GU, including a strong diet-dependent signal on chromosome 9 encompassing the transcription factor *Ets1*. Functional studies in 3T3-L1 adipocytes demonstrated that silencing *Ets1* selectively restored insulin-stimulated GU under insulin-resistant conditions. Quantitative proteomics revealed that *Ets1* knockdown reprogrammed heme and iron metabolism, marked by reduced ALAS1, transferrin receptor (TfR), and DMT1 expression, alongside increased HMOX2 and ferritin. These changes normalised TfR trafficking, reduced total heme and labile iron pools, and attenuated mitochondrial oxidative stress in insulin-resistant adipocytes.

Conclusion: Overall, these findings identify *Ets1* as a diet-dependent regulator of adipose insulin action and reveal a major link between iron-dependent redox control and adipocyte insulin sensitivity. More broadly, this study demonstrates the power of genetically diverse mouse populations to uncover gene-environment interactions underlying susceptibility to metabolic diseases.

Awareness of diabetes and MASLD among non-physician healthcare professionals: A narrative review

Kawakubo M¹, Nagafuchi M¹, Yamada H¹, Eguchi Y²

¹Department of Lifelong Developmental Nursing, Faculty of Medicine, Saga University, Saga, Japan,

²Loco Medical General Institute, Ogi, Japan

Aim/s

Multidisciplinary approaches are crucial to support patients with MASLD. However, awareness among non-physician healthcare professionals (nurses, dietitians, pharmacists) remains unclear. Furthermore, in patients with type 2 diabetes, the prevalence of MASLD is high and fibrosis progression is likely, making collaborative prevention of MASLD progression essential. To identify interprofessional gaps in practice, this review synthesizes evidence on non-physician healthcare professionals' awareness and knowledge regarding MASLD and its association with diabetes.

Methods

We conducted a narrative review and searched MEDLINE (PubMed), Scopus, and Google Scholar (2016-2025).

Inclusion criteria: awareness of non-physician healthcare professionals regarding MASLD and its association with diabetes.

Exclusion criteria: samples comprising only physicians, basic scientific research, and non-English literature.

Titles/abstracts and full texts were screened and the study characteristics and outcomes were organized.

Results

Six of 18,717 identified studies met the criteria. Studies assessing healthcare professionals' awareness of MASLD are scarce. Professions were limited to nurses and dietitians. A unique questionnaire designed to assess awareness of MASLD was used.

Approximately 50% of nurses possessed a high level of knowledge. 55% of nurses recognized diabetes as a risk factor, a lower percentage than for metabolic syndrome, alcohol consumption, or obesity.

Over 80% of dietitians possessed knowledge of MASLD symptoms and treatment, but recognition of disease outcomes remained below 50%. 90% recognized an association between type 2 diabetes and MASLD. Surveys regarding confidence in providing support and opportunities for education were insufficient for all professions.

Conclusion

This suggests a lack of awareness among non-physician healthcare professionals regarding MASLD and its association with diabetes, along with a clear deficiency in support systems. Particularly, awareness of the association between diabetes and MASLD directly affects early screening and intervention, making prompt improvement highly desirable. To strengthen patient support, the development of profession-specific educational strategies and support facilitation tools are necessary.

Macrophage Colony Stimulating Factor (CSF1) promotes resolution of fibrosis and steatosis in preclinical models of metabolic dysfunction-associated steatotic liver disease.

Keshvari S¹, Ranpura G¹, Nooru-Mohamed F¹, Hume D¹, Irvine K¹

¹Mater Research-UQ, Woolloongabba, Australia

Background & Aim

Macrophages are key modulators of hepatic development and systemic metabolic homeostasis. Our previous studies demonstrate that acute administration of a macrophage colony-stimulating factor (CSF1)–Fc fusion protein reprograms metabolism—reducing adiposity, increasing lean mass, and lowering glycaemia independently of caloric intake—while promoting hepatocyte proliferation, liver growth, and repair in injury and fibrosis. We hypothesised that CSF1-driven macrophage activation confers therapeutic benefit in diabetes-associated metabolic dysfunction, including metabolic dysfunction-associated steatotic liver disease (MASLD).

Methods

We evaluated acute CSF1 (four daily injections) across four complementary models encompassing distinct features of metabolic disease and MASLD: western diet–induced steatosis, *Alms1*–/– mice, diabetic *Leprdb*–/– mice, and a choline-deficient amino acid–defined (CDAA) diet model of fibrosis. Changes in body composition, liver size, liver fat, glucose regulation, fibrosis, and circulating insulin and proinsulin were assessed.

Results

CSF1 rapidly increased macrophage numbers in metabolic tissues, driven by enhanced growth of resident macrophages and recruitment of monocyte derived macrophages. Across all models, CSF1 consistently reduced fat mass, increased lean mass and liver mass, reflecting strong regenerative activity. Liver fat content reduced significantly, indicating an improvement in steatosis. In diabetic mice, CSF1 produced clear metabolic benefits including reduced blood glucose and circulating insulin and proinsulin, suggesting improved metabolic efficiency. In the fibrosis model, CSF1 reduced collagen accumulation, indicating an anti-fibrotic effect. At gene-expression level, the response was associated with increased *Timd4* in models without advanced fibrosis, while *Trem2* was consistently upregulated across all models, pointing to activation of a lipid-responsive, tissue-repair macrophage state.

Discussion/Conclusion

Acute CSF1 administration reprograms liver macrophages toward regenerative, anti-fibrotic, and metabolically favorable phenotypes, improving glycaemic control and reducing insulin/proinsulin burden alongside resolution of steatosis and fibrosis. These data support CSF1-based strategies as a promising therapeutic avenue for diabetes-associated MASLD, either as monotherapy or in rational combination with current metabolic agents.

A novel inhibitory role for a muscle-specific AMPK $\gamma 3$: A therapeutic target for Type 2 Diabetes mellitus

Khabib M^{1,2}, Ovens A¹, Oakhill J¹, Langendorf C¹

¹St. Vincent's Institute Of Medical Research, Fitzroy, Australia, ²The University of Melbourne, Parkville, Australia

Aim:

Type 2 diabetes mellitus (T2DM) is a serious metabolic disease in need of new treatments, and AMP-activated protein kinase (AMPK) is a strong potential therapeutic target due to its integral role in glucose homeostasis. AMPK exists as an $\alpha\beta\gamma$ heterotrimer and multiple isoforms exist for each subunit ($\alpha 1/2$, $\beta 1/2$, $\gamma 1/2/3$) allowing the formation of 12 unique AMPK complexes. Among these, the $\alpha 2\beta 2\gamma 3$ complex emerges as an ideal target for novel T2DM treatments due to its muscle-restricted tissue expression profile, a tissue heavily implicated in appropriate glucose handling. However, the lack of structural and functional information on this isoform has hindered drug development. This study aimed to characterize the function and regulatory role of a unique NH₂-terminal extension (NTE) in the AMPK $\gamma 3$ subunit.

Method:

We utilised HEK293T cells to express and purify AMPK complexes devoid of the entire $\gamma 3$ -NTE and used complementary biophysical techniques including hydrogen-deuterium exchange-mass spectrometry, surface plasmon resonance, chemical crosslinking and co-pulldowns to study $\gamma 3$ -NTE interaction with $\alpha 2$ kinase domain ($\alpha 2$ -KD).

Result:

AMPK complexes devoid of the entire $\gamma 3$ -NTE had a significant increase in basal activity without affecting activation by nucleotides or ADaM-site compounds. A specific region from the $\gamma 3$ -NTE, predicted to have a helical structure, was also found to directly interact with the $\alpha 2$ -KD. AlphaFold3 was utilized to structurally visualize this $\gamma 3$ -NTE helix bound to the $\alpha 2$ -KD of the $\alpha 2\beta 2\gamma 3$ complex, importantly the predicted model corroborates with all biochemical data.

Conclusion:

Recent results point to a regulatory mechanism for modulating the extent of inhibition from the $\gamma 3$ -NTE, indicating the $\gamma 3$ -NTE/ $\alpha 2$ -KD interaction could be therapeutically exploited. These findings have instigated the groundwork for the development of novel T2DM therapies targeting AMPK activation in skeletal muscle.

Liquiritigenin-induced dual PPAR α / γ modulation attenuates hepatic lipid accumulation and insulin resistance via AMPK signaling in metabolic dysfunction-associated steatotic liver disease

Kim H¹, Heo Y², Park J¹, Lee N¹, Choi S¹, Jeon J¹, Han S¹, Kim D¹, Lee K¹

¹Department of Endocrinology and Metabolism, Ajou University School Of Medicine, Suwon, South Korea, ²Institute of Medical Science, Ajou University School of Medicine, Suwon, South Korea

Aim: Metabolic dysfunction-associated steatotic liver disease (MASLD) is characterized by hepatic triglyceride accumulation and chronic inflammation resulting from impaired fatty acid (FA) oxidation and dysregulated metabolic signaling. Liquiritigenin (LQ), a bioactive flavonoid isolated from *Glycyrrhiza uralensis* Fisch. (Fabaceae), exhibits diverse pharmacological activities; however, its role in MASLD and the underlying mechanisms remain unclear. This study aimed to evaluate the therapeutic effects of LQ on MASLD and to elucidate the underlying molecular mechanisms, with a particular focus on PPAR α /PPAR γ activation and AMPK signaling pathways.

Methods: The effects of LQ were examined in a high-fat diet (HFD)-induced MASLD mouse model and in free fatty acid (FFA)-treated HepG2 cells. Male C57BL/6J mice were fed an HFD for 14 weeks, and LQ was administered during the final 2 weeks. Metabolic parameters, hepatic lipid accumulation, and signaling pathways were analyzed using biochemical and molecular assays and glucose and insulin tolerance tests.

Results: LQ markedly reduced hepatic triglyceride content and serum AST and ALT levels in HFD-fed mice and improved glucose intolerance and insulin resistance. LQ increased AMPK phosphorylation and the expression of SIRT1, PGC-1 α , PPAR α , and PPAR γ while suppressing that of SREBP1 and upregulating FA oxidation-related genes. In FFA-treated HepG2 cells, LQ activated AMPK, improved insulin signaling (p-AKT and p-IRS1), enhanced FA oxidation-related gene expression, and reduced pro-inflammatory cytokine levels. Pharmacological inhibition of AMPK abolished LQ-induced metabolic improvements.

Conclusion: Liquiritigenin attenuates MASLD progression by restoring hepatic metabolic homeostasis through AMPK activation and dual induction of PPAR α and PPAR γ , promoting FA oxidation and improving insulin sensitivity. Hence, LQ could be a potential natural therapeutic candidate for MASLD.

Clinical significance and molecular mechanisms of MG-H1 in the pathophysiology of insulin resistance in Japanese Individuals

Kitao S¹, Okura T¹, Ito Y¹, Kurata K¹, Ichihara Y², Sawano T², Matsuzawa K¹, Ueta E³, Nagata K², Hatano M¹, Imamura T²

¹Tottori University Hospital, Yonago, Japan, ²Tottori University, Yonago, Japan, ³Tottori University, Yonago, Japan

Aims: Methylglyoxal-derived hydroimidazolone (MG-H1), one of the advanced glycation end-products, has been a potential biomarker of type 2 diabetes (T2DM), which is strongly related to insulin resistance. However, the relationship between the dynamics of MG-H1 and insulin resistance has not been characterized, and its mechanism on insulin resistance is unknown. In this study, we aimed to investigate the relationship between MG-H1 and insulin resistance in the clinical study of Japanese individuals and identify the molecular mechanisms underlying MG-H1 associated phenomena *in vitro*.

Methods: We performed the meal tolerance test and hyperinsulinemic–euglycemic clamp analysis in 19 patients with T2DM and 19 participants without diabetes (non-DM). We measured their fasting and postprandial MG-H1 using liquid chromatography–tandem mass spectrometry. In addition, we evaluated the effects of MG-H1 on glucose uptake and insulin signaling in C2C12 skeletal myocytes. Also, we investigated the effects of MG-H1 on glucose uptake in 3T3L1 adipocytes.

Results: The postprandial MG-H1 and the area under the curve of MG-H1 in meal tolerance tests were significantly negatively correlated with the glucose disposal rate in clamp studies both in the T2DM ($r=-0.72$ ($p<0.001$)) and non-DM ($r=-0.54$ ($p<0.05$)) groups. In cultured C2C12 skeletal myocytes, pretreatment with MG-H1 inhibited insulin-stimulated phosphorylation of Akt and glucose uptake, via the activation of mechanistic target of rapamycin complex 2 (mTORC2). However, MG-H1 showed no impact on glucose uptake in 3T3-L1 adipocytes.

Conclusions: In clinical study findings revealed that postprandial MG-H1 was a novel marker of insulin resistance in Japanese individuals, and *in vitro* findings using cultured C2C12 skeletal myocytes suggested that MG-H1 disturbs insulin signaling via the mechanisms of mTORC2 activation.

Beyond glycemic control: FeNO dynamics during Tirzepatide-induced weight reduction — A hypothesis on Cardiometabolic Modulation of airway inflammation

Koga S¹

¹Insulin Resistance & Obesity (A126), Endocrinology & Metabolism, Tokyo Met Ctr For Cancer & Infectious Diseases, Tokyo 1138677, Japan

Background: Obesity is an important modifier of asthma pathophysiology and is often associated with reduced fractional exhaled nitric oxide (FeNO) levels and altered airway inflammatory phenotypes. Emerging evidence suggests that glucagon-like peptide-1 receptor (GLP-1R) signaling extends beyond glycemic control and may influence systemic inflammation, airway smooth muscle biology, and pulmonary immune responses. GLP-1 receptor agonists have been associated with improvements in respiratory outcomes in patients with metabolic disease. Tirzepatide, a dual glucose-dependent insulintropic polypeptide (GIP) and GLP-1 receptor agonist, induces substantial weight reduction and metabolic improvement. Experimental data further suggest potential interactions between GLP-1 signaling and nitric oxide biology, raising the possibility that incretin-based therapies may influence airway nitric oxide dynamics. However, the behavior of airway inflammatory biomarkers during pharmacologically induced weight loss remains poorly characterized.

Aims: To explore the potential trajectory of fractional exhaled nitric oxide (FeNO) during tirzepatide-induced weight reduction and its implications for metabolic modulation of airway inflammation.

Methods: A narrative synthesis of recent literature on obesity-related asthma, incretin-based therapies, and pulmonary GLP-1 receptor signaling was conducted to develop a hypothesis-generating conceptual model.

Results: Available evidence suggests that incretin-based metabolic therapies may influence airway biology through multiple pathways, including reduction of systemic metaflammation, modulation of adipokines, and potential direct pulmonary GLP-1 receptor signaling. These mechanisms may dynamically alter airway inflammatory patterns during weight reduction, potentially resulting in dynamic trajectories of FeNO during pharmacologically induced weight reduction.

Conclusion: Tirzepatide-induced weight reduction may modulate airway inflammatory phenotypes in obesity through metabolic and pulmonary signaling pathways. Prospective studies examining longitudinal FeNO dynamics during incretin-based therapy may help clarify the interaction between metabolic disease and airway inflammation.

References

- 1)Drucker DJ. Cell Metab 2018;27:740-756.doi:10.1016/j.cmet.2018.08.001.
- 2)Sato T, et al. Endocrinology 2020;161:bqaa201.doi:10.1210/endocr/bqaa201
- 3)Henderson I et al. Biomedicines 2025, doi:10.3390/biomedicines13112610

Kumaradoss F^{1,2}, Padmavathy T², Anoop S², Benjamin S², Rathore S², Beck M², Abraham A², Reeta V², Preethi R², Jose A², Sudhakar Y², Thomas N², Price S¹, Ekinici E¹

¹University Of Melbourne, Melbourne, Australia, ²Christian Medical College Vellore, Vellore, India

Background/Aim: Gestational Diabetes is Gestational diabetes mellitus has been on the rise over the last three decades, and more so among Asian Indian women. Although the pathophysiology is like that of Type 2 Diabetes, there is limited research evaluating the incretin-insulin axis, adipokines, and other islet hormones in patients with gestational diabetes.

Methods: We plan to comprehensively evaluate islet hormones (insulin, C-peptide, Glucagon, Pancreatic polypeptide, amylin and Ghrelin), Incretins (GLP-1, GIP, Oxyntomodulin and Glicentin) and Adipokines (Leptin, adiponectin and FGF-21) among patients with gestational diabetes (cases) compared with normoglycaemic pregnant women (controls).

Results: We studied 15 patients with gestational diabetes, age- and BMI-matched, and gravida-matched normoglycaemic controls without any illness. All patients underwent an oral glucose tolerance test at 24-28 weeks to determine their glycaemic status. All the hormones were assessed at three time points (0, 60 and 120 min) in both cases and controls. The area under the curve for each hormone was compared between cases and controls. GIP levels were lower in cases than controls ($p=0.01$). Also, there was a trend toward lower oxyntomodulin levels among cases ($p=0.07$). Moreover, Adiponectin levels were lower among cases ($p=0.02$). There was a trend toward higher FGF-21 levels in cases than in controls ($p=0.05$).

Discussion/Conclusion: The study suggests that patients with GDM exhibit impaired GIP and oxyntomodulin secretion in response to food, leading to reduced insulin secretion, increased weight, increased food intake, and reduced energy expenditure. Moreover, low adiponectin levels suggest reduced insulin sensitivity. In addition, elevated FGF21 levels suggest insulin resistance in patients with GDM. These are surrogates for developing Diabetes mellitus in patients with prediabetes. Hence, it suggests that GDM mothers have a high propensity to develop diabetes mellitus if not intervened early in the postpartum period.

Arylsulfatase B regulates adipose tissue expandability through remodelling of the adipocyte glycocalyx and growth factor signalling.

Lambert A¹, Madsen S¹, James D¹

¹The University Of Sydney, Sydney, Australia

Aim:

Adipose tissue expands through increases in adipocyte size (hypertrophy) or number (hyperplasia). Hyperplasia is generally considered metabolically protective, whereas excessive hypertrophy reflects the upper limit of adipose tissue expandability and is associated with lipid spillover contributing to systemic insulin resistance and cardiometabolic disease. Here we aimed to identify molecular mechanisms regulating adipocyte hypertrophy and hyperplasia.

Method:

Adipose tissue from 412 Diversity Outbred Australia (DOz) mice, a genetically heterogeneous mouse population, was extensively phenotyped. Histological analysis was employed to quantify adipocyte size. In a subset of 282 mice, we performed quantitative proteomics of inguinal white adipose tissue (iWAT).

Results:

Genetic mapping of adipocyte size and protein abundance revealed a genetic variant on chromosome 13 associated with smaller adipocytes and increased abundance of arylsulfatase B (ARSB) and hexosaminidase B (HEXB), indicating a causal gene-protein-trait relationship. Both enzymes participate in the turnover of glycosaminoglycans (GAGs), which are protein-bound polysaccharides that regulate the extracellular matrix. Glycomic profiling revealed an inverse association between adipocyte size and the sulphation of Heparan sulphate, a GAG known to regulate growth factor binding at the cell surface. Consistent with this mechanism, ARSB silencing in 3T3-L1 adipocytes resulted in increased adipocyte size, reduced heparan sulphate sulphation, and impaired anti-adipogenic PDGF signalling.

Conclusion:

These results identify ARSB and HEXB as key regulators of extracellular GAG remodelling that influence adipocyte size via the regulation of growth factor signalling. Altering the extracellular landscape of adipose tissue may represent a novel strategy to enhance adipose tissue expandability and mitigate obesity related cardiometabolic disease.

CREBRF variant carrying female mice are protected from dexamethasone-induced insulin resistance despite increases in body fat% whereas male carriers are not.

Hsu A¹, Quinn B¹, Wang C^{1,2}, Shepherd P^{1,2}, Lee K^{1,2}

¹University Of Auckland, Auckland, New Zealand, ²Maurice Wilkins Centre, Auckland, New Zealand

Aim: The Pacific-specific CREBRF variant is associated with higher BMI, yet lower incidence of T2D (and GDM). The variant drives favourable body composition, but it is unclear whether this is causal of diabetes protection. Data from our lab has indicated the variant alters the activity of the glucocorticoid receptor, therefore we aimed to study glucocorticoid-induced metabolic disturbance in male and female Crebrf p.458Q mice.

Methods: Weight-matched wild type (WT) or knock-in (KI) pairs aged 8-10 weeks were placed on high fat diet. Dexamethasone (DEX) (1mg/kg/day) was delivered in peanut butter (PB), control mice were given equivalent PB with no drug. EchoMRI and oGTT were carried out in week 5 then mice were randomised to DEX or PB starting from week 6. From week 8-9 the following tests were carried out in this order; EchoMRI, oGTT, i.p.ITT.

Results: There were no differences in age, weight, body composition or glucose tolerances at the start of treatment. In males, DEX treatment slowed weight gain, with lean mass loss and limited impact on fat mass. Dex treatment in females caused accelerated weight gain with lean mass loss and large increases in fat mass. Glucose tolerance (oGTT) was negatively impacted by DEX in all groups. Female WT DEX mice were more insulin resistant compared to PB control, but no significant difference in KI. Insulin sensitivity was significantly poorer in DEX vs. PB KI male mice with no significant difference in WT.

Conclusion: We observed strong sex dimorphism in the impact of dexamethasone on body fat with females gaining more fat mass, yet female carriers were protected from DEX-induced insulin resistance whereas male carriers had worse insulin resistance. This data confirms the idea that CREBRF variant diabetes protection is not driven by favourable body composition. Also, male carriers may be more susceptible to steroid-induced diabetes.

Fructose consumption increases bone mass in female mice, offsetting age related bone loss

Saravia Lucic K¹, Rahman M¹, Lucic Fisher S¹, King T¹, McDonald M¹, Koay Y¹, Lee N¹

¹University of Sydney, Sydney, Australia

Aim: The excessive intake of caloric sugars is a major driver of obesity and type 2 diabetes. Maternal diet quality also plays a critical role in shaping offspring metabolic health, with high maternal sugar intake shown to alter metabolic programming in a sex-specific manner. Although obesity and type 2 diabetes are established risk factors for low bone mass and osteoporosis, the impact of high sugar consumption on bone development and quality remains poorly understood. Here, we investigated how maternal and/or postnatal sugar intake influences skeletal outcomes in mice.

Methods: C57BL/6J dams were fed either a control, high-fructose, or high-sucrose diet prior to and during gestation and mated with control diet-fed males. After birth of their first litter, dams either remained on their assigned diet or were immediately switched from control to a high-sugar diet, or vice versa. Offspring were weaned and maintained on these diets. Mice were culled at 30 weeks of age. Comprehensive bone data was obtained from isolated femora using DXA and μ CT.

Results: Interestingly, a high-fructose diet from birth led to a marked increase in femoral length, a 12% increase in femoral cortical bone mass, and a striking five-fold increase in femoral trabecular bone volume ratio in female but not male mice. This sex-specific high bone mass phenotype occurred regardless of maternal diet and without overt differences in bodyweight or adiposity. No alterations in bone parameters were observed in either sex on high-sucrose diets or in chow-fed offspring whose mothers were fed a high sugar diet.

Conclusion: These findings demonstrate that high fructose intake enhances cortical and trabecular bone in a sex-specific manner and suggest that high-fructose intake may offset the age-related bone loss typically seen in 30-week-old female mice. These results highlight the potential to inform nutritional strategies that mitigate age-related bone decline.

Mitochondrial enzyme GLYAT regulates adipocyte mitochondrial function in obesity

Li X¹, Su Y¹, Hu T¹, Liu Y¹, Ma X¹, Bao Y¹

¹Shanghai Jiao Tong University School Of Medicine Affiliated Sixth People's Hospital, Shanghai, China

Department of Endocrinology and Metabolism, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai Clinical Center for Diabetes, Shanghai Diabetes Institute, Shanghai 200233, China

Aims: Glycine-N-acyltransferase (GLYAT) is a mitochondrial enzyme involved in medium-chain acyl-CoA metabolism, but its function in adipose tissue is unknown. We investigated the role of adipose GLYAT in obesity-associated metabolic dysfunction and its regulation of adipocyte mitochondrial function.

Methods: Transcriptomic analysis was performed on paired subcutaneous and visceral adipose tissue samples from 236 participants (56 men, 180 women; age range 18-68 years). Using a BMI threshold of ≥ 25 kg/m² to classify overweight/obesity, the study population included 65 normal-weight and 171 overweight/obese individuals. Functional studies were performed in primary human and mouse adipocytes and in mice with AAV-mediated overexpression of GLYAT in inguinal white adipose tissue under cold exposure. Transcriptomic and targeted metabolomic analyses were used to explore underlying mechanisms.

Results: Mitochondrial function-related genes were globally downregulated in adipose tissue from individuals with obesity. GLYAT expression correlated positively with BMI, WHR, body fat percentage, HOMA-IR, fatty liver index, adipose tissue insulin resistance index (Adipo-IR), and serum leptin level, and was inversely associated with adiponectin. GLYAT was enriched in mature adipocytes and increased during differentiation. Overexpression of GLYAT suppressed adipocyte energy metabolism, reduced mitochondrial respiratory complex proteins, and impaired cold-induced thermogenesis in vivo. Mechanistically, GLYAT overexpression inhibited fatty acid elongation, fatty acid metabolism, and oxidative phosphorylation and decreased the glycolytic intermediate 2-phospho-D-glycerate.

Conclusions: GLYAT acts as a negative regulator of adipocyte mitochondrial function and glycolytic flux, contributing to impaired lipid metabolism and thermogenesis in obesity.

Hepatokines-mediated regulation of pancreatic β -cell lipid accumulation in Metabolic Syndrome

Liao C^{1,2,3}, Huang^{4,5}, Tsou S⁶, Weng S⁴, Lin C^{4,6}

¹Department of Family Medicine, Taichung Armed Forces General Hospital, Taichung, Taiwan,

²School of Medicine, National Defense Medical University, Taipei, Taiwan., ³Department of Medical Education and Research, Taichung Armed Forces General Hospital, Taichung, Taiwan., ⁴Institute of Medicine, Chung Shan Medical University, Taichung, Taiwan., ⁵Department of Internal Medicine, Division of Endocrinology and Metabolism, Chung Shan Medical University Hospital, Taichung, Taiwan., ⁶Department of Medical Research, Chung Shan Medical University Hospital, Taichung, Taiwan

Background & Aim:

Metabolic syndrome (MetS) and metabolic dysfunction-associated steatotic liver disease (MASLD) are global health issues, strongly linked to the onset of type 2 diabetes (T2D). The liver is a central metabolic and endocrine organ secreting hepatokines that regulate insulin sensitivity and lipid metabolism. Abnormal hepatokine expression is associated with MetS, MASLD, and T2D. This study explores how hepatokines influence pancreatic β -cell lipid accumulation and function in MetS and MASLD, and the regulatory role of GLP-1/GIP signaling.

Methods:

In vitro cell models and animal models were used to investigate the role of hepatokines and GLP-1/GIP signaling. AML12 and HepG2 cell lines were used to evaluate the effects of GLP-1/GIP signaling on hepatokine secretion and β -cell lipid metabolism. A high-fat diet-induced MetS/MASLD db/db mouse model explored the effects of GLP-1/GIP receptor agonists (GLP-1/GIP RA) on β -cell function and hepatokine expression.

Results:

Preliminary results indicate that hepatokines such as FGF21, fetuin-A, and SeP influence β -cell lipid metabolism and function in MetS and MASLD. GLP-1/GIP RA significantly modulates hepatokine secretion, improving lipid accumulation and enhancing β -cell function in animal models. These findings suggest that GLP-1/GIP RA can effectively influence hepatokine levels and improve β -cell function in MetS and MASLD.

Discussion / Conclusion:

The findings highlight the role of hepatokines in β -cell lipid accumulation and dysfunction, suggesting hepatokines as therapeutic targets in the early stages of MetS and MASLD to prevent progression to T2D. This research supports GLP-1/GIP RA as a strategy to modulate hepatokine expression and improve β -cell function, offering new therapeutic opportunities for diabetes treatment.

BMP9/Ca²⁺ through PI3K/AKT/mTORC1 pathway inhibits the proliferation of theca cells induced by insulin resistance in PCOS

Li Y^{1,5}, Feng J¹, Deng Y^{1,7}, Yuan Y¹, Tang Z^{1,6}, Huang Q³, Zhang ¹, Wang Q¹, Yuan X¹, Tan ^{1,7}, Zhong C¹, Zhang M⁴, Luo K⁴, Liao X^{1,2}

¹Department of Endocrinology and Metabolism, Affiliated Hospital of Zunyi Medical University, Zunyi City, Guizhou Provinc, zunyi, China, ²Guizhou Provincial Key Laboratory of Pathogenesis and Prevention of Common Chronic Diseases, China, zunyi, China, ³Nuclear Medicine Department, Affiliated Hospital of Zunyi Medical University, Zunyi City, Guizhou Province, China. , zunyi, China, ⁴Department of reproductive Medicine, Affiliated Hospital of Zunyi Medical university, Zunyi City, Guizhou Province, China. , zunyi, China, ⁵ Ultrasound Department, Dianjiang People's Hospital, Chongqing City, China., Dianjiang, China, ⁶Chronic Disease Control and Prevention Department, Hechuan District Center for Disease Control and Prevention, Chongqing City, China, Hechuan, China, ⁷Endocrinology Department, Honghuagang District People's Hospital, Zunyi City, Guizhou Province, China, Zunyi, China

Keywords: Polycystic ovary syndrome, Insulin resistance, Bone morphogenetic protein 9, Knockout mice, Follicular theca cells.

Objective: To explore whether bone morphogenetic protein 9 (BMP9)/Ca²⁺ inhibits the pathological proliferation of follicular theca cells caused by insulin resistance (IR) in polycystic ovary syndrome (PCOS) through the PI3K/AKT/mTORC1 signaling pathway.

Methods: In the experiment, overexpressed adeno-associated virus (AAV-BMP9) was injected into tail vein to intervene PCOS model mice, and BMP9 gene knockout (BMP9^{-/-}) mice and primary theca membrane cell IR models were constructed to analyze the effects of BMP9 on hormone levels, insulin resistance and theca membrane cells in mice. The PCOS mice were constructed using DHEA combined with high-fat diet. HOMA-IR, ISI, AUC_{GTT} and AUC_{ITT} were calculated to evaluate the insulin resistance level of mice. The blood lipid levels of mice in each group were measured by automatic biochemical analyzer. The IR model of the theca cells was established by using palmitic acid (PA). The hormone levels were measured by ELISA. The intracellular Ca²⁺ concentration was dynamically detected by Fura-2 AM probe. The mRNA expression levels of the target genes were determined by qRT-PCR. The protein concentration and the phosphorylation levels of the pathways were measured by Western blotting.

Results: (1) BMP9-AAV can improve insulin resistance and sex hormone levels in PCOS mice, and inhibit the pathological proliferation of ovarian theca cells in PCOS mice. (2) The activity of the PI3K/AKT/mTORC1 signaling pathway in the ovaries of BMP9^{-/-} mice is enhanced. (3) The BMP9 recombinant protein reduces the intracellular Ca²⁺ concentration in the theca cells, inhibits the phosphorylation level of the PI3K/AKT/mTORC1 pathway, and thereby inhibits the pathological proliferation of theca cells caused by IR.

Conclusion: BMP9/Ca²⁺ can inhibit the pathological proliferation of theca cells in PCOS caused by IR through the PI3K/AKT/mTORC1 signaling pathway.

Time-Restricted Feeding Improves Related Metabolic Disorders in Patients with Polycystic Ovary Syndrome and Insulin Resistance

Liao X, Luo D¹

¹Affiliated Hospital of Zunyi Medical University, Zunyi, China, ³Honghuagang District People's Hospital,, Zunyi, China, ¹⁰Affiliated Hospital of Zunyi Medical University, Zunyi, China

Aim: This study aimed to investigate the effects of 8-hour time-restricted feeding on metabolism in patients with polycystic ovary syndrome and insulin resistance.

Methods: A total of 30 patients with polycystic ovary syndrome (PCOS) and insulin resistance (IR), as confirmed by the hyperinsulinemic-euglycemic clamp technique, were enrolled and underwent a 20-week 8-hour time-restricted feeding (TRF) intervention (ate between 8:00 a.m. and 4:00 p.m., with only water allowed during the remaining hours. Daily caloric intake was restricted to 1200-1500 kcal and maintained their usual level of physical activity). Ultimately, 27 participants completed the study. The outcome measures included body weight, body mass index (BMI), waist circumference, hip circumference, waist-to-height ratio (WHtR), glucose disposal rate (GDR), sex hormone-binding globulin (SHBG), free androgen index (FAI), total testosterone (TT), luteinizing hormone (LH), follicle-stimulating hormone (FSH), LH/FSH ratio, dehydroepiandrosterone sulfate (DHEA), fasting blood glucose (FBG), fasting insulin (FINS), glycated hemoglobin A1c (HbA1c), alanine aminotransferase (ALT), aspartate aminotransferase (AST), gamma-glutamyl transferase (GGT), triglycerides (TG), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), C-reactive protein (CRP), Self-Rating Anxiety Scale (SAS), Self-Rating Depression Scale (SDS), Pittsburgh Sleep Quality Index (PSQI), menstrual cycle, and the number of days of adherence to the TRF diet per week.

Results: Following the TRF intervention, we observed significant improvements in body weight, BMI, WHtR, FBG, FINS, GDR, SHBG, FAI, TT, LH, LH/FSH, HbA1c, ALT, AST, GGT, TG, LDL-C, CRP, PSQI scores, SDS and SAS scores. Additionally, menstrual irregularity was ameliorated in 88.88% (24/27) of the patients.

Conclusion: TRF may benefits to patients with PCOS and IR, notably in reducing body weight, improving insulin sensitivity and hyperandrogenism, ameliorating menstrual irregularities, and potentially promoting ovulation and alleviating depressive symptoms.

Association between the atherogenic index of plasma and metabolic dysfunction-associated steatotic liver disease risk in Chinese individuals with dysglycemic undergoing health examinations

Yang D^{1,2}, Zhao H¹, Li Y¹, Lei R¹, Zhou X¹, Yang X¹, Liao X²

¹Affiliated Hospital of North Sichuan Medical College, Nanchong City, China, ²Affiliated Hospital of Zunyi Medical University, Zunyi City, China

Aims: To investigate the association between the atherogenic index of plasma (AIP) and metabolic dysfunction-associated steatotic liver disease (MASLD) and evaluated its predictive efficacy in individuals with dysglycemia undergoing health examinations.

Methods: This cross-sectional study included 11071 adults with dysglycemia who underwent health examinations at the Affiliated Hospital of North Sichuan Medical College between March 2021 and February 2022. Participants were classified into MASLD and Non-MASLD groups. Demographic and biochemical data were collected, and AIP was calculated. AIP was analyzed as both a continuous variable and in quartiles (Q1–Q4) to evaluate its association with MASLD risk. The predictive performance of AIP, triglyceride (TG), and high-density lipoprotein cholesterol (HDL) for MASLD was assessed using receiver operating characteristic curve analysis.

Results: The prevalence of MASLD was 49.05%. Analyzed as both a continuous and categorical variable, AIP remained independently and positively associated with MASLD risk in multivariable logistic regression models (all $P < 0.001$). A non-linear, threshold-dependent relationship between AIP and MASLD risk was identified through curve-fitting analysis (P for non-linearity < 0.001). Furthermore, receiver operating characteristic (ROC) curve analysis demonstrated that AIP had superior discriminatory power for predicting MASLD compared to TG and HDL in individuals with dysglycemia.

Conclusion: In Chinese individuals with dysglycemia, elevated AIP levels show a non-linear, positive association with MASLD risk, which is characterized by a distinct threshold effect. The AIP also demonstrates superior discriminatory accuracy for predicting MASLD compared to TG and HDL.

【Key words】 dysglycemia, metabolic dysfunction-associated steatotic liver disease, atherogenic index of plasma, prediabetes, type 2 diabetes mellitus

The expression changes of Betatrophin in PCOS and the mechanism by which it regulates insulin resistance in mouse theca cells through the PI3K/AKT/FOXO1 signaling pathway

deng y¹, [Liao X](#)

¹Zunyi Medical University Affiliated Hospital, Zunyi City, Guizhou Province, China

Background and Objective: Betatrophin is a secretory protein that primarily regulates the secretion of glucose and lipids. This study aims to investigate the expression of Betatrophin in patients with polycystic ovary syndrome (PCOS) and to reveal its influence on insulin resistance (IR) in mouse theca cells through the regulation of the PI3K/AKT/FOXO1 pathway.

Methods: Based on the Rotterdam criteria in 2003, PCOS was diagnosed and divided into the healthy control (NC) group, the IR group, the PCOS non-IR group, and the PCOS-IR group. The changes of Betatrophin in PCOS patients were studied to explore the correlation between Betatrophin and IR. By inducing an IR model of mouse follicular membrane cells, Western-blot was used to detect the expression of PI3K/AKT/FOXO1 proteins and downstream signaling factors in the pathway, and to investigate the molecular mechanism of Betatrophin in insulin resistance.

Results: Compared with the NC group, the Betatrophin concentrations in the IR group, the PCOS non-IR group, and the PCOS-IR group were significantly increased. Compared with the PCOS non-IR group, the Betatrophin concentrations in the IR group and the PCOS-IR group were also significantly increased ($P < 0.05$). Additionally, in vitro experiments showed that in the IR model, Betatrophin could activate the PI3K/AKT/FOXO1 pathway.

Conclusion: Betatrophin is closely related to insulin resistance in PCOS. In vitro experiments have shown that Betatrophin can improve follicular membrane cell IR by regulating the PI3K/AKT/FOXO1 signaling pathway, which provides a new target and idea for the prevention and treatment of PCOS.

Phosphatidylserine supplementation alters lipid metabolism and fibrogenic signaling in hepatic stellate cells

Lin S¹, Dong L¹, Leeming M², Williamson N², Montgomery M¹

¹Department of Anatomy and Physiology, The University Of Melbourne, Melbourne, Australia,

²Melbourne Mass Spectrometry and Proteomics Facility, Bio21 Molecular Science & Biotechnology Institute, The University Of Melbourne, Melbourne, Australia

Aim: Metabolic dysfunction–associated steatotic liver disease (MASLD) is now a pandemic affecting approximately 38.2% of the global population. Accordingly, the burden of liver fibrosis has increased, with MASLD-related cirrhosis mortality rising by ~90% between 1990 and 2017. Despite this, only two FDA-approved therapies are available for MASLD-related fibrosis, highlighting a major unmet clinical need. Our group recently demonstrated that phosphatidylserine (PS) supplementation improves hepatic triglyceride accumulation, inflammation, and unexpectedly, liver fibrosis in mouse models of MASH. This study aimed to elucidate the role of PS in regulating hepatic stellate cell (HSC) fibrogenic responses.

Methods: Human LX-2 hepatic stellate cells were treated with either 2% bovine serum albumin (BSA) or PS (100–200 $\mu\text{mol/L}$) conjugated to 2% BSA for 48 h. During this period, cells were serum-starved for 24 h, followed by stimulation with transforming growth factor- β (TGF- β ; 5 ng/mL). Profibrotic gene expression was assessed by qPCR, while global proteomic and lipidomic changes were analyzed using mass spectrometry.

Results: PS treatment induced substantial lipidomic remodeling, characterized by marked increases in intracellular PS, accompanied by reductions in other phospholipids, including phosphatidylcholine and phosphatidylethanolamine. PS treatment significantly suppressed profibrotic *COL1A1* and *TGFB1* mRNA expression both in the presence and absence of TGF- β stimulation. In contrast, PS potentiated TGF- β –induced upregulation of the profibrotic inhibitor *TIMP1* at the mRNA level. These transcriptional changes were largely recapitulated at the protein level in proteomic analyses. Furthermore, PS attenuated TGF- β –induced expression of additional profibrotic proteins, including *COL5A1*, *COL6A2*, *PDGFRB*, and *TIMP2*. Beyond extracellular matrix regulation, PS treatment was associated with mild suppression of TCA cycle–related proteins, which may contribute to a less fibrogenic cellular phenotype.

Conclusion: Collectively, these findings suggest that increasing intracellular PS content in HSCs modulates fibrogenic signaling and extracellular matrix remodeling, supporting PS supplementation as a potential therapeutic strategy for inhibiting liver fibrosis.

Resistant starch facilitates the amelioration of non-alcoholic fatty liver disease by modulating gut microbiota

Long X^{1,2}, Ni Y², Qian L², Li H², Jia W²

¹National Clinical Research Center for Endocrine and Metabolic Diseases, Key Laboratory of Diabetes Immunology, Ministry of Education, and Department of Metabolism and Endocrinology, The Second Xiangya Hospital of Central South University, Changsha, China, ²Shanghai Key Laboratory of Diabetes Mellitus, Department of Endocrinology and Metabolism, Shanghai Diabetes Institute, Shanghai Clinical Center for Diabetes, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Aim: Non-alcoholic fatty liver disease (NAFLD) represents a hepatic manifestation of metabolic dysfunction, for which safe and effective interventions are still lacking. Accumulating evidence indicates that NAFLD is closely associated with gut microbiota through the gut-liver axis. Accordingly, microbiota-directed foods represent promising therapeutic strategies for this condition. In this study, we aimed to investigate the effects of resistant starch (RS), a nondigestible prebiotic fiber fermented primarily in the large intestine, as a microbiota-directed dietary supplement on the amelioration of NAFLD, and to further elucidate its underlying mechanisms.

Methods: A 4-month randomized placebo-controlled clinical trial was conducted in participants with NAFLD (ChiCTR-IOR-15007519), with 99 participants received 40g RS per day while 97 participants in control group received isocaloric control starch. Multi-omics profiling including metagenomics and metabolomics was used to provide an integrated understanding of how RS act. Additionally, fecal microbiota transplantation and monocolonization experiments in mice and the directed treatment with cell lines were performed to verify the causality and to explore the underlying mechanisms.

Results: Compared with the control group, RS intervention resulted in a 9.08% absolute reduction in intrahepatic triglyceride content (IHTC), alleviated adiposity, and improved glycolipid metabolism parameters. Multi-omics integrative analyses revealed that RS-reduced serum branched-chain amino acids (BCAAs) and gut microbial species, particularly *Bacteroides stercoris*, may serve as key drivers of these beneficial effects. Finally, we demonstrated that the protective effects of RS could be transferred to mice via microbiota transplantation. Administration of *Bacteroides stercoris* aggravated diet-induced NAFLD in mice, at least partially through BCAA production which promoted lipid accumulation in hepatocytes.

Conclusion: Dietary supplementation with RS may serve as an effective strategy for the management of NAFLD by modulating the composition and function of the gut microbiota.

Pre-pregnancy weight-loss is effective for ameliorating maternal cardiac protein dysregulation in a murine model of obesity.

Longfield M^{1,2}, Rodrigo N^{1,2,3}, Campbell C², Baldwin J², White M⁴, Glastras S^{1,2}

¹Department of diabetes, metabolism and endocrinology, Royal North Shore Hospital, St Leonards, Australia, ²Kolling Institute, University of Sydney, St Leonards, Australia, ³Department of Endocrinology, Nepean Hospital, Kingswood, Australia, ⁴Charles Perkins Centre, University of Sydney, Camperdown, Australia

Background: Obesity pre-pregnancy increases the risk of cardiovascular disease. Current clinical recommendations advise body weight reduction of 5-10%. GLP-1 receptor agonists are an effective therapeutic option, yet their use remains understudied.

Aims: To characterise the effect on cardiac proteins of pre-pregnancy liraglutide use in a murine model of obesity and compare this to sustained dietary intervention.

Methods: 6-week-old Female C57BL/6 mice were fed a high-fat (HFD) or chow (CHOW) diet for 8-weeks prior to weight-intervention. Liraglutide treatment (LIRA) consisted of 0.3mg/kg doses administered daily, whereas dietary intervention involved a swap from HFD to CHOW (SWITCH). Mice were sacrificed after 4-weeks of intervention or pregnancy and lactation (n=8/group/timepoint). Cardiac proteins were analysed using data-dependant acquisition, liquid-chromatography mass spectrometry. Statistical analysis was completed in Spectronaught and GraphPad, with pathway analysis completed using string.db.

Results: Pre-Pregnancy, LIRA had lower body weight than HFD, though higher than CHOW (-3.57 ± 1.21 , $P < 0.01$ and 1.52 ± 0.72 , $P < 0.05$ respectively). No significant difference in weight was observed between LIRA and SWITCH. Pre-pregnancy, 27 proteins were significantly dysregulated in HFD cardiac tissue compared to CHOW. Of these, 9 were ameliorated by treatment with liraglutide. These proteins were significantly associated with lipid metabolic processes (1.06, $P < 0.05$), and fatty acid beta-oxidation (2.3, $P < 0.001$). Inter-pregnancy weight gain was higher in LIRA compared to CHOW and SWITCH (4.31 ± 1.22 & 4.15 ± 0.78 , $P < 0.05$ respectively). Post-pregnancy, 35 proteins were significantly dysregulated in HFD compared to CHOW. Of these, 31 remained dysregulated in LIRA. These were significantly associated with lipid and fatty acid metabolic processes. Alternately there were no differences between SWITCH and CHOW post-pregnancy.

Conclusion: These findings suggest that whilst 4-weeks treatment with liraglutide modulates protein expression, its use results in minimal cardioprotective effects post-pregnancy. Conversely, dietary intervention effectively ameliorates adverse changes in cardiac protein expression. Future work should aim to study longer durations of pre-pregnancy liraglutide use.

CRISPR screening identifies APBB2 as a novel regulator of hepatic lipid metabolism

Lu J¹, Dodd G¹, Furtado D², Leeming M³, Lin S¹, Cheng Z¹, Williamson N³, Dong L¹, Montgomery M¹

¹Department of Anatomy and Physiology, University Of Melbourne, Parkville, Australia, ²Department of Chemical Engineering, The University of Melbourne, Parkville, Australia, ³Bio21 Molecular Science & Biotechnology Institute, Melbourne Mass Spectrometry and Proteomics Facility, The University of Melbourne, Parkville, Australia

Aim

Lipid metabolism dysregulation is a key feature of metabolic dysfunction-associated steatotic liver disease (MASLD), yet effective therapies targeting this pathway remain elusive. This study investigates the metabolic role of a novel protein identified from a CRISPR screen in human liver-derived HepG2 cells aimed at uncovering novel regulators of lipid metabolism: amyloid beta precursor protein binding family B member 2 (APBB2).

Method

Using [14C]-based metabolic tracing, Seahorse analysis of mitochondrial function, and mass spectrometry-based lipidomics and proteomics, we assessed the impact of APBB2 deletion on cellular metabolism. Liver-specific knockdown of *Apbb2* in mice was performed to evaluate whole-body metabolic consequences.

Result

APBB2 deletion significantly reduces mitochondrial fatty acid oxidation (70% reduction) and respiratory capacity. APBB2 knockout leads to downregulation of carnitine palmitoyltransferase 1 (CPT1) and accumulation of long-chain acyl-carnitines, supporting a block at the CPT-carnitine shuttle and downstream β -oxidation steps. In parallel, unoxidized fatty acids are rerouted into triacylglycerol (TAG) and cholesteryl ester synthesis, leading to increased lipid storage and secretion.

Untargeted proteomic and lipidomic profiling further reveal remodeling of mitochondrial cardiolipins toward longer acyl chains, together with widespread changes in TCA cycle and electron transport chain proteins, consistent with impaired oxidative metabolism. These defects extend beyond fatty acids: APBB2-deficient cells exhibit reduced glutamine oxidation, altered glucose metabolism, and compensatory upregulation of glycolytic enzymes. Liver-specific knockdown of *Apbb2* in mice lowered whole-body oxygen consumption and increased the respiratory exchange ratio, suggesting a systemic shift toward carbohydrate utilisation.

Conclusion

These findings highlight APBB2 as a novel regulator of hepatic lipid metabolism, expanding our knowledge of the genetic drivers of lipid dysregulation in MASLD.

IDH3A deficiency compromises adaptive thermogenesis and exacerbates obesity-induced metabolic dysfunction

Lu X¹, BAO Y¹, YANG Y¹, MA X¹

¹Shanghai Sixth People's Hospital Affiliated To Shanghai Jiao Tong University School Of Medicine, Shanghai, China

Aims: Adaptive thermogenesis in beige adipocytes is essential for maintaining energy homeostasis and preventing obesity. Emerging evidence suggests that human visceral adipose tissue harbors adipocytes with beige-like thermogenic features, enabling analysis of thermogenic gene regulation in humans. Isocitrate dehydrogenase 3A (IDH3A) is a rate-limiting enzyme of the tricarboxylic acid cycle, yet its function in adipocytes remain poorly defined.

Methods: We established an RNA-seq dataset from human visceral adipose tissue and assessed the expression of IDH3A. Adipocyte-specific IDH3A knockout mice were generated to investigate the role of IDH3A in beige adipocyte thermogenesis and metabolic regulation.

Results: IDH3A expression in human visceral fat was inversely associated with adiposity and adverse metabolic traits. Moreover, IDH3A expression was induced in human and mouse adipocytes following thermogenic stimulation. Adipocyte-specific IDH3A deletion in mice impaired beige fat thermogenic capacity, led to cold intolerance, and exacerbated diet-induced metabolic dysfunction.

Conclusion: In addition to its canonical enzymatic role, our findings establish IDH3A as a key mediator of adaptive thermogenesis in response to metabolic stress.

Interindividual variability in gut microbiome mediates the efficacy of resistant starch on MASLD

Lu Y¹, Long X¹, Wang H², Jia W¹, Chen L³, Li H¹

¹Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²School of Life Science and Technology, ShanghaiTech University, Shanghai, China,

³School of Mathematical Sciences and School of AI, Shanghai Jiao Tong University, Shanghai, China

Aim

Metabolic dysfunction–associated steatotic liver disease (MASLD) is a major risk factor for diabetes, yet effective therapeutic options remain limited. Prebiotic strategies that modulate the gut microbiota are promising; however, interindividual variability in efficacy hinders broad implementation. This study focuses on the heterogeneity of responses to resistant starch (RS), a prebiotic, in individuals with MASLD, aiming to identify features associated with response variability and explore the underlying mechanisms, thereby providing evidence to support precision treatment for MASLD.

Methods

Using a 30% reduction in intrahepatic triglyceride content as the threshold, participants in a previously conducted RS intervention trial for MASLD were stratified into high and low responders, and differences in clinical indices before and after the intervention were compared. These findings were then validated in another multicenter RS intervention trial. To explore the potential key factors mediating responsiveness, multi-omics analyses were conducted, and subsequently validated the findings using fecal microbiota transplantation, monocolonization, and in vitro bacterial experiments.

Results

Approximately 30% of participants were low responders, with attenuated improvements in hepatic steatosis, liver function, and adiposity-related indicators relative to high responders. Integrated multi-omics and experimental evidence implicated baseline *Prevotella* as a negative determinant of response, acting via suppression of RS degrading bacteria and consequent reduction in RS utilization. A novel isolate from high responders, *Bifidobacterium pseudocatenulatum* RRP01, directly degraded RS, enhanced its utilization, and mitigated the low-response phenotype associated with high *Prevotella* abundance. A efficacy predictive model incorporating baseline microbiome features and clinical variables demonstrated robust performance across both trials (AUC 0.74–0.87).

Conclusion

The study delineates RS response heterogeneity in MASLD and identifies baseline gut microbiota as a key mediator. A machine-learning model enables prospective population stratification. Moreover, adjunctive supplementation with *Bifidobacterium pseudocatenulatum* RRP01 may optimize the therapeutic benefits of RS, representing a potential strategy to improve outcomes in predicted low responders.

The principal energy reservoir model redefines adipose tissue distribution and metabolic risk across species

Madsen S¹, Fuller O¹, Stöckli J¹, James D¹

¹University Of Sydney, Camperdown, Australia

Aim: Adipose tissue distribution, beyond total mass, is a major determinant of metabolic health. In humans, visceral adiposity is strongly associated with insulin resistance and cardiometabolic disease, whereas subcutaneous accumulation is comparatively benign. Whether this reflects intrinsic depot biology or differences in adipose expandability remains unclear. Moreover, much mechanistic insight is derived from rodent studies, where translational relevance is often assumed rather than demonstrated. We aimed to determine which adipose depot associates with metabolic dysfunction in mice and whether depot–disease relationships mirror those observed in humans.

Method: Visceral (VAT) and subcutaneous (SUBQ) adipose mass were quantified using deep-learning models applied to digital radiographs in the Diversity Outbred Australia mouse population. Longitudinal phenotyping included systemic insulin resistance and hepatic lipid accumulation. Morphometric analyses assessed depot size and adipocyte characteristics. Associations between depot mass and metabolic traits were evaluated across genetically diverse mice.

Results: In contrast to human epidemiology, subcutaneous adiposity, rather than visceral adiposity, was associated with insulin resistance and hepatic lipid accumulation in mice. Morphometric analyses demonstrated that murine VAT functions as the principal energy reservoir, with greater mass and larger adipocytes relative to SUBQ. This organisation contrasts with humans, where SUBQ serves as the primary energy store and visceral expansion predicts metabolic disease. Thus, the depot that appears metabolically advantageous in each species is the one that evolved to buffer energy surplus, rather than an inherently good or bad anatomical site.

Conclusion: These findings support a revised conceptual framework, the Principal Energy Reservoir Model, whereby metabolic dysfunction arises when secondary adipose depots enlarge, regardless of anatomical site. This framework reconciles inter-species differences and shifts emphasis from depot location to functional adipose hierarchy as the key determinant of metabolic risk.

Early-life faecal metabolites associated with Islet Autoimmunity in children at risk of Type-1 Diabetes

Mahbub R¹, Tillett B¹, Anderson D², Zhang V¹, Creek D², Barry S³, Colman P⁴, Couper J^{3,5}, Craig M^{6,7,8}, Davis E⁹, Haynes A⁹, Huynh T^{10,11}, Kim K^{6,12}, McGorm K³, Morahan G¹³, Penno M³, Rawlinson W^{6,14}, Soldatos G^{15,16}, Spelman T³, Thomson R³, Tye-Din J¹⁷, Vuillermine P^{17,19}, Wentworth J⁴, Harrison L¹⁷, Oakey H³, Hamilton-Williams E¹

¹Frazer Institute, Faculty of Health, Medicine and Behavioural Sciences, University of Queensland, Brisbane, Australia, ²Monash Proteomics and Metabolomics Platform, Monash University, Melbourne, Australia, ³Adelaide Medical School, Faculty of Health and Medical Sciences and Robinson Research Institute, University of Adelaide, Adelaide, Australia, ⁴Department of Diabetes and Endocrinology, Royal Melbourne Hospital, Melbourne, Australia, ⁵Endocrinology and Diabetes Department, Women's and Children's Hospital, North Adelaide, Australia, ⁶Discipline of Paediatrics and Child Health, School of Clinical Medicine, Faculty of Medicine and Health, University of New South Wales, Sydney, Australia, ⁷Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia, ⁸Discipline of Paediatrics and Child Health, School of Clinical Medicine, Faculty of Medicine and Health, University of New South Wales, Sydney, Australia, ⁹Children's Diabetes Centre, The Kids Research Institute Australia, Perth, Australia, ¹⁰Department of Endocrinology and Diabetes, Queensland Children's Hospital, South Brisbane, Australia, ¹¹Children's Health Research Centre, Faculty of Health, Medicine, and Behavioural Sciences, Brisbane, Australia, ¹²Institute of Endocrinology and Diabetes, The Children's Hospital at Westmead, Sydney, Australia, ¹³Centre for Diabetes Research, Harry Perkins Institute of Medical Research, The University of Western Australia, Perth, Australia, ¹⁴Virology Research Laboratory, Serology and Virology Division, New South Wales Health Pathology, Prince of Wales Hospital, Sydney, Australia, ¹⁵School of Public Health and Preventive Medicine and School of Clinical Sciences, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, ¹⁶Diabetes and Vascular Medicine Unit, Monash Health, Melbourne, Australia, ¹⁷Walter and Eliza Hall Institute of Medical Research, Melbourne, Australia, ¹⁸Faculty of Health, School of Medicine, Deakin University, , Australia, ¹⁹Child Health Research Unit, Barwon Health, Geelong, Australia

Aim: Environmental exposures in early life, including infant diet, infections and the gut microbiota, are thought to influence the risk of islet autoimmunity (IA). Metabolites represent biochemical outputs of host-microbe interactions and may provide biomarkers of early-life processes associated with IA. We investigated associations between the early-life faecal metabolome and IA risk within the ENDIA study.

Methods: ENDIA is a longitudinal birth cohort following 1,473 children with a first-degree relative with type 1 diabetes (T1D), recruited in pregnancy or infancy. Untargeted faecal metabolomics was performed in a nested case-control analysis including 54 children who developed persistent IA (positive at two consecutive visits or T1D) and 161 matched controls. Stool samples collected near birth, every three months until two years of age and six monthly thereafter until IA onset. After quality control and normalisation, metabolites with <10% prevalence were excluded, leaving 2,528 metabolites for analysis. Differential metabolite analyses were adjusted for age, sex, maternal T1D, and infant HLA.

Results: Infant IA status explained 2% of overall variation in the faecal metabolome (Bray-Curtis PERMANOVA, $p < 0.05$). Most significant metabolites (41) were associated with a reduced risk of IA (risk ratio 0.25 [95% CI: 0.17-0.35] for the most significant metabolite; $q = 1.35 \times 10^{-10}$). While two metabolites were associated with increased risk (risk ratio 1.70 [95% CI: 1.21-2.38] for the most significant metabolite; $q = 0.036$). Multiple protective metabolites mapped to fatty acid metabolism pathways, including metabolites known to be abundant in breastmilk such as arachidonic acid. Longitudinal trajectory analysis showed several metabolites associated with lower IA risk had a dip in abundance around 12 months of age in cases.

Conclusion: This study demonstrates that faecal metabolites are associated with IA risk in early life. Longitudinal metabolic profiling in ENDIA may help identify early biomarkers of IA and inform dietary or metabolic intervention strategies for disease prediction.

High-resolution temporal *in vivo* phosphoproteomics of skeletal muscle insulin signalling identifies Bltp3a as a novel Akt substrate and positive effector of glucose uptake

Cutler H¹, Masson S¹, Diaz Vegas A¹, Hanna M², Fuller O¹, Cooke K¹, Potter M¹, De Camilli P², Humphrey S³, James D¹

¹University Of Sydney, Sydney, Australia, ²Yale University, New Haven, United States of America,

³Murdoch Children's Research Institute, Melbourne, Australia

Aims: Advances in mass spectrometry based phosphoproteomics have greatly advanced our understanding of the insulin signalling network. A central outcome of which is the lowering of blood glucose via stimulation of glycolysis and translocation of the insulin responsive glucose transporter GLUT4 to the plasma membrane. However, most phosphoproteomic studies rely on single time points and do not capture the dynamic nature of insulin signalling. Here we sought to address these shortcomings so that we may better understand dysregulation of glycaemic control at the molecular level.

Methods: We measured *in vivo* skeletal muscle glucose uptake and performed phosphoproteomic profiling across 7 time points (2, 5, 10, 20, 30, 40 mins) after insulin stimulation in two genetically distinct mouse strains, fed either a chow or high-fat/high-sugar diet (HFD). We applied a various bioinformatic approaches to the resulting data, including a forecasting approach to predict functional phosphorylation sites. To prioritise candidates, we then integrated human genetic evidence, and then validated these using genetic manipulation, *in vitro* glucose uptake assays, and microscopy.

Results: Insulin signalling is dynamic and varies by diet and genetic background. HFD induced clear diet-induced suppression of glucose uptake and selective, time-point dependent, attenuation of canonical insulin signalling. Forecasting analysis uncovered the late-endosomal protein Bridge-Like Lipid Transfer Protein Family Member 3A (Bltp3a) as a novel regulator of insulin-stimulated glucose transport. Meta-analysis revealed strong associations between single-nucleotide polymorphisms (SNPs) in Bltp3a and fasting insulin, HbA1c, and HDL. *In-vitro* validation revealed it to be a novel Akt substrate which co-localises on GLUT4 vesicles.

Conclusion: Together, these findings reveal the importance of temporal network dynamics in insulin action and identify Bltp3a as a novel regulator of skeletal muscle glucose uptake.

Regular exercise improves muscle glucose uptake by enhancing vascular flexibility in rat skeletal muscle

Mayne S¹, Attrill E¹, Matson E¹, Henstridge D², Ross R¹, Premilovac D¹

¹University of Tasmania, Hobart, Australia, ²University of Tasmania, Launceston, Australia

Loss of normal microvascular blood flow control in muscle can lead to impaired glucose uptake and development of insulin resistance and type 2 diabetes. Importantly, we know that the distribution of blood flow between capillary networks (termed vascular flexibility) that supply muscle fibres and those that bypass muscle fibres influences muscle glucose uptake. This study aimed to determine if exercise increases vascular flexibility in rat hindlimb muscle and whether this leads to increased muscle glucose uptake.

Sprague Dawley rats (~200g) were entered into a 4-week protocol. Half of the rats remained sedentary, and half were given access to running wheels three times per week. After four weeks, vascular flexibility was assessed using the constant flow pump perfused hindlimb preparation to measure the response to infusion of either saline or angiotensin II (15nM; stimulates flow redistribution towards muscle). Perfusion pressure, glucose uptake, and oxygen uptake were used to assess changes in total flow and metabolism. Contrast enhanced ultrasound and fluorescent vascular casting were used to assess changes in microvascular flow.

Rats in the exercise group ran ~25km across the 4-week intervention. Exercised rats had decreased body weight ($p<0.05$), decreased adipose mass ($p<0.001$), but no difference in calf muscle mass compared to sedentary rats. Saline did not alter perfusion pressure or metabolism in the hindlimb. Angiotensin II increased perfusion pressure and oxygen uptake in both sedentary and exercised rats ($p<0.001$). However, angiotensin II stimulated an increase in muscle blood flow ($p<0.05$) and glucose uptake ($p<0.05$) only in rats exposed to exercise.

In conclusion, these findings suggest that exercise enhances vascular flexibility in skeletal muscle, leading to increased blood flow towards muscle fibre-associated capillaries and thus greater glucose extraction. This work may help explain how exercise helps improve glucose metabolism in the context of insulin resistance and type 2 diabetes.

Dual noradrenergic regulation of POMC neurons: Implications for energy and glucose homeostasis.

Lavoie O^{1,2}, Turmel A^{1,2}, Khouma A^{1,2}, Minbashi Moeini M^{1,2}, Liu C³, Caron A^{1,2}, Michael N^{1,2}

¹Laval University, Quebec City, Canada, ²Quebec Heart and Lung Institute, Quebec City, Canada,

³University of Texas Southwestern Medical Center, Dallas, USA

Aims: Norepinephrine (NE) is an important neuromodulator influencing feeding and glucose homeostasis. It is known to target hypothalamic circuits that regulate energy balance and previous studies suggest that NE inhibits proopiomelanocortin (POMC) neurons via α 2A-adrenoceptors (ADRA2A). However, the cellular mechanisms and physiological relevance of this effect remain unclear. This study aimed to determine how ADRA2A activation regulates POMC neuron activity and aimed to assess the contribution of ADRA2A expressed in POMC neurons to energy and glucose homeostasis *in vivo*.

Methods: Whole-cell patch-clamp electrophysiology was performed in hypothalamic slices to evaluate responses of identified POMC neurons to NE and the selective ADRA2 agonist UK 14,304. Multiplex RNAscope was used to quantify *Adra2a* expression in POMC neurons. A novel *Adra2a*-flox mouse line was generated and crossed with *Pomc*-CreERT2 mice to produce inducible POMC-specific *Adra2a* knockout mice (POMC^{KOA2A}). Metabolic phenotyping, including measurements of body weight, food intake, adiposity, and glucose tolerance was assessed in POMC^{KOA2A} mice.

Results: *Adra2a* was expressed in ~50% of POMC neurons, with slightly higher expression in females. Both NE and UK 14,304 strongly inhibited POMC neurons in both sexes, hyperpolarizing the membrane potential, reducing the firing frequency, and decreasing input resistance. These effects were partially mediated by potassium channels, as blockade of Kir and K_{ATP} channels attenuated the UK 14,304-induced inhibition. Blockade of synaptic transmission, and deletion of *Adra2a* in POMC neurons, reduced the UK 14,304-induced inhibition, suggesting the involvement of both direct and indirect mechanisms. However, *in vivo*, POMC-specific *Adra2a* deletion had minimal effects on body weight, food intake, and adiposity, but modestly impaired glucose tolerance in males.

Conclusion: ADRA2A activation strongly inhibits POMC neuron activity through both cell-autonomous and circuit-level mechanisms. However, ADRA2A signalling in POMC neurons is largely dispensable for energy balance regulation, suggesting that noradrenergic control of metabolism involves additional neuronal populations or network interactions.

Association between type 2 diabetes and micronutrient deficiency in adults with class 3 obesity

Monjur M¹, Sengul D¹, Grudzinskas K¹, Grealish M¹, Reyes P², Chimoriya R², Kormas N¹, Piya M^{1,2}

¹South Western Sydney Metabolic Rehabilitation and Bariatric Program, Campbelltown, Australia,

²School of Medicine, Western Sydney University, Campbelltown, Australia

Aim

Micronutrient deficiencies are common in adults with class 3 obesity (body mass index [BMI] ≥ 40 kg/m²). This study aimed to compare the prevalence of micronutrient deficiencies between individuals with class 3 obesity with and without type 2 diabetes (T2D), and to evaluate changes over 12 months.

Methods

This retrospective cohort study included adults with class 3 obesity enrolling in a tertiary multidisciplinary weight management program in Sydney between March 2018 and June 2024. Serum micronutrient levels, routine biochemistry, anthropometry, and clinical data were assessed at baseline and 12 months.

Results

Of 705 participants enrolled, 42.0% had T2D (n=296) and 58.0% non-T2D (n=409). The T2D participants were older (mean age 53.9 ± 13.3 vs 45.1 ± 15.3 years, $p < 0.001$), had lower weight (143.0 ± 30.9 vs 154.2 ± 36.0 kg, $p < 0.001$), lower BMI (51.7 ± 9.7 vs 54.0 ± 10.8 kg/m², $p = 0.003$), and similar gender distribution (67.6% vs 70.0% female, $p = 0.54$). Prevalence of micronutrient deficiency for T2D vs non-T2D was similar: vitamin D (53.1% vs 52.2%, $p = 0.90$), B12 (6.6% vs 5.7%, $p = 0.76$), folate (2.0% vs 1.1%, $p = 0.60$) and ferritin (8.7% vs 6.6%, $p = 0.48$). Mean serum micronutrient levels did not differ between groups. Baseline Vitamin D was negatively correlated with BMI in both groups (T2D: $r = -0.126$, $p = 0.04$, non-T2D: $r = -0.237$, $p < 0.001$). At 12 months, there was significant weight loss (T2D 141.6 ± 30.2 to 132.3 ± 30.2 kg, $p < 0.001$; non-T2D 156.1 ± 36.5 to 148.8 ± 36.1 kg, $p < 0.001$). T2D participants demonstrated improved vitamin D levels (52.3 to 60.6 nmol/L, $p < 0.001$) with reduced deficiency prevalence (53.0% to 32.0%, $p = 0.003$), but no change for non-T2D participants. Other micronutrient changes were not significant at 12 months for both groups.

Conclusion

Micronutrient deficiency was highly prevalent, with over half deficient in vitamin D at baseline in patients with class 3 obesity with and without T2D. These findings support routine micronutrient screening in all adults with class 3 obesity, irrespective of T2D status.

Effect of training in Normobaric hypoxia on lipid profile and the risk of cardiovascular events in a group of women Aged 50-59 years

Morawska-Tota M¹, Tota Ł², Bagińska M³

¹Department of Sports Medicine and Human Nutrition, University of Physical Culture in Krakow, Kraków, Poland, Kraków, Poland, ²Department of Physiology and Biochemistry, University of Physical Culture in Krakow, Kraków, Poland, Kraków, Poland, ³Department of Water Sports, University of Physical Culture in Krakow, Kraków, Poland , Kraków, Poland

Aim

The study aim was to assess changes in lipid profile and AIP index under the influence of 4 weeks of training in normobaric hypoxia conditions among a group of 50-59 year-old women.

Methods

The study involved 57 women aged 50-59 years who had not previously engaged in regular physical activity. Participants were randomly assigned to one of four groups: normobaric hypoxia training (HT, n-15), normoxic training (NT, n-13), passive exposure to normobaric hypoxia (B, n-15), and control (B, n-14). The intervention comprised a 4-week progressive training programme (endurance and resistance), performed three times a week for 60 minutes, with individualised intensity. The simulated altitude was 2,500 m a.s.l in the HT and B groups, and 223 m a.s.l. in NT. Measurements were performed three times: I - pre-test, II - post-test, and III – follow-up (after 21 days). The concentrations of total cholesterol (TC), LDL fraction (LDL-C), HDL (HDL-C), triglycerides (TG) were assessed and the atherogenic index of plasma (AIP) calculated.

Results

A large interaction effect was observed between study conditions and measurement time for LDL-C, HDL-C and AIP. Pairwise comparisons included in the analysis indicated changes in these indices between measurements varied depending on training conditions. In the hypoxia training group, a decrease in LDL-C and increased HDL-C, as well as a reduction in AIP were observed. No significant changes were noted in the remaining groups. For triglycerides, only a main effect of measurement time was observed.

Conclusion

The conducted intervention demonstrated that training in high-altitude conditions can be an effective factor in preventing cardiovascular diseases and reducing cardiovascular risk.

The publication is co-financed by the national budget under the "Science for Society II" programme of the Minister of Education and Science, project number: NdS-II/SP/0512/2023/01, funding in the amount of 1,401,144.00 and total project value of 1,401,144.00.

Overexpression of ACAD10 activates Akt-mediated insulin signalling pathways and suppresses gluconeogenic gene expression in the liver.

Ng J¹, West O¹, Yew M¹, Heywood S³, Iliades P³, Febbraio M³, Drew B³, Watt K⁴, Premilovac D², Myers S¹, Henstridge D¹

¹University Of Tasmania, Launceston, Australia, ²Tasmanian School of Medicine, Hobart, Australia,

³Baker Heart & Diabetes Institute, Melbourne, Australia, ⁴Murdoch Children's Research Institute, Melbourne, Australia

Aim: Acyl-CoA dehydrogenase 10 (ACAD10) is a poorly characterised member of the ACAD family that is suggested to be involved in intracellular lipid metabolic pathways. ACAD10 variants have been associated with impaired lipid oxidation and increased adiposity in humans, however studies in an ACAD10 knockout mouse model demonstrated that loss of ACAD10 did not lead to adiposity or disruptions to glucose homeostasis. Currently, it is unknown whether upregulation of ACAD10 alters liver metabolic function.

Methods: An ACAD10 Adenovirus (ACAD10-Adv) was used to overexpress ACAD10 protein in HepG2 human liver cells. Metformin treatment was included to investigate potential synergistic effects between ACAD10 overexpression and metformin's anti-diabetic actions. Protein and gene expression analysis was conducted to evaluate the effects of ACAD10 overexpression on insulin signalling-related pathways.

Results: ACAD10 overexpression increased Akt phosphorylation compared to control cells under basal and palmitate-induced insulin resistant conditions. ACAD10 overexpression also increased GSK-3 β phosphorylation and downregulated hepatic glucose production genes such as G6PC, PCK1, PCK2 and FBP1, suggesting potential improvements in hepatic glucose metabolism. ACAD10 overexpression led to mTOR pathway activation as shown by increased phosphorylation of mTOR and its downstream target, p70S6K. ACAD10 overexpression also resulted in the upregulation of immediate early genes, including Fos proto-oncogene (c-FOS) and early growth response protein 1 (EGR-1), and one of the downstream mitochondrial integrated stress response (ISR) markers, growth differentiation factor 15 (GDF-15). Addition of metformin provided no evidence that ACAD10 operates synergistically with metformin to further improve hepatic insulin signalling and associated functions.

Conclusion: Elevated ACAD10 is correlated with increased activation of Akt-mediated insulin signalling pathway, reduced expression of gluconeogenic genes and activation of the ISR. Lipidomic analysis is currently underway to investigate if ACAD10 overexpression alters liver intracellular lipid composition.

Targeted AAV gene delivery promotes beta-cell proliferation and improves transplant outcomes

Norris N¹, Hawthorne W¹, Gunton J¹

¹Westmead Institute for Medical Research, Westmead, Australia

Aims

Beta-cell transplantation is a promising therapy for diabetes but is limited by post-transplant beta-cell loss, often requiring multiple donors. Xenotransplantation using porcine neonatal islet-like cell clusters (NICCs) represents a renewable beta-cell source, but strategies to enhance graft proliferation and function are needed. We tested whether a beta-cell targeted recombinant adeno-associated viral vector (rAAV) could enhance beta-cell proliferation and improve graft function following transplantation.

Methods

Beta-cell specificity of rAAVs was first validated in vivo in mouse islets, and ex vivo in isolated NICCs and human islets. To assess therapeutic effects, NICCs were transduced with an rAAV overexpressing a candidate pro-proliferative gene and transplanted into streptozotocin-induced diabetic mice. Random blood glucose and glucose tolerance tests were used to assess graft function post-transplant. Grafts were harvested for histological analysis, and beta-cell proliferation was quantified by co-staining for insulin and Ki67.

Results

Mice receiving NICCs transduced with rAAV showed significantly improved glucose tolerance compared with controls. Histological analysis demonstrated a marked increase in beta-cell proliferation within grafts, evidenced by increased Ki67+ insulin+ beta-cells (Fig.1).

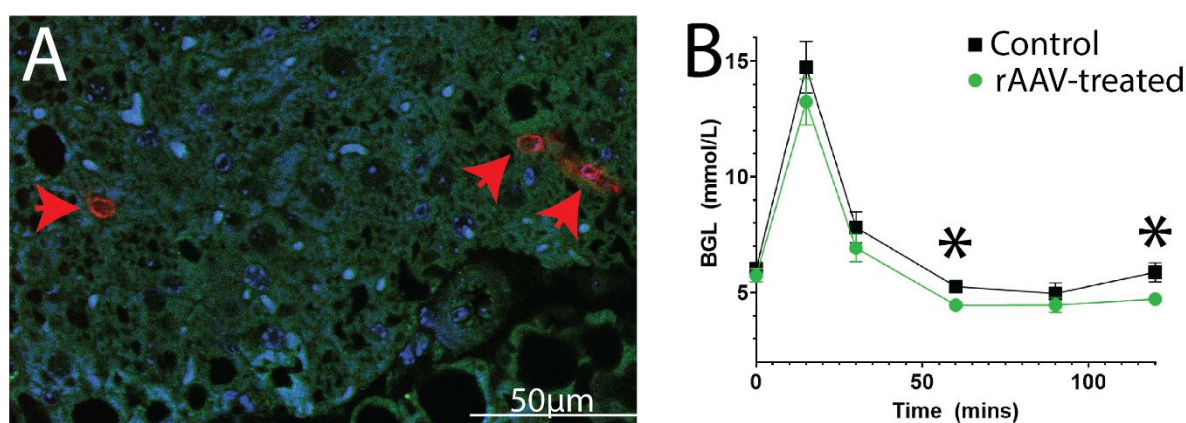


Fig.1. (A) NICC xenograft histology. rAAV increases beta-cell proliferation (Ki67, red arrows). (B) GTT showing improved glucose tolerance (*= $p < 0.05$).

Conclusion:

Beta-cell targeted rAAV delivery enhances beta-cell proliferation and improves functional outcomes following NICC transplantation. This strategy may be broadly applicable to renewable beta-cell sources, including stem-cell-derived and human islets, and represents a promising approach to improve outcomes of beta-cell replacement therapies for diabetes.

Salt-inducible kinase 3 (SIK3): a novel therapeutic target for obesity

Onda D¹, Yang C³, Dodd G², Loh K¹

¹St Vincent's Institute of Medical Research, FITZROY, Australia, ²University of Melbourne, Parkville, Australia, ³Baker Heart and Diabetes Institute, Alfred Centre, Level 4/99 Commercial Rd, Melbourne VIC 3004, Australia

Aims:

To investigate the role of hypothalamic Salt-Inducible Kinase 3 (SIK3) in the regulation of body weight and energy metabolism, and to determine whether central or pharmacological inhibition of SIK3 protects against obesity and metabolic dysfunction.

Methods:

SIK3 expression was assessed in the hypothalamus under obese conditions. Genetic deletion of SIK3 was performed specifically in orexigenic NPY neurons in mice. Metabolic phenotyping included measurements of food intake, energy expenditure, adiposity, and white adipose tissue browning under high-fat diet conditions. In parallel, diet-induced obese mice were treated orally with the selective SIK3 inhibitor GLPG-3970. Downstream signalling mechanisms were examined by assessing the phosphorylation status and activity of CRTC1 and HDAC5, as well as central leptin and insulin signalling pathways.

Results:

Hypothalamic SIK3, the predominant SIK isoform in the brain, was elevated in obesity. Mice lacking SIK3 in NPY neurons exhibited reduced food intake, increased energy expenditure, enhanced white adipose tissue browning, and resistance to high-fat diet-induced weight gain. Similarly, oral administration of GLPG-3970 to diet-induced obese mice significantly reduced body weight and adiposity, primarily through decreased energy intake, and led to multiple improvements in metabolic health. Mechanistically, SIK3 inhibition promoted dephosphorylation and activation of CRTC1 and HDAC5, resulting in enhanced central leptin and insulin signalling.

Conclusion:

These findings identify SIK3 as a critical hypothalamic regulator of energy balance and establish a causal link between increased SIK3 activity and obesity development. Pharmacological inhibition of SIK3 improves metabolic outcomes, supporting the therapeutic potential of SIK3 inhibitors, such as GLPG-3970, for the treatment of obesity and related metabolic diseases.

Determinants of haptoglobin level and its change with fenofibrate treatment in type 2 diabetes: A FIELD sub-study

Ong K¹, Januszewski A¹, Francis H¹, Tucker W^{1,2}, O'Connell R¹, Mangani A¹, Li L¹, Colman P³, Sullivan D^{1,4}, Best J⁵, Scott R⁶, Jenkins A⁷, Keech A^{1,4}, on behalf of the FIELD Study Investigators

¹The University of Sydney, Camperdown, Australia, ²Tweed Valley Hospital, Cudgen, Australia, ³Royal Melbourne Hospital, Parkville, Australia, ⁴Royal Prince Alfred Hospital, Sydney, Australia, ⁵Nanyang Technological University, Singapore, Singapore, ⁶Christchurch Hospital and NZ Clinical Research Ltd, Christchurch, New Zealand, ⁷Baker Heart and Diabetes Institute, Melbourne, Australia

Aims: Haptoglobin (HP) has anti-oxidant and anti-inflammatory properties. We have shown that higher baseline HP levels were associated with a higher risk of on-trial cardiovascular disease (CVD) events in adults with type 2 diabetes enrolled in the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) trial. Fenofibrate reduced HP levels in this study. We thus aimed to identify independent determinants of HP levels and their reduction by fenofibrate.

Methods: We used penalised regression with bootstrapped correction for optimism and random forest statistics to develop sparse models for baseline HP levels and their reduction by fenofibrate during a 6-week active run-in among 8047 FIELD trial participants.

Results: We analysed up to 37 variables (including basic demographic, conventional CVD risk factors, HP phenotype, inflammation and oxidative stress biomarkers) and identified predictors for elevated (>80th percentile) HP levels at baseline (optimism-corrected $R^2 = 0.452$ and C-statistic = 0.845), as well as predictors for overall reduction and for large (>80th percentile) reduction of HP level by fenofibrate (optimism-corrected $R^2 = 0.278$ and C-statistic = 0.846). Higher C-reactive protein (CRP), higher fibrinogen, non-HP 2-2 phenotype, higher interleukin 6, lower total bilirubin and lower soluble vascular cell adhesion molecule 1 were the most important predictors for higher baseline HP levels. Higher baseline HP levels, higher CRP, female sex, HP 2-2 phenotype, lower body mass index and higher interleukin 6 levels were the most important predictors of larger HP level reduction by fenofibrate.

Conclusion: The study findings suggested that elevation of HP level, although predictive of vascular outcomes in type 2 diabetes, could be a compensatory response to underlying inflammation stress. The models developed may help to identify people with type 2 diabetes who achieve the greatest reductions in HP levels through fenofibrate treatment.

GenomeProt, a neuropeptidogenomic platform for hormone discovery

Kore H¹, Nguyen L¹, De Paoli-Iseppi R¹, Gleeson J¹, Wells C¹, Clark M¹, Dodd G¹, Parker B¹

¹The University of Melbourne, , Australia

Proteomics has become the gold standard technology for hormone discovery. However, nearly every study analyses data against standard reference databases. This means only canonical, known proteins are identified and > 50% of mass spectrometry-based proteomics data does not map to a canonical protein. Many new proteins remain to be discovered.

Aims:

To develop a user friendly proteogenomic platform capable of identifying completely novel proteins expressed from non-canonical open reading frames (ncORFs).

Methods:

We developed of GenomeProt, a user friendly website that generates boutique sample-specific databases containing predicted known and novel proteins based on paired long-read RNAseq and proteomic data. The platform also includes several quantification and visualisation options to pinpoint the genomic loci of expressed peptides.

Results:

We demonstrate the use of this technology by analysing mouse mediobasal hypothalamus (MBH) samples, a critical brain region that integrates hormonal and metabolic signals. This was used to identify completely novel peptides secreted from this brain region using real-time, micro-dialysis sampling in conscious, freely-behaving mice and analysis by liquid chromatography – mass spectrometry. Our peptidomics analysis identified >16,000 peptides in the extracellular space of the MBH with hundreds of peptides identified from ncORFs or from known secreted proteins. We used several machine learning tools to predict secretory signals and peptide bioactivity, and further quantified changes in the secretion of potential new hormones during fasting and re-feeding. To validate potential hormone bioactivity, we screened several candidate peptides in an *in vitro* functional screen of neuronal activity. We present preliminary and ongoing work further characterising these novel peptides which may represent the foundations of novel therapies for metabolic disease or obesity.

Conclusions:

GenomeProt represents the first user-friendly application for true discovery-based proteomics and peptidomics which has applications beyond novel hormone characterisation.

GHSR expression in AgRP neurons regulates behaviour during predation threat

Paulis D¹, Drakopoulos V¹, Wust A¹, Foldi C¹, Reichenbach A¹, Andrews Z¹

¹Monash Biomedicine Discovery Institute And Department Of Physiology, Monash University, Oakleigh, Australia

Introduction/Aim

Animals must eat to survive, however, in a foraging context, animals balance food-seeking with predator evasion. Hence, the integration of the neural circuits regulating hunger and threat perception is crucial for survival. Hypothalamic agouti-related protein (AgRP) neurons play an important role, as they integrate internal metabolic and external sensory information to drive feeding behaviour. AgRP neurons are activated by ghrelin via binding on growth hormone secretagogue receptors (GHSR). Although predator threat suppresses AgRP activity and feeding behaviour, the role of ghrelin and GHSR expression on AgRP neurons in this process is unknown, making it a novel target in understanding the balance between food-seeking behaviour and predator evasion.

Method/Results

To test the role of GHSR signalling in AgRP neurons under foraging-like conditions, we used an AgRP GHSR specific knockout (KO) mouse model in a live rat stress assay. We subjected mice to a 3D and live rat under fasted conditions with chow pellets and fed conditions with chocolate pellets. We show fasted wild type mice consume less food and have higher corticosterone levels in the presence of a live rat compared to a 3D rat, whereas AgRP GHSR KO mice consume the same amount of food regardless of rat stress. Moreover, we observe significant sex differences, inclusive of endocrine and behaviour changes in response to the stress. There were also behavioural differences in approach and avoidance towards the rat across genotype.

Conclusions

Overall, our results suggest that ghrelin signalling on AgRP neurons modulates threat perception and behaviour. Moreover, sex differences suggest males place a higher value on palatable food over safety compared to females. Finally, ghrelin signalling in AgRP neurons has sex-specific effects on behaviour under conditions of live rat stress.

1020

Tirzepatide improves glucose tolerance but accelerates diabetes onset and increases splenic Ki67 expression in female NOD mice

Purcell A^{1,2}, Rodrigo N^{1,2,3}, Longfield M^{1,2,3}, Forbes J^{4,5}, Zambre S^{4,5}, Fotheringham A^{4,5}, Glastras S^{1,2,3}

Aims: Tirzepatide is a dual glucagon-like peptide-1 (GLP-1) and glucose-dependent insulintropic polypeptide (GIP) receptor agonist approved for use by individuals with type 2 diabetes and obesity. Early clinical data suggests metabolic benefit in type 1 diabetes, but effects on autoimmune disease progression remain unclear. This study examined the effects of tirzepatide on glucose control, insulin secretion, splenic immune markers, and diabetes onset in a murine preclinical model.

Methods: 8-week-old female non-obese diabetes (NOD) mice received either tirzepatide (TZP) or saline (CON) by subcutaneous injection 3xweekly, dose escalated to 40 nmol/kg, for up to 28 weeks. After 6 weeks, a subset (n=10/group) underwent fasted oral glucose tolerance testing (OGTT) and glucose-stimulated insulin secretion testing (GSIS). Spleens were also harvested and analysed by immunofluorescence for CD4, CD69, and Ki67. The remaining mice continued in the study until diabetes onset (or week 28). Fasting blood glucose was measured weekly, and diabetes as an endpoint was defined as two consecutive readings >14mmol/L with survival analysis performed.

Results: After 6-weeks, TZP-treated mice demonstrated improved glucose tolerance compared with CON (glucose area-under-curve (AUC): 661.1±61.6mmol/L/min vs 958.4±52.6mmol/L/min, p<0.01). Insulin levels were also reduced at baseline and after glucose challenge in the TZP group (insulin AUC:39.4±13.2ng/mL/min vs190.4±48.9ng/mL/min, p<0.01). Immunofluorescence analysis of spleen sections showed no difference in CD4 or CD69, but Ki67 expression was increased in TZP-treated mice (5.57±0.94% vs 3.31±0.32%, p<0.05). Over the 28-week study period, TZP-treated mice exhibited significantly higher and earlier onset of diabetes incidence compared to CON (log-rank test: $\chi^2=10.87$, p<0.001), indicating accelerated autoimmune disease progression.

Conclusion: Tirzepatide improved glucose clearance but reduced insulin secretion and accelerated diabetes onset in female NOD mice. Increased splenic Ki67 expression, without changes in CD4 or CD69, suggests altered immune cell proliferation and supports the need for mechanistic studies of tirzepatide in type 1 diabetes.

Tirzepatide ameliorates metabolic outcomes, improves body composition, and reduces insulin requirements in a murine model of insulin-resistant type 1 diabetes

Purcell A^{1,2}, Foster-Powell A^{1,2}, Rodrigo N^{1,2,3}, Saad S^{1,2,3}, Pollock C^{1,2,3}, Longfield M^{1,2,3}, Young M^{5,6}, Cullen F^{5,6}, Aksentijevic D^{5,6}, Wood C⁴

¹Kolling Institute, St Leonards, Australia, ²University of Sydney, Sydney, Australia, ³Royal North Shore Hospital, St Leonards, Australia, ⁴New South Wales Health Pathology, St Leonards, Australia, ⁵William Harvey Research Institute, London, England, ⁶Queen Mary University, London, England

Aim/s: To determine if tirzepatide improves metabolic outcomes in a murine model of insulin-resistant type 1 diabetes.

Methods: Male C57BL/6 mice received streptozotocin (55mg/kg for 5 days) to induce insulin-deficient diabetes, then were maintained on chow (D) or high-fat diet (HFD; 3:1 mixed with chow) (DD) for 24 weeks. A subset of DD mice received tirzepatide, delivered subcutaneously from either week 0 (DD-eTZIP) or 12 (DD-ITZIP), escalated to a maximum of 40nmol/kg thrice weekly. Comparator groups received saline. Severe hyperglycaemia was managed with low-dose insulin implants (BGL>25mmol). Longitudinal outcomes included body weight, energy intake, blood glucose and insulin requirements. At week 24, echoMRI body composition, grip strength, liver weight, plasma lipids, and liver function markers were measured. Skeletal muscle metabolites were assessed by ¹H NMR spectroscopy.

Results: At week 24, DD mice had higher body weight than tirzepatide-treated groups (32.21±0.41 g vs 27.26±0.42g and 26.33±0.45g; p<0.05). Despite weight loss from tirzepatide, lean mass and grip strength was preserved. Early tirzepatide reduced energy intake and shifted diet preference toward chow diet (28% vs 7% in DD of total energy from chow; p<0.01). Fasting blood glucose was elevated in DD vs control (31.72±0.52 vs 9.10±0.33mmol/L; p<0.05) and improved to near-euglycemia with early tirzepatide (11.49±1.65mmol/L), despite persistently low C-peptide. DD mice required 3.47±0.41 insulin implants/mouse, whereas DD-eTZIP and DD-ITZIP required no implants after tirzepatide initiation. DD dyslipidaemia (cholesterol 4.83±0.30mmol/L; triglycerides 2.01±0.27mmol/L) was normalised in tirzepatide groups. NMR revealed elevated leucine and valine in DD mice which was normalised by tirzepatide. Liver weight was higher in DD group than TZIP-treated group (7.42±0.45% vs 3.98±0.13% and 5.01±0.41% of body weight; p<0.0001) with improved ALT/AST (0.88±0.09 vs 0.27±0.04 and 0.37±0.05; p<0.0001).

Conclusion: In a mouse model of insulin-resistant type 1 diabetes, tirzepatide reduced insulin requirements, improved glycaemic control, and reduced adiposity.

Efficacy of weight-lowering agents on fat distribution: a systematic review and network meta-analysis of randomized controlled trials

Qiao X^{1,2}, Pan Q^{1,2}

¹Beijing Hospital, Beijing, China, ²Peking Union Medical College, Beijing, China

Aim

Pharmacotherapy offers a potential solution for individuals with overweight and obesity to decrease their body weight. However, there is limited knowledge of the effects of anti-obesity agents on the distribution of body fat.

Methods

The PubMed, Embase, and Cochrane Library databases were reviewed for randomized controlled trials (RCTs) of weight-lowering drugs between inception and May 23, 2023. The main results were visceral and subcutaneous adipose tissue (VAT and SAT). Secondary outcomes were altered body weights and waist circumferences. For the statistical analysis, STATA 14.0 was utilized, and the frequentist method was used for random-effect network meta-analyses.

Results

A total of 39 articles including 41 RCTs with 2741 patients were included. GLP-1 receptors agonists and SGLT-2 inhibitors were observed to lower VAT (-0.90 [-1.32 to -0.47] and -0.66 [-1.22 to -0.10]) after a mean of 29.4 weeks, while only GLP-1 receptor agonists reduced SAT (-1.01 [-1.58 to -0.43]). Naltrexone-bupropion, GLP-1 receptor agonists, SGLT-2 inhibitors and metformin were found to reduce body weight (-5.60 [-8.64 to -2.56] kg, -4.73 [-5.58 to -3.88] kg, -3.20 [-4.69 to -1.72] kg and -1.93 [-3.01 to -0.85] kg). Lastly, waist circumference was decreased by GLP-1 receptor agonists, metformin, SGLT-2 inhibitors, and naltrexone-bupropion.

Conclusion

This analysis demonstrated that GLP-1 receptor agonists may have advantages over other anti-obesity agents in reducing VAT and SAT. SGLT-2 inhibitors were more helpful to reduce VAT. The clinical significance relates to physicians being able to choose appropriate weight-loss agents in accordance with a patient's fat distribution.

What can I expect from two months of Tirzepatide treatment?

Raghavan A¹, Ashok A¹, S N¹

¹Revivo Metabolic Health, chennai, India

Background: Real-world body composition (BCA) data provide crucial insight into the quality of weight-loss response during treatment with Tirzepatide. This analysis aimed to quantify changes in body weight and fat mass.

Methods: Matched first-to-latest InBody assessments were analyzed for 48 patients with ≥ 1 -day follow-up. Outcomes included absolute and percentage change in body weight (kg), body fat mass (BFM), percent body fat (PBF) and waist-hip ratio (WHR). Weight-loss quality was evaluated using fat-to-muscle loss fractions. Baseline metabolic-risk prevalence was evaluated using VFA ≥ 100 cm² and WHR thresholds.

Results: Patients had a mean follow-up duration of 52.9 days, with mean reductions of -5.0 kg body weight (-5.1%), -3.0 kg BFM, and -1.26 kg SMM. Average changes also included -1.06 percentage points PBF, -13.4 cm² VFA, and -0.025 WHR. Weight-loss composition was predominantly favorable: on average, $\sim 87\%$ of total weight lost was from fat, with $\sim 10\%$ from skeletal muscle. High visceral-risk prevalence was universal at baseline (100% with VFA ≥ 100 cm²; 100% meeting high-risk WHR criteria). Several patients demonstrated substantial reductions in visceral fat .

Conclusion: Across approximately eight weeks of follow-up, patients experienced meaningful and predominantly fat-driven weight reductions, with concurrent improvements in visceral adiposity. While the majority demonstrated favorable body-composition responses, a subset required targeted intervention due to disproportionate muscle loss or adverse recomposition.

Sex-Specific impact of incretin dual agonist tirzepatide on cardiac and metabolic health in the context of high-fat-diet induced obesity in mice

Ritchie R¹, Roberts T¹, De Blasio M¹, Al Abdullah M¹, Wootten D¹, Hutchinson D¹

¹Monash University, Parkville, Australia

Aims: Glucose-dependent insulin-tropic polypeptide (GIP)-glucagon-like peptide-1 receptor (GLP-1R) co-agonists are revolutionising diabetes & obesity management. Beyond metabolic benefits, clear heart-failure benefits are emerging. Here, we sought to interrogate cardiometabolic benefits of first-in-class GIP/GLP-1R agonist tirzepatide, and whether sex-specific differences were observed.

Methods: 6-week-old male and female C57Bl6/N mice were placed on high-fat-diet (HFD; 60%kJ from lipids) or chow for 20-weeks, until 26-weeks-of-age. Bodyweights (BW) were assessed weekly; blood-glucose fortnightly. Cardiac function (echocardiography under isoflurane-anaesthesia, Vevo3100-Imaging-system), body-composition (echoMRI), metabolic caging (Promethion) and glucose-(GTT) and insulin-tolerance-testing (ITT) were performed prior, and following, 8-weeks intervention with tirzepatide (Tirz, 30nmol/kg sc, 3 times/week or saline vehicle [Veh]).

Results: As shown in the Table, tirzepatide resulted in rapid, sustained weight-loss (largely adipose) and improved glycated-haemoglobin (HbA1c). Excitingly, tirzepatide improved both cardiac and metabolic measures in both males and females, across left ventricular (LV) function (on global longitudinal strain [GLS] and isovolumic relaxation time [IVRT]), distance travelled (indicative of quality-of-life) as well as glucose and insulin tolerance.

	Male			Female		
Diet/Treatment	Chow (n=15)	HFD + Veh (n=14)	HFD + Tirz (n=13)	Chow (n=14)	HFD + Veh (n=13)	HFD + Tirz (n=15)
Metabolic parameters at study endpoint						
BW (g)	39.1±0.7	43.3±1.1 ^A	29.5±0.8 ^{****}	32.9±1.0	38.4±1.1 ^{^^}	28.5±1.2 ^{****}
HbA1c (%)	5.1±0.1	5.3±0.1	4.2±0.1 ^{****}	4.5±0.06	4.6±0.07	4.3±0.03 ^{**}
GTT AUC (x10 ³)	1.39±0.1	2.06±0.2 ^{^^}	0.77±0.1 ^{****}	1.31±0.06	1.57±0.13	0.96±0.07 [*]
Fat mass (%)	21.3±1.5	33.0±2.2 ^{^^^^}	7.3±0.8 ^{****}	31.6±2.4	41.6±1.2 ^A	20.4±3.2 ^{****}
Lean mass (%)	29.3±0.4	27.8±0.5	26.3±0.7	20.7±1.0	21.5±0.4	20.8±0.3
Distance travelled (m)	233±17	220±17	316±22 ^{**}	274±22	236±15	321±32 [*]
RER (dark cycle)	0.81±0.01	0.72±0.01 ^{^^^^}	0.74±0.02	0.79±0.01	0.72±0.01 ^{^^^^}	0.75±0.01 [*]
E/A ratio	2.4±0.3	3.0±0.4	2.6±0.3	2.5±0.2	3.0±0.3	3.0±0.3
Cardiac parameters at study endpoint						
LV weight (mg/mm)	6.9±0.1	6.5±0.2	5.4±0.2 ^{****}	5.5±0.1	5.2±0.1	4.6±0.1 [*]
LV GLS (%)	(-)17.0±0.6	(-)10.2±0.6 ^{^^^^}	(-)15.7±0.9 ^{****}	(-)17.7±0.6	(-)10.0±0.9 ^{^^^^}	(-)15.8±1.2 ^{***}
E/e'	(-)46.5±5.2	(-)39.6±2.8	(-)39.5±3.9	(-)40.3±4.8	(-)32.5±2.1	(-)33.2±3.8
IVRT (ms)	26.0±1.6	25.2±1.0	19.7±1.5 [*]	25.1±1.4	23.9±1.5	24.9±2.7

One-way ANOVA, Sidák's multiple comparisons; ^{*}P<0.05 vs sex-matched HFD+Veh, ^{**}P<0.01 vs sex-matched HFD+Veh, ^{***}P<0.001 vs sex-matched HFD+Veh, ^{****}P<0.0001 vs sex-matched HFD+Veh, [^]P<0.05 vs sex-matched chow, ^{^^}P<0.01 vs sex-matched chow, ^{^^^}P<0.001 vs sex-matched chow, ^{^^^^}P<0.0001 vs sex-matched chow.

Conclusion: Tirzepatide exerts favourable cardiac and metabolic benefits in obesity-induced cardiometabolic dysfunction in male and female mice. Weight loss and antihyperglycaemic mechanisms, in addition to direct cardiac benefits, likely contribute to overall cardiometabolic benefit, of promise for obesity-associated heart-failure.

Region-specific deletion of β -catenin in the paraventricular nucleus regulates body weight and glucose homeostasis in a sex-dependent manner

Rizwan M^{1,2,3}, Keerthisinghe P^{2,4}, Fang C^{1,2,3}, Shepherd P^{3,5}, Tups A^{2,3,4}, Grattan D^{1,2,3}

¹Department of Anatomy, School of Biomedical Sciences University of Otago, Dunedin, New Zealand,

²Centre for Neuroendocrinology, University of Otago, Dunedin, New Zealand, ³Maurice Wilkins Centre for Molecular Biodiscovery, Auckland, New Zealand, ⁴Department of Physiology, School of Biomedical Sciences University of Otago, Dunedin, New Zealand, ⁵Faculty of Medical and Health Sciences, University of Auckland, Dunedin, New Zealand

Aim: Human genome-wide association studies suggest that genetic variations in the Wnt-signalling pathway play a major role in the pathogenesis of type-2 diabetes (T2D) and obesity. β -catenin is a key effector of canonical Wnt signalling that regulates transcription via TCF7L2, a gene strongly associated with obesity and T2D. We have recently discovered that specific-deletion of β -catenin from the mediobasal hypothalamus in mice resulted in significant weight gain, especially when challenged with high-fat diet (HFD), associated with impaired glucose clearance and failure to show adaptive increase in energy expenditure. Due to its role in regulating food intake and body weight, together with expression of β -catenin, we sought to determine the role of β -catenin in the paraventricular nucleus of the hypothalamus (PVN), another key hypothalamic site co-ordinating energy balance and glucose homeostasis.

Method: Using male and female adult β -catenin flox mice, we performed bilateral injections of AAV2-mCherry-Cre into the PVN to specifically delete β -catenin expression in that region. Mice were maintained on low-fat diet (LFD) for 12 weeks, or 4 weeks LFD followed by 12 weeks HFD.

Result: On LFD, PVN β -catenin deletion increased food intake in males without altering bodyweight, whereas females showed reduced weight gain and improved glucose regulation. On HFD, food intake was unchanged in both sexes; however, female mice with PVN β -catenin deletion displayed lower body weight gain ($p < 0.001$), fat mass ($p < 0.01$), and improved glucose regulation, while males showed increased fat mass ($p < 0.05$) and impaired glucose regulation.

Conclusion: These findings identify PVN β -catenin as a sex-dependent regulator of metabolic phenotypes: in females, PVN β -catenin deletion protects against diet-induced weight gain and improves glucose regulation, whereas in males it dissociates energy intake from adiposity. This study also provides insights for future circuit, and cell-type-specific studies to further elucidate underlying mechanisms by which β -catenin signalling regulates glucose homeostasis and bodyweight.

Interrogating the role of intestinal sweet sensing in blood glucose control

Rose B^{1,2}, Robson E^{1,2}, Pezos N^{1,2}, Huang W¹, Young R^{1,2}

¹School of Medicine, Translating Nutritional Science to Good Health Research Centre, Adelaide University, Adelaide, Australia, ²Lifelong Health, South Australian Health and Medical Research Institute, Adelaide, Australia

Aims: In addition to the oral cavity, sweet taste receptors (STRs; T1R2/T1R3 heterodimers) also reside in the proximal small intestine. Activation of these intestinal STRs facilitates secretion of the gut hormones glucagon-like peptide-1 and 2 (GLP-1, GLP-2), known regulators of glucose homeostasis. However, the role of intestinal STRs in diet-induced metabolic derangement remains unclear. Here, we utilised novel intestinal T1R2-deplete mice to interrogate whether intestinal STRs drive diet-induced dysglycaemia, and their potential as therapeutic targets for postprandial hyperglycaemia.

Materials and methods: Adult male C57BL/6 mice lacking intestinal T1R2 (Vil1-Cre^{T/O}×T1R2^{fl/fl}; n=20) and wild-type littermate controls (Vil1-Cre^{+/+}×T1R2^{fl/fl}; n=20) were assigned an obesogenic high-fat high-sugar diet (HFHSD) or standard chow (SCD) for 12 weeks (n=10/group). Intragastric glucose tolerance tests (IG.GTT; 60 mg glucose) were conducted prior to and every four weeks following diet commencement. Forty-eight hours after the final (week 12) IG.GTT, mice received an additional intragastric glucose load (60 mg), 15 min after which terminal bloods were collected for metabolic plasma hormone measurement. Data were analysed using ANOVA with diet and genotype as factors.

Results: There was no effect of the HFHSD or intestinal T1R2 deletion on IG.GTT blood glucose responses. While the HFHSD augmented glucose-evoked GLP-1 ($P = 0.009$) and a diet × genotype interaction was observed ($P = 0.050$), post hoc analysis revealed no significant differences between individual groups. The HFHSD also augmented glucose-evoked insulin ($P = 0.037$) and glucagon ($P = 0.001$), independent of intestinal T1R2 deletion.

Conclusion: Twelve-week HFHSD feeding did not induce overt dysglycaemia in this model, potentially due to competing effects of augmented insulin and glucagon. The subtle interaction on GLP-1 suggests that while intestinal STRs influence these responses, their contribution to blood glucose control may be limited in response to a high glucose load.

Targeting intestinal sweet taste receptors for glycaemic control in type 2 diabetes

Rose B^{1,2}, Pezos N^{1,2}, Wu T^{1,2}, Rayner C^{1,2}, Young R^{1,2}

¹School of Medicine, Translating Nutritional Science to Good Health Research Centre, Adelaide University, Adelaide, Australia, ²Lifelong Health, South Australian Health and Medical Research Institute, Adelaide, Australia

Background and Aim: Intestinal sweet taste receptors (STR) detect dietary sweet tastants and trigger feed-forward pathways that upregulate glucose absorption (via sodium-glucose co-transporter-1; SGLT-1). In type 2 diabetes (T2D), overactivation of these mechanisms may worsen postprandial hyperglycaemia. Here, we aimed to determine whether four-week blocking of intestinal STRs with the antagonist lactisole improved glycaemic and gut hormone responses in individuals with T2D.

Methods: Thirty participants with diet or metformin-controlled T2D were randomised in a double-blind, placebo-controlled manner to sustained release (dual-encapsulated) lactisole (300 mg) or placebo (cellulose) thrice daily with meals for four weeks. A fasted, oral glucose tolerance test (OGTT, 75 g glucose) was performed before and after the four-week intervention. Plasma glucose, C-peptide, insulin, GIP and GLP-1 were measured over 180 min to assess glycaemic excursions and hormone responses.

Results: Lactisole supplementation did not alter postprandial glucose excursions compared to placebo (iAUC₀₋₁₈₀, $P = 0.161$). Similarly, no significant differences were observed in insulin ($P = 0.206$), C-peptide ($P = 0.227$), GIP ($P = 0.406$) and GLP-1 ($P = 0.743$) responses between treatments.

Conclusion: Four-week STR blockade with lactisole did not improve glycaemic responses or alter incretin secretion in individuals with T2D. The absence of incretin and glycaemic changes suggests that peripheral STR functions on intestinal absorption or metabolism may be functionally redundant in T2D, or that the encapsulated lactisole was insufficient to overcome the oral glucose load.

Cell-penetrant peptides as novel inhibitors of the interaction of protein kinase C epsilon with its binding partner coatamer protein COPB2

Olushola-Siedoks A², Small L¹, Fincham K², Norton R², Schmitz-Peiffer C¹

¹University Of Sydney, Sydney, Australia, ²Monash University, Melbourne, Australia

Aims: The lipid-activated novel protein kinase C epsilon (PKCe) plays key roles in both the generation of insulin resistance and beta cell dysfunction, making it a potential target for the treatment of type 2 diabetes. However, catalytic site inhibitors of PKCs show poor specificity due to the conservation of the catalytic domain between PKCs and other kinases. As the spatial regulation of PKCe activity is linked to its interaction with COPB2 (also known as Receptor for Activated C Kinase 2), blockade of this interaction has potential therapeutic benefits. The mechanism causing insulin resistance is debated, and this approach may also inform our understanding of the molecular pathways involved.

Methods: PKCe and COPB2 were expressed in insect cells and affinity-purified. Peptides were synthesized via Fmoc/tBu chemistry. An AlphaScreen bead-based proximity assay was used to measure peptide effects on the PKCe-COPB2 interaction. Mass spectrometry was used to identify proteins that bound to COPB2 or that were present in a PKCe-COPB2 complex isolated from intact cells.

Results: Pentapeptides with a KxKxx motif derived from the PKCe sequence potently inhibited the PKCe-COPB2 interaction, whereas other short sequences containing cationic residues were less effective. An alanine scan of the KIKIC peptide showed that the two Lys residues and C-terminal carboxylate were the most important for inhibitory activity. Several other proteins that were captured in a COPB2 pulldown of a liver lysate in a KIKIC-peptide sensitive manner were also identified as part of a PKCe-COPB2 complex isolated from intact cells. These were enriched for sterol synthesis, proteasomal protein catabolism and Golgi-related vesicular transport.

Conclusion: These results provide a basis for the design of peptides / peptidomimetics that inhibit the PKCe-COPB2 interaction and have potential for the treatment of T2D. They also provide insights into cellular processes that may be modulated by PKCe in a COPB2-dependent manner.

Clinical outcomes of empagliflozin therapy in patients with metabolically dysfunctional Steatotic liver disease: Evidence from real-world practice

Selim S¹, Mustari M², Saifuddin M³, Ahammed A⁴, Rahman M⁵, Kumar Talukde S⁶, Ifrad Bin Raunak A⁷, Masud Rana M⁸

¹Associate Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh, ²Assistant Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh, ³Associate Professor, Department of Endocrinology, Dhaka Medical College, Dhaka, Bangladesh, ⁴Associate Professor, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh, ⁵Consultant, Rajshahi Medical College, Rajshahi, Bangladesh, ⁶Professor, Department of Endocrinology, Rangpur Medical College, Rangpur, Bangladesh, ⁷Shaheed Suhrawardy Medical College and Hospital, Dhaka, Bangladesh, ⁸Researcher, Department of Endocrinology, Bangladesh Medical University, Dhaka, Bangladesh

Background & Aim: Metabolically-dysfunctional steatotic liver disease is a common comorbidity among individuals with type 2 diabetes mellitus worldwide and is associated with increased risks of liver-related and cardiovascular complications. Despite its growing burden, evidence regarding effective treatments to reduce liver fat among patients with type 2 diabetes and metabolic dysfunction-associated steatotic liver disease in Bangladesh remains limited. The aim of this study is to observe the effects of empagliflozin on liver fat among patients with type 2 diabetes and metabolic dysfunction-associated steatotic liver disease in Bangladesh.

Methods: This prospective, multicentre, real-world clinical study was conducted over a 12-month period across several tertiary care hospitals in Bangladesh. A total of 792 T2DM patients with sonographically confirmed grade I fatty liver disease were included in this study. Data were collection occurred from January to December 2023.

Results: The empagliflozin group showed improvements in BMI, fasting glucose, and liver enzymes during follow-up. Glycaemic status improved over time, with the GI category decreasing from 100% at baseline to 68.8% at 12 months, while normal glycaemic status increased to 31.2%. Logistic regression showed that male sex, higher BMI, and elevated ALT and AST were significant predictors. Males had higher odds of treatment (OR = 2.13, $p < 0.001$), and BMI increase was associated with higher treatment odds ($p < 0.012$). In the non-treatment group, males had higher odds of abnormal BMI and elevated liver enzymes.

Discussion/Conclusion: T This study demonstrated that empagliflozin led to significant reductions in liver fat content in patients with T2DM and metabolic dysfunction-associated steatotic liver disease. These findings highlight the hepatoprotective properties of empagliflozin and support its use not only for glycaemic control but also as a strategy to prevent liver complications in this high-risk population.

Intermittent fasting enhances GLP-1RA efficacy in weight loss and glycemic control in mice

Zhang J¹, Naidu D¹, Shi Y^{1,2}

¹Bain & Body Metabolism Lab, Victor Chang Cardiac Research Institute, Darlinghurst, Australia,

²Faculty of Medicine and Health, UNSW Sydney, Randwick, Australia

Aims: GLP-1 receptor agonists (GLP-1RA) have become a cornerstone of primary care for the treatment of obesity and diabetes and are typically recommended to be in conjunction with lifestyle modifications. However, limited evidence exists on whether lifestyle interventions such as intermittent fasting affect the efficacy of GLP-1RAs in promoting weight loss and improving glycemic control.

Methods: Male diet-induced obesity (DIO) mice underwent alternate-day fasting (ADF) with or without the GLP-1RA dulaglutide (Dula) for 8 weeks. Dulaglutide was injected via subcutaneous injection every 4 days. Phenotypic monitoring of body weight, energy expenditure, temperature, blood glucose, glucose and insulin tolerance tests were conducted.

Results: The combination of ADF and Dul produced significantly greater reductions in body weight compared with ADF alone, primarily driven by reductions in white adipose tissue, and an overall increase in lean mass. Mice treated with ADF+Dula showed reduced overall energy expenditure relative to ADF alone. Blood glucose was markedly reduced in both fed and fasted states in the ADF+Dula group, which also demonstrated improved glucose tolerance. Interestingly, an ex vivo repeated glucose-stimulated insulin secretion assay revealed that displayed a lower, though non-significant, trend towards a reduction in insulin secretion in isolated islets from the ADF+Dula mice.

Conclusion: These findings demonstrate for the first time that intermittent fasting can interact with GLP-1RA therapy to enhance reduction in body weight and blood glucose in diet-induced obesity. the combined effects appear largely independent of reductions in lean mass and insulin sensitivity. Future studies are warranted to understand the underlying molecular mechanisms.

Glycaemic status, but not exercise, is associated with differential gut microbiota dynamics across the glycaemic spectrum: findings from the PACE-G study

Singer J^{1,2}, Wang X^{3,4}, Chadban S^{4,5}, Min D^{3,4,6}, Twigg S^{3,4,6}

¹Department of Renal Medicine, Liverpool Hospital, Sydney, Australia, ²South West Sydney Clinical Campuses, School of Clinical Medicine, Faculty of Medicine and Health, UNSW, Australia, ³Greg Brown Diabetes and Endocrine Research Laboratory, Charles Perkins Centre, University of Sydney, Australia, ⁴Central Clinical School, Faculty of Medicine and Health, The University of Sydney, Australia, ⁵Department of Renal Medicine, Royal Prince Alfred Hospital, Sydney, Australia, ⁶Department of Endocrinology, Royal Prince Alfred Hospital, Sydney, Australia

Aim

To characterise differences in gut microbiota composition across glycaemic states and determine whether a structured exercise intervention modifies gut microbiota in normoglycaemia, prediabetes, or type 2 diabetes (T2DM).

Methods

Overweight adults (BMI ≥ 25 kg/m², aged 18–65 years) were classified as normoglycaemic (NG), prediabetes (PD), or recently diagnosed T2DM and randomised to low-volume HIIT exercise or stretching control for 12 weeks. Faecal samples were collected at baseline (NG n=73; PD n=57; T2DM n=24; total n=154) and follow-up (n=126). Shotgun metagenomic sequencing (Illumina NovaSeq X Plus) was performed. Alpha-diversity was analysed using linear mixed-effects models including time, intervention, and glycaemic group with subject-level random effects. Beta-diversity was assessed using Aitchison distances with repeated-measures PERMANOVA stratified by subject. Differential abundance was evaluated using per-taxon mixed models on robust CLR-transformed abundances with false discovery rate (FDR) correction.

Results

At baseline, overall alpha and beta-diversity did not differ significantly between glycaemic groups. However, taxonomic differences were observed. *Bifidobacterium dentium*—a key short-chain fatty acid (SCFA) producer—was reduced in PD compared with NG (FDR q=0.046), with nominal reductions in other *Bifidobacterium* species. Twenty-seven species differed between PD and T2DM (FDR<0.10), with SCFA-producing *Romboutsia* and *Clostridium* enriched in PD and *Bacteroides* enriched in T2DM.

Longitudinally, significant time-group interactions were observed for alpha diversity (all p<0.05). NG demonstrated modest increases in richness and diversity, PD showed reduced richness, and T2DM exhibited minimal change. Exercise was not associated with changes in diversity or taxon abundance (all p>0.05).

Conclusion

Gut microbiota dynamics differed by glycaemic status but were not modified by the 12-week exercise regimen. Alterations in SCFA-associated taxa suggest shifts in microbial metabolic function across the glycaemic spectrum. These findings, novel in an Australian cohort, support underlying metabolic state as a key determinant of microbiota trajectories and warrant investigation into links with liver fat and the lipidome.

Antigen-specific liposome immunotherapy engages islet macrophages to enforce immune tolerance and prolong survival in autoimmune diabetes.

Smith J¹, D. Loaiza Naranjo J¹, Aragao Horoiwa T¹, Ravichandran R¹, Lane R², Moonshi S¹, Fletcher N², Martyn A², Zhang V¹, Anasruta D¹, Nel H¹, Trau M², Talekar M¹, Thurecht K², Thomas R¹, Hamilton-Williams E¹

¹Frazer Institute, The University Of Queensland, Woolloongabba, Australia, ²Australian Institute for Bioengineering and Nanotechnology, St Lucia, Australia

Aims

Type 1 diabetes (T1D) arises when autoreactive T cells trigger an inflammatory cascade that destroys pancreatic beta cells. Antigen-specific immunotherapy (ASI) aims to restore tolerance without broad immunosuppression. We previously showed that EPC/EPG liposomes containing a CD4+ T-cell-targeted chromogranin A mimotope (BDC2.5mim) and calcitriol (D3) (BDC/D3) improved survival in hyperglycaemic NOD mice by expanding regulatory CD4+ T cells. We aimed to coordinate stable liposome delivery to lymph nodes through non-invasive dosing and investigate macrophage contributions to the pancreatic immune microenvironment.

Methods

We engineered semi-synthetic liposomes optimized for in vivo stability and lymph-node (LN) drainage following s.c. administration. Using an accelerated model, where adoptively transferred BDC2.5 CD4+ T cells from donors pretreated with BDC/D3 or empty liposomes into NOD-SCID recipients, with or without IGRP-specific CD8+ T cells. High-dimensional flow cytometry and chemokine/cytokine assays were used to investigate the pancreatic immune microenvironment.

Results

PET imaging confirmed radiolabelled-peptide retention at the injection site and accumulation in draining LN, peaking at day 6. Eight s.c. doses of BDC/D3 semi-synthetic liposomes over four-weeks significantly improved survival in hyperglycaemic NOD mice compared with empty liposomes. BDC/D3 pretreatment fully prevented diabetes after CD4+ T-cell transfer and delayed disease when CD8+ T cells were co-transferred. We found increased pancreatic CD4+FoxP3+ Treg accumulation and reduced pathogenic CD8+ infiltration. This was accompanied by pancreatic macrophages exhibiting homeostatic phenotypes (F4/80, CD206), with reduced antigen-presentation capacity (MHCII, CD80, CD86) and programs supporting tissue clearance, surveillance, and CX3CR1-dependent stabilization of the local environment, limiting early inflammatory cascades. Splenic macrophage phenotypes remained unchanged, indicating tissue-specific remodelling. In contrast, empty liposome-treated mice had elevated IFN-gamma, increased pancreatic CXCL9, CXCL10 and CCL2 levels, and myeloid accumulation, consistent with progression toward islet destruction.

Conclusion

Liposome-based ASI coordinates adaptive and innate immune regulation, coupling antigen-specific Treg induction with macrophage-mediated control of pancreatic inflammation to delay autoimmune diabetes.

1018

Ventromedial hypothalamic ghrelin receptors regulate glucose homeostasis and metabolic adaptation to energy deficit

Stark R¹, Battan C¹, Zigman J², Austin-Muttitt K³, Davies J³, Andrews Z¹

¹Monash University, Melbourne, Australia, ²University of Texas, Southwestern Medical Center, Dallas, United States of America, ³Swansea University, Medical School, Swansea, United Kingdom

Aim

Ghrelin is a fasting induced hormone that signals energy deficit to the brain through the growth hormone secretagogue receptor (GHSR) to promote hunger, conserve energy, and stabilise blood glucose. Although GHSR is widely expressed in the brain, the neural circuits linking ghrelin signalling to glucose regulation remain unclear. The ventromedial hypothalamus (VMH) is a key centre for glucose sensing and metabolic control. We therefore investigated whether GHSR expressing neurons in the VMH, and ghrelin signalling within these neurons, regulate glucose homeostasis and metabolic adaptation to energy deficit.

Results

Spatial and single cell transcriptomic analyses identified VMH-GHSR neurons as a small, predominantly glutamatergic population enriched for genes involved in glucose and stress signalling. Fiber photometry revealed that ghrelin increased and feeding slightly suppressed VMH-GHSR neuronal activity. While glucose administration had little effect, hypoglycaemia and glucoprivation robustly inhibited VMH-GHSR neuronal activity, suggesting these neurons primarily respond to cellular energy deficit rather than circulating glucose. To define the function of VMH-GHSR neurons, optogenetic activation improved glucose clearance during a glucose tolerance test. Similarly, chronic activation of these neurons enhanced glucose tolerance, supporting a role of these neurons in glucose regulation. To specifically isolate the role of ghrelin signalling within these neurons, we generated adult onset, VMH specific GHSR deletion. Receptor deletion did not affect body weight or food intake under ad libitum conditions but altered feeding patterns. In contrast to activation studies, GHSR-deleted mice displayed fasting hyperglycaemia and preferential fat oxidation without changes in stress hormones. Under caloric restriction these mice failed to conserve energy due to elevated fat oxidation resulting in accelerated fat loss. Hyperinsulinemic–euglycemic clamp studies revealed whole-body insulin resistance driven by impaired suppression of hepatic glucose production and reduced peripheral glucose uptake.

Conclusion

VMH GHSR neurons act as central metabolic sensors that couple energy deficit to fuel utilisation and glucose regulation. Deletion of GHSR reveals a specific requirement for ghrelin signalling within these neurons, highlighting a brain circuit relevant to diabetes and metabolic disease.

415

Formulation and comparative analysis of ceylon cinnamon-enriched herbal Tea: Phytochemical screening and glucose-lowering activity

Upekshi Nuwansara L¹, Subhasinghe S¹, Wijesekera K¹

¹Department Of Pharmacy, Faculty Of Allied Health Sciences, University Of Ruhuna, Galle, Sri Lanka

Aim/s: Diabetes mellitus is a leading cause of deaths worldwide. Introducing dietary modifications and strategies to improve glycaemic control are more important for prevention of diabetes. Ceylon cinnamon is a widely used spice in Sri Lanka. Scientific literature provides evidence for its antioxidant and glucose-lowering activities. The objective of this study was to formulate Ceylon cinnamon-enriched green tea and black tea blends and to compare their phytochemical composition, antioxidant and in vitro glucose-lowering activities under household preparation conditions.

Methods: Six herbal tea blends were formulated by combining Ceylon cinnamon bark powder with green or black tea in varied ratios. Qualitative phytochemical screening was conducted using standard methods. Total phenolic content (TPC) and total flavonoid content (TFC) were quantified using Folin-Ciocalteu and aluminium chloride methods, respectively. Antioxidant activity was assessed through the DPPH radical scavenging assay, with IC_{50} values were determined. In vitro glucose-lowering activity was measured using the yeast cell glucose uptake assay. Correlation analyses was determined relationships between phytochemical content, antioxidant capacity, and glucose uptake.

Results: Formulations showed significant variations in TPC and TFC. Green tea possessed the highest TPC and TFC level while Ceylon cinnamon demonstrated the lowest value. Cinnamon-enriched green tea blends showed enhanced antioxidant activity rather than black tea blends. Ceylon cinnamon alone possessed the highest glucose uptake activity, followed by cinnamon-rich green tea formulations. Correlation analysis revealed that glucose uptake activity was more closely correlated with antioxidant activity rather than total phenolic and flavonoids levels.

Conclusion: According to the results Ceylon cinnamon-enriched green tea demonstrated promising antioxidant and glucose-lowering activity, suggesting potential dietary interventions for diabetes prevention. These findings provide scientific evidence to formulate functional beverage using Ceylon cinnamon for in real-world diabetes management.

Putting the AS in MASLD: Investigating the role of alternative splicing in liver disease

Suriani N¹, De Paoli-Iseppi R¹, Kore H¹, Gleeson J¹, Clark M¹, Parker B¹, Watt M¹

¹Department of Anatomy and Physiology, University Of Melbourne, Melbourne, Australia

Aim: Metabolic dysfunction-associated steatotic liver disease (MASLD) encompasses a spectrum of disease stages from steatosis to steatohepatitis (MASH) and affects up to 40% of the world population. Previous studies have shown that key components of RNA splicing machinery are dysregulated in the livers of people with MASLD. In addition, pathways involved in RNA splicing were enriched in the livers of mice fed MASH-inducing diets compared to mice fed a standard low-fat diet, raising the possibility that RNA splicing is one of the key drivers of disease development in MASLD. While multiple studies have endeavoured to determine the role of splicing factors via genetic knockout in mice and cells, there are no studies that have determined the isoforms that are alternatively spliced in MASLD.

Methods: Immortalised human hepatocytes (THLE-2) and hepatic stellate cells (LX-2) were treated with and without a cocktail containing palmitate (C16:0 fatty acid), TGF- β , and PDGF to stimulate cell stress and fibrogenesis. Oxford Nanopore Long Read Sequencing and mass spectrometry-based proteomics was performed to determine the changes to isoforms in MASH and control cells.

Results: In total, we identified 495 and 367 upregulated and downregulated transcripts mapping back to 141 genes in THLE-2, and 1337 and 1089 upregulated and downregulated transcripts mapping back to 751 genes in LX-2 cells, indicative of isoform-level dysregulation of key genes. Additionally, we utilise mass spectrometry-based proteomics to search for peptide evidence for dysregulated transcripts at the peptide level for therapeutic targeting.

Conclusion: By leveraging our multi-omics datasets, we have identified differentially spliced isoforms in both cell lines and obtained peptide-level evidence for a subset of known and novel transcripts, suggesting that these protein isoforms may be relevant to MASLD.

Future studies will focus on validating these isoforms in preclinical models of MASH and fibrosis.

Effects of exercise frequency on glucose tolerance and pancreatic histology in OLETF rats

Tabuchi R¹

¹Hiroshima university, hatsukaichi, Japan

Aim:

To investigate the optimal exercise frequency required for improving glucose tolerance and pancreatic histological changes.

Methods:

Four-week-old male OLETF rats were divided into the exercise and sedentary groups. The rats in the exercise group were further classified into the high-, moderate-, and low-frequency groups, which exercised 7 days/week, 4 days/week, and 1 day/week, respectively. The exercise groups performed exercise until 30 weeks of age. The rats in the exercise group were housed individually in a cage with a running wheel. Oral glucose tolerance test (OGTT) was performed at 25-week-old. Pancreas were collected at 30-week-old. The sections of the pancreas were stained with hematoxylin and eosin for histological observation. The size of islets was calculated to evaluate the enlargement.

Results:

There were no significant differences in fasting glucose levels among all groups. However, the levels at 30 min after glucose administration were lower in the exercise groups than in the sedentary group. The reduction in the exercise groups depended on the exercise frequency. Fasting insulin levels were lower in the exercise groups than in the sedentary group. Although there were no significant differences in fasting insulin levels among the exercise groups, the levels at 30 min after glucose administration were lower in the moderate- and high-frequency groups than in the low-frequency group. Enlarged pancreatic islets were observed in the sedentary group. The size of pancreatic islets was smaller in the exercise groups, and the reduction was dependent on the exercise frequency.

Conclusion:

Low-frequency exercise improved glucose tolerance through increased insulin secretion, resulting in compensatory hypertrophy of the pancreatic islets. Moderate- and high-frequency exercise also improved glucose tolerance without hyperinsulinemia, suggesting improved insulin sensitivity.

Reduced calorie intake reduces circulating amyloid- β and improves cognitive and cerebrovascular function in Type 2 Diabetes mice

Brook E¹, Mamo J², Lam V¹, Rosenow T³, Takechi R¹

¹Curtin Univeristy, Perth, Australia, ²Perron Institute, Perth, Australia, ³University of Western Australia, Perth, Australia

Aim: People with type 2 diabetes (T2D) have a 50–60% increased risk of developing dementia such as Alzheimer's disease. Circulating amyloid- β (A β), particularly when associated with triglyceride-rich lipoproteins, is elevated in metabolic disease and may contribute to cerebrovascular dysfunction and cognitive decline. This study aimed to determine whether reduced calorie intake lowers plasma A β and improves cognitive and cerebrovascular outcomes in a T2D mouse model.

Methods: 16-week-old db/db T2D mice and db/+ heterozygous controls were allocated to three groups (n=15/group): controls (db/+), diabetic controls (db/db, ad libitum), and diabetic mice receiving calorie restriction (db/db, pair-fed to db/+ intake). The intervention was conducted for 12 weeks. Plasma A β levels were measured, and cognitive function was assessed using short-term spatial reference memory and long-term memory tests. Cerebral blood flow was evaluated with MRI.

Results: Compared with diabetic controls, calorie-restricted db/db mice showed a significant reduction in circulating A β levels. This was accompanied by improvements in both short-term spatial reference memory and long-term memory performance. Calorie normalisation also increased cerebral blood flow. Emerging associations were observed between triglyceride-associated A β , cognitive performance, and cerebral perfusion.

Conclusion: Reduced calorie intake in T2D reduces circulating A β , improves cognitive function, and enhances cerebral blood flow. These findings support the concept that metabolic interventions targeting peripheral amyloid burden may reduce dementia risk in T2D by improving neurovascular health.

Feeding and physical activity is coordinated by NPY4R signalling

Tan H¹, Herzog H¹, Zhang L¹

¹St Vincents Centre for Applied Medical Research, Darlinghurst, Australia

Feeding and physical activity is coordinated by NPY4R signalling

Aim: To elucidate the critical regulatory mechanism coordinating physical activity with food intake and energy homeostasis.

Methods: Using the activity-based anorexia (ABA) mouse model combined with feeding machines, and chemogenetic manipulations, we comprehensively tested various NPY and NPY4R transgenic mouse lines to dissect feeding behaviour and physical activity.

Results: Under ABA with 1-hour food access, both wild-type (WT) and NPY-deficient (NPY^{-/-}) mice significantly increased wheel-running, peaking at day 2. However, while WT activity gradually declined below baseline, NPY^{-/-} mice exhibited a sustained increase, accompanied by higher energy expenditure. This led to a dramatic weight loss not seen in WT-ABA mice or food-restricted NPY^{-/-} mice without a running wheel. Arcuate nucleus NPY expression was unchanged by *ad libitum* running but increased with food restriction severity (1h > 2h access), suggesting NPY elevation may curb hyperactivity and promote food anticipation. As Y4 receptor activation requires high NPY levels, and Y4^{-/-} mice show baseline hyperactivity, we tested them in ABA. Similar to NPY^{-/-}, Y4^{-/-} mice displayed significantly elevated wheel-running activity and diminished food-anticipatory activity (FAA) during the final ABA days, accompanied with an increased energy expenditure compared to WT mice on the same paradigm. By contrast, Y1^{-/-} mice on ABA while exhibited higher energy expenditure than WT, they had comparable wheel running activity to WT mice. These data suggest a primary role of Y1 in mediating NPY's effect on metabolic rate, whereas Y4 plays dual roles in regulating energy metabolism and activity during prolonged energy deficit.

Conclusions: Our findings establish a key role for NPY4R signalling in the integrated dual control of feeding and physical activity, specifically modulating wheel-running behaviour.

Reactive gliosis of hypothalamic astrocytes drives neurofibrosis and metabolic dysfunction.

Teo R¹, Beddows C¹, Shi F¹, Cho E², Dodd G¹

¹Department of Anatomy and Physiology, The University Of Melbourne, Parkville, Australia,

²Biological Optical Microscopy Platform (BOMP), The University Of Melbourne, Parkville, Australia

Background/Aim

Defective and augmented extracellular matrix, a process termed neurofibrosis, develops around neurons within the arcuate nucleus of the hypothalamus (ARC) during the progression of metabolic dysfunction. Once established, the defective neurofibrotic extracellular environment within the ARC promotes cellular insulin resistance, resulting in significant whole-body metabolic dysfunction. While the causality of ARC neurofibrosis to the development of metabolic conditions has recently been established, the underlying cellular and molecular mechanisms driving neurofibrosis remain completely unexplored.

Methods/Results

Key proteoglycan and glycosaminoglycan components of neurofibrosis are expressed by astrocytes, indicating that neurofibrosis may originate through reactive changes in ARC astrocytes. We demonstrated that reactive astrogliosis within the ARC emerges following one week of exposure to a high-fat, high-sugar diet. The degree of astrogliosis in the ARC positively correlates with the development of neurofibrosis within the ARC from 4 weeks and up to 12 weeks of high-fat, high-sugar feeding. To link astrocytes' activity with the development of neurofibrosis, we utilised Designer-Receptor-Exclusively-Activated-by-Designer-Drugs (DREADDs) to chemogenetically induce reactive astrogliosis conditionally in the ARC of lean mice for eight weeks. We observed a marked expansion of neurofibrosis within the ARC, which promoted defective glucose homeostasis in otherwise healthy mice. The effects of ARC astrocyte activation on whole-body metabolism are attenuated following ARC extracellular matrix digestion, indicating that dysfunctional ECM deposition by reactive astrocytes is causal to impaired glycaemic control. To explore the extent to which inhibiting obesity-driven reactive astrogliosis can alleviate impaired glycaemic control in metabolic disease, we chemogenetically inhibited reactive astrogliosis using DREADD (hM4Di) astrocytes in diet-induced obese mice. We demonstrate that reversing reactive astrogliosis in the ARC results in the reversal of neurofibrosis, which promotes remission from diet-induced obesity.

Conclusion

These findings define a previously unidentified mechanism by which reactive astrogliosis in the ARC drives the development of metabolic conditions through the pathogenesis of neurofibrosis.

Associations between meal timing, sleep-disordered breathing, and glycaemic variability during sleep in adults at risk of Type 2 Diabetes

Variji A¹

¹Adelaide University, Adelaide, Australia, ²South Australian Health and Medical Research Institute, Adelaide, Australia, Ade, Australia

Background: Meal timing and sleep behaviours influence glucose regulation. However, the interplay between meal timing, sleep, and nocturnal glycaemia remains poorly understood in adults at risk of type 2 diabetes.

Aim: To investigate whether meal timing relative to sleep is associated with sleep quality and nocturnal glycaemic variability regulation in adults at risk of type 2 diabetes.

Methods: This study included baseline data from 82 of 114 adults with overweight or obesity and elevated fasting glucose (≥ 5.6 mmol/L) who were enrolled in a randomized controlled trial (NCT05769335). Participants had concurrent meal timing data (myCircadianClock), sleep assessment (Withings Sleep Analyzer), and continuous glucose monitoring (CGM; Freestyle Libre Pro, Abbott, USA) available. Meal timing, meal frequency and eating window duration were calculated. Sleep outcomes included total sleep time, sleep efficiency, sleep latency, sleep stage duration, and apnea–hypopnea index (AHI). Glycaemic variability was assessed using CGM-derived metrics including standard deviation of glucose (SD), coefficient of variation of glucose (CV). Associations were examined using multivariable regression and mixed-effects models adjusted for age, sex, and BMI.

Results: Participants (81% female) were aged 60 ± 6 years with a BMI of 32.3 ± 3.0 kg/m². Higher sleep-disordered breathing by AHI was associated with greater glycaemic variability during the sleep period, reflected by higher SD glucose and CV glucose (all $p < 0.05$). Meal timing parameters, including meal frequency, eating window duration and the interval between the last meal and sleep onset, showed no significant association with sleep or glycaemic outcomes (all $p > 0.05$).

Conclusion: Meal timing did not influence sleep quality or nocturnal glycemia. However, respiratory disturbance during sleep may be relevant to nocturnal glucose regulation in adults at risk of type 2 diabetes.

SLC22A3-dependent histamine transport regulates adipogenesis, mast-cell–adipose interactions, and systemic lipid homeostasis in humans and mice

Wang Q^{1,2}, Lee K^{1,2}, Hsuan L¹, Wang M¹, Shepherd P^{1,2}

¹Department of Molecular Medicine and Pathology, School of Medical and Health Sciences, University of Auckland, New Zealand, Auckland, New Zealand, ²Maurice Wilkins Centre for Molecular Biodiscovery, Auckland, New Zealand, Auckland, New Zealand

Aim:

There is limited evidence that histamine plays a role in adipose biology and metabolic regulation. SLC22A3/OCT3 transports monoamines, including histamine, and this study investigates whether variation in SLC22A3-mediated histamine transport may influence adipocyte differentiation, adipose tissue immunology, and systemic lipid homeostasis.

Methods:

Histamine uptake was assessed *in vitro* using cells expressing either wild-type or variant SLC22A3. Human carriers of the SLC22A3 genetic variant, along with orthologous SLC22A3 variant knock-in (KI) mice, underwent metabolic phenotyping that included fasting plasma non-esterified fatty acids (NEFA), body composition, and adipose histology. Adipocyte differentiation was evaluated in 3T3-L1 preadipocytes treated with the OCT3 inhibitor Decynium-22 or the H1 receptor antagonist antihistamine at specific stages of differentiation.

Results:

Initial *in vitro* findings indicate that enhanced histamine uptake is associated with higher fasting NEFA and reduced fat mass *in vivo*. This was accompanied by increased mast cell presence, suggesting possible changes in local histamine-related immune signalling. *In vitro*, pharmacological inhibition of SLC22A3 impaired 3T3-L1 differentiation into adipocytes. Attenuation of histamine receptors with an antihistamine increased lipogenesis during early differentiation but reduced mature adipogenic markers at later stages. Together, these results suggest that SLC22A3 activity may influence adipocyte maturation by altering the intra- and extracellular histamine balance, thereby modulating temporal H1-receptor signalling.

Conclusion:

These preliminary findings raise the possibility that SLC22A3/OCT3 mediated histamine transport contributes to adipocyte differentiation, adipose immune composition, and systemic lipid mobilisation. Further work is ongoing to establish causality, define receptor specific mechanisms, and determine the extent to which altered histamine flux may contribute to metabolic dysfunction relevant to diabetes.

Circulating miRNA profiles in people with normal glucose, prediabetes or type 2 diabetes and changes with an exercise intervention

Wang X^{1,2}, Marian O^{1,3}, Gerofi J^{1,2}, Baker C^{1,2}, Min D^{1,2,4}, Twigg S^{1,2,4}

¹Greg Brown Diabetes & Endocrine Research Laboratory, Charles Perkins Centre, University of Sydney, Sydney, Australia, ²Central Clinical School, Faculty of Medicine and Health, University of Sydney, Sydney, Australia, ³School of Medical Sciences, Faculty of Medicine and Health, University of Sydney, Sydney, Australia, ⁴Department of Endocrinology, Royal Prince Alfred Hospital, Sydney, Australia

Aim

To compare circulating miRNA profiles among people with normal glucose (NG), prediabetes (PD), or newly diagnosed type 2 diabetes (T2DM), and evaluate the effects of a 12-week exercise intervention on circulating miRNA levels in the PACE-G study.

Methods

Participants with BMI ≥ 25 kg/m² were classified into NG, PD and new onset T2DM groups and randomly assigned to a 12-week exercise intervention (supervised combined HIIT and progressive resistance training) or usual care control. Plasma was collected at baseline and week-12. Circulating miRNA profiling was performed using the TaqMan® Array Cards on pooled cDNA samples from matched group at baseline and week-12 (n=3/group). Selected miRNAs were validated in individual samples by qPCR using TaqMan™ Advanced miRNA Assays. Participants with paired plasma samples were included in the analysis (NG, n=62; PD, n=49; T2DM, n=21).

Results

A total of 191 miRNAs were analysed using Array Cards and subsequently validated by qPCR. At baseline, miR-146a-5p and miR-10a-5p were significantly elevated in both PD and T2DM groups compared with the NG group, while miR-92a-3p was significantly higher in the T2DM group than in NG and PD groups (all $p < 0.05$). After 12-week exercise intervention, the PD-Exercise group showed decreased levels of miR-146a-5p ($p = 0.048$) and close to significant lesser miR-10a-5p ($p = 0.055$) compared with the NG-Exercise group. In contrast, miR-885-5p was significantly increased in the T2DM-Exercise group ($p = 0.046$). By univariate analysis, in PD and T2DM group, miR-885-5p correlated positively with liver fat ($r = 0.468$, $P = 0.002$) and ($r = 0.712$, $P = 0.003$) whereas in T2DM miR-10a-5p correlated negatively with liver fat ($r = -0.657$, $P = 0.005$).

Conclusion

The circulating miRNAs identified herein show associations with glycaemic status and demonstrate that HIIT-based exercise may modify specific circulating miRNA levels. These findings may have metabolic marker and mediator clinical significance. Associations of these regulated miRNAs with key metabolic parameters and the lipidome, as well as their bioactivity in prediabetes and diabetes, will be further investigated.

Characterisation of the functional features of the gut microbiota associated with type 1 diabetes

Wang X¹, Zhang V¹, Anderson D², Popat A³, Walpole C⁴, Creek D², Morrison M¹, Tillett B¹, Hamilton-Williams E¹

¹Frazer Institute, The University of Queensland, Woolloongabba, Australia, ²Monash Institute of Pharmaceutical Sciences, Monash University, Parkville, Australia, ³School of Pharmacy and Pharmaceutical Sciences, The University of Queensland, Woolloongabba, Australia, ⁴Translational Research Institute (TRI), Woolloongabba, Australia

Aim: While altered gut microbiota composition is frequently reported in type 1 diabetes (T1D), there is high variability between studies. This study aims to define the functional and metabolic drivers of microbiome-mediated protection from T1D by integrating human clinical multi-omics with an *in vivo* humanised gnotobiotic mouse models.

Methods: We utilised whole genome sequencing metagenomics and untargeted LC-MS metabolomics to profile the gut microbiome of children with established T1D (n=19) compared with age and sex-matched matched healthy children (n=20). To evaluate disease causality, germ-free non-obese diabetic (NOD) mice were colonised with stool samples from six functionally distinct human donors and monitored for spontaneous diabetes incidence. Murine multi-omics and splenic immunophenotyping were subsequently performed to compare 'protected' versus 'non-protected' microbiomes.

Results: In the human cohort, global taxonomic and metagenomic pathway composition changes were modest. However, the overall stool metabolome was significantly distinct between healthy and T1D children (PERMANOVA P=0.0498). Univariate analysis (ANOVA) identified five specific metabolites that were significantly differentially abundant between the two groups following false discovery rate (FDR) correction (FDR < 0.1). *In vivo*, two donor microbiomes were identified that conferred significant protection against diabetes onset while four donor microbiome did not protect after colonisation in NOD mice. Cross-species multi-omics integration successfully identified a highly conserved network of specific microbial taxa, functional pathways, and shared metabolites that were consistently enriched in both healthy humans and protected mice. Immunologically, this protective metabolomic profile correlated with a systemic shift in the splenic B cell compartment, specifically expanding tolerogenic transitional-2 marginal zone precursor (T2-MZP) and follicular B cells.

Conclusion: These data suggest that T1D pathogenesis is driven by the functional metabolic output of the gut microbiota rather than broad taxonomic shifts. Identifying conserved metabolite-taxa networks across clinical and humanised murine cohorts can define the molecular drivers of systemic autoimmune tolerance, highlighting actionable targets for T1D prevention.

Impact of high-fat diet on the elasticity of lipid metabolism in the hypothalamus

Wang Y^{1,2,3}, Bernard A^{1,2}, Huynh K^{1,2,3,4}, Fach J^{1,3}, Woo H^{1,3}, Liu H¹, Liu Y¹, Mellet N¹, Meikle P^{1,2,3,4}, Drew B^{1,2,3,4}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²Baker Department of Cardiometabolic Health, University of Melbourne, Parkville, Australia, ³School of Translational Medicine, Monash University, Melbourne, Australia, ⁴Baker Department of Cardiovascular Research Translation and Implementation, La Trobe University, Melbourne, Australia

Introduction/Aim

The hypothalamus is the primary centre of the brain that cooperate dynamic adaptations to metabolic challenges, by integrating nutrient and hormonal signals to control energy expenditure and feeding behaviour. Enzymes involved in lipid metabolism play crucial roles in the regulation of energy homeostasis in the hypothalamus. The brain is the second-most lipid-rich organ, with lipids playing essential roles in membrane formation, signalling, inflammation regulation, neurogenesis, energy storage, and protection against oxidative stress. Although representing half of the dry weight of the brain, how lipid metabolism in the hypothalamus adapt to metabolic challenges is not well understood.

High-fat diet has recently been shown to reduce the "metabolic elasticity" of peripheral organs, i.e. their ability to respond to energy balance disturbances and return to baseline homeostasis. We applied this concept to the hypothalamus to assess its adaptability to metabolic challenges, modelled by an *Ad Libitum–Fasting–Refeeding* cycle. Moreover, we assessed whether these adaptations in the hypothalamus can be affected by short- and long-term high-fat diet interventions.

Methods/Results

Here, using mass spectrometry-based targeted lipidomics, we characterize the adaptations of 750 lipids in mouse hypothalamus, cerebrospinal fluid and plasma, to a metabolic challenge modelled by an *Ad Libitum–Fasting–Refeeding* cycle. Our data demonstrated that around 45% lipids in the hypothalamus adapted to the *Ad Libitum–Fasting–Refeeding* cycle. Moreover, our findings revealed that high-fat diet interventions significantly altered these adaptations, identifying pathway perturbations not evident when comparing single metabolic state snapshots in high-fat diet versus chow-fed mice.

Conclusions

This study demonstrates the dynamics of brain lipidome in response to metabolic challenges, and provide comprehensive resource for further investigation to understand the role of brain lipidome in regulating metabolism.

Adipocyte-specific PDIA5 deletion alleviates diet-induced obesity and metabolic disorders

Wang Y¹, Long K¹, Ganapathy T¹, Cheng K¹

¹The Hong Kong Polytechnic University, Hong Kong, Hong Kong

Background: Obesity, featured by excessive accumulation of visceral white adipose tissue (WAT), contribute to type 2 diabetes and hyperlipidemia. WAT is an important endocrine to maintain system glucose and lipid metabolism. Obese WAT is infiltrated by increased amount of pro-inflammatory immune cells including macrophages and T-cells, which promotes insulin resistance and chronic inflammation and impairs adipose function. Here we reveal that endoplasmic reticulum protein protein disulfide isomerase A5 (PDIA5) as novel etiological factor linking obesity and metabolic disease using human sample and animal model.

Method: Adipocyte-specific PDIA5 knockout (A-PDIA5 KO) mice and WT controls were fed with a high-fat-diet (HFD), followed by metabolic phenotyping including assessment of glucose tolerance, insulin sensitivity, lipid profiles and etc. After 20-week of HFD treatment, amount of inflammatory cell infiltration in WAT was quantified by flow cytometry analysis. In vitro, inflammatory responses were evaluated in PDIA5-modified adipocytes after LPS+TNF- α stimulation. RNA sequencing and proteomics identified PDIA5-regulated pathways in adipose tissue.

Result: A positive association between adipose PDIA5 expression and obesity in was found in humans and mice. Lipopolysaccharide (LPS) induced PDIA5 secretion in 3T3-L1 adipocytes, suggesting PDIA5 as an adipokines. Overexpression of PDIA5 potentiated LPS-induced inflammation in mature adipocytes, whereas PDIA5 deletion exerted opposite effects. A-PDIA5 KO mice were resistant to HFD-induced obesity, glucose intolerance, insulin resistance and hyperlipidemia. Histological analysis revealed that A-PDIA5 KO mice reduced fibrosis and immune infiltration in visceral and subcutaneous WAT. Flow cytometry analysis revealed that inflammatory T cells including Th1 and Th17 cells were reduced in visceral WAT of A-PDIA5 KO mice. RNAseq and proteomics analysis showed that adipocyte PDIA5 deletion modulate the pathways related to T cell receptors, T cell differentiation and metabolic pathways.

Conclusion: PDIA5 promotes obesity and metabolic dysfunction by enhancing adipose inflammation and T cell responses, suggesting PDIA5 as a therapeutic target for obesity-related disorders.

A unique cell-penetrating peptide attenuates Inflammasome-mediated pyroptosis in bone marrow-derived macrophages

Wang Y¹, Pervin M¹, Choi J¹, Yavari P¹, Rosado C¹, de Haan J¹

¹Baker Heart and Diabetes Institute, MELBOURNE, Australia

Background: Diabetes is closely associated with chronic inflammation. Targeting inflammation may therefore represent a potential approach to manage diabetes and its associated complications, such as unhealthy weight and atherosclerosis. Pyroptosis is a pro-inflammatory programmed cell death mechanism mediated by the NLRP3 -Caspase-1-gasdermin D (GSDMD) signalling pathway, forming membrane pores that facilitate the release of pro-inflammatory cytokines such as IL-1 β and IL-18. We designed a synthetic cell-penetrating peptide (CP-P) to inhibit GSDMD activity and subsequent inflammatory responses.

Aims: We aimed to evaluate the inhibitory effect of CP-P on inflammasome-mediated pyroptosis.

Methods: Bone marrow-derived macrophages (BMDMs) were pre-incubated with or without CP-P, the cell penetrating residue only (CPR), or a modest non-specific permeable peptide (M-NS-PP), followed by LPS priming and ATP stimulation. Pyroptosis-associated readouts were subsequently assessed.

Results: CP-P reduced mature IL-1 β release after LPS+ATP stimulation compared to LPS+ATP alone ($p < 0.0001$). In cell lysates, CP-P decreased protein expression of NLRP3, Caspase-1, GSDMD (and its cleaved form), and pro-IL-1 β . Importantly, these protein expressions remain unchanged from BMDMs treated with CPR. Consistently, *Gsdmd* mRNA level was reduced in CP-P pre-incubated cells compared to LPS+ATP stimulation ($p < 0.0001$). However, no significant change was observed with M-NS-PP treatment.

Conclusion: These findings highlighted the importance of the CPR residue on CP-P in exerting the inhibitory effect against GSDMD activity, suggesting the CP-P's therapeutic potential for targeting inflammation in diabetes and its complications.

Chronic glycaemic control modulates the relationship between GIP and glucagon secretion following oral and enteral nutrients in type 2 diabetes

Wang Z^{1,2,3}, Huang W^{1,2}, Rasmussen R⁴, Horowitz M^{1,2,5}, Jones K^{1,2}, Rayner C^{1,2,6}, Xie C^{1,2,5}, Wu T^{1,2}

¹School of Medicine, College of Health, Adelaide University, Adelaide, Australia, ²Centre of Research in Translating Nutritional Science to Good Health, Adelaide University, Adelaide, Australia, ³College of Medicine and Public Health, Flinders University, Adelaide, Australia, ⁴Faculty of Health and Medical Sciences, Department of Biomedical Sciences, University of Copenhagen, Copenhagen, Denmark, ⁵Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia, ⁶Department of Gastroenterology and Hepatology, Royal Adelaide Hospital, Adelaide, Australia

Aims: Glucose-dependent insulinotropic polypeptide (GIP) may exert both insulinotropic and glucagonotropic effects. While its insulinotropic action is reportedly attenuated or abolished with worsening of glycaemic control in type 2 diabetes (T2D), the relationship between GIP and glucagon secretion across different levels of glycaemic control remains unclear. This study evaluated the relationship between postprandial GIP and glucagon responses to a mixed meal in T2D individuals, as well as following intraduodenal fat and glucose infusion in healthy and/or T2D individuals.

Methods: Data were analysed from three clinical studies: (i) mixed-meal testing in T2D (44 male/35 female; age 64.7±0.8 years; BMI 30.0±0.6kg/m²; HbA1c 6.6±0.1%), (ii) intraduodenal fat infusion in T2D (10 male/5 female; age 68.8±2.2 years; BMI 30.2±1.3kg/m²; HbA1c 6.7±0.2%), and (iii) intraduodenal glucose infusion in health (10 male; age 45.2±7.8 years; BMI 25.3±1.3kg/m²; HbA1c 5.2±0.1%) and T2D (8 male/2 female; age 67.3±2.4 years; BMI 28.5±1.1 kg/m²; HbA1c 6.2±0.2%). Relationships between postprandial GIP and glucagon or insulin following the mixed meal were also determined after stratification by HbA1c (<6.5%, 6.5-7.0%, >7.0%).

Results: Following mixed-meal ingestion, early postprandial (0-30min) glucagon secretion correlated positively with GIP ($r=0.43$, $P<0.0001$), with the strength of this association increasing with higher HbA1c levels ($r=0.15$, $P=0.39$; $r=0.54$, $P=0.0064$ and $r=0.67$, $P=0.0007$ for subgroups with HbA1c<6.5%, 6.5-7.0% and >7.0%, respectively). In contrast, the insulinogenic index correlated with GIP only in subgroups with HbA1c<6.5% and between 6.5-7.0% ($r=0.39$, $P=0.026$ and $r=0.42$, $P=0.042$, respectively). During intraduodenal fat infusion, glucagon and GIP responses correlated strongly in T2D ($r=0.62$, $P=0.013$). Following intraduodenal glucose infusion, early glucagon and GIP increments (0-15min) were closely related in T2D ($r=0.81$, $P=0.004$), but not in healthy individuals ($r=0.11$, $P=0.76$).

Conclusion: These observations indicate a glycaemia-dependent shift in endogenous GIP action in T2D, characterised by attenuation of insulinotropic effects and relative amplification of glucagonotropic effects with deteriorating glycaemic control.

Secretory carrier membrane protein 3 (Scamp3) regulates insulin biosynthesis and insulin granule maturation in pancreatic beta-cells

Webster H¹

¹University Of Sydney, Sydney, Australia

Background and Aim/s: Pancreatic beta-cells tightly regulate insulin biosynthesis and secretion via the regulated insulin secretory pathway. A key step is packaging proinsulin into insulin secretory granules (ISGs) at the trans-Golgi network, followed by cleavage to mature insulin within ISGs. ISGs contain proteins essential for insulin biosynthesis, storage and secretion and are central to beta-cell function. Our lab recently identified Secretory Carrier Membrane Protein 3 (Scamp3) as a novel ISG component. Scamp3 knockdown (Scamp3KD) in rat INS1 beta-cells significantly decreased insulin storage and secretion. Scamp3 is a ubiquitously expressed transmembrane protein involved in receptor recycling, protein sorting and vesicle biogenesis; however, its role in beta-cells remains unclear. This study investigated the role of Scamp3 in ISG biogenesis and maturation.

Methods: Scamp3 affinity purification was performed in INS1 cells using anti-Scamp3 or IgG control antibodies. Cells were transfected with Scamp3-specific or non-targeting siRNA for 48h. Samples were analysed by liquid chromatography tandem mass spectrometry (LC-MS/MS) to identify proteins enriched in Scamp3 pull-downs and those differentially expressed following Scamp3KD. Proinsulin trafficking was assessed using the GFP-tagged proinsulin reporter proCpepRUSH. Following Scamp3KD, synchronised proinsulin release from the endoplasmic reticulum was induced by biotin, and live-cell confocal imaging quantified proinsulin export from the Golgi to ISGs over time. Proinsulin conversion to insulin was assessed by SDS-PAGE of lysates collected at defined timepoints.

Results: Proteomic analysis of pull-downs identified proteins involved in secretory granule maturation and protein sorting such as Igf2r and Gga1. Igf2r was also among the most strongly up-regulated proteins in Scamp3KD cells. Gga1 mediates Igf2r recycling by recruiting clathrin and the adaptor protein Ap-1, which was significantly down-regulated following Scamp3KD. Scamp3KD significantly increased the proinsulin/insulin ratio at early timepoints following release from the endoplasmic reticulum.

Conclusion: These findings indicate Scamp3 interacts with machinery involved in secretory granule maturation and is required for efficient proinsulin-to-insulin conversion.

Weger M¹, Mauvoisin D², Hoyle D¹, Wang J³, Martin E⁴, Rae J¹, Ferguson C¹, Klink G⁵, Cieleš M⁶, Macaustlane K¹, Larance L⁶, Quadroni M⁷, Templeman I⁸, Walhin J⁸, Karagounis L⁹, Betts J⁸, Johnston J¹⁰, Durussel F⁷, Firsov D⁷, Fournier S¹¹, Müller O¹¹, Schulz B¹, Parton R¹, Weger B¹, Gachon F^{1,12}
¹The University Of Queensland, St Lucia, Australia, ²Nantes University, Nantes, France, ³Vienna Biocenter, Vienna, Austria, ⁴Ecole Polytechnique Federale de Lausanne, Lausanne, Switzerland, ⁵Heidelberg University, Heidelberg, Germany, ⁶The University of Sydney, Sydney, Australia, ⁷University of Lausanne, Lausanne, Switzerland, ⁸University of Bath, Bath, United Kingdom, ⁹Australian Catholic University, Melbourne, Australia, ¹⁰University of Surrey, Guildford, United Kingdom, ¹¹Lausanne University Center Hospital, Lausanne, Switzerland, ¹²Aarhus University, Aarhus, Denmark

Aim: Systemic energy homeostasis is essential for maintaining metabolic health and depends on inter-organ communication, with the liver acting as a central hub by secreting the majority of circulating blood proteins. Despite its importance, the detailed mechanisms underlying hepatic protein secretion, and the consequences of their disruption in disease pathogenesis, remain incompletely understood. Our previous work demonstrated that secreted proteins accumulate in a diurnal (24-hour) manner in the mouse liver, raising the possibility that hepatic protein secretion is subject to circadian regulation, which we investigated here.

Methods: We performed diurnal proteomic analyses of human blood, as well as blood and liver tissue from wild-type mice, circadian clock-disrupted mice, and *ob/ob* mice, exposed to different eating/feeding and fasting schedules. Downstream analyses included electron microscopy imaging of key secretory pathway organelles, including the endoplasmic reticulum (ER) and Golgi apparatus, as well as pharmacological studies conducted in the mouse model to elucidate the mechanisms underlying diurnal hepatic protein secretion.

Results: We found that hepatic protein secretion follows a diurnal rhythm regulated by food intake and the circadian clock component BMAL1. Rhythmic variation in the expression of secretory pathway proteins, particularly those involved in protein folding and *N*-glycosylation within the ER and Golgi apparatus, mediates this process. Specifically, feeding-fasting rhythms drive hepatic protein secretion through PYGL-mediated glycogenolysis, which generates glycosylation substrates in the form of UDP-sugars, along with the induction of physiological ER stress. Notably, these mechanisms of diurnal protein secretion are attenuated in *ob/ob* mice and are influenced by variants in glycogen and glycosylation metabolism-associated disease genes in humans.

Conclusion: Together, our findings establish hepatic glycogen metabolism as a circadian regulator of liver protein secretion, revealing an additional layer of metabolic control over the timing of liver physiology.

Impact of obesity on hypothalamic metabolic elasticity

Woo H^{1,3}, Bernard A^{1,2}, Fach J^{1,3}, Liu H¹, Liu Y¹, Huynh K^{1,2,3,4}, Drew B^{1,2,3,4}, Wang Y^{1,2,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²Baker Department of Cardiometabolic Health, University of Melbourne, Parkville, Melbourne, Australia, ³School of Translational Medicine, Monash University, Melbourne, Australia, ⁴Baker Department of Cardiovascular Research Translation and Implementation, La Trobe University, Melbourne, Australia

Introduction: Obesity represents a major global health challenge, affecting 1 in 8 people worldwide and increasing the risk of diabetes, cardiovascular diseases. “Metabolic elasticity” refers to the ability of an organism to respond to metabolic challenges, such as fasting and refeeding, and to restore its baseline metabolic homeostasis. Zhou et al. previously demonstrated that obesity impairs both metabolic and gene elasticity during fasting-refeeding cycles in peripheral metabolic tissues, including the liver, adipose tissue and muscles¹. The hypothalamus plays a central role in regulating energy balance, and obesity has been shown to disrupt hypothalamic transcriptional profiles. However, how obesity affects the metabolic and gene elasticity of the hypothalamus remains unclear.

Objective: To study the effect of obesity on the metabolic elasticity of the hypothalamus.

Methods: To assess the elasticity of hypothalamic genes, we used a mouse model of fasting-refeeding and leveraged “Gene Elasticity Score” (GElaS), a metric developed by Zhou et al. to quantify gene elasticity, in hypothalamic samples¹. Additionally, to examine the effect of obesity on the elasticity of the hypothalamic transcriptome, we compared the elasticity scores from the hypothalamus of lean mice to diet-induced obese mice.

Results: Our results revealed that diet-induced obesity leads to a decline in both metabolic elasticity (e.g. body weight) and gene elasticity. Genes involved in immune-related pathways and extracellular matrix remodelling, which were enriched in endothelial and astro-ependymal clusters, exhibited high elasticity that was markedly reduced during obesity.

Conclusions: Using this approach, we demonstrate that obesity disrupts the metabolic elasticity of the hypothalamus. To the best of our knowledge, this is the first study to characterise hypothalamic metabolic elasticity, and our findings deepen the understanding of obesity-associated metabolic disruption. Importantly, this transcriptomic-based elasticity model provides a comprehensive tool for studying metabolic health of the hypothalamus in future studies.

1. Zhou et al., Cell Metabolism, [10.1016/j.cmet.2023.08.001](https://doi.org/10.1016/j.cmet.2023.08.001).

SGLT2 inhibitors preserve muscle strength and muscle mass in Type 2 Diabetes: Clinical and in vitro evidence

Wu T^{1,2}, Juan C², Hwu C¹

¹Section of Endocrinology and Metabolism, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ²Institutes of Physiology, College of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan

Aims: To evaluate the effects of sodium-glucose cotransporter 2 inhibitor (SGLT2i) therapy on skeletal muscle strength and muscle mass in patients with type 2 diabetes mellitus, and to explore the cellular effects of SGLT2i on skeletal muscle cells.

Methods: This study consisted of a cross-sectional and a one-year longitudinal cohort analysis in patients with type 2 diabetes mellitus. Muscle strength of the dominant lower extremity was measured using a hand-held dynamometer. Total muscle mass was measured using a bioelectrical impedance analysis device. The effects of SGLT2i on myoblast differentiation and mature myotube were investigated using C2C12 skeletal muscle cell model.

Results: A total of 305 and 236 patients with type 2 diabetes mellitus were enrolled in the cross-sectional and longitudinal cohorts, respectively. In the cross-sectional analysis, SGLT2i users had greater knee extension, ankle dorsiflexion, and ankle plantar flexion strength than non-users. SGLT2i therapy was independently associated with higher knee extension and ankle plantar flexion strength in the multivariate analysis. In the longitudinal cohort, SGLT2i therapy was positively associated with the change of total muscle mass from baseline after adjustment for clinical variables. In cell studies, treatment with empagliflozin increased myotube width during myoblast differentiation. Empagliflozin increased myosin heavy chain expression and decreased muscle RING finger-1, atrogin-1, and myostatin expression in mature myotube.

Conclusion: SGLT2i therapy is associated with greater lower-extremity muscle strength and preservation of total muscle mass in patients with type 2 diabetes mellitus. SGLT2i therapy promotes myogenic differentiation and suppresses atrophy-related protein expression in C2C12 cells, supporting its direct muscle-protective effect.

Effects of well- and poorly-absorbed low-calorie sweeteners on insulin secretion and sensitivity in type 2 diabetes

Xie C¹, Li T¹, Bound M¹, Grivell J¹, Sun Y¹, Jones K¹, Horowitz M¹, Young R¹, Rayner C¹, Wu T¹

¹Adelaide University, Adelaide, Australia

Aims

Reducing sugar intake is a major focus of global health policy to reduce the burden of metabolic disease, including type 2 diabetes (T2D), and has driven increased use of low-calorie sweeteners (LCS). However, a 2022 World Health Organisation systematic review reported that habitual consumption of LCS is associated with increased T2D risk. We evaluated the acute effects of a well-absorbed LCS, acesulfame potassium (Ace-K), and a poorly-absorbed LCS, sucralose, on insulin secretion and sensitivity in T2D.

Methods

Sixteen participants with T2D (8M/8F, age 66.6±1.5 years, BMI 31.9±1.2 kg/m², HbA1c 6.6±0.2%, diabetes duration 8.5±1.8 years), managed by diet and/or metformin, were evaluated on 3 study days in a double-blind, randomised, crossover design. On each day, a hyperglycaemic clamp (15mmol/L) was maintained between t=0-210min by intravenous infusion of 25% dextrose. Between t=30-180min, participants consumed a capsule containing either 175mg Ace-K, 58mg sucralose (equi-sweet) or 175mg cellulose (flavourless control), with 250mL water every 30min (LCS doses below FDA acceptable daily intake). Blood glucose and plasma insulin were measured regularly. Insulin sensitivity was calculated as the mean glucose infusion rate divided by mean plasma insulin between t=150-210min.

Results

Blood glucose was maintained comparably at ~15mmol/L across study days. Plasma insulin increased during hyperglycaemia on all days, with a greater increment following Ace-K than sucralose or placebo (P=0.02) and no difference between the latter. Intravenous glucose requirement was lower following sucralose (P=0.04), but not Ace-K, compared to placebo. Insulin sensitivity was reduced after Ace-K and sucralose compared to placebo (P=0.04 and 0.03), with no difference between them.

Conclusions

In well-controlled T2D, acute exposure to either well- or poorly-absorbed LCS impairs insulin sensitivity. However, only Ace-K augments insulin secretion during hyperglycaemia, without affecting whole-body glucose disposal. These findings suggest that the oral bioavailability of an LCS affects its mode to disrupt glucose metabolism in T2D.

Effects of combining taurocholic acid with the bitter taste receptor agonist denatonium benzoate on postprandial glycaemic control in people with type 2 diabetes.

Xie C¹, Bound M¹, Grivell J¹, Jones K¹, Horowitz M¹, Young R¹, Rayner C¹, Wu T¹

¹Adelaide University, Adelaide, Australia

Aims

Intestinal bile acids, beyond the established role of facilitating fat digestion and absorption, have emerged as important metabolic regulators. We have demonstrated, in both healthy and type 2 diabetes (T2D) participants, that jejunal administration of taurocholic acid (TCA) stimulates glucagon-like peptide-1 (GLP-1) secretion and markedly reduces the glycaemic response to jejunal glucose. Ex vivo studies indicate that TCA interacts with intestinal bitter taste receptors (BTRs) to evoke GLP-1 release in human intestinal tissues. This study evaluated the effects of TCA formulated with the BTR agonist, denatonium benzoate (DB), delivered in an enteric-release capsule, on postprandial glycaemia, gastric emptying and gallbladder emptying in people with T2D.

Methods

Ten participants with T2D, managed by diet and/or metformin monotherapy (6 male/4 female; age 71.8±2.1 years, BMI 30.2±1.1 kg/m², HbA1c 6.6±0.1%, duration of known diabetes 9.6±2.5 yrs), were studied on 5 occasions in a double-blind, randomised, crossover fashion. On each study day, participants consumed capsules containing either cellulose (placebo), TCA (2g), TCA/DB (1g/30mg), TCA/DB (2g/30mg), or TCA/DB (4g/30mg), designed for small intestinal release 1 hour after ingestion. After 60min, subjects consumed a standardised mashed-potato meal (474.5kcal) labelled with ¹³C-octanoic acid to measure gastric emptying (breath test) and glycaemia over 4 hours using venous blood samples.

Results

All participants tolerated the protocol well, although seven experienced diarrhoea following TCA/DB (4g/30mg). Compared with placebo, neither TCA alone nor TCA/DB affected fasting glucose or the glucose response to the test meal (p=0.81). There were no differences in the gastric half-emptying time (p=0.83), or gallbladder emptying (treatment effect p=0.70) between treatments.

Conclusion

In relatively well-controlled participants with T2D, oral administration of enteric-release BA-BTR therapy combining TCA and DB had no effect on postprandial glycaemia, or gastric emptying. These findings suggest that targeting the BA-BTR pathway to reduce postprandial glucose using this delivery strategy is ineffective in T2D.

Gastric emptying is related to basal metabolic rate in both health and type 2 diabetes

Xie C¹, Brog M¹, Sun Y¹, Jones K¹, Horowitz M¹, Rayner C¹, Wu T¹

¹Adelaide University, Adelaide, Australia

Aims

Gastric emptying, which determines the rate at which ingested nutrients are delivered to the small intestine for absorption and utilisation, is a major determinant of postprandial metabolism, and increasingly targeted for the management of obesity and type 2 diabetes (T2D). In both health and T2D, gastric emptying exhibits a substantial inter-individual variation, for reasons that are uncertain. Given that gastric emptying governs the availability of nutrients for energy provision, it is plausible that its regulation may reflect metabolic demand. We, therefore, examined the relationship between the rate of gastric emptying and estimated basal metabolic rate (BMR) in healthy individuals and those with T2D.

Methods

105 healthy (50 male/55 female, aged 32.4 ± 1.2 yrs, BMI 24.6 ± 0.3 kg/m², HbA1c $5.3 \pm 0.02\%$) and 85 T2D, participants (55 male/30 female, aged 51.2 ± 1.2 yrs, BMI 27.0 ± 0.5 kg/m², HbA1c $10.0 \pm 0.2\%$) consumed a 75g glucose drink (300mL) containing 150mg ¹³C-acetate. Gastric emptying was measured by breath sampling, and BMR was estimated using the Mifflin-St Jeor Equation. The relationship between the gastric half-emptying time (T50) and BMR was assessed using Pearson correlation analysis.

Results

In healthy participants, T50 ranged from 21.4-162.4min, and estimated BMR from 1025-2105kcal/day. In T2D participants, T50 ranged from 38.9-117.1min, and estimated BMR ranged from 955-2121kcal/day. T50 was related inversely to BMR in both groups (health: $r = -0.26$, $p = 0.002$; T2D: $r = -0.52$, $p < 0.001$).

Conclusion

Relatively more rapid gastric emptying is associated with a higher BMR in both health and T2D, with a stronger relationship in the latter group, supporting the concept of a physiological link between nutrient delivery and energy expenditure. Further studies are warranted to investigate the causal relationship between BMR and gastric emptying and the consequent effects on postprandial metabolism, particularly in T2D.

Therapeutic effects of 1, 25-dihydroxyvitamin D₃ with astragalus polysaccharide on insulin resistance in gestational diabetes mellitus rat models

Xie L¹, Yan S¹, Xie L¹, Wang Y², Ren S¹

¹Jilin University, Changchun, China, ²Department of Clinical Laboratory of Jilin Provincial Maternal and Child Health Hospital (Jilin Provincial Obstetric Quality Control Center), Changchun, China

Aim: To investigate the combined effects of 1,25-dihydroxyvitamin D₃ (1,25(OH)₂D₃) and astragalus polysaccharide (APS) on gestational diabetes mellitus and underlying mechanisms.

Methods: Sprague-Dawley rats were fed with high-fat diet and low-dose Streptozotocin to establish diabetic rat model. Rats from different groups were administered 1,25(OH)₂D₃ or APS or both 1,25(OH)₂D₃ and APS for two consecutive weeks. The levels of serum glucose, insulin and lipid parameters were measured. The levels of oxygen species (ROS), liver function indicators, vitamin D receptor (VDR), insulin signaling pathway, PI3K/AKT/FOXO1 pathway, gluconeogenesis and lipid metabolism related proteins in the liver were also assessed.

Results: The combination of 1,25(OH)₂D₃ and APS reduced the serum levels of glucose, AST, ALT, FFA, TG, and ApoB as well as HOMA-IR of GDM rats ($p < 0.05$); They could also reduce the cellular production of ROS and increase the mRNA levels of VDR and CYP2R1 and the expression of VDR, IR, IRS1, GLUT2, PI3K, AKT, pAKT, and pAKT/AKT ($p < 0.05$), along with inhibiting the expression of FOXO1, PEPCK, G6pase and SREBP1C and enhancing PPAR- γ protein expression ($p < 0.05$).

Conclusion: 1,25(OH)₂D₃ combined with APS could produce better efficacy in activating VDR and the insulin signaling pathway through the PI3K/AKT/FOXO1 signaling pathway to alleviate IR.

Keywords: PI3K/AKT/FOXO1 Pathway, Vitamin D Receptor, Oxidative Stress, Lipid Metabolism, Gluconeogenesis, HOMA-IR

Targeting the skeletal muscle NOX4-NFE2L2 axis promotes antioxidant defence and healthy ageing

Xirouchaki C^{1,2}, García-Domínguez E^{3,4}, Coughlan E^{1,2}, McGrath M^{1,2}, Giri S^{1,2}, Liang S^{1,2}, Wiede F^{1,2}, Bigot A⁵, Sadoshima J⁶, Gomez-Cabrera M⁷, Philp A^{8,9}, Moberg M^{10,11}, Apró W^{11,12,13}, Roman W^{3,4}, Mitchell C^{1,2}, Tiganis T^{1,2}

¹Monash Biomedicine Discovery Institute, Monash University, Clayton, Australia, ²Department of Biochemistry and Molecular Biology, Monash University, , Clayton, Australia, ³3 Australian Regenerative Medicine Institute, Monash University, Clayton, Australia, ⁴Victoria Node, EMBL Australia, Clayton, Australia, ⁵Sorbonne Université, Inserm, Institut de Myologie, Centre de Recherche en Myologie, Paris, France, ⁶Department of Cell Biology and Molecular Medicine, Cardiovascular Research Institute, Rutgers New Jersey Medical School, , Newark, USA, ⁷Freshage Research Group, Department of Physiology, University of Valencia. CIBERFES. Fundación Investigación Hospital Clínico Universitario/INCLIVA, Valencia, Spain, ⁸Centre for Healthy Ageing, Centenary Institute, Sydney, Australia, ⁹School of Sport, Exercise and Rehabilitation Sciences, Faculty of Health, University of Technology Sydney, Sydney, Australia, ¹⁰Department of Physiology, Nutrition and Biomechanics, The Swedish School of Sport and Health Sciences, , Stockholm, Sweden, ¹¹Department of Physiology and Pharmacology, Karolinska Institutet, Stockholm, Sweden, ¹²School of Sport, Exercise and Rehabilitation Sciences, University of Birmingham, Birmingham, UK, ¹³Department of Clinical Science, Intervention and Technology, Karolinska Institutet, Stockholm, Sweden

Background:

A decline in NFE2L2-orchestrated adaptive homeostasis and the emergence of oxidative distress are hallmarks of ageing. In contracting skeletal muscle, the Reactive Oxygen Species (ROS)-generating enzyme NADPH oxidase 4 (NOX4) acts as a key upstream activator of NFE2L2-dependent adaptive responses. Skeletal muscle NOX4 expression declines with ageing in both mice and humans, resulting in impaired NFE2L2 signalling, increased oxidative damage, and reduced muscle function. Skeletal muscle-specific deletion of NOX4 accelerates age-associated physiological decline, leading to increased sarcopenia, frailty, insulin resistance and systemic inflammation in 20-month-old chow-fed mice.

Aims:

To restore NOX4 signalling and adaptive homeostasis targeting the NOX4-NFE2L2 Axis in ageing

Methods:

- Ablation of Nox4 expression in Skeletal Muscle using muscle-creatine kinase (*Mck*) promoter-driven Cre recombinase.
- Viral overexpression of Nox4 in muscle of Nox4-deficient and control mice using AAV9-MHCK7-mNox4.
- Pharmacological stimulation of the NFE2L2 pathway using sulforaphane in Nox4-deficient and control mice.
- Comprehensive physiological assessment of muscle and systemic health.

Results:

Reinstating NOX4 expression or activating downstream NFE2L2 signalling with sulforaphane, an NFE2L2 agonist, restored skeletal muscle adaptive responses and reversed systemic physiological decline in aged NOX4-deficient mice, recapitulating key benefits of exercise. Sulforaphane restored antioxidant defence and muscle function, reducing adiposity, hyperglycemia, systemic inflammation, and hepatic steatosis while improving exercise capacity and metabolic health. Mechanistically, it reinstated NFE2L2-dependent transcriptional programs regulating antioxidant defence and mitochondrial function. Complementary muscle-targeted AAV9-MHCK7-mNox4 delivery similarly restored NOX4 expression, enhanced NFE2L2 signalling, improved muscle mass and function, and corrected metabolic dysfunction.

Conclusion:

Collectively, these findings identify the NOX4-NFE2L2 axis as a key regulator of adaptive homeostasis in skeletal muscle and demonstrate that pharmacological activation of NFE2L2 or AAV-mediated restoration of NOX4 can attenuate age-associated functional and metabolic decline. These results provide mechanistic insight into how exercise-induced antioxidant signalling promotes healthy ageing while protecting against sarcopenia and frailty.

Recurrent hypoglycemia induces neurohistological changes linked to mental health Vulnerability

Yap C¹, Lee Y¹, Pamidi N¹, Beatty D²

¹Monash University Malaysia, Kuala Lumpur, Malaysia, ²Aston Clinton Scientific UK, Edinburgh, United Kingdom

Aims:

This study assessed the neurohistological consequences of recurrent hypoglycemia and the potential role in mental health vulnerability

Methods:

Forty male Sprague–Dawley rats were randomly assigned to either an experimental group (n = 30) or a control group (n = 10). Both experimental and control groups were maintained on standard laboratory chow with water provided ad libitum throughout the 28-days study period. Fasting blood glucose (FBG) levels were monitored to confirm diabetic status. Following confirmation of diabetes, recurrent hypoglycemia was induced in the experimental group daily. Blood glucose levels were measured at pre-insulin, 1-, 2-, and 3-hour post-insulin to document glycemic fluctuations and hypoglycemic episodes, clinical signs including reduced mobility and seizure episodes. At the conclusion of the study, brain tissues were harvested for histopathological evaluation.

Results:

Outcomes were categorized into four groups: (1) hypoglycemia with seizures and reduced mobility, (2) hypoglycemia with reduced mobility without seizures (subdivided into survivors and early mortality), (3) persistent hyperglycemia despite insulin treatment, and (4) normoglycemia without physical symptoms. Neurohistological alterations were most pronounced in Categories 1 and 2, with disrupted neuronal morphology, features indicative of cellular stress, and degeneration in regions critical for memory and emotional regulation. Survival differed markedly across categories: animals experiencing severe seizures or prolonged mobility impairment often succumbed early, whereas those with milder or no symptoms survived. Animals in Category 4 maintained normoglycemia and exhibited normal histology, while Category 3 showed variable structural changes. These findings indicate that recurrent hypoglycemic episodes, rather than insulin exposure per se, drive cumulative neurohistological injury linked to mental health vulnerability.

Conclusion:

Recurrent hypoglycemia induces neurohistological brain injury, particularly in animals experiencing severe seizures or mobility impairment, with survival varying according to hypoglycemia severity. Preventing severe and repeated hypoglycemia is critical to preserve neuronal integrity, mental well-being, and public health.

Regulated mobilisation of a sequestered GLUT4 pool is selectively impaired in insulin resistance

Yap L¹, Coster A², Stoeckli J¹, Diaz-Vegas A¹, James D¹

¹University Of Sydney, Sydney, Australia, ²University of New South Wales, Sydney, Australia

Background/Aim:

Insulin resistance (IR) is widely interpreted as a defect in insulin signalling. However, insulin's central metabolic action, recruitment of GLUT4 and other proteins to the plasma membrane, ultimately depends on membrane trafficking. This raises a fundamental question: does IR primarily reflect signalling failure, or a breakdown in regulated membrane trafficking capacity? To address this, we sought to define the kinetic architecture of endogenous GLUT4 trafficking and determine which steps in the trafficking cycle become dysregulated in IR.

Methods:

We combined high-content live-cell imaging with quantitative mathematical modelling to measure endogenous GLUT4 trafficking dynamics in 3T3-L1 adipocytes under basal and insulin-stimulated conditions, comparing control and insulin-resistant states across extended time courses. Rate constants governing exocytosis, endocytosis, and recycling-pool size were estimated directly from the data.

Results:

Basal trafficking revealed a limited recycling pool, whereas insulin stimulation expanded both pool size and exocytosis rates, consistent with mobilisation of a previously sequestered GLUT4 population. In insulin-resistant adipocytes, the insulin-stimulated exocytosis rate constant was reduced to ~60% of what is observed in control conditions, while basal trafficking remained largely preserved. Total GLUT4 abundance was unchanged, but the insulin-responsive pool was reduced by ~15%, indicating GLUT4 redistribution into an insulin-insensitive compartment with altered trafficking dynamics.

Conclusion:

These findings support a model in which insulin regulates both trafficking kinetics and the size of a dynamically recruitable GLUT4 pool, showing that IR arises from selective impairment of regulated exocytic mobilisation rather than global trafficking collapse. More broadly, this work reframes IR as a defect in regulated membrane trafficking capacity, linking insulin signalling to the physical organisation of intracellular transport systems that control metabolic flux.

β -Hydroxybutyrate lowers glucose in type 1 diabetes by suppressing intestinal and hepatic glucose transporters via GPR109A

Li S¹, Wang J¹, Xin C², Yin J¹

¹Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Jiangxi University of Chinese Medicine, Nanchang, China

Aim/s: β -Hydroxybutyrate (3HB) is elevated in type 1 diabetes (T1D) and is commonly viewed primarily as a marker of ketoacidosis risk. We investigated whether 3HB can improve glucose metabolism in T1D and explored intestinal and hepatic mechanisms.

Methods: We integrated human monitoring data with mechanistic experiments. In an inpatient low-carbohydrate diet (LCD) cohort with endogenous insulin-deficient diabetes (n=62), fasting glucose and ketone levels were recorded during the LCD period and analysed for their relationship. In a separate outpatient obesity pilot study undertaking LCD (n=7), continuous glucose monitoring (CGM) together with continuous ketone monitoring (CKM) was used to describe temporal glucose–ketone patterns. Causality and mechanisms were examined in streptozotocin (STZ)-induced T1D mice given oral 3HB for 7 weeks, assessing glycaemia, ¹⁸F-FDG PET/CT tissue glucose uptake, intestinal tracer absorption, liver glycogen pathology, intestinal/hepatic glucose transporter expression, and signalling. GPR109A inhibition (mepenzolate bromide) and mTOR inhibition (rapamycin) were applied in vivo and in hepatocytes/intestinal epithelial cells.

Results: Across the two LCD-based human studies, an inverse association was observed between glucose and ketone levels. In STZ-T1D mice, oral 3HB reduced fasting and random glucose, decreased hepatic ¹⁸F-FDG uptake and intestinal tracer absorption, and alleviated glycogenic hepatopathy. Mechanistically, 3HB downregulated SGLT1, GLUT2 and GLUT5 in intestine and liver and inhibited PI3K–AKT–mTOR signalling; these effects were attenuated by GPR109A inhibition and recapitulated by rapamycin in vitro.

Conclusion: 3HB exerts glucose-lowering effects in T1D models, at least in part by suppressing intestinal and hepatic glucose transport through a GPR109A-linked PI3K/AKT/mTOR pathway, and improves liver glycogen pathology—supporting the 3HB–GPR109A axis as a candidate pathway for further evaluation.

Enhancing islet transplantation therapy outcomes for Type 1 Diabetes patients

Zamani N¹, Harty M¹, Panizzutti Parry B¹, Schiesse J², Williams R¹, Aston-Mourney K¹

¹Institute for Mental and Physical Health and Clinical Translation, School of Medicine, Deakin University, Victoria, Australia, ²Murdoch Children's Research Institute, Department of Paediatrics, The University of Melbourne, Melbourne, Australia

Background and Aims:

Islet transplantation has emerged as a promising therapeutic option for achieving long-term glycaemic stability in type 1 diabetes. Despite the potential, transplantation outcomes are limited by early graft loss caused by immune-mediated reactions, chronic inflammation, and non-immune stressors such as hypoxia and oxidative stress (1). One reparative strategy is the development of a supportive microenvironment that not only shields transplanted islets from post-transplant stressors but also mimics the native extracellular matrix (ECM) to promote islet viability and function. Accordingly, this project aims to develop a multifunctional, ECM-mimetic hydrogel to enhance the survival and functionality of transplanted islets.

Methods:

We optimised a self-assembling peptide hydrogel for islet encapsulation by co-assembling ECM-inspired motifs, including laminin- and fibronectin-derived peptides. The combination formed a biocompatible, biodegradable, and biomimetic scaffold that supported INS-1E β -cell function and enhanced cell survival.

INS-1E β -cells and pluripotent stem cell (PSC)-derived islet cell clusters were encapsulated within the hydrogel to evaluate cell survival, insulin expression, and glucose-stimulated insulin secretion (GSIS).

To address key post-transplant stressors, the cytoprotective potential of bioactive agents, including metformin and fucoidan, was assessed within the hydrogel system under hyperglycaemic and pro-inflammatory cytokine conditions (IL-1 β , TNF- α , IFN- γ).

Results:

The ECM-mimetic hydrogel supported INS-1E β -cell function and enhanced cell survival, while maintaining insulin expression in PSC-derived islet clusters. Metformin preserved GSIS and reduced apoptosis under hyperglycaemic conditions, and fucoidan significantly reduced apoptosis under pro-inflammatory cytokine stress. These results provide a strong rationale for integrating metformin and fucoidan into the ECM-mimetic hydrogel to further support β -cell survival and function.

Conclusion:

This study aims to establish a translational ECM-mimetic hydrogel platform complemented with bioactive agents to enhance long-term islet graft survival and function, offering a more effective and durable cell-based therapeutic strategy to improve glycaemic control in individuals with T1D.

References:

1. Gamble A, Pepper AR, Bruni A, Shapiro AMJ. The journey of islet cell transplantation and future development. *Islets*. 2018;10(2):80-94.

RAGE inhibition suppresses immune cell infiltration and antigen presentation in an outbred model of diabetic kidney disease

Zambre S¹, Whiddett R¹, McCarthy D¹, Loaiza Naranjo J¹, Du C^{1,2}, Tejo E^{1,2}, Buckle I^{1,2}, Forbes J^{1,2,3}, Fotheringham A^{1,2}

¹The University Of Queensland, Mater Research Institute., Brisbane, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland., Brisbane, Australia, ³Department of Medicine, The University of Melbourne, Austin health, Melbourne, Australia

Aim:

Diabetic kidney disease (DKD) is characterized by kidney dysfunction and inflammation. The receptor for advanced glycation end products (RAGE) contributes towards kidney inflammation, but its role in immune-epithelial cross talk is not known. We investigated how RAGE promotes kidney and systemic immune activation in DKD and whether RAGE antagonism attenuates this.

Methods:

Diabetes was induced using multiple-low-dose streptozotocin in male (n=12) outbred CD-1 mice (6-8 weeks old) followed by intragastric therapy from 10 weeks age: (i) RAGE antagonist Azeliragon (AZ) (3 mg/kg/day, 3x per week), (ii) Placebo (3x per week) for 12 weeks. Kidney function was assessed via FITC-sinistrin glomerular filtration rate (mGFR), and urinary albumin-to-creatinine ratio (uACR). Immune cell profiling of kidneys and renal lymph nodes (RLN) was performed using multi-parameter flow cytometry and immunofluorescence. mRNA levels of *ciita* and *H2a-α* were measured by qPCR.

Results:

After ~12 weeks of diabetes, early kidney disease was evident with ~5-fold rise in uACR (P=0.0296), kidney hypertrophy (~2-fold rise in kidney to body weight ratio; P<0.0001), glomerulosclerosis (P<0.0001) and early hyperfiltration (P=0.0084) followed by loss of mGFR (P=0.0090) vs no diabetes. AZ improved kidney function (mGFR) by ~60% (P=0.0337) and improved glomerulosclerosis (P=0.0198) vs placebo. Kidneys (and RLN) from mice with diabetes had greater infiltration of CD8+ T cells, MHCII+F4/80+macrophages along with increased expression of RAGE on these cell types. Diabetes increased infiltration of cDC1s and moDCs dendritic cell populations. AZ treatment reduced RAGE expression on CD8+T cells and macrophages and lowered populations of cDC1s (p=0.0349) and moDCs (p=0.0136) vs placebo. CD13+ proximal tubule cells from mice with diabetes had significant upregulation of MHC Class II expression (p=0.0027) and increased *ciita* and H2A-α levels that was not seen with AZ therapy (P=0.0374).

Conclusion:

RAGE signalling in PTECs promotes dendritic cell and macrophage infiltration, enhancing tubular antigen presentation driving inflammation in DKD.

Critical role of brainstem NPFF neuronal circuits in the control of torpor-like states

Zhang L^{1,2}, Koller J³, Herzog H^{1,3}

¹St Vincent's Center For Applied Medical Research, Sydney, Australia, ²St. Vincent's Clinical School, School of Clinical Medicine, UNSW Medicine & Health, UNSW, Sydney, AUSTRALIA, ³Faculty of Medicine, UNSW, Sydney, AUSTRALIA

Aim: Energy conserving strategies such as torpor and hibernation are important survival mechanisms that endothermic organism utilise to deal with environmental challenges like starvation and cold exposure. While neuronal circuits in the brain have been implicated in this process the exact underlying mechanism of initiating and controlling torpor-like states is still unknown.

Methods: We used brain fos mapping, chemo- and opto-genetic manipulations and viral tracing techniques to identify, functionally characterize and circuitry map the brainstem NPFF neurons.

Results: We show that selective chemo-genetic activation of a brainstem NPFF neuronal circuit induces a hypothermic and hypometabolic state in mice, characterised by a rapid drop in brown adipose and whole-body temperature, reduced locomotor activity and altered glucose metabolism. Interestingly, although body temperature and oxygen consumption are low in this state, the mice are still able to adjust body temperature to environmental temperature fluctuations. Mechanistically, NTS NPFF neuronal activation modulates neurons in the lateral parabrachial nucleus (PBN) and median preoptic area (MPO) to regulate body temperature which was confirmed via opto-genetic activation of these downstream nuclei.

Conclusions: Taken together, our results reveal a novel neuronal circuit in the brain stem that serves as a major regulator of torpor, which may also be explored as potential intervention point in metabolic diseases.

Sodium phenylbutyrate improves glucose metabolism and muscle strength in obese and diabetic mouse models

Zhou T¹, Lin H¹, ZHAO D¹, CHENG K¹

¹Hong Kong Polytechnic University, Hongkong, China

Aim: Sarcopenia is characterized by the progressive loss of skeletal muscle mass and strength. Sarcopenia causes insulin resistance in Type 2 Diabetes Mellitus (T2DM) and obesity, whereas T2DM can adversely impact skeletal muscle mass, strength, and function. Recent studies showed that these two chronic diseases are featured by aberrant BCAA metabolism. Sodium phenylbutyrate (NaPB), is commonly used to treat urea cycle disorder and amyotrophic lateral sclerosis, but recently has been shown to promote branched chain amino acids (BCAA) metabolism. Given its effects on BCAA metabolism, this study aims to explore the potential therapeutic effects of NaPB in diabetes and sarcopenia and to elucidate the underlying mechanisms.

Methods: The study employed two mouse models: a genetically induced diabetic and obese model (db/db) and a high-fat, high-cholesterol (HFHC) diet-induced obese and pre-diabetic mouse model. The disease models were gavaged with NaPB at a dosage of 1 g/kg/day for a duration of three months. The therapeutic effects of NaPB on glucose, lipid and energy metabolism, muscle strength and exercise ability were assessed. Metabolic tissues including the liver, muscles and adipose tissues and serum were collected for immunoassays, quantitative PCR (qPCR), multi-omics analyses, and histological examinations.

Results: NaPB significantly improved glucose tolerance and insulin sensitivity in both db/db diabetic mice and HFHC diet-induced obese mice. NaPB reduced circulating BCAA levels, concomitant with decreased insulin concentrations. Additionally, NaPB increased muscle grip strength, maintained muscle fiber size and facilitated glycogen storage while reducing collagen deposition, indicating an overall improvement in muscle function. Multi-omics results suggested that NaPB enhances fatty acid utilization and activates the Tryptophan-Kynurenine pathway.

Conclusion: This study demonstrates that NaPB has significant anti-diabetic and anti-sarcopenic effects, supported by improved glucose metabolism, BCAA catabolism, and muscle function. Future research should elucidate the molecular mechanisms of NaPB and evaluate its therapeutic potential in clinical settings.

Multi-tissue prioritisation of leucine-associated genes as candidate mediators of metabolic disease risk

Zhou X¹, Cheng K¹, Li G¹

¹Hong Kong Polytechnic University, Hong Kong, Hong Kong SAR

Aim: Elevated branched chain amino acids are associated with insulin resistance and type 2 diabetes, but causal genes and tissue mechanisms remain unclear. We aimed to prioritize functional genes at leucine associated loci across metabolic tissues and place them in pathway context.

Methods: Harmonised leucine MTAG GWAS summary statistics were analysed to define independent loci. Candidate genes were prioritised at each locus using a two-tier strategy based on positional mapping and functional gene prioritisation. Tissue specific regulatory evidence was then integrated across major metabolic tissues using transcriptome wide association analysis and summary data based Mendelian randomisation with heterogeneity filtering. To support transparent prioritisation, one top gene was selected for each locus tissue combination using a predefined evidence hierarchy. Rank based gene set enrichment analysis was used to assess pathway context.

Results: We identified 42 independent leucine loci. Integrating GWAS and transcriptomic evidence yielded 11 prioritized locus tissue selections across three tissues. In subcutaneous adipose, prioritized genes were DBT, USP37, DNAJB12, HSD17B14, and UQCC1; in visceral adipose, HSD17B14 and UQCC1; and in skeletal muscle, SLC1A4, DLG4, HSD17B14, and UQCC1. HSD17B14 and UQCC1 showed the most consistent cross tissue support, each recurring in three tissues. Seven of 11 selections met joint criteria of Bonferroni significant TWAS and SMR with HEIDI filtering and concordant effect direction. Liver showed no GWAS candidate hit, but PLCD4 emerged as a supplementary liver specific strict joint signal. Pathway enrichment was suggestive rather than significant after multiple testing; however, leading edge annotations linked UQCC1 to mitochondrial organization and respiratory chain assembly, and HSD17B14 to lipid, steroid, and small molecule catabolic processes.

Conclusion: This framework prioritizes HSD17B14 and UQCC1 as plausible effector genes at leucine associated loci and highlights mitochondrial and catabolic programs as candidate mechanisms linking leucine dysregulation to metabolic disease risk.

Stream 4:
Epidemiology, public
health and policy

The 'relative value' of Diabetes Alliance Program Plus: Economic evaluation of an integrated care model for type 2 diabetes

Acharya S^{1,2,3}, Deeming S², Hamilton F², Hure A^{2,3}, Joshua D^{2,3}, Parsons M¹

¹Hunter New England Health District, New Lambton, Australia, ²Hunter Medical Research Institute, New Lambton, Australia, ³University of Newcastle, Callaghan, Australia

Background:

Type 2 diabetes mellitus (T2DM) is a major contributor to morbidity and health service utilisation, particularly in regional and rural communities where access to specialist care is limited. Traditional hospital-centred models often result in fragmented care and long waiting times. The Diabetes Alliance Program Plus (DAP+) is an integrated care and quality-improvement initiative that embeds specialist support within primary care through case conferencing, shared care planning, clinician education, and data-driven quality improvement. Previous evaluations have demonstrated program acceptability, feasibility, and effectiveness in improving care processes and reducing hospital utilisation. Economic evaluation is required to inform decisions regarding broader implementation.

Aim:

To describe the economic evaluation framework used to assess the relative value of DAP+ and present preliminary findings relevant to health system decision-makers.

Methods:

A Cost-Consequence Analysis (CCA) is being undertaken as a precursor to a full Cost-Benefit Analysis consistent with NSW Treasury guidelines. Implementation and intervention resource utilisation were quantified using administrative datasets, structured workshops with implementation teams, cost-capture templates completed by participating services, and time-in-motion studies. Downstream impacts on health service utilisation were estimated using a retrospective cluster cohort study emulating a target trial of program effectiveness.

Results:

Preliminary analyses confirm previously demonstrated program effectiveness and identify measurable resource investments across stakeholders. Early findings suggest potential reductions in downstream health service utilisation, supporting further evaluation of the relative value of DAP+.

Conclusion:

Economic evidence is essential to guide decisions regarding scaling integrated diabetes care models. This study provides a transparent evaluation framework and early economic signals to inform policy decisions regarding wider implementation of DAP+.

Gestational Diabetes: Diagnostic timing and maternal-neonatal outcomes

Aigaonkar A¹, Fan A², Perrier J¹, Reid C¹, Joshi T^{2,3}, Yuen L^{2,3}
¹University Of New England, Armidale, Australia, ²University of Newcastle, Newcastle, Australia, ³Central Coast Local Health District, Gosford, Australia

Introduction
Emerging evidence suggests that earlier screening and treatment of gestational diabetes (GDM) improves neonatal and maternal outcomes.¹ However, there is little comparison between the outcomes of GDM diagnosis earlier in pregnancy versus the standard diagnosis in real-world settings.

Aim/s
To compare and examine the maternal and neonatal outcomes in mothers who received an early GDM (4 to 19+6 weeks) versus standard (after 20 weeks) diagnosis, since the implementation of the 2014 Australian Diabetes in Pregnancy (ADIPS) criteria.²

Methods
A retrospective audit was conducted of all GDM pregnancies presenting to the Central Coast Local Health District antenatal clinic between January 2019 to April 2024. GDM was present if oral glucose tolerance test (OGTT) results were consistent with 2014 ADIPS guidelines.² Maternal characteristics, antenatal treatment, maternal and neonatal outcomes, were obtained from electronic medical records.

Results
A total of 1883 pregnancies were included in the study, comprising 376 (20.0%) early and 1507 (80.0%) standard GDM diagnoses. Women with early GDM were older (32.24 v 31.37, p=0.004), more likely to have PCOS (20.5% v 12.5%, p<0.001), prior GDM (40.2% v 17.2%, p<0.001), and a family history of diabetes (44.9% v 33.3%, p<0.001) than standard GDM.

<i>Variable</i>	<i>Early GDM (n=376)</i>	<i>Standard GDM (n=1507)</i>	<i>Significance (p-value)</i>
	<i>n(%)</i>	<i>n(%)</i>	
Insulin treatment	267 (71.0)	728 (48.3)	<0.001
Spontaneous labour	72 (19.1)	442 (29.3)	<0.001
Emergency Caesarean	95 (25.3)	265 (17.6)	<0.001
	Mean (SD)	Mean (SD)	
Gestational age at delivery (weeks)	38.24±2.5	38.76±1.3	<0.001
Birthweight (g)	3336.23±702.9	3391.99±511.6	<0.001
Length (cm)	49.03±7.5	49.87±5.0	<0.001

Conclusion
Early GDM was associated with greater treatment requirements, increased obstetric intervention, and delivery of smaller neonates compared with standard GDM. Prospective studies are required to determine whether early treatment independently improves perinatal outcomes.

References

1. Simmons D, Immanuel J, Hague WM, Teede H, Nolan CJ, Peek MJ, et al. Treatment of Gestational Diabetes Mellitus Diagnosed Early in Pregnancy. N Engl J Med. 2023;388(23):2132-44. doi:10.1056/NEJMoa2214956.
2. Nankervis A, McIntyre H, Moses R, Ross GP, Callaway L, Porter C, et al. ADIPS Consensus Guidelines for the Testing and Diagnosis of Gestational Diabetes Mellitus in Australia and New Zealand [Internet]. 2013 [updated 2014 Nov; cited 2024 Apr 24]. Available from: https://www.adips.org/downloads/2014ADIPSGDMGuidelinesV18.11.2014_000.pdf

Impact of type 2 diabetes diagnosis on subjective life expectancy and healthy lifestyle behaviours in older Thai adults: longitudinal findings from the HART cohort

Ali S¹, Gu Y²

¹Saw Swee Hock School of Public Health, National University Of Singapore, Singapore, Singapore,

²School of Sociology, Nanjing Normal University, Nanjing, China

Aims: As T2D rises among older Thai adults, its impact on perceived longevity and lifestyle change is unclear; we examined whether diagnosis leads to reductions in subjective life expectancy and positive/adverse lifestyle changes using longitudinal, nationally representative Thai data.

Methods: We used four waves (2015, 2017, 2020, 2022) of the Health, Aging, and Retirement in Thailand (HART) cohort of adults ≥ 45 y ($n=8,086$) with survey weights for the sampling design. We summarised weighted T2D indicators, SLE (self-rated probability of being alive in 10y), and six lifestyle domains: leisure time physical activity (LTPA), smoking, alcohol use, sleep, stress management, and social engagement. Incident T2D was new physician diagnosis; logistic regression and GEE models, adjusted for sociodemographic and health factors, estimated associations of prevalent/incident T2D with SLE and behavioural transitions.

Results: T2D prevalence was 17.2% (SE:0.5); 268 participants developed T2D over follow up (4% incidence; 16.3/1,000 person-years). Most T2D cases were mild/moderate (89.2%), 95.0% received treatment, and 42.1% reported the condition as an obstacle, including 11.0% with considerable limitation. Unhealthy behaviours were common, particularly low LTPA 71.9% (SE:0.6) and social engagement 29.2% (SE:1.0). Mean 10y SLE was 70%; adults with T2D were less likely to rate their 10y survival chance $\geq 50\%$ (58.7%, SD:1.5 vs 66.5%, SD:0.7). In adjusted analyses, prevalent T2D was associated with lower odds of rating survival $\geq 50\%$ (OR:0.91, 95%CI:0.83-0.99). Incident diagnosis did not significantly alter annual SLE change. Following diagnosis, adults had lower odds of reporting any LTPA (OR:0.75, 95%CI:0.61-0.93) and initiating alcohol use (OR:0.47, 95%CI:0.29-0.75); other transitions were not significant.

Conclusions: Although adults with T2D reported lower SLE, diagnosis did not shift perceived longevity. No positive lifestyle changes emerged, and LTPA declined, indicating a need for stronger behavioural support at diagnosis. Further research should clarify how communication, risk perception, and context shape responses to better promote lifestyle change.

How remote, digital technologies shape Dyadic diabetes care for older adults and care partners: Realist synthesis of mechanisms and policy-relevant innovations

Ali S¹, Tariq O², Bin Abbas A³, Thu H⁴

¹National University Of Singapore, Singapore, Singapore, ²University of the Punjab, Lahore, Pakistan,

³Saving 9, Islamabad, Pakistan, ⁴Digital Transformations for Health Lab, Geneva, Switzerland

Aim/s: Dyadic care is often central to diabetes management, but rapid growth in remote, home-based technologies is reshaping how older adults and their spouses, adult children, and other informal caregivers share care tasks. Evidence is still scattered across tools and outcomes, offering limited clarity on what works, for whom, and when. We synthesised mechanisms and policy-relevant innovations to inform care for older populations.

Methods: Realist synthesis with searches of Embase, MEDLINE, PubMed, and Scopus (2005-2025) plus reference screening. Included studies used digital tools as core diabetes care components with an intended care-partner role. We appraised rigour and relevance, implications for patient, care partner, and dyadic outcomes, and synthesised Context-Mechanism-Outcome (CMO) configurations into a programme theory explaining how/when effects occur.

Results: Thirteen studies were included (3 controlled; 10 feasibility, qualitative, or process evaluations). Sample sizes ranged from 10 dyads to 2,072 patients; care partners were mainly spouses or adult children, co-resident or living-away. Innovations clustered into four models: shared real-time monitoring and alerts (eg, CGM sharing, home wound imaging), low-burden telemonitoring with caregiver summaries and escalation (IVR, calls or text), caregiver-mediated education with professional back-up, and paired adherence tools enabling caregiver oversight. We extracted 24 CMOs, consolidated into 10 across five domains: shared visibility and joint sensemaking, negotiated boundaries, prompted routines, caregiver capability-building with rapid feedback, and escalation linking home signals to timely care. Suppressors included caregiver overload, alert fatigue, and access or usability barriers limiting engagement. One controlled study showed predominantly positive clinical and behavioural effects; two reported mixed results, improving cardiometabolic control, emergency use, and caregiver burden/anxiety, with less consistent change in other outcomes.

Conclusion: Dyadic digital care for older adults is most effective when designed as a coordinated social and clinical system, combining low-burden channels, explicit roles and boundaries, equitable access supports, and reliable escalation into primary care.

Associations between cardiometabolic risk factors and consumption of different dairy products in type 2 diabetes in Iran: the RaNCD cohort study

Namazi N¹, **Anjom-Shoae J**^{2,3}, Safari-Faramani R⁴, Jones K^{2,3,5}, Horowitz M^{2,3,5}, Pasdar Y⁶

¹Diabetes Research Center, Endocrinology and Metabolism Research Institute, Tehran University of Medical Sciences, Tehran, Iran, ²School of Medicine, College of Health, Adelaide University, Adelaide, Australia, ³Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide, Australia, ⁴Department of Epidemiology, School of Health, Social Development and Health Promotion Research Center, Research Institute for Health, Kermanshah University of Medical Sciences, Kermanshah, Iran, ⁵Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia, ⁶Research Center for Environmental Determinants of Health (RCEDH), Health Institute, Kermanshah University of Medical Sciences, Kermanshah, Iran

Introduction and aims: Dairy products may affect cardiometabolic risk in type 2 diabetes (T2D) differentially. Fermented dairy products (e.g. yogurt) appear broadly protective and milk largely neutral-to-beneficial, while the effect of cheese is unknown. A current major limitation is that information in individuals with type 2 diabetes (T2D), particularly from Middle Eastern populations with distinct dietary patterns and high dairy consumption, remains limited. We have explored, in T2D, associations between cardiometabolic risk factors and consumption of different dairy products in Iran.

Materials and methods: This cross-sectional study included 783 adults with T2D (49% male; age 52±7 years; BMI 28±4 kg/m²) participating in the Ravansar Non-Communicable Disease (RaNCD) cohort study. Dietary intakes of milk, yogurt, cheese and dough (a traditional Persian fermented beverage made from yogurt, water and salt) were assessed using a validated 118-item food frequency questionnaire. Multiple logistic regression was used to determine associations between cardiometabolic risk factors (overweight/obesity, dyslipidaemia and hypertension) and consumption of dairy products after adjustment for age, sex, total energy and fat intake, physical activity, smoking, socioeconomic status, and fasting blood glucose.

Results: The odds of overweight/obesity (OR=0.42; 95% CI: 0.19–0.92), but not dyslipidaemia or hypertension, were reduced when total dairy consumption was higher, irrespective of fat content. The odds of overweight/obesity (OR=0.50; 95% CI: 0.29–0.87) were also inversely associated, while hypertension (OR=1.60; 95% CI: 1.03–2.49) was related directly, to dough consumption. No significant associations were observed between other cardiometabolic outcomes and consumption of milk, yogurt or cheese.

Conclusions: In Iranians with T2D, the odds of overweight/obesity are reduced by 58% and 50%, when consumption of dairy products and dough, respectively, are higher. That the odds of hypertension were, however, associated directly with consumption of dough underscores the importance of product-specific composition, particularly sodium content, in evaluating cardiometabolic impact of dairy products.

Insulin resistance assessed by HOMA-IR in overweight and obese adults in Mongolia

Batbayar D¹, Dorj B¹, Khishigt K², Jargal M¹, Maruush E³, Zorigbaatar C¹

¹Northern Cancer Center of Mongolia, Orkhon province, Erdenet city, Mongolia, ²Erdenet Sanatorium Complex, Orkhon province, Erdenet city, Mongolia, ³Ikh Tavat Hospital, Orkhon province, Erdenet city, Mongolia

Aim

Assessing insulin resistance is crucial for evaluating cardiovascular risk and preventing comorbidities associated with insulin resistance, particularly type 2 diabetes mellitus. The aim of this study is to assess the association between the degree of insulin resistance and the different components of the cardiometabolic factors among clients with overweight and obesity.

Method

In 2025, a cross-sectional study was conducted among 228 clients (male 166, female 162) who underwent preventive health screening at Erdenet Medical Hospital. Insulin resistance was assessed using the homeostasis model assessment of insulin resistance (HOMA-IR). HOMA-IR values were classified as follows: less than 1.9 indicating normal insulin sensitivity, 2.0 to 2.9 representing early insulin resistance, and 3.0 or greater signifying significant insulin resistance. Body mass index (BMI), Waist circumference (WC), blood pressure (BP), ankle-brachial index (ABI), ultrasonographic carotid intima-media thickness (IMT), lipid panels, glucose, HbA1C, insulin, C-Peptide and homeostasis model assessment of insulin resistance (HOMA-IR) were measured, in addition to CRP and smoking status.

Result

Among the participants with valid HOMA-IR data, 20.3% were classified as normal insulin sensitivity, 26.4% as showing early insulin resistance, and 53.3% as demonstrating significant insulin resistance. In terms of BMI category distribution, 53.1% were classified as overweight, 35.5% as stage 1 obesity. Significant differences were observed across HOMA-IR categories for BMI, WC, systolic BP, glucose, HbA1c, triglycerides, HDL, insulin, C-peptide and CRP ($p < 0.05$). There were no significant differences in age, ABI, CIMT, LDL, total cholesterol or smoking status across HOMA-IR categories ($p > 0.05$). HOMA-IR was positively correlated with glucose ($r = 0.51$, $p < 0.001$), TG ($r = 0.34$, $p < 0.001$), WC ($r = 0.26$, $p < 0.001$), BMI ($r = 0.22$, $p = 0.001$), Systolic BP ($r = 0.20$, $p = 0.003$).

Conclusion

More than half of the overweight or obese clients exhibited significant insulin resistance.

Confirmatory factor analysis of metabolic syndrome in polycystic ovary syndrome: Insights from a multi-country unselected population-based study

Bizuneh A¹, Melin J¹, Tay C^{1,2}, Earnest A³, Azziz R⁴, Suturina L⁵, Zhao X⁶, Gambineri A⁷, Tehrani F⁸, Yildiz B⁹, Kim J¹⁰, Xu L¹¹, Makwe C¹², Teede H^{1,2}, Joham A^{1,2}

¹Monash Centre for Health Research and Implementation, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, ²Department of Endocrinology and Diabetes, Monash Health, Melbourne, Australia, ³School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, ⁴Departments of Obstetrics and Gynecology, and Medicine, University of Alabama at Birmingham, Birmingham, United States, ⁵Department of Reproductive Health Protection, Scientific Center for Family Health and Human Reproduction Problems, , Russian Federation, ⁶Department of Reproductive Medicine, Guangdong Provincial People's Hospital (Guangdong Academy of Medical Sciences), Southern Medical University, Zhongshan, China, ⁷Department of Medical and Surgical Science-DIMEC, Division of Endocrinology and Diabetes Prevention and Care, IRCCS Azienda Ospedaliero-Universitaria di Bologna, Via Massarenti 9, , Italy, ⁸Reproductive Endocrinology Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Velenjak, Iran, ⁹Division of Endocrinology and Metabolism, Department of Internal Medicine, Hacettepe University School of Medicine, , Turkey, ¹⁰Division of Reproductive Endocrinology, Department of Obstetrics and Gynecology, Healthcare System Gangnam Center, Seoul National University Hospital, , Republic of Korea, ¹¹Department of Obstetrics and Gynecology, West China Second University Hospital, Sichuan University, , China, ¹²Department of Obstetrics and Gynaecology, College of Medicine, University of Lagos, Idi-Araba, Nigeria

Background: Metabolic syndrome (MetS), a heterogeneous cluster of cardiometabolic risk factors, is highly prevalent in women with polycystic ovary syndrome (PCOS). Despite increased metabolic risk in PCOS, the underlying structure of MetS and relationships among its components remain poorly understood, particularly in unselected, community-based populations.

Aim: To characterize the underlying structure of metabolic syndrome in unselected women with and without PCOS.

Methods: We analyzed data from the PCOS Phenotype in Unselected Population (P-PUP) cohort, an internationally diverse, multicenter, medically unbiased, and well-characterized harmonized dataset comprising women with and without PCOS from eight countries across four continents. The factor structure of MetS and the interrelationships among its components (obesity, lipids, insulin resistance (IR), and blood pressure (BP)) were evaluated.

Results: The study included 3321 women, of whom 19% had PCOS and 34.5% were obese. In women with and without PCOS, the latent MetS construct was strongly characterized by obesity (standardized loading = 0.97 vs 0.93), lipids (0.82 vs 0.75), and IR (0.90 vs. 0.78; all $p < 0.001$), whereas BP contributed minimally (0.24 vs 0.30). In women with PCOS, obesity was strongly correlated with IR ($r = 0.83$) and lipids ($r = 0.87$), and IR was strongly correlated with lipids ($r = 0.78$; all $p < 0.001$). The core structure of MetS differed between lean and overweight/obese women with PCOS.

Conclusion: Obesity, IR, and lipids were the strongest correlates of MetS in women with and without PCOS. Although the core structures of MetS are shared between women with and without PCOS, the construct is more strongly driven by obesity and IR in PCOS, indicating these are not merely contributors but central pillars of MetS in PCOS. These findings underscore the need for targeted interventions prioritizing weight management and insulin sensitization to mitigate the disproportionately high metabolic burden in women with PCOS.

Body mass index and waist-to-hip ratio patterns in women with and without polycystic ovary syndrome: evidence from an unselected population study

Bizuneh A¹, Tay C^{1,2}, Earnest A³, Azziz R⁴, Suturina L⁵, Zhao X⁶, Gambineri A⁷, Tehrani F⁸, Yildiz B⁹, Kim J¹⁰, Xu L¹¹, Makwe C¹², Teede H^{1,2}, Joham A^{1,2}

¹Monash Centre for Health Research and Implementation, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, ²Department of Endocrinology and Diabetes, Monash Health, Melbourne, Australia, ³School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, ⁴Departments of Obstetrics and Gynecology, and Medicine, University of Alabama at Birmingham, Birmingham, United States, ⁵Department of Reproductive Health Protection, Scientific Center for Family Health and Human Reproduction Problems, , Russian Federation, ⁶Department of Reproductive Medicine, Guangdong Provincial People's Hospital (Guangdong Academy of Medical Sciences), Southern Medical University, Zhongshan , China, ⁷Department of Medical and Surgical Science-DIMEC, Division of Endocrinology and Diabetes Prevention and Care, IRCCS Azienda Ospedaliero-Universitaria di Bologna, Via Massarenti 9, , Italy, ⁸Reproductive Endocrinology Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Velenjak, Iran, ⁹Division of Endocrinology and Metabolism, Department of Internal Medicine, Hacettepe University School of Medicine, , Turkey, ¹⁰Division of Reproductive Endocrinology, Department of Obstetrics and Gynecology, Healthcare System Gangnam Center, Seoul National University Hospital, , Republic of Korea, ¹¹Department of Obstetrics and Gynecology, West China Second University Hospital, Sichuan University, , China, ¹²Department of Obstetrics and Gynaecology, College of Medicine, University of Lagos, Idi-Araba, Nigeria

Background: Polycystic ovary syndrome (PCOS) is a heterogeneous endocrine disorder among women of reproductive age, often linked to obesity. However, current data are primarily derived from clinic-based cohorts, which are subject to referral bias and may overestimate obesity prevalence. The specific distribution of body mass index (BMI) and waist-hip ratio (WHR) across PCOS Phenotypes in unselected populations remains poorly characterized.

Aim: To characterize BMI and WHR patterns within a large, harmonized, and multiethnic cohort of women with and without PCOS.

Methods: This multi-center, community-based study pooled data from eight countries across four continents. Primary outcomes included BMI and WHR, categorized per World Health Organization criteria: BMI as lean (< 25 kg/m²) or overweight/obese (≥ 25 kg/m²), and WHR as normal (< 0.85) and central obesity (≥ 0.85). Clinical features were compared between PCOS and non-PCOS cohorts. Data were analyzed using a multivariable logistic regression model.

Results: Of 9240 women from 11 ethnic groups (predominantly Asian Chinese (Han), 45.2%; Persian, 22.2%), 11.4% were diagnosed with PCOS; 52.5% had normal BMI, 35.6% were overweight/obese, while 12% had central obesity. The odds of overweight/obesity and central obesity were higher in women with PCOS. The odds of overweight/obesity in PCOS were higher across all ethnic groups, except for Asian Koreans, while White Italian and Black American women had higher odds of central obesity.

Conclusion: Our findings indicate that in these unselected populations, whilst women with PCOS were more likely to have a higher BMI, most women with PCOS had a normal BMI, contrasting with prior clinic-based studies. We showed ethnic heterogeneity in BMI and central obesity. Longitudinal, population-based studies integrating genomic, metabolic, and body composition are essential to unravel BMI and WHR-related heterogeneity and to inform ethnicity-specific risk stratification and precision management in PCOS.

Linking periodontal health and glycaemic control in adults with diabetes: Implications for integrated care and public health

Wong G², Glastras S^{1,3}, **Brennan S**¹, Saponja M^{2,4}, Cheng A^{2,4}, Walk J⁵, Cheng K⁴, You W⁶

¹Department of Endocrinology, Royal North Shore Hospital, St Leonards, Australia, ²Oral Health Services, Primary and Community Health, Northern Sydney Local Health District, St Leonards, Australia, ³Kolling Institute, University of Sydney, St Leonards, Australia, ⁴Sydney Dental School, Faculty of Medicine and Health, The University of Sydney, Australia, ⁵Nursing & Midwifery Research, Northern Sydney Local Health District, St Leonards, Australia, ⁶School of Nursing and Midwifery, Western Sydney University, Parramatta, Australia

Aim/s: To examine periodontal status and its association with glycaemic control among adults with diabetes attending an outpatient clinic in Sydney, Australia, and to describe behavioural, access, and service-related factors relevant to public health and diabetes service delivery.

Methods: This cross-sectional study included adults with type 1 or type 2 diabetes who underwent periodontal screening using the Periodontal Screening and Recording (PSR) index. PSR scores were used for continuous analyses, while PSR severity-based categories summarised periodontal burden. Glycaemic control was assessed using glycated haemoglobin (HbA1c). Participants completed questionnaires on demographics, oral hygiene practices, lifestyle behaviours, dental service access, and awareness of the diabetes–oral health relationship. Associations were examined using correlation, partial correlation and regression analyses.

Results: A total of 120 participants were included (36% type 1 diabetes, 64% type 2 diabetes). Overall mean PSR was 1.97 (SD 0.82), indicating moderate periodontal involvement, with more severe periodontal burden observed among participants with type 2 diabetes. Mean PSR was positively correlated with HbA1c ($r = 0.35$, $p < .001$) and remained significantly associated after adjustment for age, total cholesterol, and creatinine. In multivariable regression, each one-unit increase in mean PSR corresponded to approximately 9 mmol/mol higher HbA1c ($\beta = 0.42$, $p < .001$). Oral hygiene practices were below recommended levels, over one-quarter of participants had not attended a dentist in more than two years, and awareness of the diabetes–oral health relationship was limited.

Conclusions: Poor periodontal status was independently associated with higher glycaemic levels in this outpatient diabetes population. The combination of periodontal burden, limited awareness among participants, and gaps in preventive care highlights an opportunity for public health and service-level intervention. Integrating periodontal screening and oral health education into diabetes services may support earlier risk identification and more holistic chronic disease management.

Exploration of genetic risk-stratified screening for Type 1 Diabetes in primary care: An Australian pilot study

Brodie S^{1,2}, Craig M^{1,2,3,4,5}, Cameron F^{6,7,8}, Couper J^{9,10}, Colman P^{11,12}, Davis E^{13,14,15}, Deed G¹⁶, Gleeson M¹⁷, Hendrieckx C^{18,19,20}, Hoffman R²¹, Huynh T^{22,23,24}, Nassar N^{1,25,26}, Pawlak D²⁷, Speight J^{18,19,20}, Wentworth J^{11,28}, Bell K^{1,2}

¹Charles Perkins Centre, University Of Sydney, Camperdown, Australia, ²The Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, University of Sydney, Westmead, Australia, ³Institute of Endocrinology and Diabetes, The Children's Hospital at Westmead, Westmead, Australia, ⁴Department of Paediatrics, St George Hospital, Kogarah, Australia, ⁵School of Clinical Medicine, University of New South Wales, Kensington, Australia, ⁶Department of Diabetes and Endocrinology, Royal Children's Hospital, Parkville, Australia, ⁷Murdoch Children's Research Institute, Parkville, Australia, ⁸Department of Paediatrics, University of Melbourne, Parkville, Australia, ⁹Diabetes and Endocrinology, Women's and Children's Hospital, North Adelaide, Australia, ¹⁰Robinson Research Institute, University of Adelaide, North Adelaide, Australia, ¹¹Department of Diabetes and Endocrinology, Royal Melbourne Hospital, Parkville, Australia, ¹²University of Melbourne Department of Medicine, Royal Melbourne Hospital, Parkville, Australia, ¹³Children's Diabetes Centre, The Kids Research Institute Australia, Nedlands, Australia, ¹⁴Department of Endocrinology and Diabetes, Perth Children's Hospital, Nedlands, Australia, ¹⁵University of Western Australia Medical School Paediatrics Division, The University of Western Australia, Nedlands, Australia, ¹⁶Monash University, Melbourne, Australia, ¹⁷Caringbah Family Practice, Caringbah, Australia, ¹⁸The Australian Centre for Behavioural Research in Diabetes, Diabetes Victoria, North Melbourne, Australia, ¹⁹School of Psychology, Deakin University, Geelong, Australia, ²⁰Institute for Health Transformation, Deakin University, Geelong, Australia, ²¹Graduate School of Medicine, University of Wollongong, Wollongong, Australia, ²²Department of Endocrinology and Diabetes, Queensland Children's Hospital, South Brisbane, Australia, ²³Child Health Research Centre, Faculty of Health, Medicine, and Behavioural Sciences, The University of Queensland, South Brisbane, Australia, ²⁴Department of Chemical Pathology, Mater Health Services, South Brisbane, Australia, ²⁵Child Population and Translational Health Research, Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, University of Sydney, Camperdown, Australia, ²⁶Leeder Centre for Health Policy, Faculty of Medicine and Health, University of Sydney, Newtown, Australia, ²⁷Breakthrough T1D, St Leonards, Australia, ²⁸St Vincent's Institute of Medical Research, Fitzroy, Australia

Aim: As a national screening program for type 1 diabetes (T1D) is being considered, implementation strategies that promote broad uptake, access, and acceptability are key. This study aimed to explore a polygenic risk-stratified T1D screening program embedded in routine childhood immunisation visits in primary care.

Method: A single-arm implementation pilot in three general practices in South-Eastern Sydney (April–August 2025). Infants attending routine immunisation appointments at 6 weeks, 4 months, or 6 months of age were offered screening using the T1D genetic risk score 2 (GRS2) from a heel prick dried bloodspot. Infants at increased risk (>90th centile) were offered islet autoantibody screening at 12 months of age. Parents were invited to complete surveys at the time of screening.

Results: Of an estimated eligible population of 275 infants, 51 were consented and screened (female: 53%; aged 6 weeks: 33%; 4 months: 36%; 6 months: 27%). Four (8%) returned an increased risk result. To date, all who have turned 12 months of age have undergone follow-up sample collection and returned a negative autoantibody result. Nineteen parents completed surveys (32%). T1D risk-related anxiety was low (modified State Anxiety Inventory (SAI): 36 ± 12 points), with most reporting no-to-low anxiety (SAI: 24–40 points; 68%). Parents felt screening was acceptable (100%), worthwhile (89%), and should be available to all Australian children (95%). Reasons for taking part included: benefit to their child (84%) or others (53%), and health professional recommendation (42%). Half reported no barriers to participating (52%) and the most common barrier was concern about the test being painful (26%).

Conclusion Genetic risk-stratified T1D screening aligned with routine infant immunisations in primary care appears feasible and acceptable. Larger studies and mixed method approaches are warranted to

confirm findings. Increasing uptake and addressing concerns around sample collection may enhance a future national screening program.

Funding: Breakthrough T1D

Glycemic characteristics of pregnant women with Gestational Diabetes in China using OTC CGM

Cao L¹, Yao Y¹, Mo Y², Ma X¹, Lu J¹, Zhou J¹

¹Shanghai Sixth People's Hospital, Shanghai, China, ²Shenzhen Sibionics Technology Co.,LTD, Shenzhen, China

Aims: This study analyzed over-the-counter (OTC) real-time continuous glucose monitoring (CGM) data from Chinese patients to evaluate glycemic characteristics in pregnant women with gestational diabetes, and to compare CGM metrics across different treatment groups.

Methods: This cross-sectional study included 5847 pregnant women with gestational diabetes who self-purchased real-time CGM devices between 2022 and 2023. A total of 10888 CGM reports were obtained. Demographic and clinical information was self-reported via the mobile application. All sensor-derived parameters were aggregated, and mean values were calculated as individualized CGM metrics, including time in range (TIR, 3.5–7.8 mmol/L), time above range (TAR, >7.8 mmol/L) and time below range (TBR, <3.5 mmol/L). Attainment of CGM targets was also compared across treatment groups.

Results: The median TIR, TAR and TBR in the study population were 93.9%, 4.5% and 1.1%, respectively. Compared with the non-insulin treatment group, the insulin-treated group showed lower TIR and higher TAR and TBR (all $P < 0.05$). Among insulin-treated women, those using insulin pumps exhibited lower TIR, higher TAR and TBR, and lower attainment rates for all CGM metrics than those receiving subcutaneous insulin injections (all $P < 0.05$).

Conclusion: Overall glycemic control was generally favorable among Chinese pregnant women with gestational diabetes using OTC CGM. Nevertheless, glycemic control was less favorable in women receiving insulin therapy, especially those using insulin pumps. OTC CGM data may provide insight into natural glucose management behaviors outside clinical supervision, offering valuable real-world evidence for optimizing diabetes care during pregnancy.

Keywords: continuous glucose monitoring; gestational diabetes; real-world data

Sustained physical activity and diabetes risk: A target trial emulation using the Australian diabetes, obesity and lifestyle study

Cao T^{1,2}, Li X¹, Dunstan D^{2,3}, Shaw J²

¹School of Allied Health, Human Services and Sport, La Trobe University, Bundoora, Australia, ²Baker Heart and Diabetes Institute, Melbourne, Australia, ³Faculty of Health/School of Exercise and Nutrition Sciences/Institute for Physical Activity and Nutrition, Deakin, Burwood, Australia

Aim: To estimate the causal effect of sustained adherence to moderate-to-vigorous physical activity (MVPA) guidelines on incidence of diabetes using a target trial emulation framework.

Methods: We emulated a hypothetical target trial using data from the Australian Diabetes, Obesity and Lifestyle Study (AusDiab), a national longitudinal cohort with assessments at baseline, 5-year, and 12-year follow-up. Eligible participants were adults free of diagnosed diabetes at baseline and the 5-year visit, which served as time zero for the emulated trial. Sustained adherence was defined as ≥ 150 minutes/week of MVPA at both baseline and 5 years; participants reporting < 150 minutes/week at both time points were classified as non-adherent. Individuals with discordant activity patterns were excluded to ensure comparison of sustained exposure strategies. Incident diabetes at 12 years was the primary outcome. Missing data were addressed using multiple imputation by chained equations ($M=40$). Average treatment effects (ATE) were estimated using targeted maximum likelihood estimation (TMLE) with Super Learner and pooled using Rubin's rules.

Results: Sustained adherence to physical activity guidelines during the 5-year exposure period was associated with a substantially lower probability of developing diabetes by the 12-year follow-up. The expected probability of diabetes if none adhered (EY_0) was 0.388 (SE 0.141; 95% CI 0.104–0.672; $p=0.009$), compared with 0.018 (SE 0.008; 95% CI 0.002–0.034; $p=0.025$) if all adhered (EY_1). The average treatment effect ($ATE = EY_1 - EY_0$) was -0.369 (SE 0.139; 95% CI -0.651 to -0.088 ; $p=0.011$), representing a 36.9 percentage-point lower probability of developing diabetes under sustained adherence to MVPA guidelines.

Conclusion: Sustained adherence to physical activity guidelines was associated with a significantly lower risk of incident diabetes over 12 years. These findings support regular physical activity as an important strategy for long-term diabetes prevention.

Prevalence of paradoxical hypoglycemia following oral glucose tolerance test (OGTT) and its association factors among high-risk Thai participants for type 2 diabetes

Chatchomchuan W¹, Thewjitcharoen Y¹, Wanothayaroj E¹, Butadej S¹, Nakasatien S¹, Himathongkam T¹

¹Theptarin Diabetes, Thyroid and Endocrine Center, Vimut-Theptarin Hospital, Bangkok, Thailand

Background: Hypoglycemia following OGTT during diabetes screening has been linked with higher future risk of developing diabetes and preclinical atherosclerosis. Exaggerated insulin secretion associated with increased incretin levels is regarded as possible mechanism of reactive hypoglycemia in these patients though major gaps remain in our understanding of this phenomenon.

To determine the prevalence and associated factors of paradoxical hypoglycemia after OGTT in individuals with normal glucose tolerance, and to assess these associations using the newly proposed IDF criteria.

Aim:

Method: An 18-year retrospective study was conducted among high-risk individuals who underwent OGTT between 2007 and 2024. Blood samples were collected at 0, 60, and 120 minutes. Individuals with normal glucose tolerance and 2-hour plasma glucose <70 mg/dL were identified and compared with those with normal OGTT results. The newly proposed OGTT criteria using 1-hour plasma glucose cutoffs of 155 mg/dL for intermediate hyperglycemia and 209 mg/dL for type 2 diabetes were applied.

Results: A total of 1,189 OGTT records were reviewed. Based on traditional criteria, 554 patients (46.5%) had normal glucose tolerance. Post-OGTT hypoglycemia occurred in 14 patients (14/554; 2.5%). These patients tend to be younger than those without hypoglycemia (mean age 46.4 ± 12.3 vs. 48.0 ± 12.9 years). Elevated 1-hour plasma glucose (≥ 209 mg/dL) was found in 10.9% of the normal glucose tolerance group, compared with 7.1% in the hypoglycemia group (P -value = 0.653). According to the newly proposed IDF criteria, these individuals could be reclassified as having type 2 diabetes mellitus.

Conclusion: OGTT-induced paradoxical hypoglycemia in individuals with normal glucose tolerance was rare and more common in younger participants. A 1-hour OGTT alone may miss these cases. Hypoglycemia during OGTT should be monitored, as it may associated with future glycemetic deterioration.

Unveiling diagnostic information for type 2 diabetes through interpretable machine learning

Chen Q¹, Zhong C¹

¹The Affiliated Hospital Of Southwest Medical University, Luzhou, China

Objective: This study aims to develop a highly interpretable diagnostic model for Type 2 Diabetes Mellitus (T2DM) to overcome the “black box” limitation of traditional machine learning in healthcare, extract clear and clinician-friendly diagnostic information from electronic health records (EHRs), and improve the transparency, trustworthiness, and clinical usability of artificial intelligence (AI)-assisted T2DM diagnosis.

Research Design and Methods: We proposed DSpaLaRefiner, a novel interpretable deep learning algorithm that captures key data-space landmarks to achieve both global and local interpretability. It amplifies significant features via radial basis distances and quantifies feature contributions at the individual sample level. Global feature importance was identified through 100 repeated modeling runs. The model was trained, internally validated, and externally validated using EHRs from two hospitals in Southwest China, including over 16,000 T2DM patients and healthy controls with 39 physical examination indicators. Its performance was compared with SVM, random forest (RF), logistic regression (LR), multilayer perceptron (MLP), and modified attention network (AN).

Results: In internal validation, DSpaLaRefiner achieved accuracies of 0.9879, 0.9722, and 0.9767 on three independent datasets, and 0.9190 in external validation, outperforming all conventional methods. It stably identified core diagnostic markers including blood glucose, age, urine glucose, hematocrit, and HDL-C. The model provided sample-specific local explanations for each prediction and extracted clinically consistent indicator intervals fully aligned with existing medical knowledge.

Conclusions: It identified key diagnostic features including blood glucose, age, and urine glucose, provided sample-specific local explanations, and extracted clinically consistent indicator intervals. This model offers high accuracy and dual interpretability, supporting trustworthy AI-assisted T2DM diagnosis.

Projected impact of ADIPS 2025 diagnostic thresholds on gestational diabetes prevalence and perinatal outcomes: a retrospective cohort reclassification study

Cooper J¹, Deitch J^{1,2}, Yates C^{1,2}, Lee I^{1,2}

¹Department of Diabetes & Endocrinology, Western Health, St Albans, Australia, ²Department of Medicine, University of Melbourne, Parkville, Australia

Background: The Australasian Diabetes in Pregnancy Society (ADIPS) 2025 guideline raised diagnostic thresholds for gestational diabetes mellitus (GDM) to better target women more likely to benefit from intensive diabetes management, while reducing overdiagnosis and health system burden.

Aim: To quantify the expected change in GDM prevalence with application of ADIPS 2025 criteria and to compare maternal characteristics and key perinatal outcomes between women who would be *reclassified* as not having GDM versus women who *retained* a diagnosis of GDM.

Methods: Retrospective observational cohort of 7,385 singleton births ≥20 weeks' gestation at Western Health in 2019. Women were classified by OGTT into: no GDM; GDM by ADIPS 2014 criteria but not by ADIPS 2025 (ADIPS-2014-only); and GDM by ADIPS 2025. Baseline characteristics were compared across groups. The primary outcome was large-for-gestational-age (LGA). Outcomes were compared between groups with modified Poisson regression, adjusting for maternal age, BMI, and country of birth, with and without treatment (medical nutritional therapy +/- insulin) included.

Results: Using ADIPS 2014 criteria, 1,629/7,385 (22.1%) women were diagnosed with GDM versus 939/7,385 (12.7%) applying ADIPS 2025, with 690/1,629 (42%) reclassified as not having GDM. LGA occurred in 9.2% (no GDM), 5.8% (ADIPS-2014-only), and 11.4% (ADIPS 2025). Compared with ADIPS 2025, the ADIPS-2014-only group had a lower adjusted risk of LGA (adjusted risk ratio ~0.55; 95% CI 0.37-0.78), consistent with and without adjustment for treatment. There was no significant difference between GDM groups for other outcomes including neonatal hypoglycaemia, pre-eclampsia, and shoulder dystocia.

Conclusions: Applying ADIPS 2025 thresholds to a large, multi-cultural cohort would reduce GDM diagnoses by 40% and preferentially treat women at higher LGA risk. Ongoing post-implementation evaluation is needed to assess outcomes and equity impacts among women no longer meeting diagnostic criteria, and therefore no longer performing glycaemic monitoring, receiving treatment, or undergoing post-pregnancy type 2 diabetes screening.

Improving diabetes burden estimates: developing an algorithm to identify and exclude gestational diabetes in linked health data

Gale J¹, Cox E^{1,2}, Lyons-Reid J¹, Colagiuri S^{2,3}, **Nassar N**^{1,2,4}, Gibson A^{1,2}

¹The Leeder Centre for Health Policy, Economics and Data, The University Of Sydney, Sydney, Australia, ²Charles Perkins Centre, The University of Sydney, Sydney, Australia, ³Faculty of Medicine and Health, The University of Sydney, Sydney, Australia, ⁴Child Population and Translational Health Research, Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

Aim: Gestational diabetes mellitus (GDM) is identified through routine testing at 24–28 weeks gestation and generally resolves post-birth. Differentiating GDM from pre-existing diabetes within administrative health data can be challenging due to overlap in the types of treatments used; however, it is essential for improving population-level diabetes surveillance. We aimed to develop and apply an algorithm to distinguish GDM from type 1 and type 2 diabetes amongst diabetes cases identified in linked administrative health datasets.

Methods: We used the Medicines Intelligence Data Platform comprising linked hospital admissions, Medicare claims and Pharmaceutical Benefits Scheme medication data to identify adults with any diabetes in NSW, 2013–2021. Individuals with diabetes were identified using a validated algorithm based on indicators including diabetes-related Medicare service claims, insulin and/or glucose lowering medicine dispensing, and diabetes-related hospital admissions

Results: Development of the GDM-specific algorithm involved two stages. In Stage 1, women with diabetes were screened for: 1) a recorded diagnosis of GDM in a hospital admission (ICD10-AM O24.4); or 2) claims for insulin, metformin and/or HbA1c tests which only fell within 6-months of a birth (obstetric ICD10-AM code: Z37.X, O80.X-084.X). The 6-month period surrounding the GDM or obstetric code was defined as the 'GDM window', and all diabetes indications within this window were recoded as 'GDM flags'. Stage 2 assessed the timing of diabetes indicators relative to the GDM window to classify women as: GDM only; GDM followed by diabetes; or diabetes prior to GDM, with the latter categorised based on the type of pre-pregnancy claims.

Conclusion: The resulting algorithm enhances the identification and exclusion of GDM within linked administrative health data, improving the accuracy of classifying type 1 and type 2 diabetes cases at the population level. Incorporating this approach into routine data surveillance can strengthen national estimates of diabetes prevalence and incidence.

Regional variation in diabetes burden across Primary Health Networks in New South Wales, Australia

Cox E¹, Gale J¹, Falster M³, Meyerowitz-Katz G⁴, Maberly G⁴, Williams K^{5,6}, Colagiuri S^{2,7}, Nassar N^{1,2,8}, Gibson A^{1,2}

¹Leeder Centre for Health Policy, Economics and Data, The University Of Sydney, Sydney, Australia,

²Charles Perkins Centre, The University of Sydney, Sydney, Australia, ³Medicines Intelligence

Research Program, School of Population Health, University of New South Wales, Sydney, Australia,

⁴Western Sydney Diabetes, Integrated and Community Health, Western Sydney Local Health District,

Blacktown, Australia, ⁵ Nepean Blue Mountains Family Metabolic Health Service, Nepean Blue

Mountains Local Health District, Kingswood, Australia, ⁶ Charles Perkins Centre-Nepean, The

University of Sydney, Sydney, Australia, ⁷Faculty of Medicine and Health, The University of Sydney,

Sydney, Australia, ⁸Child Population and Translational Health Research, Children's Hospital at

Westmead Clinical School, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

Aims: To assess the prevalence and incidence of diabetes amongst adults in New South Wales (NSW), by primary health network (PHN).

Methods: This study used a population-level linked data asset containing records for all Medicare-eligible adults residing in NSW, Australia, from 2005–2020 (n =7.4 million). Individuals with diabetes (excluding gestational diabetes mellitus) were identified using a validated algorithm based on a combination of diabetes-related medical service claims, dispensed insulin and/or glucose lowering medicines, and diabetes-related hospital admissions. Crude prevalence and incidence estimates were calculated for 2019 and stratified by PHN according to individuals' postcode of residence. Prevalence estimates were compared with 2018 National Diabetes Services Scheme (NDSS) registrant data.

Results: Diabetes prevalence varied substantially across PHNs, ranging from 12.4% in South Western Sydney to 7.1% in Northern Sydney – 1.5-2.0 times higher than NDSS registrations (**Figure 1**). A similar pattern was observed for incidence, with the highest annual rates in Western NSW (9.0 per 1000 person-years) and Western Sydney (8.6 per 1000 person-years), nearly double that of Northern Sydney (4.8 per 1000 person-years). Time trend analyses of age-sex-standardised prevalence and incidence are underway, with results expected by August.

Conclusions: Our findings highlight geographic disparities and a higher-than-expected diabetes burden across NSW compared with National Diabetes Services Scheme data. Ongoing monitoring of regional variations in diabetes prevalence and incidence can be used to support PHN needs assessments, guide investment in diabetes prevention and management, and highlight successful local-level initiatives.

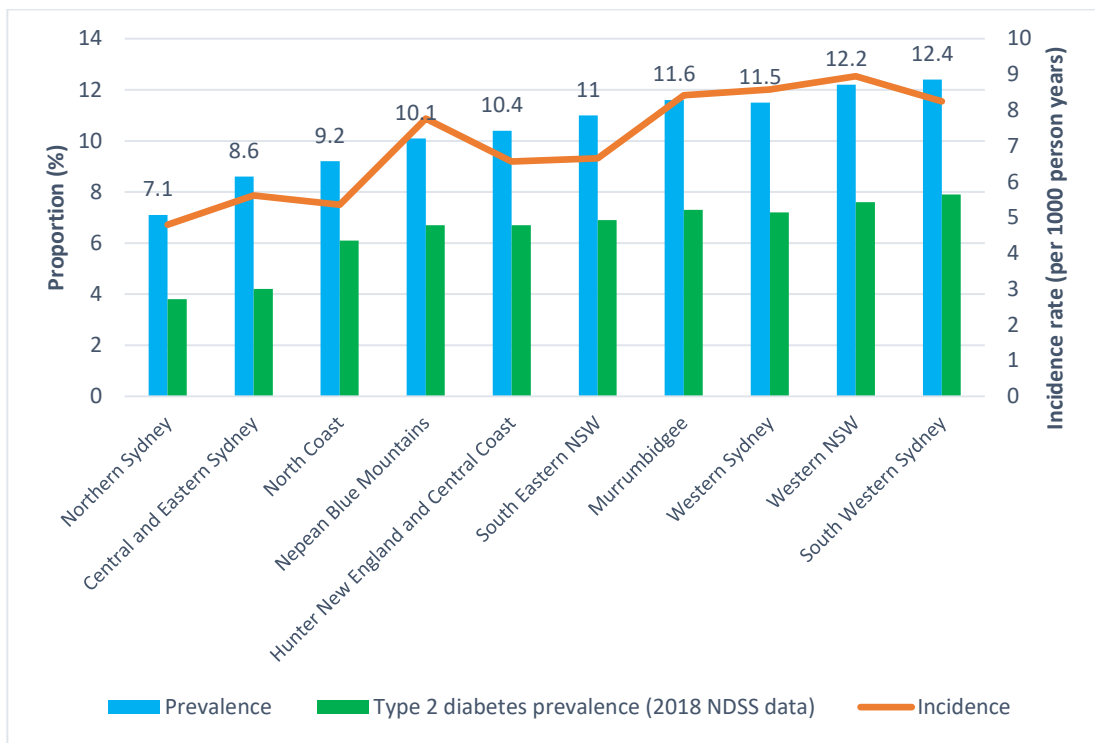


Figure 1. Diabetes prevalence and incidence across NSW PHNs in 2019, including comparison with 2018 National Diabetes Services Scheme (NDSS) type 2 diabetes prevalence estimates

Affordable but underused: 10-year trends in utilisation and out-of-pocket costs of Medicare-funded allied health services for diabetes management

Cox E^{1,2}, Gale J^{1,2}, van Gool K¹, Falster M³, Parr E⁴, Colagiuri S^{2,5}, Nassar N^{1,2,6}, Gibson A^{1,2}

¹Leeder Centre for Health Policy, Economics and Data, The University Of Sydney, Sydney, Australia,

²Charles Perkins Centre, The University of Sydney, Sydney, Australia, ³Medicines Intelligence

Research Program, School of Population Health, University of New South Wales, Sydney, Australia,

⁴Exercise and Nutrition Research Program, Mary MacKillop Institute for Health Research, Faculty of Health Sciences, Australian Catholic University, East Melbourne, Australia, ⁵Faculty of Medicine and

Health, The University of Sydney, Sydney, Australia, ⁶Child Population and Translational Health Research, Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

Aims: To examine utilisation, out-of-pocket (OOP) costs and bulk billing rates for Medicare-funded allied health services used for diabetes management in New South Wales (NSW).

Methods: This study used a population-level linked data asset containing records for all Medicare-eligible adults ≥ 18 years residing in NSW, Australia, from 2005 – 2020 ($n = 7.4$ million). Individuals with diabetes were identified using a validated algorithm combining diabetes-related medical service claims, dispensed insulin and/or glucose lowering medicines, and diabetes-related hospital admissions. Medicare data (Medicare Benefits Schedule, MBS) were used to identify annual claims, mean OOP costs and bulk billing rates for Medicare-funded allied health services from 2012 – 2021. Costs were adjusted to 2021 prices.

Results: The proportion of individuals with diabetes with ≥ 1 allied health claim increased from 28.9% in 2012 to 35.7% in 2019 (23.5% relative increase), before decreasing to 34.0% during 2021. When stratified by provider type, utilisation of dietetic and diabetes education services steadily decreased over the 10-year period, from 4.2% to 2.8% and from 1.9% to 1.2% with ≥ 1 claim, respectively. In contrast, podiatry and physiotherapy service use increased from 20.3% to 24.1%, and 5.1 to 7.6%, respectively. Podiatry services accounted for close to two-thirds of total allied health claims annually. Bulk billing rates remained consistent at around 72% of total annual claims. For non-bulk billed services, mean OOP costs increased from \$12.5 to \$19.0 (52% increase), with dietetic and physiotherapy services experiencing the greatest growth.

Conclusions: Medicare-funded allied health use has remained low over the past decade, with approximately one-third of individuals accessing a service annually. Although OOP costs per service have increased over time, they remain relatively modest. These trends may suggest that individuals with diabetes are seeking allied health care from low or no OOP fee providers, who may be in limited supply.

From ulcer to amputation: incidence, timing and risk factors for minor and major amputations in people with diabetes-related foot ulcers

Cramb S^{1,2}, Zhang Y^{1,3}, McPhail S^{1,4}, Pacella R⁵, van Netten J^{1,6}, Kinnear E⁷, Lazzarini P^{1,7}

¹Australian Centre for Health Services Innovation, Queensland University of Technology, Kelvin Grove, Australia, ²Jamieson Trauma Institute, Metro North Health, Brisbane, Australia, ³Karolinska Institute, Stockholm, Sweden, ⁴Metro South Health, Brisbane, Australia, ⁵Institute for Lifecourse Development, University of Greenwich, London, UK, ⁶University of Amsterdam, Amsterdam, The Netherlands, ⁷The Prince Charles Hospital, Metro North Health, Brisbane, Australia

Aims

To examine the incidence, timing and risk factors for minor and major amputations among people with diabetes-related foot ulcers (DFU).

Methods

This was a secondary analysis of data from a prospective cohort of patients with DFU who attended any of 65 outpatient Diabetic Foot Service clinics across Queensland between 1 July 2011 and 31 December 2017. All patients had 34 socio-demographic, co-morbidity, limb, ulcer, and treatment factors collected at their first visit and were followed until their first DFU-related hospitalisation with a minor or major amputation procedure, ulcer healing, death, or 24 months. Incidence rates were calculated separately for minor and major amputations using person-years of follow-up and time-to-procedure using medians. Risk factors were identified using univariate Cox analyses and multivariable flexible parametric survival models.

Results

Of 4709 patients, the cohort median age was 63 years (IQR 54–72), 70% were men, 91% had type 2 diabetes, 53% resided in major cities and 11% were Indigenous Australians. The incidence of minor and major amputations per 100 person-years with ulcers was 18.0 (95% CI, 17.0–20.0) and 5.3 (4.4–6.3), respectively. Median time to minor amputation was 77 days (IQR 23–195), shorter than the 96 days for major amputation (IQR 29–271; major vs minor: $p=0.021$). Risk factors for both minor and major amputations were end-stage renal disease, mild-to-severe peripheral artery disease, and deep ulcers (all $p<0.05$). Additional risk factors unique to minor amputation were smoking, previous amputations, moderate-to-severe infection, previous DFU care by a nurse, no DFU debridement and no knee-high offloading treatment. Risk factors unique to major amputation were larger ulcer size.

Conclusion

These findings may help Diabetic Foot Services identify which people with DFU are most likely to benefit from more intensive management to prevent amputations.

Reframing GDM prevention: values-driven messaging to support health promoting behaviours in pregnancy

de Jersey S¹, May K², Albion A², Gedge V¹, Sutherland D¹, Fitzpatrick J¹, Chenary M²

¹Prevention Strategy Branch, Population Health Division, Queensland Health, Herston, Australia,

²Common Cause Australia, Canberra, Australia

Aim:

Gestational diabetes mellitus (GDM) is the most common medical condition of pregnancy. Although behaviour change is central to prevention, population-level messaging risks reinforcing stigma and disengagement. This study aimed to identify implementable, non-stigmatising messaging principles to support health promoting behaviours and GDM risk reduction within routine antenatal care and public health systems.

Methods:

A qualitative study was conducted with women who had experienced pregnancy within the previous five years. Purposive sampling ensured diversity in body size, GDM experience, language background and pregnancy complexity. Semi-structured focus groups explored concepts relating to nutrition, physical activity, weight and GDM prevention. Reflexive thematic analysis identified framing approaches that were perceived as motivating, respectful and non-stigmatising, and feasible for population level implementation.

Results:

Eighteen focus groups with women (n=130, aged 35 ± 4 years) from across Australia were conducted, segmented for weight stigma experience. Participants reported conversations about reducing GDM risk was uncommon. Behaviour-focused messages (nutrition, physical activity and help-seeking) were consistently more acceptable and motivating than messages centred on weight or GDM risk. Strengths-based framing that emphasised autonomy, flexibility and lived realities of pregnancy reduced perceptions of blame. Participants supported universal delivery of consistent messaging, rather than segmentation by body size to minimise inequity and harmful assumptions. Messages were most implementable when they prioritised achievable actions; acknowledged variability in capacity; framed maternal and infant health as interconnected; and offered multiple pathways for support. Weight and GDM information was appropriate when delivered sensitively, individualised with clear clinical rationale and reassurance.

Conclusion

Values-based messaging represents a scalable, low-cost strategy to strengthen GDM risk reduction efforts without exacerbating weight-based stigma. Embedding these principles into antenatal guidelines, clinician training, and public health campaigns can improve acceptability, support engagement, and enhance the effectiveness of population-level diabetes prevention initiatives.

Beyond BMI: Sex- and age-specific DXA-derived body composition phenotypes and diabetes risk in US adults

Dejenie T¹, Mannan H², Fahey P¹, Adapa S¹, Atlantis E¹

¹School of Health Sciences, Western Sydney University, Campbelltown, New South Wales, Australia,

²Translational Health Research Institute, Western Sydney University, Campbelltown, New South Wales, Australia

Background & Aim: BMI does not distinguish fat from lean mass and may therefore inadequately capture adiposity-related diabetes risk. We aimed to derive sex- and age-specific diabetes-optimized DXA body composition thresholds, examine DXA-derived phenotypes in relation to diabetes and evaluate concordance with BMI-defined obesity.

Methods: We analyzed 8,125 U.S. adults aged 20–59 years from NHANES 2013–2018 with valid DXA measures. Sex- and age-specific fat mass index (FMI) thresholds optimized for prevalent diabetes were identified using receiver operating characteristic analyses, and low appendicular lean mass index (ALMI) was defined as <10th percentile. Participants were classified into mutually exclusive DXA-phenotypes based on FMI and ALMI. Survey-weighted logistic regression models examined associations between phenotypes and prevalent diabetes. BMI-DXA concordance analyses assessed adiposity misclassification.

Results: FMI was positive associated with diabetes, whereas ALMI was inversely associated only after mutual adjustment. Prevalence of diabetes ranged from 4.7% (normal FMI/ALMI) to 22.0% (high FMI/low ALMI). The high FMI and low ALMI phenotype showed the strongest association with prevalent diabetes (OR 4.40; 95% CI: 3.20–5.41). DXA-defined obesity (using diabetes-optimized FMI thresholds) was associated with more than twofold higher odds of prevalent diabetes (OR 2.15; 95% CI: 1.23–3.78), with the highest odds observed among those classified with obesity by both measures (OR 4.67; 95% CI: 3.67–5.94).

Discussion/Conclusion: Adiposity and lean mass are jointly linked to diabetes risk. These findings highlight the importance of moving beyond weight-based metrics toward integrated body composition assessment for improved diabetes risk stratification, though prospective studies are needed to confirm predictive utility

Diabetes alliance program plus and HbA1c outcomes in people with type 2 diabetes: an emulated cluster trial using linked general practice data

Dizon J^{1,2}, Hure A^{1,2}, Parsons M³, Joseph M³, Southwell A³, Oldmeadow C^{1,2}, Barker D^{1,2}, Skippen P^{1,2}, Taylor R^{1,2}, Acharya S^{1,3}

¹University of Newcastle, Callaghan, Australia, ²Hunter Medical Research Institute, New Lambton Heights, Australia, ³Hunter New England Local Health District, New Lambton Heights, Australia

Aim

To compare HbA1c control over 5 years between Australian adults with T2D receiving DAP+ versus propensity-matched usual care controls.

Methods

DAP+ delivered diabetes specialist support including case conferencing and capacity building to general practices. Using Lumos linked general practice data from NSW (2015-2024), a pragmatic cluster-randomised trial was emulated, comparing DAP+ practices versus propensity-matched control practices based on baseline practice and patient characteristics. HbA1c (%) was analysed continuously (log-normal model) and categorically (<7%, 7-8.9%, ≥9%; multinomial model) using longitudinal Bayesian hierarchical models.

Results

The sample comprised of 26,056 adults with T2D (n=13,028 in DAP+ practices, n=13,028 in control practices) with mean age 66 (SD: 13) years and 48% female. DAP+ practices showed lower mean HbA1c compared to controls: -0.193 percentage points (95% CrI -0.261 to -0.123) at year 1, -0.165 (-0.240 to -0.090) at years 2-3, and -0.129 (-0.212 to -0.045) at years 4-5. Patients in DAP+ practices had higher probability of achieving HbA1c <7%, with relative risks of 1.10 (95% CrI 1.06 to 1.15) at year 1, 1.08 (1.03 to 1.13) at years 2-3, and 1.08 (1.03 to 1.14) at years 4-5. Risk of HbA1c ≥9% was lower in DAP+ practices: RR 0.77 (0.66 to 0.91) at year 1, 0.76 (0.64 to 0.90) at years 2-3, and 0.80 (0.65 to 0.98) at years 4-5. Risk of HbA1c 7-8.9% was reduced at year 1 (RR 0.90, 0.84 to 0.96) with no difference thereafter.

Conclusion

DAP+ participants had lower mean HbA1c, higher rates of achieving HbA1c <7%, and lower rates of HbA1c ≥9% than propensity-matched controls over 5 years. These findings support the effectiveness of integrated care models for improving diabetes outcomes in primary care.

Prediabetes and diabetes are prevalent amongst people on the kidney transplant waiting list and increase following transplantation.

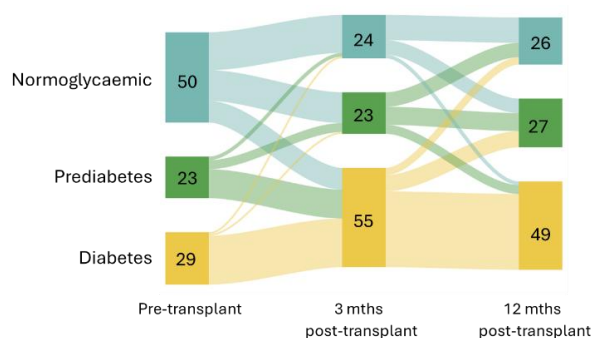
Dwyer K¹, Hewitson T¹, Sobey B¹, Di Luca N¹

¹The Royal Melbourne Hospital, Parkville, Australia

Aim: To determine the prevalence of prediabetes among patients on the transplant waiting list, and at 3- and 12-months post transplantation, in a large metropolitan hospital transplant centre (The Royal Melbourne Hospital, RMH) in Australia.

Methods: This was a retrospective observational cohort study of kidney transplant recipients at RMH between Jan 2020 and Dec 2024, and who remained within the RMH health network for follow-up. The Electronic Medical Record (EMR) at RMH was used to determine the prevalence of prediabetes ($5.7\% \leq \text{HbA1c} < 6.5\%$) pre-transplant, and at 3- and 12-months post-transplant. Only recipients with data at all time points were included in the analysis (n=102).

Results: The prevalence of prediabetes of patients on the transplant waiting list was 23%. 34% of patients with pre-transplant normoglycemia developed prediabetes within 3-months of transplantation. A further 24% developed diabetes. Most patients with pre-transplant prediabetes developed overt diabetes within 3-months (Figure). At 12-months post transplantation, 75% of recipients had prediabetes or diabetes.



Conclusion: 50% of patients on the kidney transplant waiting list have diabetes or prediabetes, which increases to 75% by 3-months post transplantation and persists to 12-months. Early and targeted interventions to reduce post-transplant metabolic dysfunction and associated morbidity and mortality is warranted.

High burden of kidney function impairment among people with type 2 diabetes in Indonesia's primary care Chronic Disease Management Program (PROLANIS)

Edwiza D¹, Wisnu W², Marbun M³, Illavi F¹, Nugraha W¹, Tahapary D^{2,4}

¹Department of Internal Medicine, Dr. Cipto Mangunkusumo National Referral Hospital, Faculty of Medicine, Universitas Indonesia, Central Jakarta, Indonesia, ²Division of Endocrinology, Metabolism, and Diabetes, Department of Internal Medicine, Dr. Cipto Mangunkusumo National Referral Hospital, Faculty of Medicine, Universitas Indonesia, Central Jakarta, Indonesia, ³Division of Nephrology and Hypertension, Department of Internal Medicine, Dr. Cipto Mangunkusumo National Referral Hospital, Faculty of Medicine, Universitas Indonesia, Central Jakarta, Indonesia, ⁴Metabolic, Cardiovascular and Aging Cluster, The Indonesian Medical Education and Research Institute, Faculty of Medicine, Universitas Indonesia, Central Jakarta, Indonesia

Aim:

To estimate the burden of impaired kidney function and identify associated factors among people with type 2 diabetes enrolled in Indonesia's Chronic Disease Management Program (PROLANIS) in primary health care.

Methods:

This cross-sectional study was conducted in 2024 among people with type 2 diabetes enrolled in PROLANIS across ten primary health care centers in DKI Jakarta. Kidney function was assessed using estimated glomerular filtration rate (eGFR) and urine albumin-to-creatinine ratio (UACR). Impaired kidney function was defined as albuminuria ≥ 30 mg/g and/or eGFR < 60 mL/min/1.73 m². Participants were stratified according to Kidney Disease: Improving Global Outcomes (KDIGO) risk categories. Multivariate logistic regression analysis was used to identify factors independently associated with impaired kidney function.

Results:

Impaired kidney function was identified in 154 participants (51.0%) based on UACR, 95 (31.5%) based on eGFR, and 184 (60.9%) when both parameters were combined. According to KDIGO risk classification, 117 (38.7%), 94 (31.1%), 48 (15.9%), and 43 (14.2%) participants were categorized as low, moderate, high, and very high risk, respectively. Blood pressure above target range (adjusted OR 2.26; 95% CI 1.40–3.65; $p < 0.001$) and HbA1c $\geq 7\%$ (adjusted OR 2.16; 95% CI 1.41–3.29; $p < 0.001$) were independently associated with impaired kidney function.

Conclusion:

There was a high proportion of impaired kidney function among people with type 2 diabetes enrolled in PROLANIS at primary health care centers in DKI Jakarta. Blood pressure above target range and HbA1c $\geq 7\%$ were independently associated with impaired kidney function, highlighting the need to strengthen blood pressure and glucose management within Indonesia's primary health care system.

Estimating the excess healthcare costs of Type 2 Diabetes using linked administrative data: A matched cohort study

Ekinci E¹, Wu N³, O'Neal D¹, Schilling C³, Clarke P^{1,2}

¹Australian Centre for Accelerating Diabetes Innovations; Melbourne Medical School, University of Melbourne, Melbourne, Australia, ²University of Oxford, Oxford, United Kingdom, ³Melbourne Health Economics, Centre for Health Policy, Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Australia

Background & Aim: Type 2 diabetes (T2D) imposes a substantial economic burden on health systems, yet population-level cost estimates remain limited. This study aimed to quantify the excess healthcare costs associated with T2D using linked data.

Methods: A retrospective matched cohort study was conducted using the Australian Medicines Intelligence Data Platform. Individuals with T2D were matched 1:1 to controls by age, sex, and socioeconomic status (SEIFA). The final cohort included 453,281 people with T2D and matched controls, contributing 7.25 million person-years (2014–2021). Annual healthcare costs were calculated in 2021 AUD. Generalised linear models (GLM, gamma distribution, log link) were used to estimate cost ratios (CR) and the impact of complications.

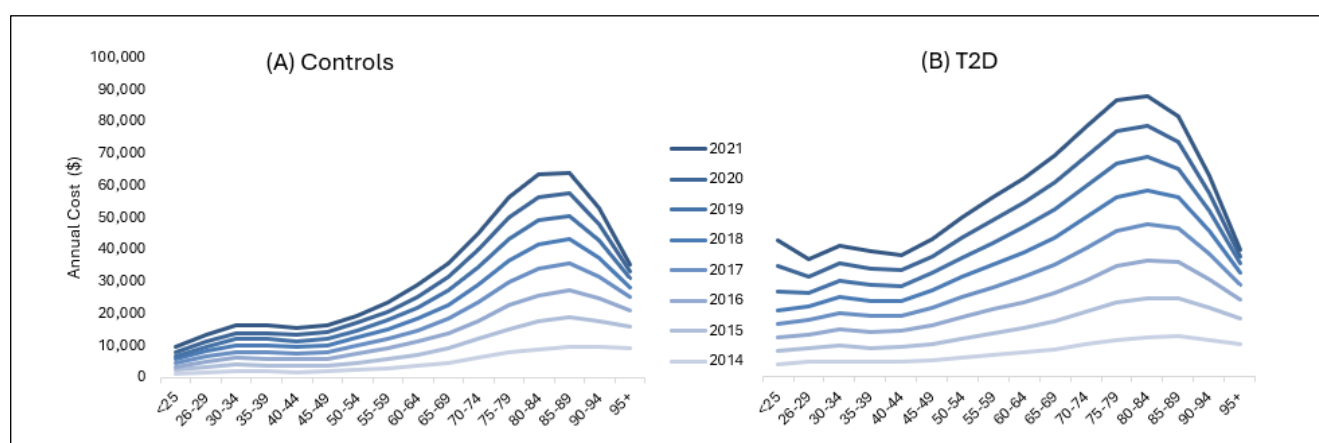
Results: People with T2D incurred higher healthcare costs than controls. Mean annual healthcare costs were AUD \$7700–\$8,900 in the T2D group, exceeding controls by \$3,000–\$3,700. In-hospital cost was the largest contributor, adding A\$1,600 per person-year. GLM analyses demonstrated higher mean healthcare costs with T2D (CR=1.68) than in matched controls. Lower limb disease (CR=5.35) and kidney disease (CR=4.86) were associated with the greatest increases in costs. Nearly half (46.2%) of T2D adults experienced multiple complications, amplifying costs. Preliminary extrapolation based on national T2D prevalence suggested a potential annual excess burden of AUD \$3.6–4.4 billion.

Discussion / Conclusion: T2D was associated with substantially increased healthcare costs, driven by complications. These findings highlight the economic importance of early intervention and preventing complications. Linked administrative data provide a robust framework for monitoring long-term cost burden and informing policy and resource allocation in diabetes care.

A short statement justifying abstract late submission: The full multivariable GLM analyses and final cost estimates were finalised after the regular abstract submission deadline due to the time required for model completion, validation, and SURE data approval processes. This late-breaking submission ensures inclusion of the most up-to-date and complete results.

Panel: Optional age-stratified findings and figure 2014–2021 Costs difference (T2D & controls).

Absolute burden was concentrated in older T2D adults, but relative excess burden began much earlier in midlife. Excess costs were greatest among T2D adults aged 60–74 years (approximately A\$4,000 per person-year).



Mongolian diabetes registry from MONDIA study: A population-based study with policy implications for diabetes surveillance in Mongolia

Erdenebat D¹, Khasag A²

¹NCD Center, Gyals Medical Center, Ulaanbaatar, Mongolia, ²Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia

Aim

To establish the first nationally representative diabetes registry in Mongolia through the MONDIA study and characterize the epidemiological profile, treatment gaps, and complication burden to inform evidence-based diabetes policy.

Methods

The MONDIA study employed a multi-stage, population-based cross-sectional design across Mongolia's five geographical regions and Ulaanbaatar city. A total of 1,820 adults aged 30-70 years underwent oral glucose tolerance testing, HbA1c measurement, and standardized complication screening including retinal photography, neuropathy assessment, and albuminuria testing. Diabetes was defined using WHO criteria. Weighted analysis accounted for complex survey design.

Results

Age-standardized diabetes prevalence was 10.0% (95%CI:8.2-12.1), representing a threefold increase since 1999. Prediabetes affected 9.8% (95%CI:7.9-12.1). Among individuals with diabetes, 48.5% were previously undiagnosed. Of those diagnosed, 15.4% were untreated, 30.2% were treated but uncontrolled (HbA1c $\geq$ 7.0%), and only 5.9% achieved comprehensive glycemic control. Complication prevalence among known diabetes cases included retinopathy (29.3%), peripheral neuropathy (71.0%), and albuminuria (14.8%). Urban residents demonstrated significantly higher diabetes risk compared to rural populations (OR:2.1, 95%CI:1.4-3.2).

Conclusion

The MONDIA registry reveals a substantial undiagnosed diabetes burden, profound treatment gaps, and high complication rates in Mongolia. These findings underscore urgent need for systematic screening programs, strengthened primary care capacity, and registry-based chronic disease management strategies to achieve universal health coverage goals for diabetes care.

Type 2 Diabetes prevalence and associated risk factors across ethnic groups in Australian Primary Care

Ezinne N¹, Agho K³, Doyle A⁴, Osuagwu U¹

¹Western Sydney University, Bathurst, Australia, ²Translational Health Research Institute, Western Sydney University, Campbelltown, Australia, ³Discipline of Public Health, School of Medicine, Western Sydney University, Campbelltown, Australia, ⁴School of Rural Medicine, Charles Sturt University, Orange, Australia

Aim

Type 2 diabetes disproportionately affects ethnic minority populations in Australia, yet ethnicity-specific patterns of cardiometabolic risk in primary care are not well characterised. This study examined the prevalence of type 2 diabetes and its associated risk factors across major ethnic groups in Australian primary care.

Methods

A cross-sectional analysis was conducted using Australian primary care data collected between 2014 and 2024 from the General Practitioner Research Network, comprising 251,623 adults across eight ethnic groups. Crude and adjusted prevalence estimates of type 2 diabetes were calculated. Ethnicity-stratified multivariable logistic regression models were fitted to examine associations between type 2 diabetes and demographic, socioeconomic, behavioural, and cardiometabolic risk factors. Adjusted prevalence estimates were derived using marginal standardisation. Comparisons were undertaken between the pre-COVID (2014–2019) and post-COVID (2020–2024) periods.

Results

Crude prevalence of type 2 diabetes was highest among Pacific Peoples (7.1%), Middle East and North African (MENA) populations (5.8%), compared with Europeans (3.6%). After full adjustment, type 2 diabetes prevalence remained highest among South and Central Asians (4.1%) and Pacific Peoples (3.4%). Compared with Europeans, the adjusted odds of type 2 diabetes were significantly higher among Southern and Central Asians (OR 3.08, 95% CI 2.80–3.40), Pacific Peoples (OR 2.50, 95% CI 2.21–2.82), MENA populations (OR 2.06, 95% CI 1.84–2.31), and South-East Asians (OR 2.10, 95% CI 1.93–2.28). Older age, male sex, obesity, dyslipidaemia, hypertension, unemployment, and lack of health insurance were consistently associated with higher odds of type 2 diabetes. Post-COVID increases in prevalence were most pronounced among Pacific Peoples and South and Central Asians.

Conclusions

Substantial ethnic disparities in type 2 diabetes prevalence and cardiometabolic risk profiles persist in Australian primary care. These findings underscore the need for culturally tailored, equity-focused prevention and management strategies targeting high-burden ethnic populations.

Decade-long trends in the prediabetes and diabetes prevalence across ethnic groups in Australian primary care, 2014–2024

Ezinne N¹, Agho K³, Doyle A⁴, Osuagwu U¹

¹Western Sydney University, Bathurst, Australia, ²Translational Health Research Institute, Western Sydney University, Campbelltown, Australia, ³School of Medicine, Western Sydney University, Campbelltown, Australia, ⁴School of Rural Medicine, Orange, Australia

Introduction and Aim

Ethnic disparities in diabetes are well recognised, yet long-term patterns within Australian primary care remain poorly described. This study examined 10-year trends in the prevalence of diabetes and prediabetes across major ethnic groups between 2014 and 2024.

Methods

De-identified electronic health records were analysed for 60,888 adults (≥ 18 years) with at least one glycaemic test (fasting plasma glucose, HbA1c, or OGTT) captured by the General Practitioner Research Network. Glycaemic status was classified using ADA criteria. Annual prevalence estimates (%; 95% CI) were stratified by ethnicity, age, sex, Body Mass Index (BMI), and hypertension status.

Results

Overall diabetes prevalence was 9.8% (95% CI 9.5–11.0), comprising 1.9% undiagnosed (1.84–2.06) and 7.9% diagnosed (7.7–8.1). Undiagnosed diabetes ranged from 0.7% (0.23–1.94) in Hispanics to 2.4% (2.11–2.69) in Indigenous Australians. Between 2014 and 2024, diabetes prevalence increased significantly across most ethnic groups: from 6.0% to 8.8% among Europeans, 8.1% to 16.7% in Middle Eastern/North African populations, 10.2% to 14.0% in South & Central Asians, 4.6% to 10.9% in South-East Asians, 13.0% to 16.0% in Pacific Peoples, and 7.3% to 11.0% in Sub-Saharan Africans.

Prediabetes nearly doubled among South-East Asians (14.0–28.2%), South & Central Asians (12.0–26.8%), and Sub-Saharan Africans (10.2–26.9%), with the steepest increases observed after 2020. Estimated progression from prediabetes to diabetes ranged from 1.9% in Hispanics to 4.3% in South-East Asians. Across ethnicities, both conditions were strongly associated with obesity, hypertension, and older age. Diabetes was more prevalent in males, whereas prediabetes was slightly more common in females.

Conclusion

Diabetes and prediabetes have risen markedly across Australian ethnic groups over the past decade, with disproportionate growth among MENA, South & Central Asian, South-East Asian, and Pacific Peoples. These trends underscore the urgency for ethnicity-specific, sex-responsive screening strategies and obesity-focused prevention programs in primary care.

Individual and contextual drivers of blood pressure in Type 2 Diabetes: Evidence from a multilevel analysis

Fadlilah S^{1,2}, Tsai H¹

¹Taipei Medical University, Taipei, Taiwan, ²Universitas Respati Yogyakarta, Yogyakarta, Indonesia

Aims: Suboptimal blood pressure control remains common among individuals with type 2 diabetes mellitus (T2DM), highlighting the need to better how cardiometabolic and contextual factors jointly shape risk in primary care populations. This study to evaluate the contribution of cardiometabolic, clinical, and sociodemographic factors to systolic and diastolic blood pressure while accounting for regional clustering.

Methods: A cross-sectional study was conducted using pooled data from 2,078 adults with T2DM across 16 provinces in Indonesia. Standardized interviews, clinical measurements, and laboratory tests were performed. Multilevel linear mixed models with province-level random intercepts were used to examine determinants of systolic (SBP) and diastolic blood pressure (DBP). Sequential adjustment was applied, and sensitivity analyses were performed using fasting blood glucose (FBG) in place of HbA1c.

Results: Mean SBP and DBP were 144.3 ± 19.4 mmHg and 88.4 ± 10.7 mmHg, respectively, indicating suboptimal control. In fully adjusted models, higher HbA1c was significantly associated with increased SBP ($\beta=2.88$; $p<0.001$) and DBP ($\beta=1.33$; $p<0.001$). Longer diabetes duration (SBP $\beta=0.38$; DBP $\beta=0.15$) and higher BMI (SBP $\beta=0.44$; DBP $\beta=0.34$) were also independently associated with higher blood pressure (all $p < 0.001$). Male sex was associated with higher SBP ($\beta=2.44$; $p=0.018$) and DBP ($\beta=1.14$; $p=0.047$), while non-smoking status was inversely associated with both outcomes. Between-province variation decreased from 5.0% to 2.7% for SBP and from 4.2% to 2.4% for DBP after adjustment, indicating that individual-level factors explained much of the variability. Findings were consistent in sensitivity analyses using FBG.

Conclusion: Blood pressure in T2DM is strongly influenced by modifiable cardiometabolic factors, particularly glycemic control, adiposity, and disease duration. These findings underscore the importance of integrated, patient-centered management strategies in primary care settings.

Keywords: Type 2 Diabetes Mellitus; Blood Pressure; Glycated Hemoglobin A; Body Mass Index; Risk Factors; Primary Health Care

Adiposity–sarcopenia phenotype and metabolic profile in Indonesian adults with Type 2 Diabetes Mellitus

Fatya A¹, Tahapary D^{1,2}

¹Division Of Endocrinology, Metabolism & Diabetes, Dept Of Internal Medicine, Faculty Of Medicine, Universitas Indonesia, Central Jakarta, Indonesia, ²Clinical Research Unit Cipto Mangunkusumo Hospital, Central Jakarta, Indonesia

Background: Asians demonstrating ethnic-specific body composition characterized by higher adiposity at lower BMI. This study evaluated the relationship between body composition and metabolic profiles among Indonesian adults with T2DM.

Methods: A cross-sectional study was conducted at Cipto Mangunkusumo Tertiary Care hospital in Jakarta, involving 1,082 adults (507 T2DM and 575 healthy controls). Body composition was assessed using bioelectrical impedance analysis, including waist circumference (WC), BMI, body fat percentage (BFP), skeletal muscle mass (SMM) and skeletal muscle index (SMI), while metabolic parameters comprised HbA1c, random glucose, and lipid profiles.

Results: Participants with T2DM was older (52.36 ± 11.23 vs 32.17 ± 5.17 yo) and had higher WC (91.5 vs 84.5 cm), BMI (27.39 vs 25.27 kg/m²), and BFP (37.0 vs 33.2%) than controls (all $p < 0.001$). SMI was significantly lower in the T2DM group (15.63 vs 15.93 kg/m²; $p = 0.049$), whereas absolute SMM did not differ ($p = 0.170$). BMI strongly correlated with WC ($r = 0.858$), BFP ($r = 0.682$), and SMI ($r = 0.650$) (all $p < 0.001$). Except for LDL-C, all metabolic markers differed significantly between groups. WC and SMI were inversely correlated with HDL-C ($r = -0.415$ and $r = -0.431$; $p < 0.001$).

Conclusion: Indonesian adults with T2DM exhibit an adiposity–sarcopenia phenotype characterized by higher adiposity and relatively lower muscle mass. While BMI remains a useful indicator of adiposity, SMI better captures muscle status than SMM. The inverse associations of WC and SMI with HDL-C suggest that central adiposity and relative sarcopenia contribute to the adverse metabolic profile, underscoring the need to integrate muscle assessment into routine T2DM care.

Has Australia entered a new era of the diabetes epidemic? Trends in diabetes prevalence, incidence and mortality in New South Wales, Australia 2013-2021

Gibson A^{1,2}, Cox E^{1,2}, Gale J^{1,2}, Falster M³, Stanaway F⁴, Wilson A¹, Colagiuri S^{2,5}, Meyerowitz-Katz G^{4,6}, Maberly G⁶, Williams K^{2,7}, Nassar N^{1,2}

¹Leeder Centre for Health Policy, Economics and Data, University Of Sydney, Camperdown, Australia,

²Charles Perkins Centre, University of Sydney, Camperdown, Australia, ³School of Population Health, University of New South Wales, Randwick, Australia, ⁴School of Public Health, University of Sydney, Camperdown, Australia, ⁵Boden Collective, University of Sydney, Camperdown, Australia, ⁶Western Sydney Local Health District, Blacktown, Australia, ⁷Neapean Blue Mountains Local Health District, Neapean, Australia

Aim:

To examine trends in diabetes prevalence, incidence and mortality among adults in New South Wales (NSW), Australia between 2013 and 2021, overall and by sex and age groups.

Methods:

We used a whole-of-population linked administrative dataset for NSW to identify prevalent and incident cases of diabetes (excluding gestational diabetes) and deaths for calendar years 2013–2021. Diabetes was ascertained using a validated algorithm. Rates were standardised to the 2017 NSW population by age and sex.

Results:

Overall diabetes prevalence increased by 16%, from 8.1% in 2013 to 9.4% in 2021. Prevalence rose across all age groups and remained consistently higher in men, but the largest proportional increase occurred among women aged <40 years, whose prevalence rose by 69% (from 1.6% to 2.7%). New cases of diabetes (incidence) declined overall by 21%, from 808 to 642 per 100,000 persons over the study period. However, trends differed markedly by age: incidence decrease in adults aged ≥40 years but increased by among those aged <40 years (from 232 to 270 per 100,000 persons). The largest proportional increase was observed among women aged <40 years, with incidence rising by 30% (from 274 to 357 per 100,000 persons). The adjusted mortality rate amongst individuals with diabetes decreased by 8.0% from 1217 per 100,000 persons to 1120 per 100,000 persons.

Conclusion:

Consistent with recent observations in other high-income countries, Australia's most populous state appears to have entered a new phase of the diabetes epidemic. The number of adults living with diabetes continues to rise, with rates declining in those aged ≥40 years but accelerating among younger adults, particularly women. Prevention and early-detection must be strengthened and adapted, with targeted efforts to address rising younger-onset diabetes and its long-term health and economic consequences.

Cardiovascular–Kidney–Metabolic Syndrome in young and middle-aged adults: Global burden, inequalities, and future trends from GBD 2021

Gui W¹, Lin X¹

¹Sir Run Run Shaw Hospital, Zhejiang University School Of Medicine, Hangzhou, China

Aims: Cardiovascular–kidney–metabolic (CKM) syndrome captures the interconnected continuum of metabolic risk, chronic kidney disease, and cardiovascular disease. We quantified the global burden, inequalities, and future trends of CKM-related conditions among adults aged 20–54 years.

Methods: Using estimates from the Global Burden of Disease (GBD) 2021 study, we assessed incidence, mortality, prevalence, years lived with disability (YLDs), and disability-adjusted life years (DALYs) for five metabolic risk factors, seven CKM core diseases, and heart failure from 1990 to 2021. We examined patterns by age, sex, Socio-demographic Index (SDI), and geography; quantified inequalities; and projected future burden to 2050 using a Bayesian age–period–cohort model.

Results: From 1990 to 2021, global DALYs attributable to metabolic risk factors increased from 66.31 to 113.86 million, despite a decline in the age-standardized DALY rate (EAPC -0.33 (-0.37 , -0.29)). High body-mass index and high systolic blood pressure were the leading metabolic risks, while ischemic heart disease and stroke remained the dominant core diseases. In contrast, type 2 diabetes and heart failure continued to rise (EAPC 1.42 (1.37 , 1.47) and 0.47 (0.43 , 0.51), respectively). Men consistently had higher burdens than women, and younger adults (20–35 years) showed notable increases in obesity- and glucose-related burden. Burden was inversely associated with SDI, with the highest levels and slowest declines in low-SDI regions. Projections to 2050 suggest a further increase in overall burden, with growing contributions from obesity- and glucose-related risks and rising heart failure burden attributable to chronic kidney disease and stroke.

Conclusions: CKM-related burden in young and middle-aged adults is increasingly shaped by a metabolic-driven risk transition, widening socioeconomic inequalities, and an adverse future trajectory. Integrated strategies prioritizing obesity, hypertension, and dysglycemia control, together with coordinated cardio–renal–metabolic prevention, are urgently needed to mitigate the projected burden.

Pregnancy outcomes after an Australian district-wide programme to promote Contraception use and Pre-conception planning among women with established diabetes mellitus.

Gupta A^{1,2,3}, Fletcher E², Immanuel J⁴, MacMillan F¹, Sriharan A¹, Osuagwu U¹, Ratnaweera M⁵, Khan M¹, Webber A¹, Do M³, Perera K¹, Flack J², Wong V², Wong T^{1,2}, Simmons D^{1,2}

¹Western Sydney University, , Australia, ²South-Western Sydney Local Health District, , Australia,

³Western Sydney Local Health District, , Australia, ⁴Texas Women's University, Denton, United States of America, ⁵Waikato District Health Board, , New Zealand

Background

Pregnancy preparation may reduce adverse pregnancy outcomes among women with diabetes. This study evaluated pregnancy outcomes before and after introduction of the Diabetes Contraception And Pre-pregnancy Program (DCAPP) in South-Western Sydney, a multi-ethnic, outer-metropolitan health district of Australia (population ~1million).

Methods

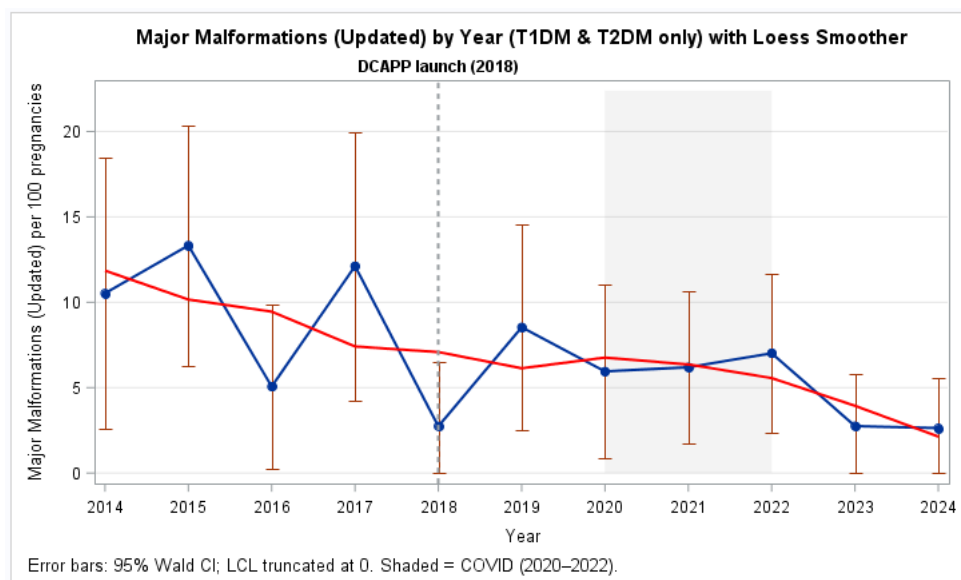
New diabetes pre-pregnancy clinics and multifaceted campaigns to increase awareness were launched including educational materials for women of reproductive age and their primary care healthcare professionals. A retrospective cohort study design evaluated ten-year (2014-2024) outcomes (primary outcome: major malformations). Comparisons pre- and post-intervention with adjustment for the COVID period were made using Mantel-Haenszel testing. Poisson regression modelling was used to compare pregnancy preparation activities.

Results

Among 981 pregnancies (28.7% with Type 1 diabetes; mean Age 32±5 years; 24.5% European; mean BMI 31.6±7.4 kg/m²) annual malformation rates dropped from 13.3% to 2.6% over 11 years with evidence of a significant temporal trend ($p=0.002$). Malformation rates dropped significantly across pre-COVID (2014-2019: 8.7%), during COVID (2020-2022: 6.4%), and post-COVID (≥2023: 2.7%) ($p=0.003$). Birth year was independently associated with a lower malformation rate (risk ratio 0.89, 95% CI 0.82-0.96; $p=0.003$). After DCAPP, women more often attended diabetes in pregnancy clinics before 10 weeks' gestation ($p=0.022$) with more frequent use of high dose folate (RR 3.26, 95% CI 2.23–4.79).

Conclusion:

Publicly funded “pregnancy planning clinics” alongside awareness and education programs improved pregnancy planning and outcomes in women with type 1 and type 2 diabetes over 10 years in this district-wide Australian program.



Video supplemented consenting for Aboriginal and Torres Strait Islander participants: co-design and early participant perceptions – The Flash Study

Hachem M^{1,2,3}, Hearn T^{1,2,4}, Kelly-Edwards B^{1,2}, Kelly R^{1,2}, Cross C², Eer A^{1,2}, Sommerville C^{1,2}, Bolitho J^{1,2}, Klaic M^{2,5}, Churilov L^{2,6}, Burchill L^{2,7}, Ekinci E^{1,2,4}, FlashGM Study Collaborators & Sites
¹Department of Medicine—Austin Health, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, AUS, ²Australian Centre for Accelerating Diabetes Innovations (ACADI), Melbourne Medical School, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, AUS, ³Endocrinology and and Centre for Research and Education in Diabetes and Obesity (CREDO), Austin Health, Heidelberg, AUS, ⁴Medical Clinic, Rumbalara Aboriginal Cooperative, Mooroopna, AUS, ⁵Melbourne School of Health Sciences, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Parkville, AUS, ⁶Department of Medicine, Royal Melbourne Hospital, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Parkville, AUS, ⁷Cardiovascular Medicine, Mayo Clinic, Rochester, USA

Background: Aboriginal and Torres Strait Islander peoples bear disproportionate burdens of type 2 diabetes yet remain underrepresented in clinical trials. Traditional informed consent documents are often lengthy and culturally misaligned, posing barriers to participation.

Aim: To design, implement and evaluate a co-designed informed consent video as part of a national randomised trial investigating continuous glucose monitoring (ACTRN12621000753853) for Aboriginal and Torres Strait Islander people with type 2 diabetes.

Methods: We used a design science research methodology and the Culturally Adaptive Governance Framework to co-design a 3-minute plain language video. The video script and visual artwork were developed with Aboriginal researchers and a Gumbaynggirr, Dhunghutti, Bungalung lived-experience artist with voiceover by a Yorta Yorta researcher. Evaluation comprised semi structured interviews with 11 study participants (January–June 2025). design a 3minute plain language video. The video script and visual artwork were developed with Aboriginal researchers and a structured interviews with 11 study participants (January–June 2025).

Results: Participants (n=11; age mean 52.1, range 26–70; 55% male) reported the video improved clarity and accessibility of the trial, reinforced participant autonomy, and enhanced cultural sensitivity and safety. Four themes emerged: (1) clarity and accessibility (animations and plain language aided comprehension); (2) cultural sensitivity and safety (Aboriginal representation promoted trust); (3) participant autonomy (explicit reassurance about voluntary participation and data ownership); and (4) potential for language adaptation. The video was hosted publicly to facilitate equitable access and used beyond the trial for policy advocacy.

Conclusions: A brief, co-designed informed consent video is a practicable and culturally appropriate adjunct to written consent for trials involving Aboriginal and Torres Strait Islander participants. Video consenting may improve comprehension, trust and engagement; further controlled studies should evaluate effects on recruitment and objective comprehension metrics.

Why we join: Reasons for participation among Aboriginal and Torres Strait Islander people in a CGM trial – The flash study

Hachem M^{1,2,3}, Hearn T^{1,2,4}, Kelly-Edwards B^{1,2}, Kelly R^{1,2}, Cross C², Eer A^{1,2}, Sommerville C^{1,2}, Bolitho J^{1,2}, Klaic M^{2,5}, Churilov L^{2,6}, Burchill L^{2,7}, Ekinici E^{1,2,4}, FlashGM Study Collaborators & Sites

¹Department of Medicine—Austin Health, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Heidelberg, Australia, ²Australian Centre for Accelerating Diabetes Innovations (ACADI), Melbourne Medical School, Faculty of Medicine, Dentistry and Health Sciences, Melbourne, Australia, ³Endocrinology and and Centre for Research and Education in Diabetes and Obesity (CREDO), Austin Health, Heidelberg, Australia, ⁴Medical Clinic, Rumbalara Aboriginal Cooperative, Mooroopna, Australia, ⁵Melbourne School of Health Sciences, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Parkville, Australia, ⁶Department of Medicine, Royal Melbourne Hospital, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Parkville, Australia, ⁷Cardiovascular Medicine, Mayo Clinic, Rochester, Minnesota, United States of America, ⁸FlashGM Study Sites and Collaborators, ,

Aim

Using the Theoretical Framework of Acceptability (TFA), this qualitative sub-study embedded within the Flash Study (ACTRN12621000753853), a multi-centre randomised controlled trial, sought to understand how the acceptability of CGM influences the decision to participate in and remain engaged with a diabetes clinical trial.

Methods

Between August 2024 and August 2025, twelve trial participants completed 30-minute semi-structured interviews exploring their reasons for consenting or declining trial participation in the Flash Study. Interviews were audio-recorded, transcribed and de-identified. Transcripts were deductively coded to the constructs of the Theoretical Framework of Acceptability and inductive content analysis was undertaken. Two coders independently analysed all transcripts; inter-rater reliability was assessed against the study's predefined threshold. Ethics approval was provided by St Vincent's HREC (HREC 188/20).

Results

Key motivations for trial participation clustered within the TFA constructs of ethicality, perceived effectiveness and affective attitude. Participants saw CGM to contribute to the health of future generations and this served as a catalyst for consenting to the trial, despite identified barriers such as concerns over post-trial sustainability (ongoing cost). Flexible, community-centred trial communication enhanced the affective attitude toward participation.

Conclusions

For Aboriginal and Torres Strait Islander peoples, the decision to participate in the Flash Study was influenced by the perceived acceptability of CGM. Recruitment strategies should focus on both trial logistics and importantly, clearly communicating the cultural and practical value of the proposed diabetes therapy.

Operationalising continuous glucose monitoring in Type 2 Diabetes using value focused process engineering – The flash study

Hachem M^{1,2,3}, Hearn T^{1,2,4}, Kelly-Edwards B^{1,2}, Kelly R^{1,2}, Cross C², Eer A^{1,2}, Sommerville C^{1,2}, Bolitho J^{1,2}, Klaic M^{2,5}, Churilov L^{2,6}, Burchill L^{2,7}, Ekinci E^{1,2,4}, FlashGM Study Collaborators & Sites²

¹University of Melbourne, Melbourne, AUS, ²Australian Centre for Accelerating Diabetes Innovations (ACADI), Melbourne Medical School, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Parkville, AUS, ³Endocrinology and and Centre for Research and Education in Diabetes and Obesity (CREDO), Austin Health, Heidelberg, AUS, ⁴Medical Clinic, Rumbalara Aboriginal Cooperative, Mooroopna, AUS, ⁵Melbourne School of Health Sciences, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, AUS, ⁶Department of Medicine, Royal Melbourne Hospital, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, AUS, ⁷Cardiovascular Medicine, Mayo Clinic, Rochester, USA

Aims

To describe the use of Value Focused Process Engineering (VFPE) to investigate the barriers and enablers of conducting a clinical trial within an Aboriginal and Torres Strait Islander health setting - the Flash Study (ACTRN12621000753853).

Methods

A participatory workshop was held with 30 clinical staff from urban, regional, rural, and remote sites working on the Flash Study in August 2024. VFPE event driven process chain and objective/s models were developed and iteratively validated with clinicians and health professionals.

Results

The VFPE model identified priority barriers and enablers using both qualitative and process driven data. The key enablers were a need for resourcing and equipping study coordinators, device supply logistics and consent procedures. Based on the identified barriers and enablers, proposed operational changes comprised of structured onboarding checklists, standardised training content, remote data support protocols, and flexible visit arrangements.

Conclusion

VFPE provides a pragmatic method to align values, objectives and processes to operationalise CGM delivery in trials for underserved populations. These findings can be used to improve future diabetes clinical trials in Aboriginal and Torres Strait Islander health settings and in resource-challenged environments to enhance participant retention and data completeness.

The use of CGM in Aboriginal and Torres Strait Islander communities: the FlashGM Study

Hachem M^{1,2,3}, Kelly-Edwards B^{1,2}, Hearn T^{1,2,4}, Kelly R^{1,2}, Cross C², Eer A^{1,2}, Sommerville C^{1,2}, Twigg S², Freund M⁵, O'Neal D^{2,6}, Story D^{2,7}, Brown A^{2,8,9}, McLean A¹⁰, O'Brien R³, Duy Tran A^{2,11}, Clarke P^{2,11,12}, Braat S^{2,13,14}, Koye D^{2,13,14}, Atkinson-Briggs S², Eades S², Burchill L^{2,15}, Ekinci E^{1,2,3}, FlashGM Study Collaborators²

¹University of Melbourne, Parkville, Australia, ²Australian Centre for Accelerating Diabetes Innovations (ACADI), University of Melbourne, Parkville, Australia, ³Austin Health, Heidelberg, Australia, ⁴Rumbalara Aboriginal Cooperative, Mooroopna, Australia, ⁵University of Newcastle, Newcastle, Australia, ⁶St Vincent's Hospital Melbourne, Endocrinology, Fitzroy, Australia, ⁷University of Melbourne, Critical Care, Parkville, Australia, ⁸Telethon Kids Institute, Indigenous Genomics, Adelaide, Australia, ⁹The Australian National University, Indigenous Genomics, Canberra, Australia, ¹⁰Cairns Hospital, Department of Endocrinology and Diabetes, Cairns, Australia, ¹¹Melbourne School of Population and Global Health, Parkville, Australia, ¹²University of Oxford, Health Economics Research Centre, Oxford, United Kingdom, ¹³University of Melbourne, Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, Parkville, Australia, ¹⁴University of Melbourne, MISCH (Methods and Implementation Support for Clinical Health) Research Hub, Parkville, Australia, ¹⁵Mayo Clinic, Ohio, USA

Aims: Aboriginal and Torres Strait Islander people experience a disproportionate burden of type 2 diabetes. Continuous glucose monitoring (CGM) devices provide convenient glucose data but are not widely available or subsidised for this population. In partnership with Aboriginal and Torres Strait Islander communities, this multi-centre, randomised controlled trial evaluates CGM versus self-monitoring of blood glucose (SMBG) over six months to determine effects on (i) haemoglobin A1c (HbA1c), (ii) attainment of glucose targets, (iii) hypoglycaemia frequency, and (iv) cost-effectiveness within Aboriginal and Torres Strait Islander health services.

Methods: This non-masked, parallel-group, two-arm, individually randomised trial (ACTRN12621000753853) enrolled adults with type 2 diabetes on injectable therapy and baseline HbA1c $\geq 7.5\%$ ($n=350$). Participants were randomised 1:1 to CGM or SMBG for six months across urban, rural, regional and remote clinical sites including Aboriginal Community Controlled Health Organisations, Aboriginal Medical Services, primary care and tertiary hospitals. The primary outcome is change in HbA1c at six months; secondary outcomes include CGM metrics, hypoglycaemia frequency, cost-utility and quality of life.

Results: From June 2021–Feb 2026, 340 participants screened, 242 randomised and 204 completed across 25 sites.

Conclusions: This is the first to CGM device trial for Aboriginal and Torres Strait Islander adults with type 2 diabetes.

The acceptability of screening children for type 2 diabetes (T2DM): understanding the perspectives of parents living in Australia

Hardt J¹, Walker J¹, Devlin B¹, Huynh T^{1,2}, Littlewood R^{1,3}

¹The University Of Queensland, St Lucia, Australia, ²Children's Health Queensland Hospital and Health Service, South Brisbane, Australia, ³Health and Wellbeing Queensland, Milton, Australia

AIMS

International evidence-based guidelines support screening children for T2DM. However, details regarding implementation in practice are lacking, contributing to under-reporting, missed diagnosis and irreversible chronic disease development among children and adolescents worldwide. This research aimed to understand the perspectives of Australian parents relating to the acceptability of screening children for T2DM.

METHODS

Australia-wide distribution of an online survey collected quantitative and qualitative responses. Eligible participants included parents of all cultural backgrounds living in Australia, providing care for at least one child younger than 18 years. Recruitment was facilitated via social media, health professional contacts and word-of-mouth. Survey questions covered i) health system engagement, ii) T2DM perceptions and iii) T2DM screening acceptance, with descriptive statistics and correlation analysis presenting the findings.

RESULTS

One-hundred surveys were collected from parents (85% female) from across Queensland (n=64), New South Wales (n=15), Tasmania (n=11), Victoria (n=8), South Australia (n=1) and Western Australia (n=1), from nine different cultural backgrounds. Findings revealed 90% of parents were very supportive/supportive of screening all children for T2DM, with 83% agreeing/strongly agreeing it was an important concept. A weak negative correlation was found between screening support and SEIFA decile, with parents living in more disadvantaged areas more supportive of screening ($\rho=-0.298$, $p<0.01$). A family history was evident among 31% of parents, 74% of these agreed/strongly agreed with the associated blame and shame, and 94% agreed/strongly agreed that T2DM is seen as a 'bad lifestyle disease'. Parents who were supportive of screening overall were more accepting of screening their own children ($\rho=0.754$, $p<0.01$).

CONCLUSION

Understanding parent perspectives strengthens the development of screening strategies with high acceptance and sustainability in practice. This will promote the early identification of T2DM, allowing the timely initiation of prevention and management strategies, helping to reduce the health and financial burdens for current and future generations.

Prevalence and determinants of obesity among adolescents and young adults in Bangladesh: Insights from a National survey

Hasan M¹, Ratul R¹, Hasanat M¹

¹Bangladesh Medical University, Dhaka, Bangladesh

Abstract content

Aims: To estimate the prevalence of obesity and identify socio-demographic, lifestyle, and metabolic risk factors among Bangladeshi adolescents and young adults.

Method: This is a post-hoc analysis of a nationwide study that included 2300 young [adolescents: 10-18 years, n=1118 and young adults: 19-34 years, n=1182] by multistage random sampling during March-August 2024. Obesity among adolescents was defined by BMI percentiles (overweight 85th–94th, obesity ≥95th), while in adults by BMI cut-offs (overweight 23–24.9 kg/m², obesity ≥25 kg/m²). Data on lifestyle, family, and socioeconomic history were collected. Blood pressure (BP), plasma glucose, and lipid profile were measured.

Results: The prevalence of overweight/obesity was 29.2% (overweight 11.6%, obesity 17.6%), higher among young adults (43.8%) vs. adolescents (13.6%), and in urban areas (38.2%) vs. rural areas (21.1%). In both adolescents and young adults, overweight/obesity was associated with higher wealth index (OR 3.3, 95% CI 2.4–4.8 and 1.9, 95% CI 1.5–2.4 respectively), urban residence (OR 2.9, 95% CI 2.1–4.2 and 1.5, 95% CI 1.2–1.9 respectively), and late bedtime (OR 3.0, 95% CI 2.1–4.3 and 1.3, 95% CI 1.0–1.6 respectively). In addition, overweight/obesity was associated with increased screen time (OR 2.1, 95% CI 1.5–2.9) and short sleep duration (OR 2.2, 95% CI 1.5–3.2) in adolescents while frequent meals outside home (OR 1.3, 95% CI 1.0–1.7) and female gender (OR 1.4, 95% CI 1.1–1.8) in young adults. Elevated BP, acanthosis, and dyslipidemia were associated with overweight/obesity in both groups and diabetes in young adults (all p<0.01).

Conclusion: Obesity is highly prevalent among Bangladeshi youth, with distinct risk profiles in adolescents and young adults. Lifestyle factors such as late bedtime, short sleep, poor diet, and inactivity, together with urbanization and metabolic disorders, contribute significantly.

Duration of living in Australia matters: unpacking the association between duration of residence and gestational diabetes mellitus risk among migrant women

Hasin M^{1,2}, Alif S^{1,2,3,4}, Cramer R⁵, Rahman M^{1,2,6}

¹Institute Of Health And Wellbeing, Federation University Australia, Victoria, Australia, Berwick, Australia, ²Collaborative Evaluation and Research Centre (CERC), Federation University Australia, Victoria, Australia, Berwick, Australia, ³School of Public Health and Preventive Medicine, Monash University, Clayton, Australia, ⁴School of Health Sciences, The University of Melbourne, Carlton, Australia, ⁵College of Sport, Health and Engineering, Victoria University, Footscray, Australia, ⁶Faculty of Public Health, Universitas Airlangga, Surabaya, Indonesia

Aim: Gestational Diabetes Mellitus (GDM) has increased significantly among migrants in Australia over the past 20 years. Previous research suggested that migrant women with longer residence had higher risk of GDM. However, limited evidence exists with Australian context. To examine whether the duration of living in Australia is associated with increased risk of GDM among migrant women.

Methods: This retrospective cohort study analysed data from the Victorian Perinatal Data Collection (VPDC) for births between 2019 to 2021. Of the 228,635 women who gave birth during that period, 69,063 were migrants. Duration of residence was categorised as <5 years, 5–9 years, and ≥10 years. GDM was defined from the listed variable, the 'Obstetric complications' ICD-10 code. Multivariate logistic regression was used to assess the association by adjusting for potential confounders such as years of delivery, maternal age, Body Mass Index (BMI), parity, and smoking (before and after 20 weeks of gestation).

Results: In this cohort, GDM prevalence was 28.5% (n = 19,698), and the highest prevalence occurred among Southern and Central Asian women (13.2%). Higher risk was observed among women aged ≥35 years (AOR 1.38, 95% CI 1.33–1.43), those living in metropolitan areas (1.36, 1.27–1.45), and women with BMI ≥25 kg/m² (2.05, 1.98–2.10). Women living in Australia for ≥10 years at the time of birth had a 17% lower risk of GDM (0.83, 0.79–0.86). A history of GDM in a previous pregnancy was the strongest predictor of GDM diagnosis (50.92, 28.52–90.91).

Conclusion: Longer duration of stay in Australia (≥10 years) was significantly associated with a lower risk of GDM, suggesting a potential protective effect. These findings highlight the need for targeted interventions for newly arrived migrants (<5 years) to reduce GDM risk.

Keywords: Gestational diabetes mellitus, Post-migration, Migrant, Risk factor, Australia.

Type 2 diabetes in Western Australian children and adolescents aged <16 years of age (2011 – 2025)

Haynes A^{1,2}, Nilsen A^{1,3}, Abraham M^{1,3}, Shah M³, Davis E^{1,2,3}, Curran J³, Taplin C³

¹Children's Diabetes Centre, The Kids Research Institute Australia, Nedlands, Australia, ²Paediatrics, UWA Medical School, The University of Western Australia, Nedlands, Australia, ³Perth Children's Hospital, Nedlands, Australia

Aim/s

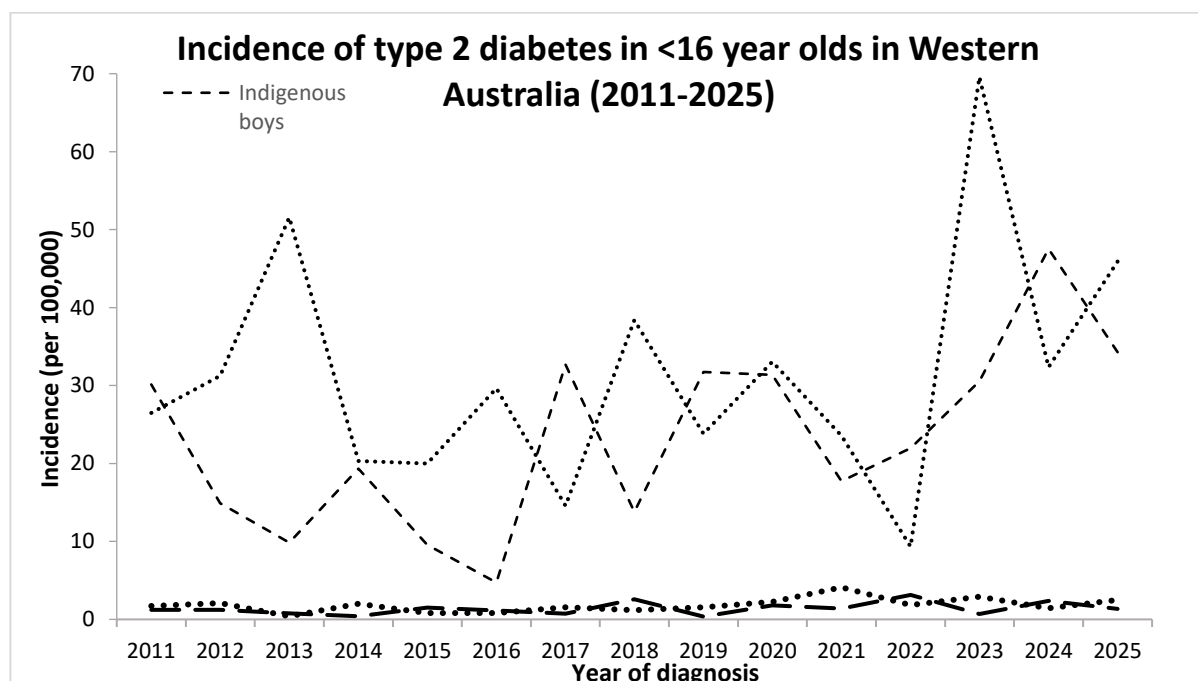
To determine the incidence of children and adolescents newly diagnosed with type 2 diabetes in Western Australia between 2011 and 2025.

Methods

Cases of type 2 diabetes diagnosed between 1 January 2011 and 31 December 2025 in children and adolescents aged <16 years and resident in Western Australia at the time of diagnosis were extracted from the Western Australian Children's Diabetes Database. This prospective, longitudinal diabetes register is maintained by the diabetes services at Perth Children's Hospital has previously been reported as having ~70% completeness of ascertainment for type 2 diabetes diagnosed in this age group in Western Australia. Estimated resident population counts by single year of age and gender for Western Australia was obtained from the Australian Bureau of Statistics for both the total, and Aboriginal and Torres Strait Islander population by year. Crude incidence rates were estimated overall, by gender and Indigenous status, using all cases as the numerator data and respective population count as the denominator data.

Results

Of 303 cases newly diagnosed between 2011 and 2025, 168 (55.5%) were female and 174 (57.6%) of Aboriginal and/or Torres Strait Islander descent. An ~18-fold higher incidence was observed in Indigenous compared to non-Indigenous children (mean annual incidence of 27.4/100,000 vs 1.6/100,000).



Conclusion

The incidence of type 2 diabetes in Western Australian Indigenous children and adolescents is increasing rapidly.

Testosterone and Type 2 Diabetes in women: A systematic review and meta-analysis

Healy R¹, Patten R¹, Vogrin S^{2,3}, Huang J¹, Zare N¹, Woessner M¹, Grossmann M⁴, Levinger I^{1,3}

¹Institute for Health and Sport (IHES), Victoria University, Footscray, Australia, ²Department of Medicine-Western Health, The University of Melbourne, Melbourne, Australia, ³Australian Institute for Musculoskeletal Science (AIMSS), University of Melbourne and Western Health, Melbourne, Australia, ⁴Department of Endocrinology, Austin Health and the University of Melbourne, Melbourne, Australia

Aims: Women experience greater comorbidity and mortality risk in type 2 diabetes (T2D) compared to men, indicating a sex-gap in T2D management. This gap may be, in part, mediated by testosterone in women as hyperandrogenism has been reported to contribute to insulin resistance in women. This study aimed to review/synthesise current literature on testosterone and T2D in women as well as establish female-specific testosterone reference ranges for risk of T2D.

Methods: EBSCOhost (CINAHL, MEDLINE, SPORTDiscus) and Pubmed were searched for articles published until March 2025. Eligible articles included comparison of testosterone in women with and without T2D, or longitudinal assessment of testosterone and future incident/risk of T2D. Two reviewers independently screened the 2,243 articles identified through the literature search, from which 30 eligible studies underwent risk of bias assessment and data extraction for this systematic review and meta-analysis. Effect sizes were estimated using random-effects model meta-analysis and meta-regression. Subgroup analysis were conducted for potential confounding effects of polycystic ovarian syndrome (PCOS) on testosterone in women.

Results: 21 studies and 113,154 women were included in this review. Women with T2D had higher testosterone compared to women without (1nmol/L [95% CI 0.76; 1.23] vs 0.8nmol/L [95%CI 0.63; 0.97]) and this increase was not explained by age (p 0.17), BMI (p 0.77), menopausal status (p >0.05) or diagnosed PCOS (SMD 0.31, 95%CI 0.13; 0.49). Testosterone had a stepwise increase in T2D risk at three to 13 years follow-up (0.36 – 1.78nmol/L (OR <1.5), 1.8 – 3.5nmol/L (OR 1.5-2.5) and 3.53 – 8.2nmol/L (OR >2.5)).

Conclusion: In women, higher testosterone was associated with a higher risk of prevalence and future T2D, even in those without PCOS. Future work is required to elucidate the mechanisms underpinning this relationship, and whether measurement of testosterone provides additional information for T2D risk stratification in women for clinical practice.

Economic evaluation of eHealth Enhanced Chronic Care Model: Modelling the impact of adherence variability on cost-effectiveness analysis

Hedfi S¹, Balasooriya N², Chua D^{1,3}, Menon A^{1,3}, Comans T^{1,4}

¹Centre for Health Services Research, Faculty of Medicine, University of Queensland, Herston, Australia, ²School of Medicine and dentistry ,Griffith University, Brisbane, Australia, ³Metro South Health, Brisbane, Australia, ⁴National Ageing Research Institute, Melbourne, Australia

Background

Economic evaluation is key to the implementation of eHealth Enhanced Chronic Care Model (eCCM). Demonstrating their cost-effectiveness supports their long-term adoption. However, with over 50% dropout rate, not all participants with type 2 diabetes mellitus (PwT2DM) are engaged with the eCCM, which lowers the effect size. Attrition is rarely incorporated into economic models, which misrepresents the results, and minimizes the outcomes. Given eCCM inherent methodological challenges, eCCM's economic evaluation requires a tailored modelling approach.

Aim

The aim is to develop an economic evaluation framework for eCCM interventions that explicitly account for PwT2DM attrition rates and behavioural heterogeneity.

Methods

We developed a multi-state semi-Markov microsimulation model. Health-state transitions and mortality were informed by UKPDS Outcome Model 2, while first complications were modelled using Risk Equations for Complications Of Diabetes (RECODe), with severity tracked via the Diabetes Complications Severity Index (DCSI). The stratification module based on diabetes surveys' psychometric domains linked to COM-B behavioural model, assessed PwT2DM' drop out risk. The analysis spans over 45 years with annual cycles from the health system perspective, with probabilistic and scenario sensitivity analyses. The main outcomes are Incremental Cost-Effectiveness Ratio, costs per 1% HbA1c reduction, cost per Quality Adjusted Life Year (QALY), and survival probability.

Expected Results

RECODe complemented UKPDS-OM2 predictions as the results were lower than UKPDS OM2 alone. DCSI monitored the diabetes -related complication's severity, and we adjusted the outcomes accordingly. The stratification module identified three subgroups: High, Moderate and Low Adherence. The high adherence group presented consistently lower incremental costs for 1% HbA1c reduction, demonstrating greater cost-effectiveness.

Conclusion

We identified a significant gap in the existing literature: Patients' behavioural variability is often overlooked, misrepresenting the outcomes. By profiling PwT2DM' prior to enrolment, we can optimize eCCM outcomes and maximise benefits.

Foot care and foot resources in people with diabetes in less advantaged regions, with a focus on the western pacific region

Hemphill M^{1,2,3}, Wischer N⁴, McGill M^{4,5,6}, Huang M^{1,3}, Twigg S^{4,5}, Jenkins A^{1,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²The University of Notre Dame Australia, Sydney, Australia, ³The University of Melbourne, Melbourne, Australia, ⁴National Association of Diabetes Centres, Sydney, Australia, ⁵The University of Sydney, Sydney, Australia, ⁶Royal Prince Alfred Hospital Diabetes Centre, Sydney, Australia

Aims:

Diabetes-related foot disease (DFD) burden is high in less advantaged regions. This reflects global inequalities in awareness, prevention and management. We aimed to (i) identify key aspects of organisation and sustainability of services including challenges of DFD care in the Western Pacific Region (WPR) and (ii) identify suitable free accessible resources.

Methods:

A narrative review using a systematic approach to data collection was conducted. Review methods aligned with Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA, 2020) guidelines where appropriate. Studies and resources for evaluation focused on diabetes-related foot disease management and challenges to care. Data quality was assessed using a mixed methods appraisal tool (2018).

Results:

Forty-two publications and resources were examined. In parts of the WPR, patient and health professional education is limited, with little or no subspecialised health and podiatry services. Only six WPR countries have national guidelines, the majority of which have low concordance with international recommendations. International guidelines that can be used or modified for use in less advantaged regions: (i) IDF Clinical Practice Recommendations on the Diabetic Foot: A guide for healthcare professionals ([IDF-DFCR-2025-update.pdf](#)) and (ii) International Working Group on the Diabetic Foot guidelines ([Guidelines \(2023 update\) - IWGDF Guidelines](#)). Other important resources are from Foot Forward for diabetes ([www.footforward.org.au](#)) and D-Foot International (<https://d-foot.org>), which include patient and clinician education materials and guidelines. Notably, none of the guidelines has specifically addressed methods to establish and then maintain interdisciplinary specialist diabetes foot services in the WPR including an upskilled workforce, dedicated site and equipment, and systems processes.

Conclusions:

Current DFD management in the WPR merits attention and improvement. There are several standardised resources that could be implemented in regions of high DFD burden and processes that could be included in models of care to complement such DFD care guidelines for the WPR.

The budget impact of advanced hybrid closed-loop insulin delivery systems in young people with Type 1 Diabetes in Australia

Nash B¹, **Hill M**¹

¹Medtronic, Macquarie Park, Australia

Aim: To assess the incremental costs to the Australian Healthcare Payer from implementing funding for the advanced hybrid closed loop (AHCL) system compared to Multiple Daily Injections (MDI) with Continuous Glucose Monitoring (CGM) over a 5-year time horizon, in young people with Type 1 diabetes (T1D) less than 20 years of age.

Methods: The overall incremental budget impact was calculated for ~15,000 young people with T1D per year¹ if they were to receive funding for an AHCL instead of MDI+CGM. An uptake rate of 50% to 70% was assumed over 5 years. Calculations included cost offsets of CGM, consumables and insulin currently funded, those assumed to remain on private health insurance (PHI), and acute diabetes complications. A baseline HbA1c of 7.8% and hypoglycaemia and diabetic ketoacidosis rates and costs were from a recent Australian study². Indirect costs of a caregiver's time off work were included.

Results: Incremental device costs are AU\$5.95M in year 1 increasing to AU\$18.59M over 5 years. AHCL costs increase with uptake but significant cost-offsets occur via those with current funding for CGM and consumables, less insulin use, and PHI. Savings due to reduced complications grow from AU\$3.22M in year 1 to AU\$4.88M in year 5. Productivity gains for the caregiver are ~AU\$331,500 in year 1 increasing to ~AU\$502,700 in year 5. The total incremental cost to the Payer (not including DOW) is AU\$2.73M in year 1 increasing to AU\$13.71M in year 5.

Conclusion: AHCL provides meaningful clinical benefits for young people with T1D, reducing complications and caregiver burden. Although upfront costs are higher, substantial offsets from existing funding, reduced insulin use, and fewer acute events limit the budget impact. These findings support the economic value of AHCL and reinforce the case for public funding to ensure equitable access for young Australians living with T1D.

References:

1. International Diabetes Federation 2025; <https://diabetesatlas.org/data-by-location/country/australia/>
2. Burnside et al. 2025. Diabetes Technology & Therapeutics. Published October 2025 ahead of print. DOI: 10.1177/15209156251387160

Insulin resistance in children and adolescents: A cross-sectional exposome-wide association study within a life-course framework

Hoang K^{1,2}, Nguyen T³, Wu C^{4,5}, Lee T^{4,6}, Hung H⁷, Kuo C⁸, Weng S^{4,9}, Chen Y^{8,10,11,12,13,14,15}

¹International PhD Program in Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan, ²Department of Pediatrics, Pham Ngoc Thach University of Medicine, Ho Chi Minh City, Vietnam, ³Department of Pediatrics, University of Health Sciences, Vietnam National University Ho Chi Minh City, Ho Chi Minh City, Vietnam, ⁴Division of Endocrinology and Metabolism, Department of Internal Medicine, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan, ⁵Department of Endocrinology and Metabolism, Shuang Ho Hospital, Taipei Medical University, Taipei, Taiwan, ⁶Department of Endocrinology and Metabolism, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan, ⁷Department of Endocrinology and Metabolism, Chi-Mei Medical Center, Tainan, Taiwan, ⁸Graduate Institute of Clinical Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan, ⁹Department of Endocrinology and Metabolism, Taipei Medical University Hospital, Taipei Medical University, Taipei, Taiwan, ¹⁰Department of Family Medicine, Wan Fang Hospital, Taipei Medical University, Taipei, Taiwan, ¹¹Department of Family Medicine, School of Medicine, College of Medicine, Taipei Medical University, Taipei, Taiwan, ¹²School of Nutrition and Health Sciences, College of Nutrition, Taipei Medical University, Taipei, Taiwan, ¹³Graduate Institute of Metabolism and Obesity Sciences, Taipei Medical University, Taipei, Taiwan, ¹⁴TMU Research Center for Digestive Medicine, Taipei Medical University, Taipei, Taiwan, ¹⁵Child Development Research Center, Taipei Medical University Hospital, Taipei, Taiwan

Aims:

Pediatric insulin resistance (IR) reflects early-life and dietary exposures, but multidomain influences remain unclear. We conducted an exposome-wide association study (ExWAS) to identify exposures associated with paediatric IR.

Methods:

Participants from the Taiwan Pubertal Longitudinal Study included girls (6–14 years) and boys (9–17 years). IR was defined by HOMA-IR ≥ 3.16 . ExWAS utilized logistic regression, adjusting for age, sex, parental education, and family income. False discovery rate (FDR) correction addressed multiple comparisons. Sensitivity analyses adjusted for adiposity and pubertal status.

Results:

Among 341 participants, 113 had IR. The IR group exhibited higher BMI z-score (1.48 ± 1.33 vs 0.23 ± 1.49 ; $P < .001$) and higher central precocious puberty prevalence (69.0% vs 55.7%; $P = .03$). Gestational diabetes mellitus (GDM) and preterm birth were nominally associated with higher IR risk, whereas dietary mineral intake showed inverse associations. After FDR correction, GDM and preterm birth remained significant. PCA identified a nutrient-dense dietary pattern inversely associated with IR (adjusted OR per 1 SD: 0.71; 95% CI: 0.53–0.93; $P = .01$).

Conclusion:

Pediatric IR reflects combined prenatal and environmental influences, specifically GDM and preterm birth. Findings emphasize early-life prevention and a life-course exposome framework for addressing pediatric metabolic risk.

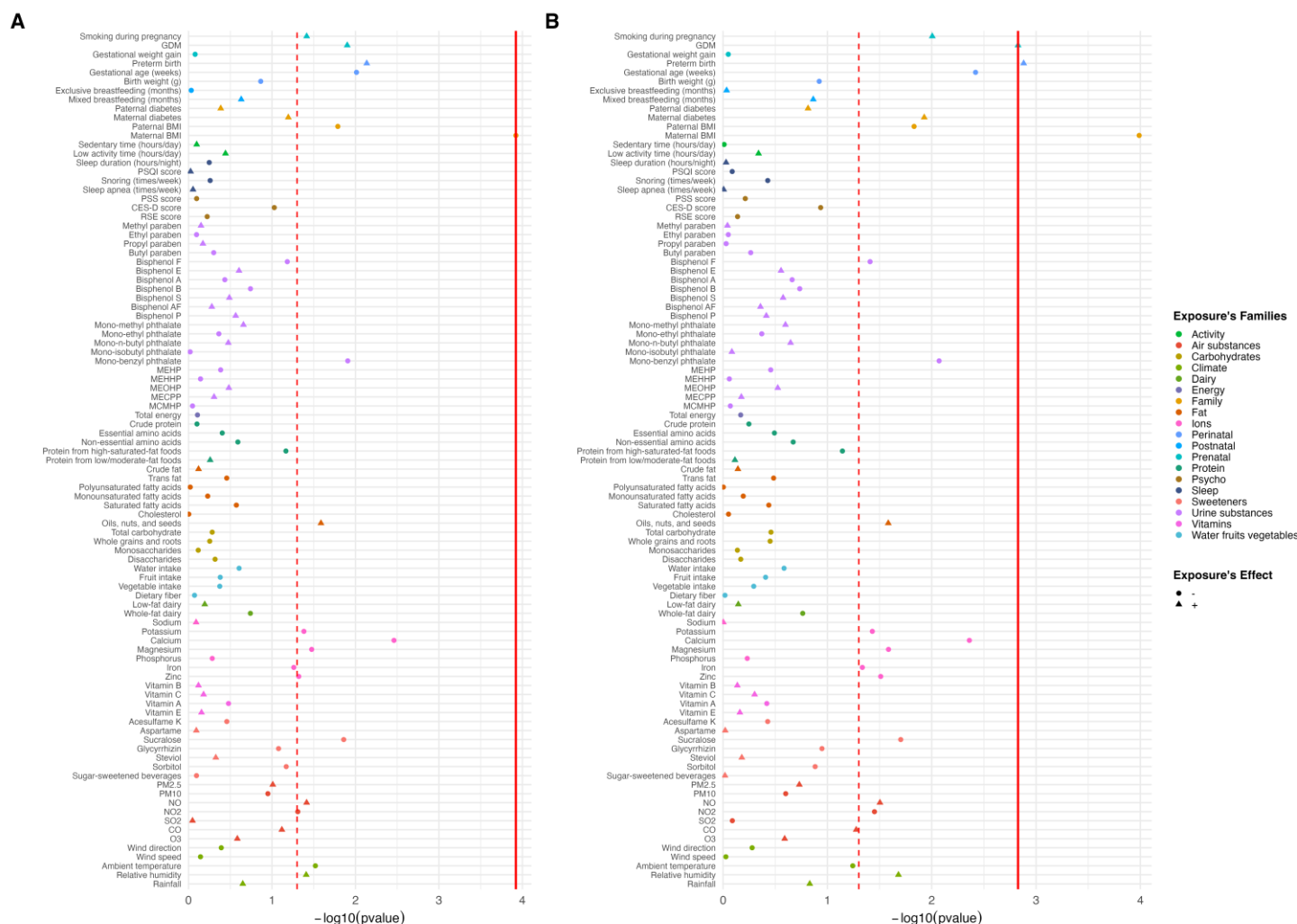


Figure 1. Manhattan plots from the exposome-wide association study of paediatric insulin resistance

Manhattan plots showing $-\log_{10}(p \text{ values})$ for associations between individual exposures and IR in (A) the unadjusted model, (B) the model adjusted for age, sex, parental education, and family income. Colours denote exposure families, and shapes indicate the direction of association. The dashed vertical line represents the nominal significance threshold ($p = 0.05$), and the solid vertical line represents the FDR-adjusted significance threshold.

Effectiveness and economic impact of the diabetes pay-for-performance (P4P) program in Taiwan: A systematic review and meta-analysis

Hsu C¹

¹National Health Research Institutes, Miaoli County, Taiwan, ²Min-Sheng General Hospital, Taoyuan, Taiwan

Introduction: Taiwan introduced the Diabetes Pay-for-Performance (P4P) program in 2001 to enhance diabetes care quality through financial incentives. Participation has expanded from 31.45% in 2011 to 70.1% in 2024. While evidence suggests P4P improves mortality, its impact on total healthcare costs remains debated. This study evaluates whether P4P enrollment alters the cost structure of care while maintaining clinical efficacy.

Methods: A systematic review and meta-analysis were conducted using PubMed, EMBASE, and the Cochrane Library. A random-effects model synthesized primary clinical and cost-related outcomes.

Results: Analysis showed that P4P enrollment significantly reduced all-cause mortality by 33% (Pooled HR: 0.67; 95% CI: 0.56–0.79; $P = 0.0002$) and was associated with an additional 0.22% reduction in HbA1c levels. Regarding healthcare utilization, P4P participants had a significantly lower risk of hospitalization (Pooled Ratio: 0.84; 95% CI: 0.82–0.87). Economically, although P4P participants incurred higher outpatient and examination costs (Pooled mean difference: \$21.06; 95% CI: 15.65–26.52), total medical costs did not increase and actually decreased significantly (Pooled MD: -\$165.48; 95% CI: -220.26 to -110.74). Significant heterogeneity was observed in all-cause mortality ($I^2 = 87.2\%$) and HbA1c ($I^2 = 76.1\%$).

Conclusion: The Taiwan Diabetes P4P program demonstrates stable clinical benefits, including reduced mortality and improved glycemic control. By shifting the care focus toward preventive outpatient services, the program reduces high-cost hospitalizations without increasing the overall financial burden. These findings support P4P as an effective policy tool for chronic disease management in the Western Pacific region.

Case conferencing for chronic conditions in primary and community care: a systematic scoping review

Hure A^{1,2}, Aldridge C¹, Forbes C¹, Lin S¹, Pryor D¹, Taylor R^{1,2}, Mingay E^{1,2}, Dolja-Gore X^{1,2}, Yu W³, Acharya S^{1,2,3}

¹University of Newcastle, Callaghan, Australia, ²Hunter Medical Research Institute, New Lambton Heights, Australia, ³Hunter New England Local Health District, New Lambton Heights, Australia

Introduction: Non communicable diseases are the leading cause of global morbidity and mortality. Integrated care is increasingly employed to address the growing complexity and burden of chronic conditions, including diabetes, by enhancing coordination and continuity across healthcare systems. Case conferencing has emerged as a promising strategy across Australian and international settings.

Aim: To systematically identify and summarise the international quantitative evidence on case conferencing for chronic conditions, including diabetes, or equivalent models of collaborative care delivered in primary care.

Methods: A scoping review was conducted using Joanna Briggs Institute methodology. Studies included adults with at least one chronic condition, including multimorbidity, and evaluated integrated case conferencing interventions involving synchronous collaboration among at least three health professionals, including a medical practitioner. Quantitative studies published in English from 2006 onwards and conducted in middle- or high- income countries were included. Studies involving children, pregnancy, communicable diseases, asynchronous or acute care models, tertiary settings, qualitative designs, and case reports were excluded.

Results: A total of 7,875 records underwent title and abstract screening; 725 progressed to full text review; 35 studies were included. Most studies were conducted in the United States (n=11), Australia (n=9), and the United Kingdom (n=6). Diabetes was the most frequently studied condition (n=12), followed by dementia (n=5), chronic kidney disease (n=5), cancer (n=3), cardiovascular disease (n=1), mental illness (n=1), and chronic respiratory disease (n=1). Case conferencing occurred in diverse settings, including general practices, specialist clinics, community outpatient services, medical centres, and virtual care. Medical specialists participated in 80% of studies, general practitioners in 71%, while patient attendance was less common (17%).

Conclusion: Case conferencing is increasingly in use across chronic conditions, with particularly strong application and findings in diabetes management. The breadth of settings and multidisciplinary engagement highlights its potential to support patients and providers in managing chronic conditions.

Effective coverage of diabetes treatment in Japan from 2003 to 2019

Ikeda N¹, Sugiyama T², Nishi N³

¹Laboratory of Nutrition and Social Science, Center for Nutritional Epidemiology and Policy Research, National Institute of Health and Nutrition, National Institutes of Biomedical Innovation, Health and Nutrition, Settsu, Japan, ²Division of Health Services Research, Diabetes and Metabolism Information Center, National Institute of Global Health and Medicine, Japan Institute for Health Security, Shinjuku, Japan, ³Graduate School of Public Health, St Luke's International University, Chuo, Japan

Abstract title

Aim

To examine national trends in the effective coverage of diabetes treatment in Japan, a quality-adjusted metric representing the proportion of potential health gain actually achieved, using a health system performance framework that links treatment need, treatment effect, and glycaemic control.

Methods

We analysed cross-sectional data for 169,926 adults aged 20 years or older from 17 annual National Health and Nutrition Surveys conducted between 2003 and 2019. Treatment need was defined as glycated haemoglobin (HbA1c) equal to or greater than 7.0% or self-reported current use of glucose-lowering medication. For individuals with treatment need, we applied nearest-neighbour matching to estimate the average treatment effect (ATE) of medication on HbA1c. Effective coverage was calculated as the ratio of the total estimated HbA1c reduction to the aggregate potential reduction (counterfactual) expected if all individuals in need had received treatment, which serves as a health system performance metric accounting for both the quality and reach of care.

Results

The age-standardized prevalence of treatment need for diabetes remained approximately 6–7% over the study period. The ATE on HbA1c increased from 0.4 percentage points (95% confidence interval, 0.1–0.6) in 2003–2005 to 1.0 percentage points (0.7–1.3) in 2016, then declined to 0.5 percentage points (0.2–0.8) in 2017–2019. An upward trend in effective coverage was observed from 25.3% (0.4–50.3) in 2003–2005 to 70.4% (58.3–82.5) in 2013–2015, followed by a modest decline to 56.3% (34.2–78.4) in 2017–2019.

Conclusion

Effective coverage of diabetes treatment improved from the early 2000s to the mid-2010s but showed signs of levelling off thereafter. Optimizing treatment effectiveness and delivery remains a priority in diabetes care in Japan.

Presymptomatic Type 1 Diabetes in Japanese first-degree relatives: Epidemiology, Islet autoantibody profiles, and distinct immunogenetic architecture from PREP-T1D study

Imagawa A¹, Chujo D², Kawamura T³, Kikuchi T⁴, Shiraki Y⁵, Koshiba R⁵, Akira S⁶

¹Department of Internal Medicine (I), Osaka Medical and Pharmaceutical University, Takatsuki, Japan, ²Department of Diabetes, Metabolism, and Endocrinology, International University of Health and Welfare, Ichikawa, Japan, ³Abeno Medical Clinic, Osaka, Japan, ⁴Department of Pediatrics, Saitama Medical University, Moroyama, Japan, ⁵General Medicine Medical, Sanofi K.K., Tokyo, Japan, ⁶Department of Endocrinology and Diabetes, Saitama Medical University, Moroyama, Japan

Aims: Presymptomatic type 1 diabetes (T1D) staging via islet autoantibody (IAb) screening is well-established in Caucasian populations, but epidemiological and immunogenetic data from Asia populations have not been well studied. This study aimed to determine the prevalence of Stage 1/2 T1D among Japanese first-degree relatives (FDRs) of T1D individuals and characterize initial IAb and HLA associations.

Methods: PREP-T1D was a multicenter screening study across Japan (August 2024, one-year period). FDRs aged 0–49 years underwent four-IAb screening (GADA, IAA, IA-2A, ZnT8A) and IAb-positive participants proceeded to secondary screening including 75g OGTT with C-peptide measurement at 0, 30, 60, 90, 120 minutes, HbA1c, and HLA DRB1-DQB1 genotyping. Single IAb-positive (SP) cases were analyzed for associations between IAb type and susceptible (*0405-*0401, *0802-*0302, *0901-*0303) / protective (*1501-*0602, *1502-*0601, *08:03-*06:01) HLA haplotypes.

Results: Of 2,614 screened FDRs, 95 (3.6%) were IAb-positive: 79 single-positive (3.0%) and 16 multiple-positive (0.6%). ZnT8A was most prevalent (49.5%), followed by GADA (42.1%) and IA-2A (32.6%). Female proportions were 57.5% overall, 54.4% in single-positive (GADA-only 57.7%, ZnT8A-only 48.6%, IA-2A-only 61.1%) and 18.8% in multiple-positive. Secondary screening revealed normal glycemia in 59, prediabetes in 28, and overt hyperglycemia in 2 participants. Multiple IAb-positive individuals showed markedly lower C-peptide AUC and Σ C-peptide. HLA analysis of SP cases revealed GADA-only enriched for susceptible haplotype combinations (52.0% vs. 13.7%, $P=0.0004$ vs. other SPs). In contrast, ZnT8A-only and IA-2A-only carried substantial proportions of protective haplotypes, with enrichment of DRB1*08:03–DQB1*06:01 (10.6% vs. 1.2%, $P=0.010$) and DRB1*15:01–DQB1*06:02 (11.1% vs. 2.6%, $P=0.033$), respectively.

Conclusion: This first nationwide presymptomatic T1D screening study in Asia demonstrates IAb positivity rates comparable to Caucasian populations. The distinct immunogenetic architecture, particularly protective HLA haplotypes enriched in single ZnT8A/IA-2A positivity, may partly explain Japan's unique T1D epidemiology and lower prevalence, underscoring the need for ethnicity-specific screening frameworks.

Socioeconomic status and medication utilisation in type 2 diabetes: insights from the FIELD study

Januszewski A^{1,2}, Kwon C¹, Li L², O'Connell R², Francis H², Mangani A², Colman P³, d'Emden M⁴, Sullivan D^{5,6}, Best J⁷, Simes J², Davis T⁸, Keech A²

¹University of Sydney, Sydney Pharmacy School, Camperdown, Australia, ²University of Sydney, NHMRC Clinical Trials Centre, Camperdown, Australia, ³Royal Melbourne Hospital, Department of Diabetes and Endocrinology, Parkville, Australia, ⁴Royal Brisbane Hospital, Brisbane, Australia, ⁵Royal Prince Alfred Hospital, Department of Chemical Pathology, Camperdown, Australia, ⁶University of Sydney, Faculty of Medicine and Health, Camperdown, Australia, ⁷Nanyang Technological University, Lee Kong Chian School of Medicine, , Singapore, ⁸University of Western Australia, Medical School, Perth, Australia

Background

Type 2 diabetes (T2D) is frequently accompanied by multiple comorbidities requiring polypharmacy. Whether area-level socioeconomic status (SES) influences medication utilisation patterns in T2D remains insufficiently characterised.

Methods

We analysed 5,715 Australian participants with T2D enrolled in the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study. Residential addresses were geocoded and linked to Australian Census-derived area-level SES measures: Index of Relative Socioeconomic Disadvantage (IRSD), Index of Education and Occupation (IEO), and Index of Economic Resources (IER), expressed as state-level percentiles. Medication use throughout the entire FIELD trial follow-up was categorised into 24 therapeutic classes. Associations between SES and (i) use of individual drug classes and (ii) total number of drug classes were examined using correlation, logistic regression, and Poisson models adjusted for age, sex, diabetes duration, HbA1c, eGFR, and prior cardiovascular or microvascular disease.

Results

Across all indices, residence in higher-SES areas was associated with fewer medication classes used during follow-up (Spearman rho -0.10 to -0.12 , all $p < 0.001$). Users of the most medication classes resided in lower-SES areas than non-users (all $p < 0.05$). In adjusted logistic regression, each decile increase in area-level SES was associated with 2.1–8.1% lower odds of using a given medication class (all $p < 0.05$). Consistently, higher area-level SES was associated with fewer medication classes overall (adjusted Poisson RR 0.93–0.99 per 10-percentile increase), indicating a graded reduction in medication burden across the SES spectrum.

Among class users, associations between area-level SES and within-class medication counts were heterogeneous. Residence in higher-SES areas was associated with greater supplement use (RR 1.01–1.08, $p < 0.007$), whereas analgesic use was modestly with increasing SES (RR 0.99, $p < 0.04$).

Conclusions

Residence in lower-SES areas was associated with greater overall medication burden during trial follow-up. Within-class medication intensity varied by therapeutic category, suggesting socioeconomic gradients in comorbidity burden, symptom management, and discretionary medication use.

Socioeconomic gradients in geographic access to healthcare services among Australians with type 2 diabetes

Januszewski A^{1,2}, Li L², O'Connell R², Best J³, Simes J², Sullivan D^{4,5}, Davis T⁶, Keech A²

¹University of Sydney, Sydney Pharmacy School, Camperdown, Australia, ²University of Sydney, NHMRC Clinical Trials Centre, Camperdown, Australia, ³Nanyang Technological University, Lee Kong Chian School of Medicine, Singapore, Singapore, ⁴Royal Prince Alfred Hospital, Department of Chemical Pathology, Camperdown, Australia, ⁵University of Sydney, Faculty of Medicine and Health, Camperdown, Australia, ⁶University of Western Australia, Medical School, Perth, Australia

Background

Geographic access to healthcare influences health outcomes, yet variation in access across area-level socioeconomic strata among people with type 2 diabetes is not well characterised. We examined associations between area-level socioeconomic status (SES) and geographic access to healthcare services across Australia.

Methods

We analysed data from 5,147 participants with type 2 diabetes enrolled in the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study. Residential addresses were geocoded and linked to national healthcare facility data. Area-level socioeconomic status (SES) was assessed using Census-derived Index of Relative Socioeconomic Disadvantage (IRSD), Index of Education and Occupation (IEO), and Index of Economic Resources (IER), expressed as state-level percentiles and categorised into tertiles.

For each participant, mean distance to the 10 nearest healthcare services (general practice and hospitals) was calculated and compared across SES tertiles strata.

Results

Median distance to healthcare services differed significantly across area-level SES strata for all indices. Participants residing in lowest versus highest SES tertiles lived further from general practice services (IRSD: 1.9 [1.4–4.5] vs 1.8 [1.3–2.4] km; IER: 1.9 [1.3–4.6] vs 1.8 [1.4–2.5] km; IEO: 2.2 [1.5–5.3] vs 1.6 [1.2–2.2] km; all $p < 0.0001$).

More marked gradients were observed for hospital-based services (IRSD: 10.2 [5.7–23.1] vs 5.5 [3.6–9.9] km; IER: 10.1 [5.2–23.8] vs 5.8 [3.9–9.8] km; IEO: 10.9 [6.9–24.1] vs 4.7 [3.2–8.1] km; all $p < 0.0001$). Inequality was greatest for IEO, with participants residing in the highest SES (vs. lowest) tertile areas living closer general practice (25%), hospitals (57%), and emergency departments (63%). Lower IRSD and IER were associated with adverse cardiovascular outcomes.

Conclusions

Pronounced area-level socioeconomic gradients exist in geographic access to healthcare among Australians with type 2 diabetes, highlighting structural inequities that may contribute to disparities in diabetes care and outcomes.

Understanding health literacy and its role in medication adherence among Indian migrants with type 2 diabetes mellitus.

Parmar J¹, McCaffery K², Rahaman S¹, Sidhu B³, Zachariah D⁴, Hng T⁴, **Jayaballa R**⁴, Wong V³, Hibbert E⁵, Turalic U⁶

¹Western Sydney University, Campbelltown, Australia, ²University of Sydney, Camperdown, Australia,

³South Western Sydney Local Health District, Liverpool, Australia, ⁴Western Sydney Local Health District, Westmead, Australia, ⁵Nepean Hospital, Kingswood, Australia, ⁶Northern Sydney Local Health District, Cremorne, Australia

Aim/s: Type 2 Diabetes Mellitus (T2DM) is a growing global health concern, with Indian migrants facing unique challenges due to cultural, linguistic, and systemic barriers. Health literacy is a critical factor in diabetes management, yet its link to medication adherence in this population is not well understood. This study examined the relationship between health literacy—both objectively measured (performance-based) and self-reported—and medication adherence among Indian migrants with T2DM, while considering demographic, socioeconomic, and health-related factors.

Methods: A cross-sectional survey was conducted with 309 Indian migrants recruited from multicultural health services and hospital diabetes clinics in Greater Western Sydney, Australia. Eligible participants were aged 18+, diagnosed with T2DM for at least one year, and on prescribed diabetes medication. Data were analysed using multivariable logistic regression.

Results: Low health literacy was common, with over 67.64% reporting low to marginal performance based health literacy and 62.46% reporting low self-reported health literacy. Medication adherence was also low, with 68.93% of participants classified as non-adherent. Lower health literacy, both performance-based (adjOR = 9.14, 95% CI: 4.24 - 19.72; $p < 0.001$) and self-reported (adjOR = 12.45, 95% CI: 4.55 - 34.10; $p < 0.001$) were significantly associated with low medication adherence. Additional predictors included private health insurance, BMI, glucose levels, comorbidities, and social support. Models varied slightly depending on the health literacy measure used.

Conclusion: Health literacy is a key determinant of medication adherence among Indian migrants with T2DM. Findings highlight the need for culturally tailored interventions that enhance understanding of medical information, improve navigation of healthcare systems, and strengthen social and family support to promote better diabetes self-management.

Keywords: Cross-sectional study, Type 2 Diabetes Mellitus, health literacy, medication adherence, Indian migrants

Changing demographic trends of age and sex distribution of Diabetes in Sri Lanka over the past decade

Jayawickreme K^{1,2}, Nilmini S², Kaluarachchi R², Tennakoon S³, Antonypillai C²

¹Department of Diabetes and Endocrinology, Royal North Shore Hospital, St. Leonards, Australia,

²Diabetes and Endocrinology unit, National Hospital Kandy, Kandy, Sri Lanka, ³Department of Community Medicine, Faculty of Medicine, University of Peradeniya, Peradeniya, Sri Lanka

Aims

Diabetes is increasing globally, with a growing burden in low- and low-middle-income countries like Sri Lanka. Understanding demographic trends is essential for risk stratification and service planning. This study aimed to analyse changing demographic trends among patients with diabetes in Sri Lanka.

Methods

A 10-year retrospective cross-sectional descriptive study was conducted including all new admissions to the Diabetes clinic at the National Hospital, Kandy, from 1 January 2012 to 31 December 2021 from medical records. Demographic data from 14,491 diabetes admissions were analysed.

Results

The mean age at first presentation with diabetes over the study period was 49.63 years (SD 13.58), with a significant downward trend over time ($p < 0.001$). This reduction was observed in both sexes but was more pronounced among females ($p < 0.001$) than males ($p = 0.012$). The highest mean age at admission was recorded in 2012 (51.38, SD 12.5 years), declining to a nadir in 2020 (46.27, SD 14.23 years), followed by a modest increase in 2021 (48.15, SD 13.85 years; $p < 0.001$). Females presented at a significantly younger age than males (47.75, SD 13.71 vs. 52.45, SD 12.88 years; $p < 0.001$).

The proportion of females with diabetes increased significantly from 56% in 2012 to 64.4% in 2020, before a slight decline to 60.7% in 2021 ($p < 0.001$). Young-onset diabetes (≤ 35 years) increased markedly over the decade, with numbers rising from 140 in 2012 to 396 in 2020 (2.83 times increase in number from baseline), and proportions increasing by 15.3% from 11.3% to 26.6%, before a reduction in 2021. Overall clinic admissions increased over time, with a decline during 2020–2021 with the COVID pandemic.

Conclusion

Diabetes in Sri Lanka is rising, increasingly affecting younger individuals, particularly females, highlighting an urgent need for early prevention strategies and targeted healthcare planning.

Guidelines for firefighters with diabetes: now and the future

Mina R¹, **Jenkins A**²

¹Fire And Rescue NSW, Greenacre, Australia, ²Baker Heart & Diabetes Institute, Melbourne, Australia

Aim/s

Eighty percent of persons living with diabetes are in the workforce. A small subset of work roles is safety critical in nature, in that impairment or acute incapacity of a worker potentially impacts the safety of others, which can include the public. Historically, treatment with insulin has presented challenges for such roles. Ever-evolving modern technologies and expanding Type 2 diabetes drug options, represent growing potential for safety critical work, thus requiring reconsideration of how persons are assessed, with this paper providing a specific focus on firefighters, who operate in a unique and dynamic occupational setting

This paper examines the applicability of diabetes technologies – opportunities and challenges, mostly in the context of Type 1 diabetes, with a specific focus on the occupation of firefighters, who serve public safety.

Methods

Review of literature; multidisciplinary dialogue capturing key considerations from stakeholders e.g. endocrinology, occupational medicine, employer, legal.

Results

Technologies aiding in the management of insulin managed diabetes have become a major asset, both clinically and in expanded opportunities for workers, such as pilots. For firefighters, however, at this time, there remain limitations, not based on diagnosis, rather based on careful consideration of inherent job requirements related to the specific operational environment, as well as physical and cognitive demands.

Conclusion

Our findings highlight the importance and need for clinician awareness of specific inherent job requirements, including safety critical tasks, where safety considerations pertain to the individual and others, including the public. Improving cross-discipline dialogue and information sharing will be key in monitoring ongoing opportunities for safety critical workers, including firefighters, as technology evolves.

Epidemiology, health outcomes, and care options for people with Type 1 diabetes in the Western Pacific Region

Jenkins A¹, Thornton T¹, Huang M¹, Kodani N², Ma R³

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²Japan Institute for Health Security, Tokyo, Japan, ³Chinese University of Hong Kong, Hong Kong, Hong Kong (China)

Aims: To overview the epidemiology and health outcomes for people with Type 1 diabetes (T1D) in the Western Pacific Region (WPR).

Methods: Thematic review of English language literature and use of the Type 1 diabetes Index (www.t1dindex.org) for incidence and prognosis. World Bank data for country income status. Searches of company and NGO websites and discussions with WPR clinicians re care availability.

Results: T1D affects 1M people in the WPR, with widely varying incidence and health outcomes. Annual incidence in youth (0-14 years) ranges 0.9 (95% CI 0.6–1.3)/100,000 people in Fiji to 23.2 (21.3-25.2)/100,000 people in Australia, and is rising 2-14% p.a. There are few studies in adults and in the low- and middle-income regions. Whilst pre-clinical T1D is recognised, in the WPR screening is rare. Trials to delay clinical onset are available e.g. in Australia, but the only clinical approved drug to delay onset, Teplizumab, is not yet available in the WPR. Stigma is common. Health outcomes vary greatly. The mean number of healthy life years lost for a person with T1D in WPR is 34(8) years, ranging from 21 years (Singapore) to 46 years (Vietnam). More healthy life years are lost in less advantaged areas. Insulin pumps (10 models) and CGM (6 models) are available in 13 and 16 of 37 WPR Countries respectively, but subsidised in very few (e.g. Australia, New Zealand, and Japan). Availability of T1D care and technology skilled healthcare professionals is not well-mapped. For many WPR areas access to even basic care (insulin, syringes and blood glucose and ketone monitoring) is challenging. At least four Non-Government Organisations assist with T1D care in 20 WPR countries.

Conclusions: More studies of T1D epidemiology (all ages), outcomes, care options, and advocacy are needed. Equitable access to tests, care and treatments is needed.

Diabetes in Mongolia: Burden of disease, healthcare challenges, and the need for a National registry

Khasag A¹

¹Mongolian National University Of Medical Sciences, Ulaanbaatar , Mongolia

Aim/s: To synthesize current evidence on the diabetes burden in Mongolia, examine healthcare system challenges, and advocate for a national diabetes registry.

Methods: This review synthesizes epidemiological data, healthcare system analyses, and published reports on diabetes prevalence, care cascade, and complications in Mongolia.

Results: Diabetes prevalence in Mongolia has increased threefold over two decades, from 3.2% in 1999 to approximately 10.0% among adults aged 30 years and older, with an additional 9.8% having prediabetes. The International Diabetes Federation estimates 208,500 Mongolian adults currently live with diabetes, projected to reach 328,800 by 2050. Alarming, 74.7% of cases remain undiagnosed. Among diagnosed patients, only 5.9% achieve glycemic control, while 48.5% are unaware of their condition and 30.2% remain treated but uncontrolled. Hospital data show sepsis as the leading cause of mortality (65.0% of deaths), followed by renal failure, reflecting poor metabolic control and late presentation. Healthcare system challenges include fragmented information systems, limited rural diagnostic access, insufficient specialist workforce, and low public health literacy.

Conclusion: The escalating diabetes burden in Mongolia requires urgent action. Establishing a national diabetes registry is essential for accurate surveillance, patient tracking, quality-of-care assessment, and evidence-based health policy to curb this epidemic and its complications.

Liver-related complications and mortality in type 1 and type 2 diabetes with metabolic dysfunction-associated steatotic liver disease- a nationwide population-based study in Korea

Kim J¹, Choi J¹, Kim K¹, Kim S¹, Shin S¹, Kim K¹, Kim Y¹

¹Korea University Anam Hospital, Seoul, South Korea

Aim

The rising prevalence of obesity has accelerated the burden of metabolic dysfunction-associated steatotic liver disease (MASLD) in people with diabetes, including those with type 1 diabetes (T1D). We compare the incidence of MASLD-related liver complications and mortality among adults with T1D, type 2 diabetes (T2D), and non-diabetics.

Methods

Patients were identified using a nationwide database in Korea from 2002 to 2021, and mortality data were collected through 2023. MASLD was defined as a fatty liver index (FLI) ≥ 30 with T1D or T2D and FLI ≥ 30 with ≥ 1 metabolic abnormality in non-diabetics. Based on T1D subjects' age, sex, and year of MASLD diagnosis, 1:3 matched T2D and non-diabetic controls were enrolled. The outcomes included composite liver-related complications (liver failure, cirrhosis or cirrhosis-related complications, hepatocellular carcinoma (HCC), liver transplantation, and liver-related mortality) and extrahepatic biliary tract and pancreatic cancers.

Results

34,390 MASLD subjects (T1D, 4,990; T2D, 14,970; non-diabetics, 14,970) were enrolled, with a mean age (SD) of 59.7(13.0) years, and 56.6% were male. Mean FLI was 49.4(16.2), 51.6(17.0), and 33.5(18.0) in T1D, T2D, and non-diabetes, respectively. Over a 10.7-year follow-up, T1D exhibited the highest risk of composite liver-related complications (adjusted hazard ratio [aHR], 2.23; 95% CI, 1.74–2.86), followed by T2D (aHR, 1.53; 95% CI 1.25–1.87) versus non-diabetics after adjustment for confounding variables, including glucose. Liver cirrhosis and related complications were the most common complications, with aHRs of 2.15 in T1D and 1.51 in T2D. The risk of HCC was highest in T1D (aHR 2.07), whereas the risks of gallbladder and pancreatic cancers were highest in T2D (aHR 2.04 and aHR 2.40, respectively).

Conclusions

Liver-related complication risk is highest in T1D, followed by T2D and non-diabetic MASLD patients. This study reveals a distinct susceptibility to malignancies based on diabetes types. This study highlights the need for routine screening and tailored management strategies targeting MASLD in clinical care for diabetes patients.

Social determinants of health influencing diabetes self-management behaviors among immigrants: A scoping review

Kudoh R¹, Shibayama T¹

¹Institute of Medicine, University Of Tsukuba, Tsukuba, Japan

Aim: This scoping review aimed to identify and synthesize the social determinants of health influencing diabetes self-management behaviors among immigrants residing in host countries for three or more months.

Methods: A systematic search was conducted in January 2024 across Web of Science and PubMed, covering publications from 2004 to 2024. Eligible studies were original, peer-reviewed articles available in full text, focusing on immigrants with diabetes and reporting quantitative outcomes across five self-management behavior domains: diet, physical activity, monitoring, medication adherence, and healthcare utilization. Social determinants of health were defined using the framework proposed by Felicia et al. (2021). Self-management behaviors were operationalized as five daily, quantitatively measurable domains selected from the seven Self-Care Behaviors defined by the Association of Diabetes Care and Education Specialists: diet, physical activity, monitoring, medication adherence, and healthcare utilization. Studies were excluded if they were protocols, conference abstracts, or review articles.

Results: A total of 33 studies were included in the final analysis. Multiple social determinants of health were found to influence diabetes self-management behaviors among immigrants. Educational attainment, employment status, income level, health insurance coverage, language proficiency, and healthcare access were frequently associated with self-management outcomes. Social support from family and community played a significant role in shaping dietary habits, physical activity levels, and coping behaviors. Migration-related factors, including legal status, cultural beliefs, and differences in healthcare systems, emerged as additional barriers to effective self-management. These determinants operated interactively, affecting both the feasibility and sustainability of daily diabetes self-management practices.

Conclusion: Diabetes self-management among immigrants is strongly shaped by social and structural factors. Interventions aimed at improving diabetes outcomes in immigrant populations must address the broader social context, including socioeconomic conditions, cultural factors, and barriers to healthcare access.

Association between adipokines and lipid profiles in the urban and rural Indonesian young adults

Kurniawan F^{1,2}, Wisnu W^{1,2}, Urfa M¹, Tahapary D^{1,2}, Rinaldi I³, Purnamasari D^{1,2}

¹Division of Endocrinology, Metabolism, and Diabetes, Department of Internal Medicine, Faculty of Medicine Universitas Indonesia/Dr. Cipto Mangunkusumo General National Hospital, Jakarta Pusat, Indonesia, ²Metabolic Disorder, Cardiovascular, and Aging Research Cluster, Indonesian Medical Education and Research Institute, Faculty of Medicine Universitas Indonesia, Jakarta Pusat, Indonesia, ³Division of Hematology and Clinical Oncology, Department of Internal Medicine, Faculty of Medicine Universitas Indonesia/Dr. Cipto Mangunkusumo General National Hospital, Jakarta Pusat, Indonesia

Backgrounds and Aims

Urbanization in Indonesia creates metabolic disparities. Adipokines (leptin and adiponectin) link adipose tissue to lipid dysregulation, yet urban-rural associations with dyslipidemia are underexplored in Southeast Asian youth amid rising CVD. This study aims to evaluate the effect of urbanization on the association between adipokines and lipid profiles in Indonesian young adults.

Methods

A cross-sectional study comparing urban and rural-origin university freshmen students aged 18-23 years was conducted. Leptin, adiponectin, and lipid profiles were measured using stored serum samples collected after overnight fasting. Adipokines were categorized into low and high based on the median for each sex. Lipid profiles were also categorized into low and high based on specific cut-offs: 200 mg/dL for total cholesterol; 100 mg/dL for LDL-cholesterol; 150 mg/dL for triglyceride, and 40 mg/dL (in men) or 50 mg/dL (in women) for HDL-cholesterol. Logistic regression analyses were performed to evaluate the association between adipokines and lipid profiles.

Results

There were 189 urban and 186 rural subjects. Triglyceride levels were higher in urban than rural subjects, and similar trends were observed for total- and LDL-cholesterol. Urban also had higher leptin and leptin-adiponectin ratios (LAR) than rural subjects. No differences were observed for adiponectin levels between the two populations. Higher leptin levels were associated with higher total- and LDL-cholesterol levels, with the associations more pronounced in the rural subjects. Higher leptin and LAR were associated with higher triglyceride levels, while the opposite was found for adiponectin. These associations were more pronounced in urban than in rural subjects. Additionally, higher adiponectin levels were negatively associated with lower HDL-cholesterol levels.

Conclusion

Urbanization in Indonesian young adults is associated with adverse lipid and adipokine profiles. Urbanization also modifies the relationship between adipokines and lipid dysregulation in this specific population.

Keywords:

urbanization in Indonesia, young adults, lipid profiles, leptin, adiponectin

An applied, pragmatic update of the life! Behaviour change program: a multi-disciplinary, community and evidence informed approach

Kwon J¹, Holmes-Truscott E^{2,3}, Van Der-Velden J¹, Westhorpe M¹, Lim K¹, Geerling R^{2,3}, Burrows T⁴, Skinner J⁴, Duncan M^{5,6}, Skinner T^{2,3}, Speight J^{2,3}

¹Diabetes Victoria, Carlton, Australia, ²School of Psychology and Institute for Health Transformation, Deakin, Geelong, Australia, ³The Australian Centre for Behavioural Research in Diabetes, Diabetes Victoria, Carlton, Australia, ⁴School of Health Sciences, College of Health, Medicine and Wellbeing, University of Newcastle, Newcastle, Australia, ⁵School of Medicine & Public Health, College of Health, Medicine and Wellbeing, University of Newcastle, Newcastle, Australia, ⁶Global Sport and Movement Collaborative, University of Newcastle, Callaghan, Australia

Aims:

Funded by the Victorian Government and managed by Diabetes Victoria, the *Life!* program is a 12-month behaviour change intervention designed to reduce risk of type 2 diabetes and cardiovascular conditions. Since 2007, the program has reached over 90,000 participants. The group-based program is delivered in-person and online in English, Chinese, Vietnamese, and Arabic. Tailored options include telephone health coaching and a version for people with prior gestational diabetes. Core components address nutrition, physical activity, and goal setting, including weight reduction. To ensure ongoing relevance, acceptability, and alignment with contemporary evidence, a pragmatic, evidence- and community-informed review of the *Life!* program was undertaken.

Methods:

Led by a multidisciplinary team (health promotion, clinical, research), and guided by facilitator and community advisory groups, a multi-stage review of the English program was undertaken from 2021-2026, including: (i) needs assessment to identify priorities; (ii) revision of program goals (targeted behaviours) and content (including data instruments, facilitator training resources); (iii) condensed pilot testing of revised content. The process integrated rapid literature review; data evaluation; targeted consultation and review (scientific, facilitator, community and departmental); health literacy, language and stigma checks, and iterative refinement.

Results:

Program goals were revised to include eight *Life!* Health Actions across nutrition, movement, and sleep, removing weight loss as a behaviour change goal and updating evaluation outcomes and measures accordingly. Content revisions incorporated evidence-informed behaviour change techniques, strengthened content on nutrition, movement, sleep and wellbeing, and emphasised maintaining behaviour change and person-centred SMARTER goal setting. Revised materials and training were considered acceptable, practical, and relevant by facilitators and (potential) participants, with minor refinements identified.

Conclusions:

The revised *Life!* program represents a progressive shift in preventative health promotion for adults, integrating contemporary evidence with person-centred and weight-inclusive practice. Next steps include staged implementation, evaluation, and adaptation to support engagement among tailored populations.

A novel AUC-to-serum zinc ratio for improved risk stratification of postpartum glucose intolerance in women with gestational impaired glucose tolerance

Lee J¹, Kim L², Kim W¹, Kim Y¹

¹Division of Endocrinology and Metabolism, Department of Internal Medicine, CHA University Gangnam Medical Center, Seoul, South Korea, ²Division of Endocrinology and Metabolism, Department of Internal Medicine, Halla Hospital, Jeju, South Korea

Aims: Women with gestational impaired glucose tolerance (GIGT) are often underserved in postpartum care. We investigated whether the 100g OGTT AUC-to-Serum Zinc Ratio (AUC/Zn Ratio), improve risk stratification for postpartum glucose intolerance compared to conventional diagnostic categories.

Methods: We analyzed 344 pregnant women who underwent a 100g OGTT and serum zinc (Zn) measurement. Postpartum metabolic status was assessed via a 75g OGTT at 6-12 weeks (N=80). Multivariate analysis adjusted for age, HbA1c, triglycerides, family history of DM, and parity. An optimal cut-off was determined using Youden's index.

Results: The AUC/Zn Ratio increased significantly across diagnostic groups (281.7 ± 46.2 , 332.3 ± 40.4 , and 367.1 ± 52.6 for NGT, GIGT and GDM, respectively; $p < 0.0001$). In the high-risk subgroup (GIGT/GDM), the ratio was an independent predictor of postpartum glucose intolerance. The proposed model achieved a significant NRI of 0.21 ($p < 0.05$). Using a cut-off of 340, GIGT individuals with a Ratio ≥ 340 showed a risk profile (35.2%) comparable to the GDM group (32.7%) and significantly higher than those below the threshold (12.5%).

Conclusion: The AUC/Zn Ratio may be an independent predictor for identifying high-risk individuals within the GIGT population overlooked by traditional diagnostic criteria. This ratio may help clinicians identify those requiring intensive postpartum surveillance and personalized prevention strategies for type 2 diabetes. While these findings suggest significant potential for improving postpartum care, further large-scale prospective studies are warranted to validate these results and establish clinical thresholds.

Table 1. Postpartum Metabolic Outcomes According to AUC/Zn Ratio and Diagnostic Categories

Group (N=80)	N	AUC/Zn Ratio	Postpartum glucose intolerance rate (%)	p-value
GIGT with Ratio < 340	16	312.4 ± 18.2	12.50%	Ref.
GIGT with Ratio ≥ 340	17	362.1 ± 14.5	35.20%	0.028*
GDM (All)	47	367.1 ± 52.6	32.70%	0.041*

Prevalence and risk factors of diabetic retinopathy in Korean adults: A Nationally representative study

Lee M¹, Kwon H², Han K³

¹Myongji Hospital, Hanyang University College of Medicine, Goyang-si, South Korea, ²Division of Endocrinology and Metabolism, Department of Internal Medicine, Yeouido St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Seoul, Republic of Korea, ³Soongsil University, Seoul, Republic of Korea

Aims

To define the contemporary burden of diabetic retinopathy (DR) in Korean adults with diabetes and to examine clinically relevant dose–response relationships between glycemic control, diabetes duration, and DR risk.

Methods

This cross-sectional study analyzed 2,221 adults aged ≥ 40 years with diabetes with diabetes from the Korea National Health and Nutrition Examination Survey (2017–2020). DR was identified using standardized fundus photography and classified according to Early Treatment Diabetic Retinopathy Study criteria. Weighted analyses accounting for the complex survey design were performed. Multivariable logistic regression models were used to identify independent risk factors for DR.

Results

The weighted prevalence of DR increased progressively with worsening glycemic control and longer diabetes duration (all P for trend < 0.001). DR prevalence ranged from 12.23% among individuals with HbA1c $< 6.5\%$ to 44.64% among those with HbA1c $\geq 10.0\%$, and from 12.93% in undiagnosed diabetes to 38.26% in those with a diabetes duration ≥ 15 years. After multivariable adjustment, HbA1c $\geq 10.0\%$ (odds ratio [OR] 5.85; 95% CI 3.27–10.46), diabetes duration ≥ 15 years (OR 3.62; 95% CI 2.39–5.50), and insulin therapy (OR 3.82; 95% CI 2.20–6.64) were independently associated with DR.

Conclusion

In this nationally representative population, DR risk increased in a graded, dose–response manner with poorer glycemic control and longer diabetes duration.

Association between glucagon-like peptide-1 receptor agonists and risk of mental health disorders among people with type 2 diabetes: active comparator, new user cohort study

Lee Y¹, Kim C², Kim S¹, You S¹

¹Yonsei University College of Medicine, Seoul, South Korea, ²Yale School of Medicine, New Haven, USA

Background: Glucagon-like peptide-1 receptor agonists (GLP1RAs) are widely used for type 2 diabetes owing to their metabolic and cardiovascular benefits. However, concerns have emerged regarding potential psychiatric adverse effects, and existing evidence remains inconsistent. We evaluated the risk of mental health disorders among GLP1RA users compared with users of dipeptidyl peptidase-4 inhibitors (DPP4Is) and sodium-glucose cotransporter-2 inhibitors (SGLT2Is).

Methods: We conducted a nationwide, retrospective, active-comparator new-user cohort study using the Korean Health Insurance Review and Assessment database from 2012 to 2021. Patients aged ≥ 18 years who initiated GLP1RAs, SGLT2Is, or DPP4Is for type 2 diabetes were included. We compared the hazard ratios (HRs) and 95% confidence intervals (CIs) for depression, anxiety, sleep disorders, and suicide using the Cox proportional hazards models after 1:variable-ratio propensity score matching. Sensitivity analyses varied propensity score methods and follow-up strategies.

Results: After large-scale propensity score matching, 18,825 GLP1RA users were matched with 623,750 SGLT2I users, and 5,762 GLP1RA users with 874,902 DPP4I users. Compared with DPP4Is, GLP1RA use was not associated with increased risks of depression (HR 1.00 [95%CI, 0.83–1.20]), anxiety (HR 0.92 [95%CI, 0.77–1.08]), or sleep disorder (HR 1.14 [95%CI, 0.97–1.33]). In contrast, compared with SGLT2Is, GLP1RA use was associated with higher risks of depression (HR 1.20 [95%CI, 1.09–1.31]) and anxiety (HR 1.09 [95%CI, 1.00–1.19]). Suicidality events were rare and not observed among GLP1RA users.

Conclusions: Initiation of GLP1RAs was not associated with increased risk of psychiatric disorders compared with DPP4Is but was associated with higher risks of depression and anxiety relative to SGLT2Is. These findings suggest that comparative psychiatric safety signals vary according to active comparators, providing real-world evidence to inform ongoing debates on GLP1-based therapies. Further studies incorporating clinical data and high-risk subgroups are needed to clarify mechanisms and guide clinical decision-making.

A 16-Pollutant fingerprint predicts diabetes risk via endocrine disruption: NHANES 2015–2016

Lin X¹, Zhao H¹, Gui W¹, Wang G²

¹Department of Endocrinology and Metabolism, Sir Run Run Shaw Hospital, Zhejiang University School Of Medicine, Hangzhou, China, Hangzhou, China, ²Department of Orthopedics, Sir Run Run Shaw Hospital, Zhejiang University School Of Medicine, Hangzhou, China, Hangzhou, China

Aim/s: To identify a data-driven pollutant fingerprint associated with endocrine disruption and diabetes-related metabolic dysfunction in a nationally representative population.

Methods: We analyzed 2,368 participants (aged 0–80 years) from the NHANES 2015–2016 cycle. Eighty-nine persistent organic pollutants (POPs) and serum levels of estradiol (E2), total testosterone (TT), and sex hormone-binding globulin (SHBG) were measured. Low TT and elevated SHBG are established predictors of insulin resistance and incident diabetes. After lipid adjustment and log-transformation, pollutants were screened for associations with metabolic risk factors and correlated with hormones ($|r| \geq 0.15$). LASSO-penalized regression with 10-fold cross-validation derived a pollutant signature. Logistic regression examined associations between the fingerprint and obesity (BMI ≥ 30), a key diabetes risk factor.

Results: Fifty-five POPs were significantly associated with metabolic dysfunction. E2 and TT were inversely correlated with most pollutants, while SHBG showed positive correlations—patterns linked to insulin resistance and diabetes risk. LASSO selected 16 pollutants (PCB-209, PCB-170, n-PFOS, PFHxS, trans-nonachlor), forming a risk score with excellent discrimination (AUC=0.88). Higher scores correlated with lower TT ($r=-0.32$) and higher SHBG ($r=0.29$), hormonal profiles consistently associated with diabetes development. Among 765 obese participants (diabetes-prone phenotype), several high-chlorinated PCBs showed inverse associations with obesity (OR 0.20–0.96), suggesting adipose sequestration of lipophilic pollutants with concurrent endocrine disruption and lower TT/SHBG ratios.

Conclusion: A 16-pollutant fingerprint predicts metabolic dysfunction through endocrine-disrupting pathways involving reduced testosterone and elevated SHBG—key mediators of insulin resistance and diabetes risk. These findings support targeted reduction of legacy and emerging POPs as a novel diabetes prevention strategy.

Voices from the Diabetes Community: Qualitative insights into what it will take to end diabetes stigma and discrimination in Australia.

Litterbach E^{1,2,3}, Jordan J^{1,2,3}, Klinker L^{4,5,6}, Scibilia R⁷, Hagger V^{8,9}, Sørholm U^{1,2,3}, Skinner T^{1,2,3}, Speight J^{1,2,3}, Holmes-Truscott E^{1,2,3}

¹The Australian Centre for Behavioural Research in Diabetes, Melbourne, Australia, ²School of Psychology, Deakin University, Geelong, Australia, ³Institute for Health Transformation, Deakin University, Geelong, Australia, ⁴Research Institute Diabetes Academy Mergentheim (FIDAM), Mergentheim, Germany, ⁵Diabetes Center Mergentheim, Mergentheim, Germany, ⁶Department of Clinical Psychology and Psychotherapy, University of Bamberg, Bamberg, Germany, ⁷Breakthrough T1D, New York, USA, ⁸School of Nursing and Midwifery, Faculty of Health, Deakin University, Burwood, Australia, ⁹Centre for Quality and Patient Safety Research, Institute for Health Transformation, Deakin University, Geelong, Australia

Aims: Diabetes stigma and discrimination, the negative social judgments, stereotypes, and prejudices placed on a person because of their diabetes, are experienced by 4 in 5 people with diabetes and have huge negative impacts. Our aim was to explore what Australian adults living with type 1 (T1D) and type 2 diabetes (T2D) perceive is needed to end diabetes stigma/discrimination.

Methods: In an Australian randomised, controlled online survey, evaluating diabetes stigma-reduction campaign videos, adults with T1D and T2D (N=875; 31% exposed to the intervention) were invited to provide free-text responses to an open-ended question: 'What do you think is needed to bring an end to diabetes stigma and discrimination?' Thematic analysis was applied to the 390 qualitative responses (45% of respondents).

Results: Qualitative respondents were: 56% women/female, aged 57±14 (Mean±SD) years, 58% living with T2D. Some respondents commented that diabetes stigma/discrimination was not a concern, others believed that it will never be eliminated. Over half (59%) agreed that people with diabetes experience stigma/discrimination due to their condition. Responses suggesting how we might end diabetes stigma/discrimination focused on 1) *ceasing stigmatising messaging and behaviours*: e.g., stereotypes around "lifestyle" and higher body weight "causing" diabetes; portrayals of people with diabetes as a 'cost to society', and; referring to diabetes without differentiating between types, leading to public misconceptions; 2) *interventions to address stigma*: including targeted action for community-wide awareness-raising to dismantle misconceptions; positive portrayals of diabetes in the media; upskilling healthcare professionals; and increased adoption of stigma-reduction policies (e.g., workplaces, schools, airports) and understanding of anti-discrimination rights.

Conclusions: These findings suggest that collective and cross-sector opportunities do exist (e.g., education, anti-stigma/discrimination policies) however, action is needed across (inter)personal, organisational, community and policy levels. Interventions addressing stigma/discrimination need to be co-developed with community and evaluated, to ensure they align with community needs to maximise impact.

Supporting type 2 diabetes risk-reduction for women and their children following gestational diabetes mellitus: a qualitative study of health professionals.

Litterbach E¹, Vasilevski V², Van der Pligt P³, Hunter S⁴, Hobbs O², Moran L⁵, Holmes-Truscott E¹

¹The Australian Centre for Behavioural Research in Diabetes, Carlton, Australia, ²Deakin University, Burwood, Australia, ³Swinburne University of Technology, Melbourne, Australia, ⁴Flinders University, Adelaide, Australia, ⁵Monash University, Melbourne, Australia

Aims: A life-course approach to type 2 diabetes (T2D) and cardiovascular disease (CVD) risk-reduction after gestational diabetes mellitus (GDM) may support optimal health behaviours for mothers, children and other family members. Health professionals play a key role in delivering risk-reduction education and support. This study aimed to understand professional views on T2D risk-reduction for women post-GDM and their children.

Methods: Purposive sampling identified health professionals working with women during or after GDM, in Australia. Nineteen multi-credentialled health professionals (Diabetes Educator n=8; Midwife n=3, Practice Nurse n=5; Maternal/Child Health Nurse n=2; Dietitian n=4; Endocrinologist n=1; General Practitioner n=3) participated in individual 25–30-minute semi-structured interviews. Professionals spanned metropolitan and rural hospitals/clinics (private and public) across four Australian states/territories. Qualitative interviews explored perceptions of professional roles, responsibilities, barriers and enablers to supporting T2D risk-reduction in the care setting, for women post-GDM and their children. Data were subject to thematic analysis.

Results: Beyond clinical discussions during pregnancy, focused on T2D risk-awareness and screening, professionals described inconsistent views about who is responsible for supporting women and families to adopt risk-reducing behaviours after GDM. Conversations about physical activity, nutrition, and referrals to risk-reduction programs were shaped by individual professional interests and priorities rather than embedded care pathways. Barriers to supporting family-level risk-reduction after GDM included concerns about over-burdening mothers, limited integration into routine care, a lack of supports focused on maternal and child cardiometabolic health, and few acceptable, family-centred programs for referral. Among this sample of motivated health professionals, a life-course approach to risk-reduction was considered important and likely feasible with improved resourcing and infrastructure.

Conclusion: Greater clarity regarding professional roles and responsibilities in supporting T2D and CVD risk-reduction for women and children post-GDM is needed. Policy reform and increased resourcing are required to embed life-course T2D risk-reduction support within routine care for families post-GDM.

Association of longitudinal changes in body roundness index, conicity index, and relative fat mass with incident multimorbidity in older Chinese adults

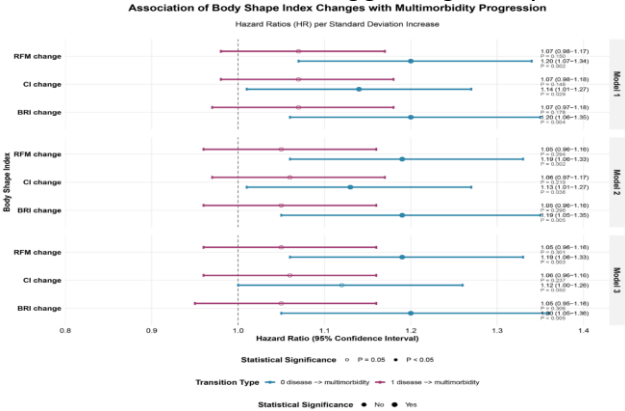
Li Z¹, Lü A¹, Ren W¹, Duan R¹, Yan Y¹, Liu S¹
¹Shanxi Bethune Hospital, Taiyuan, China

Aim: To investigate whether longitudinal changes in body shape indices—Body Roundness Index (BRI), Conicity Index (CI), and Relative Fat Mass (RFM)—are associated with the risk of developing multimorbidity among older Chinese adults.

Methods: We analyzed data from the Chinese Longitudinal Healthy Longevity Survey, focusing on participants aged ≥65 years without multimorbidity at baseline. BRI, CI, and RFM were derived from anthropometric measurements, and their 3-year changes were categorized as persistently low, gain, loss, or persistently high. Incident multimorbidity was defined as developing ≥2 chronic diseases. Associations were assessed using Cox models, adjusted for multiple covariates.

Results: Among 2,348 participants (mean age 80.4), 752 developed multimorbidity over 6.1 years. Each standard deviation increase in BRI, CI, and RFM was associated with a 9–11% higher multimorbidity risk. Compared to the persistently low group, the gain and persistently high groups for BRI had 46% (HR=1.46, 95% CI:1.17–1.81) and 61% (HR=1.61, 95% CI:1.33–1.95) increased risks, respectively. For CI, only the persistently high group showed significantly elevated risk (HR=1.24, 95% CI:1.03–1.51). For RFM, both gain (HR=1.56, 95% CI:1.26–1.93) and persistently high (HR=1.53, 95% CI:1.27–1.84) groups were at higher risk. No significant risk reductions were observed in the loss groups. Dose-response analyses indicated linear risk increases with rising indices.

Conclusion: Longitudinal increases in BRI, CI, and RFM are associated with higher multimorbidity risk in older Chinese adults, suggesting their potential utility in identifying individuals at elevated risk.



The mediating role of biological age acceleration in the association between obesity and hypertension: A longitudinal study from CHARLS

Li Z¹, Gao L¹, Wei B¹, Duan R¹, Zhang C¹, Zhao A¹, Bai Y¹, Yan Y¹, Lü A¹, **Liu S¹**
¹Shanxi Bethune Hospital, Taiyuan, China

Aim: To examine whether biological age acceleration mediates the link between obesity and hypertension in a national cohort of older Chinese adults.

Methods: Longitudinal analysis of 2,039 participants (≥45 years) from the China Health and Retirement Longitudinal Study (2011–2020). Ten anthropometric/metabolic indices assessed obesity. Biological age was calculated using the Klemera-Doubal method (8 biomarkers); its acceleration (KDM-BAacc) was the residual from regressing biological on chronological age. Incident hypertension was determined by measurement, diagnosis, or medication. Associations were tested using regression, with mediation analyzed via bootstrapping.

Results: Over the follow-up, higher levels of all obesity indices (except TyG alone) were significantly associated with both increased KDM-BAacc and a higher risk of hypertension. Each one-year increase in KDM-BAacc was associated with a 10% elevated risk of developing hypertension (OR=1.10, 95% CI: 1.06–1.14). Causal mediation analysis revealed that KDM-BAacc significantly mediated 8.9% to 11.1% of the total effect of obesity on hypertension risk. The mediation effect was most pronounced for composite indices reflecting both metabolic dysfunction and adiposity: TyG-BMI (10.4%), TyG-WC (11.1%), and TyG-WHtR (10.5%). Subgroup analyses indicated that the mediating role of KDM-BAacc was stronger in women and in participants younger than 65 years.

Conclusion: Accelerated biological aging is a significant mediator in the obesity-hypertension pathway. Targeting biological aging may offer a novel strategy for mitigating cardiovascular risk associated with obesity.



Machine learning prediction of cardiometabolic multimorbidity in aging Chinese adults: A National longitudinal study

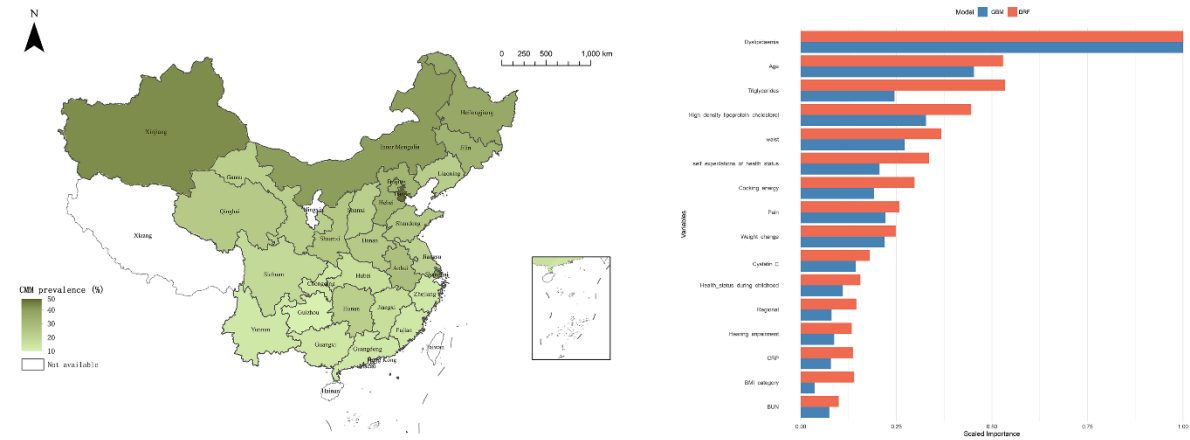
Li Z¹, Lü A¹, Ren W¹, Bai Y¹, Duan R¹, Yan Y¹, Zhao A¹, Fan X¹, Chen X¹, **Liu S¹**
¹Shanxi Bethune Hospital, Taiyuan, China

Aim: To develop and compare machine learning (ML) models for predicting the future risk of cardiometabolic multimorbidity (CMM) in China's aging population.

Methods: We analyzed longitudinal data from 16,970 participants (aged ≥45 years) in the China Health and Retirement Longitudinal Study (CHARLS, 2011–2018). Using 42 predictors from 2013/2015 (demographics, lifestyle, physical measures, blood biomarkers), we trained five ML models: generalized linear model (GLM), gradient boosting machine (GBM), distributed random forest (DRF), deep learning (DL), and a Stacked Ensemble. CMM in 2018 was defined as ≥2 of hypertension, diabetes, heart disease, or stroke. Models were evaluated via AUC, Brier score, and calibration, with SMOTE and cross-validation applied.

Results: The Stacked Ensemble model achieved the highest discriminative performance with an AUC of 0.755 (95% CI: 0.735-0.775), outperforming individual models (GBM AUC=0.751, DRF AUC=0.748, GLM AUC=0.740, DL AUC=0.732). It also demonstrated excellent calibration (Brier score=0.153). Key predictors identified across top models included dyslipidemia (most important), age, elevated triglycerides, low HDL-C, increased waist circumference, poorer self-expectations of health, presence of pain, use of solid cooking fuels, recent weight change, and higher cystatin C levels. Geographical analysis revealed significant provincial disparities in CMM prevalence, ranging from 10.2% to 47.9%.

Conclusion: ML, particularly ensemble modeling, effectively predicts CMM risk in China's aging population. Integration of clinical, behavioral, and self-perceived health indicators enhances prediction, supporting targeted prevention strategies.



"Task shifting" to provide podiatric care in Pacific Island Countries and Territories

Loughry C¹, Chuter V², Jagilly R³, Hon K⁴, Fitridge R

¹Central Adelaide Local Health Network, Adelaide, Australia, ²Western Sydney University, , ³National Referral Hospital Honiara; Solomon Islands, ,

Four out of the top ten countries with highest prevalence of diabetes mellitus can be found in Pacific Islands Countries and Territories (PICTs). High rates of undiagnosed diabetes are also described in the PICTs (IDF atlas 2025).

PICTs have not only the highest rates diabetes, but also high rated of diabetes-related foot complications and amputation rates with rates mostly increasing. Diabetes-related foot disease (DFD) is managed primarily by general medicine physicians, and general and/or orthopaedic surgeons as there are no subspecialty services in the region.

Podiatry care plays a fundamental role in preventive of DFD, management of pre-ulcerative lesions and in the management of active DFD. Wite no podiatry services in the PICTs, other clinicians (nursing and medical) must assume these roles through task shifting. Task-shifting is by default a core part of the regional diabetes footcare model—both nursing and medical staff have taken on tasks that otherwise would have been allocated to specialised Allied Health staff in major centres. As a rational redistribution of tasks from specialized health workers to those with shorter training such as nurses, task shifting is a practical and potentially cost-saving approach to address workforce shortages and improve health equity.

Working with senior clinicians (medical and nursing) in the Solomon Islands we aim to develop a hybrid on-line and in person training program for senior nurses with diabetes and/or wound management experience to develop core basic skills of podiatrists (Graduate Diploma of Nursing in Foot Care). Initially experienced clinicians will undertake training in an Australian multi-disciplinary foot service and subsequently teach a series of modules in the Solomon Islands with support of Australian clinicians. Adopting a train-the-trainer approach the aim will be for a core group of SI clinicians to teach the program moving forward and potentially implement the program in other PICTs. (299 words)

Trajectories of inflammatory score and the risk of incident diabetes: a national cohort study

Luo Y^{1,2}, Li H¹, Gong H¹, Guo L¹, Pan Q^{1,2}

¹Beijing Hospital, Beijing, China, ²Peking University Fifth School of Clinical Medicine, Beijing, China

Aims: This study delineated temporal trajectories of individual inflammatory scores and examined their relationship with incident DM risk using nationally representative cohort data from the China Health and Retirement Longitudinal Study (CHARLS).

Methods: The temporal trajectories of the inflammatory score, which was calculated as the sum of Z-scores for C-reactive protein (CRP) and white blood cell (WBC) counts, were specified as the exposure. The impact of different dynamic trajectory patterns on the risk of incident DM was analyzed using a longitudinal targeted maximum likelihood estimation (LTMLE) framework, adjusting for time-invariant and time-varying confounders.

Results: A total of 4,305 participants were included, 2,404 (55.84%) of whom were female, with a median baseline age of 58 years. During a 7-year follow-up period, 730 individuals (17.0%) developed incident DM. Four distinct inflammatory score trajectories were identified: low-stable, decreasing, increasing, and high-stable. After adjusting for multiple covariates, LTMLE analyses showed that the high-stable trajectory was significantly associated with an increased risk of DM compared with the low-stable reference group (odds ratio [OR] = 1.407, 95% confidence interval [CI]: 1.397–1.418), with an E-value exceeding 2. In subgroup analyses, the high-stable trajectory was associated with significantly elevated risks among individuals with BMI < 25 kg/m² (OR = 1.608, 95% CI: 1.104–2.111), rural residents (OR = 1.389, 95% CI: 1.030–1.748), and non-smokers (OR = 1.433, 95% CI: 1.026–1.839). However, neither multiplicative nor additive interaction analyses demonstrated statistically significant interactions between inflammatory trajectories and stratification factors (all interaction p-values > 0.05).

Conclusion: A persistently elevated inflammatory score is significantly associated with a heightened risk of incident DM. Early identification and intervention may aid in the prevention and management of DM.

Table. Comparison of the effects of inflammatory score trajectories on incident DM risk using ltmle and g-computation methods with superlearner library 1.

			Estimate OR	SE	CI low	CI high	P value
Model4	Decreasing	LTMLE	0.997	0.002	0.993	1.001	0.127
		G-computation	1.080	0.027	1.029	1.133	0.002
	Increasing	LTMLE	1.031	0.003	1.025	1.037	<0.001
		G-computation	1.125	0.036	1.056	1.197	0.000
	High stable	LTMLE	1.407	0.006	1.397	1.418	<0.001
		G-computation	1.426	0.001	1.425	1.428	0.000

Model4 adjust: age, gender, residence, education, marital, smoking, drinking, hypertension, dyslipidemia, cardiovascular disease, liver disease, chronic kidney disease, BMI; superlearner library 1 includes generalized linear Model. Abbreviation: OR, Odds ratio; SE, Standard error; CI, Confidence interval; BMI, Body mass index.

Can lifestyle factors mitigate the risk of type 2 diabetes after a gestational diabetes diagnosis?–Australian Longitudinal Study on Women’s Health cohort study

Marschner S¹, Quintans D¹, Chow C^{1,2}, Cheung N^{1,3}
¹Westmead Applied Research Centre, The University of Sydney, Westmead, Australia, ²Department of Cardiology, Westmead Hospital, Westmed, Australia, ³Department of Diabetes & Endocrinology, Westmead Hospital, Westmead, Australia

Aim: To assess whether lifestyle factors can mitigate the risk of type 2 diabetes mellitus(T2DM) after a gestational diabetes mellitus(GDM) diagnosis in young women.

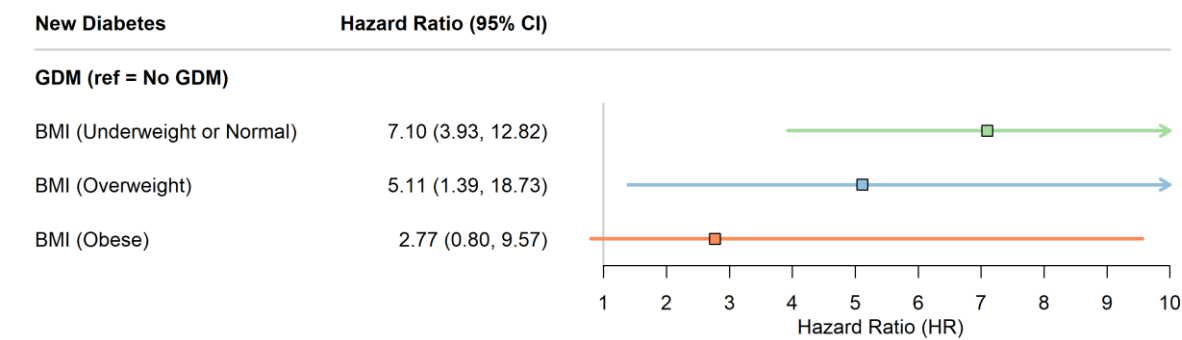
Method: This prospective cohort study included parous women aged <50years from the Australian Longitudinal Study on Women’s Health cohort linked with Australian hospital, emergency and perinatal data. We assessed whether lifestyle factors, namely smoking, sleep, breastfeeding, physical activity, body mass index, parity, guideline diets and their components modify the risk of T2DM from GDM. Cox proportional hazards models were used with all covariates time-varying. Associations were quantified using adjusted hazard ratios(aHR) with 95% confidence intervals(95%CI).

Results: Of 10,368 parous women, 9.7% (1,003/10,368) were diagnosed with GDM and 2.9% (301/10,368) were diagnosed with T2DM after a median of 16.7years follow-up. GDM ((aHR)=4.09 (95%CI:2.97–5.63)), overweight (aHR=2.33 (95%CI:1.42–3.83), obesity (aHR=8.34 (95%CI:5.45–12.77)) and breast feeding for >6 months (aHR=0.39 (95%CI:0.25–0.61)) were independent predictors of T2DM. No lifestyle risk factor had a differing effect among women with and without a GDM. Women with GDM remained at high risk even when weight is controlled, see figure.

Evidence: This study confirms GDM is an independent risk factor (4-fold) for T2DM, with no evidence that lifestyle risk factors mitigate this risk. Breast feeding and controlled weight reduces risk of T2DM.

Conclusion: A diagnosis of GDM remains a significant risk factor even for women with controlled weight. Close monitoring of all women with a GDM diagnosis is essential for T2DM prevention.

Figure: Impact of a GDM diagnosis for different body mass index levels



Is the association between gestational diabetes and type 2 diabetes genetic or environmental?: twin cross-sectional study

Marschner S¹, Simmons D², Hardikar A³, Chow C¹, Cheung W^{1,4}

¹Westmead Applied Research Centre, The University of Sydney, Westmead, Australia, ²Macarthur Clinical School, Campbelltown Hospital, Campbelltown , Australia, ³Westerns Sydney University School of Medicine, Westmead, Australia, ⁴Department of Diabetes and Endocrinology, Westmead Hospital, Westmead, Australia

Aim: To assess the relative genetic and environmental contributions to the pathway from gestational diabetes mellitus (GDM) to type 2 diabetes mellitus (T2DM).

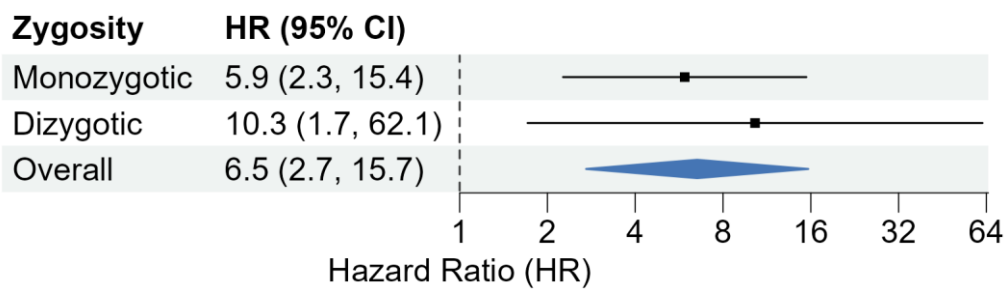
Method: Cross-sectional data were used from the Twins Research Australia registry, including female twin pairs where both were parous and aged >18 years. Cox proportional hazards analysis of time from first birth to T2DM or last survey date, adjusting for self-GDM, their twin GDM and zygosity, with a random effect for the twin pair.

Results: Among 1240 parous women of mean age 54.0±11.6 years, 106 (8.5%) had GDM and 47 (3.5%) had T2DM. Among 620 twin pairs 494 (79.7%) were monozygotic twins. In separate models, women with GDM had higher risk of subsequent T2DM (HR=7.2, 95% confidence interval (95%CI):3.0,17.3) and women had higher risk if their co-twin had GDM (HR=6.5, 95%CI:2.7,15.7). There was no evidence a women’s risk of T2DM was more strongly associated with hat their twin’s GDM in monozygotic than the dizygotic twins (see Figure).

Evidence: The strong association between GDM and subsequent T2DM may be largely influenced by shared environmental component, rather than genetic factors, as the strength of association did not differ by zygosity.

Conclusion: Monozygosity did not increase the risk of GDM progression to T2DM, suggesting that environmental rather than genetic factors may play a more important role in T2DM progression. As the strong association between GDM and T2DM is potentially modifiable through lifestyle measures, this should be a focus of intervention.

Figure: Association of co-twin GDM status with a T2DM diagnosis by zygosity



Trends and treatment outcomes of diabetes patients with confirmed tuberculosis: Routine program data from Lampung Province, Indonesia

Masrul P¹, Ekasari Y², Saraswati A², Santoso L², Anggriani D², Prasetyadi P², Destiyayu R², Riyanto S², Kirana O²

¹Harapan Bunda Hospital, Bandung, Indonesia, ²Provincial Health Office, Lampung, Indonesia

Aim: To describe trends, patient characteristics, and tuberculosis treatment outcomes among diabetes patients using routine program data from Lampung Province, Indonesia, and to highlight unique findings such as the high rate of newly diagnosed diabetes at TB diagnosis and the fluctuating TB-DM comorbidity proportions observed in this setting.

Methods: We analyzed routine tuberculosis program data from Lampung Province, Indonesia, for 2021–2025. We included adult patients (≥ 18 years) registered with both tuberculosis and documented diabetes mellitus. We extracted data on demographic characteristics and tuberculosis treatment outcomes from the provincial TB registry. We defined treatment outcomes according to national tuberculosis program standards and summarized patient characteristics and treatment outcomes using descriptive statistics.

Results: Between 2021 and 2025, we registered 3,237 diabetes patients (4.4%) with confirmed tuberculosis in Lampung Province. The proportion of TB among diabetes patients increased from 3% in 2021–2022 to 6% in 2023 and remained stable at approximately 5% during 2024–2025. Most TB–diabetes patients were male (54%). Notably, we newly diagnosed diabetes in 52% of cases at the time of TB diagnosis, with no previously known history of diabetes. We observed overall treatment success in 82.8% of cases, with mortality at 4.1%, loss to follow-up at 1.9%, and rare treatment failure ($<0.1\%$).

Conclusion: Diabetes is an increasing comorbidity among TB patients in Lampung Province. Despite high treatment success, mortality and loss to follow-up indicate a need for better integration of TB and diabetes services.

Addressing inequity in patients with Type 2 Diabetes in a predominantly rural Maori population using continuous glucose monitoring

McDonald-Brown M¹, Herrmann L¹, Simmonds C²

¹Health NZ, Whakatane, New Zealand, ²Eastern Bay Primary Health Alliance, Whakatane, New Zealand

Objectives: Does continuous glucose monitoring (CGM) improve HbA1c levels, time in range (TIR), and patient engagement in predominantly rural Māori participants with type 2 diabetes?

Introduction: The Eastern Bay of Plenty in New Zealand (NZ) is a high-deprivation, underserved region with a higher-than-average Māori population. Māori experience significant inequities in diabetes outcomes, including higher complication rates and a 2.6-fold increased risk of hospitalisation for diabetes compared with non-Māori. Improving equitable access to effective diabetes technologies is therefore critical. International research shows CGM improves HbA1c, increases TIR, reduces hypoglycaemia, and enhances patient-reported outcomes. However, evidence describing CGM use in rural, predominantly Māori populations with type 2 diabetes remains limited. This study aimed to determine whether benefits observed in clinical trials could be replicated in a real-world rural Māori community setting.

Methods: Practice Nurses across participating general practices selected five patients each with poor glycaemic control who were considered at high risk of diabetes-related complications. Each participant received one CGM reader and five sensors, providing 10 weeks of funded “finger-prick-free” glucose monitoring. Participants attended fortnightly appointments for sensor replacement and structured glycaemic review. Data collected included HbA1c, TIR, scanning frequency, medication changes, and measures of patient engagement. Outcomes were analysed descriptively.

Results: Forty participants from nine general practices were enrolled. Mean baseline HbA1c was 97 mmol/mol (± 25). After five sensor wears, mean HbA1c reduced to 66 mmol/mol (± 13). Ninety-six percent achieved HbA1c reduction without increased hypoglycaemia, and medication changes occurred in 92%. All participants improved TIR and scanning frequency, and 96% reported greater engagement and control. Although 92% wished to continue CGM, only 16% were able to do so due to ongoing cost.

Conclusions: Using CGM improved glycaemic management and was acceptable to Māori participants in this high-deprivation rural NZ setting. Funded access may help address inequities in diabetes-related outcomes.

Comparing the prevalence of dementia among Australians with and without diabetes across different sociodemographic groups: findings from the 2021 national census

Mehta K¹, Gong J¹, Santoso J², Salim A¹, Stephan B, Anstey K, Shaw J, Magliano D

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²RMIT, ,

Aim: To compare the prevalence of dementia among Australians with and without diabetes and examine variation across key sociodemographic factors.

Methods: We conducted a cross-sectional analysis of the 2021 Australian national census among respondents aged 60–99 years. Prevalence was stratified by education, income, socioeconomic disadvantage, remoteness, and country of birth.

Results: Age- and sex-standardised prevalence of dementia was higher in Australians with diabetes (3.83%) than in those without (3.33%), representing a 15% higher prevalence in the diabetes population. Women with diabetes had a higher prevalence than women without diabetes and men with diabetes. Across all sociodemographic strata, the prevalence of dementia was consistently higher among Australians with diabetes; however, the gap between Australians with and without diabetes widened in certain sociodemographic groups.

The largest differences were observed among Australians with no education (6.56% vs. 4.78%, 37% higher), those in remote areas (4.37% vs. 3.22%, 36% higher) and those born in Vietnam (4.71% vs. 3.79%, 24% higher) or China (3.81% vs. 2.95%, 29% higher). Differences were smaller among those living in the most socioeconomically disadvantaged areas (4.72% vs. 4.29%, 10% higher), those earning <\$500/week (4.00% vs. 3.47%, 15% higher) and those born in Italy (4.11% vs. 3.71%, 11% higher). After adjusting for age and sex, the prevalence of dementia was 15% higher in the diabetes population, with this elevated risk persisting across sociodemographic strata.

Conclusions: Dementia is more prevalent among Australians with diabetes, with a greater burden among socioeconomically and culturally disadvantaged populations. Addressing sociodemographic inequities is essential for effectively managing the burden of diabetes-related dementia in Australia's ageing population.

The Epidemiology of diabetes in pregnancy: Growing costs, future burden

Meyerowitz-Katz G^{1,2}, Hng T^{1,3}, Maberly G^{1,2}
¹Western Sydney LHD, Blacktown, Australia, ²University of Sydney, Camperdown, Australia,
³Western Sydney University, Blacktown, Australia

Background

Diabetes is a growing health concern in Australia. Diabetes in pregnancy, especially gestational diabetes, is a growing issue that heralds the future risk of disease nationally. This epidemiological study examines the changing epidemiology of diabetes in pregnancy in a large cohort of patients.

Methods

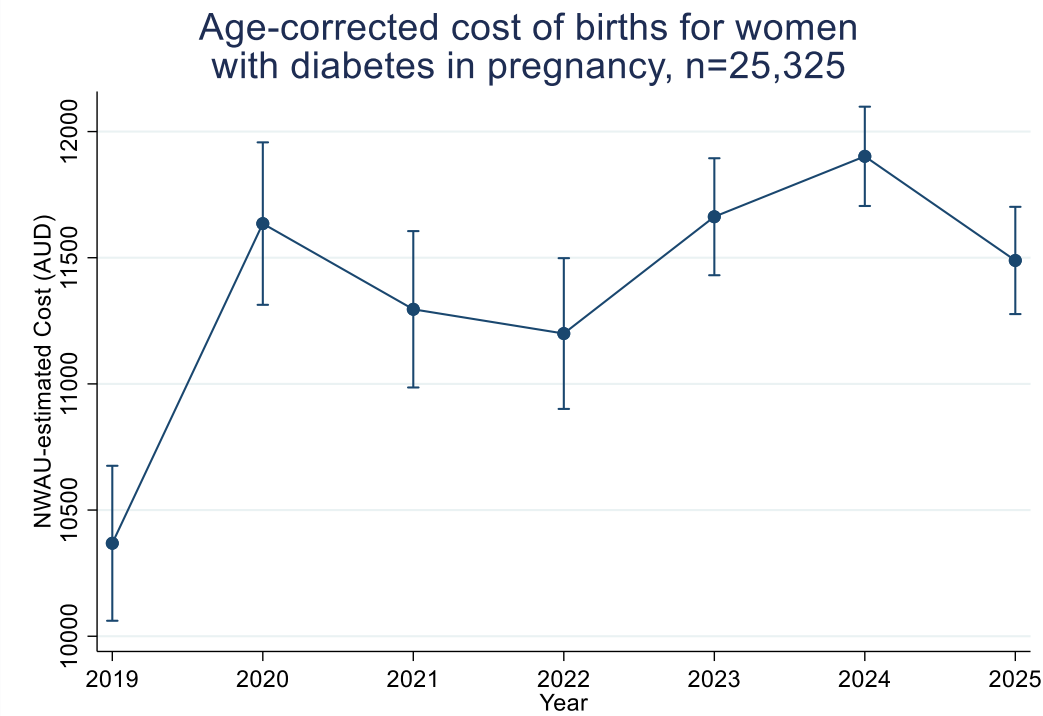
This study used the admitted patients dataset for Western Sydney Local Health District to estimate diabetes in pregnancy rates in women giving birth in the area. This includes data on ethnicity, hospital costings, and demographics. Age-corrected regressions were used to examine the trends in admissions data for this population.

Results

There were 25,349 births registered between 2019 and 2025 for women with diabetes in pregnancy in this cohort. Of these, 1.9% had Type 1, 7.2% had Type 2, and 90.9% had gestational diabetes. The number has been rising over time, with an age-corrected percentage of 19.0% of births having diabetes in pregnancy in 2019 vs 24.3% in 2025. In addition, the costs of diabetes in pregnancy have rapidly increased even accounting for the changing age of the population. This is shown in Figure 1. There have been significant shifts in the demographic, with a large increase in the proportion of women from India in the period.

Discussion

Diabetes in pregnancy rates have dramatically increased in recent years. Concerningly, costs per birth have also increased, with a total estimated cost of \$5.95million for births alone in 2025. Demographics may explain this trend.



Is a national screening program for type 1 diabetes in children acceptable to culturally diverse Australian families: A comparative cross-sectional study.

Molino Z^{1,2}, Hendrieckx C^{3,4,6}, Mallitt K^{1,2}, Narayan K^{1,2,5}, Nassar N^{1,2}, Speight J^{3,4,6}, Craig M^{1,2,5}, Bell K^{1,2}

¹Faculty of Medicine and Health, University of Sydney, Camperdown, Australia, ²Charles Perkins Centre, University of Sydney, Camperdown, Australia, ³School of Psychology, Deakin University, Geelong, Australia, ⁴Institute for Health Transformation, Deakin University, Geelong, Australia, ⁵Institute of Endocrinology and Diabetes, The Children's Hospital Westmead, Westmead, Australia, ⁶The Australian Centre for Behavioural Research in Diabetes (ACBRD), Diabetes Australia, Melbourne, Australia

Aim: To explore the perspectives of culturally diverse Australian families on population-wide screening for type 1 diabetes (T1D) in children.

Methods: Secondary analysis of pre-screening survey responses from parents of children enrolled in the Australian T1D National Screening Pilot. Five key survey topics were analysed: self-rated understanding & assessed knowledge, attitudes & beliefs, locus of control, risk perception, and anxiety. All parents who fully or partially completed the pre-screening survey were included in the analysis. Parental ethnicity was dichotomised into European Australian (European and Oceanian (Australian, New Zealand and Pacific Islander peoples)) and non-European Australian (Aboriginal & Torres Strait Islander peoples, African, Middle Eastern, East Asian, South Asian, South American and Other) categories. Binary and multivariate logistic regression analyses were conducted to assess the effect of ethnicity on survey responses and adjusted for parental education and screening cohort. Odds ratios and their corresponding 95% confidence intervals were reported.

Results: Of the 3,598 participating parents, 38.7% identified as non-European Australian. Participants identifying as non-European Australian were significantly less likely to: report feeling they understood T1D (OR=0.64, 95% CI [0.54–0.76]), demonstrate knowledge of T1D ($\geq 80\%$ correct) (OR=0.40, 95% CI [0.34–0.47]) and agree that screening for T1D was worthwhile (OR=0.64, 95% CI [0.44–0.92]). In addition, non-European Australian participants had higher rates of moderate anxiety (OR=1.90, 95% CI [1.59–2.27]) and high anxiety (OR=2.32, 95% CI [1.74–3.10]) compared to European Australian participants.

Conclusions: For population-based screening programs to be acceptable, information must be culturally and contextually tailored to address the diverse needs of Australia's rich, multicultural population.

Using real-world data to create an open-access projection and health economic model for diabetes prevention and prevention of diabetes complications: The ALLSPARK model

Livori A^{1,2,3}, Gong J¹, Dynes E¹, Magliano D¹, Shaw J¹, **Morton J**^{1,2}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²Monash University, Melbourne, Australia,

³Grampians Health, Ballarat, Australia

Aim:

Health economic justifications are required for widespread adoption of health interventions, but there is no public, user-friendly health economic model for diabetes in Australia. We designed a platform that can perform diabetes incidence and complication projections and cost-effectiveness analyses for any intervention designed to reduce diabetes incidence or diabetes complications. This model considers age, sex, history of complications, and socioeconomic disadvantage.

Methods:

A dataset containing 1,148,627 individuals from the National Diabetes Services Scheme was linked to the National Death Index, Australian and New Zealand Dialysis and Transplant Registry, and hospital admissions data from four states. We used this dataset to model the incidence of type 2 diabetes, complications of diabetes, and renal and cardiovascular mortality. All adults with type 2 diabetes on the NDSS were included, with follow-up from 2015-2022. Include a sentence on outcomes instead of the models. The incidence rates generated from the model were used to construct a multi-state life-table model using 2022 Australian population data, aging the population in 0.1 year cycles over a 20-year time horizon.

Results:

The model allowed for relative risk reductions generated from new interventions research to be applied to all or parts of the Australian population to understand the impact on event outcomes, quality of life, mortality, and costs by socioeconomic disadvantage. The model underwent validation and performs within specification and generates health economic outcomes and sensitivity analyses to the user via a web-based user interface.

Conclusion:

We have created the ALLSPARK, an open-sourced tool with an easy to use interface that can project diabetes health outcomes and perform health economic analyses for any diabetes-related intervention. This provides clinicians, health services, and decision makers with the relevant information to understand longer term impacts of interventions and the ability to perform robust health economic analyses to justify their implementation

Updating the coefficients of the Indian Diabetes Risk Score (IDRS) using nationally representative data from Sri Lanka

Munasinghe H¹, Dissanayaka D², Jayasundara D², Piyasena P³, Sivaprasad S⁴, Nugawela M⁵

¹Menzies - School of Health Research, Tiwi, Australia, ²University of Kelaniya Sri Lanka, Kelaniya, Sri Lanka, ³Vision and Eye Research Institute, School of Medicine, Anglia Ruskin University, Cambridge, United Kingdom, ⁴National Institute of Health and Care Research Biomedical Research Centre, UCL and Moorfields Eye Hospital, London, United Kingdom, ⁵UCL Institute of Ophthalmology, , United Kingdom

Aims:

The Indian Diabetes Risk Score (IDRS) is a simple, non-invasive screening tool widely used across South Asia. However, its coefficients were derived from regional Indian data and may not be optimally calibrated for other populations. Sri Lanka has one of the highest diabetes prevalences in the region, with approximately one in four adults affected and a substantial proportion remaining undiagnosed. We aimed to update the coefficients of the IDRS using nationally representative Sri Lankan data and evaluate improvements in predictive performance.

Methods:

We analysed data from 6,028 adults participating in the Sri Lanka Health and Ageing Study (2018–2019), a nationally representative survey. Diabetes was defined as fasting plasma glucose ≥ 126 mg/dL, random glucose ≥ 200 mg/dL, or self-reported physician diagnosis. Logistic regression was used to refit the original IDRS predictors (age, waist circumference, physical activity, and family history of diabetes) and estimate updated coefficients. Model discrimination was assessed using the area under the receiver operating characteristic curve (AUC), and calibration was evaluated using calibration plots, slopes, and observed-to-expected (O/E) ratios.

Results:

All IDRS predictors remained independently associated with diabetes ($p < 0.05$). Compared with adults aged < 35 years, those aged 35–49 and ≥ 50 years had 5.10-fold (95% CI: 3.77–6.90) and 13.12-fold (95% CI: 9.81–17.55) higher odds of diabetes, respectively. Individuals with both parents affected had a 3.93-fold increased risk (95% CI: 2.78–5.53). Updating the coefficients improved discrimination (AUC 0.713 to 0.749) and corrected miscalibration (O/E ratio 0.646 to 1.00), demonstrating improved agreement between predicted and observed risk.

Conclusions:

Updating IDRS coefficients using Sri Lankan national data significantly improves predictive accuracy. Local coefficient refinement enhances transportability and supports implementation of risk-based community screening within Sri Lanka's national non-communicable diseases programmes.

Childhood antecedents of adult disease (the CANDID study): Tertiary adolescent healthcare management of childhood-onset diabetes and risk of chronic complications in adulthood

Nielsen T^{1,2}, Lain S^{1,2}, Craig M^{3,4}, Jenkins A⁵, Donaghue K^{4,6}, **Nassar N**^{1,2,3}

¹Leeder Centre for Health Policy, Economics and Data, Faculty of Medicine and Health, University Of Sydney, Newtown, Australia, ²Child Population and Translational Health Research, Children's Hospital at Westmead Clinical School, Faculty of Medicine and Health, University Of Sydney, Newtown, Australia, ³Charles Perkins Centre, University of Sydney, Camperdown, Australia, ⁴Institute of Endocrinology and Diabetes, Children's Hospital at Westmead, Westmead, Australia, ⁵Baker Heart and Diabetes Institute, Melbourne, Australia, ⁶Discipline of Child and Adolescent Health, University of Sydney, Westmead, Australia

Aim: To determine the effect of childhood and adolescent healthcare utilisation and treatment on long-term complications amongst people with childhood-onset type 1 diabetes (T1D)

Methods: A childhood-onset (aged <16 years) T1D cohort diagnosed between 1990-2009 in New South Wales (NSW) was identified from the Australasian Paediatric Endocrine Group (APEG) dataset and linked with adolescent clinic visit data from the tertiary Children's Hospital at Westmead. The cohort was longitudinally linked to NSW Hospital admission, Emergency Department (ED), Medicare Benefit Schedule data from 2002-2019 to identify any chronic or cardiac, eye, lower limb, and kidney complications in adulthood (from ≥18 years). Multivariable Cox regression models were used to assess the impact of mean HbA1c during adolescence (<7%, 7-9%, >9%) on risk of chronic complications, adjusted for socio-demographics, decade/age of diagnosis, comorbidities and acute complication events (hospitalisation/ED for diabetic ketoacidosis, hypoglycaemia, hyperglycaemia).

Results: Of 2275 youth with T1D (mean age at diagnosis 8.4 (SD 3.7) years), 7.8% had mean HbA1c during adolescence of <7%, 67.4% HbA1c 7-9% and 24.8% HbA1c >9%. One in five (19.2%) experienced an incident chronic complication during adulthood with median follow-up from age 18 of 9.5 years [IQR 5.5-13.7] and T1D duration of 18 years [IQR 15-23]. Almost half (45.0%) had an acute complication. After adjusting for risk factors, elevated HbA1c (>9% vs. <7%) was associated with increased risk of any chronic complication (HR 2.14; 1.46-3.14), eye (HR 2.39; 1.51-3.78), kidney HR 2.75; 1.48-5.14) and lower limb complications (HR 1.70; 0.94-3.07). Further adjustment for acute complications, the effect of HbA1c >9% was slightly attenuated but remained associated with any chronic complication (HR 1.65; 1.12-2.43).

Conclusions: Young adults' risk of chronic diabetes complications was associated with elevated HbA1c during childhood/adolescence and increased acute complications during adulthood, highlighting the importance of diabetes management across the lifespan on individuals' long-term health.

Which Australian families choose to screen their newborns for type 1 diabetes genetic risk?

Natarajan K^{1,2}, Brodie S^{1,2}, Mallitt K^{2,3}, Gordon A^{1,2,4}, Henry A^{5,6}, Shand A^{2,7}, Nassar N^{1,2}, Craig M^{1,2,8}, Bell K^{1,2}

¹Charles Perkins Centre, University of Sydney, Camperdown, Australia, ²Faculty of Medicine and Health, University of Sydney, Camperdown, Australia, ³School of Public Health, University of Sydney, Camperdown, Australia, ⁴Centre for Newborn Care, Royal Prince Alfred Hospital, Camperdown, Australia, ⁵Department of Women's and Children's Health, St George Hospital, Kogarah, Australia, ⁶UNSW Medicine and Health, University of New South Wales, Kensington, Australia, ⁷Department of Maternal Fetal Medicine, Royal Hospital for Women, Randwick, Australia, ⁸Institute of Endocrinology and Diabetes, The Children's Hospital at Westmead, Westmead, Australia

Aim: Population screening for type 1 diabetes (T1D) allows for the early identification of at-risk children, facilitating early diagnosis and prevention of diabetic ketoacidosis, with close clinical monitoring. This study aimed to explore the demographic factors associated with parental consent for T1D genetic-risk screening in newborns.

Methods: Secondary analysis of the demographic data of families invited for the newborn T1D polygenic risk heel prick screening in four Australian hospitals as part of the Australian T1D National Screening Pilot (2022-23). Logistic regression was performed to assess the association of demographic variables with consent status.

Results: Overall, 2,536 newborns were included in the study, of which 84.5% were consented for T1D genetic-risk screening. Maternal factors associated with a reduced likelihood of consent were: already having a child (Parity = 2: OR = 0.60; 95% CI: 0.41 – 0.83; Parity ≥ 3: OR = 0.38; 95% CI: 0.24 – 0.62), region of birth (Africa: OR = 0.53; 95% CI: 0.29 - 0.97; East Asia: OR = 0.59; 95% CI: 0.42 – 0.83; South Asia: OR = 0.66; 95% CI: 0.45 – 0.96), the need for interpreter services (OR = 0.31; 95% CI: 0.18 – 0.54), and 'overseas' financial classification (OR = 0.56; 95% CI: 0.36 – 0.87).

Conclusion: Overall, uptake for genetic-risk T1D screening was high. Systemic barriers to healthcare access, such as language and cultural barriers as well as increasing parity (potentially due to a reduced perceived need for additional screening following prior experience with newborn screening), appear to play roles in influencing parents' decision to not consent for T1D screening. Addressing these barriers may further improve screening uptake, particularly among culturally and linguistically diverse populations.

Longitudinal validation of the Indian Diabetes Risk Score for predicting incident diabetes: 9-year follow-up from the Kerala Diabetes Prevention Program

Nguyen D¹

¹Baker Heart & Diabetes Institute, Monash University School of Public Health and Preventive Medicine, Keysborough, Australia

Aim/s

Most undiagnosed type 2 Diabetes (T2D) occurs in low- and middle-income countries including India, where laboratory screening is impractical. The Indian Diabetes Risk Score (IDRS), based on four non-invasive factors (age, waist circumference, physical activity and family history), is widely used for community screening, with a threshold of ≥ 60 indicating high risk. However, **its longitudinal predictive performance has not been formally validated**. This study evaluated whether baseline IDRS predicts incident diabetes over 9 years.

Methods

Secondary analysis of the Kerala Diabetes Prevention Program (K-DPP) cohort was conducted among adults without diabetes at baseline ($n=1508$). Associations between baseline IDRS and 9-year incident diabetes were assessed using logistic regression. Discriminative performance was evaluated using area under the receiver operating characteristic curve (AUC-ROC). Linear regression examined the association between change in IDRS from year 2 to year 9 (Δ IDRS) and concurrent change in fasting plasma glucose (Δ FPG), and the cross-sectional relationship between IDRS and FPG over time.

Results

Over 9 years of follow-up, higher baseline IDRS was associated with incident diabetes (continuous IDRS: adjusted OR 1.041, $p<0.001$; IDRS ≥ 60 threshold: adjusted OR 1.72, $p=0.080$). However, discriminative performance was poor (AUC-ROC=0.577). At the ≥ 60 cut-off, sensitivity was moderate (71.2%), specificity was low (34.7%). Δ IDRS was not associated with Δ FPG ($\beta=0.050$, $p=0.513$); however, the low-risk group had a 9.6 mg/dL smaller Δ FPG than the high-risk group. Cross-sectional associations between IDRS and FPG were significant at both time points but stronger at 9 years ($\beta=0.44$) than 2 years ($\beta=0.17$; $z=-2.44$, $p=0.015$).

Conclusion

Baseline IDRS was positively associated with 9-year incident diabetes, but the ≥ 60 threshold showed limited individual-level predictive precision. Continuous IDRS better captured graded diabetes risk than dichotomised classification. IDRS reflected **between-group** differences in glycaemic trajectories but not **within-person** glycaemic changes overtime. These findings support IDRS as a population screening/risk stratification tool rather than a precise individual prognostic or glycaemic monitoring tool.

Maternal age and glucose criteria–specific detection of gestational diabetes in Asian women: Implications for screening in the Western Pacific region

Nguyen N¹, Do T²

¹Endocrinology Clinic, Hanh Phuc International Hospital, Ho Chi Minh City, Viet Nam, ²Department of Geriatrics, Hanoi Medical University, Hanoi, Viet Nam

Aims: Gestational diabetes mellitus (GDM) is an increasingly important public health concern in the Western Pacific Region, where Asian women are known to carry a disproportionately high risk. Although advancing maternal age is a recognized determinant of GDM, limited data are available on how fasting and post-load glucose measures differentially contribute to age-related patterns of GDM detection in Asian populations.

Methods: This retrospective cohort study included pregnant women undergoing a 75-g oral glucose tolerance test (OGTT) at 24–28 weeks of gestation. GDM was defined by meeting at least one of the following thresholds: fasting plasma glucose (FPG) ≥ 5.1 mmol/L, 1-hour plasma glucose (1h-PG) ≥ 10.0 mmol/L, or 2-hour plasma glucose (2h-PG) ≥ 8.5 mmol/L. Overall and age-stratified GDM prevalence were estimated, and age-related differences were analyzed separately according to fasting and post-load glucose criteria.

Results: Among 887 participants (mean age 32.2 years), 99.4% were of Asian ethnicity. The overall prevalence of GDM was 31.7%, increasing with maternal age from 21.9% in women <30 years, to 33.3% in those aged 30–39 years, and reaching 58.3% in women aged ≥ 40 years. Abnormal glucose values were observed in 5.6% for FPG, 20.4% for 1h-PG, and 24.7% for 2h-PG. Among glucose-based diagnostic thresholds, the 2h-PG glucose criterion showed the greatest discriminatory ability (Cramér's $V = 5.18$) across age groups, followed by the 1h-PG and fasting criteria (Cramér's $V = 4.13$ and 3.95, respectively).

Conclusion: GDM prevalence in Asian women was substantial, particularly among those of advanced maternal age. Post-load glucose measurements, especially the 2-hour OGTT value, were more effective than fasting glucose in detecting age-related differences in GDM. These findings highlight the importance of comprehensive OGTT-based screening strategies to improve GDM detection in Asian populations across the Western Pacific Region.

Associations between OGTT glucose levels and predicted preeclampsia risk by Fetal Medicine Foundation (FMF) model

Nguyen N¹, Do T²

¹Hanh Phuc International Hospital, Ho Chi Minh City, Viet Nam, ²Hanoi Medical University, Hanoi, Viet Nam

Aims: Gestational diabetes mellitus (GDM) and hypertensive disorders frequently coexist and share metabolic risk factors. Understanding which glycaemic parameters are most strongly linked to preeclampsia risk could improve risk stratification in routine antenatal care. This study evaluated relationships between OGTT components and predicted preeclampsia risk using the Fetal Medicine Foundation (FMF) preeclampsia prediction model.

Methods: A total of 887 pregnant women underwent first-trimester screening and a 75-g OGTT at 24–28 weeks. Predicted risks of preeclampsia before 34 weeks (FMF34) and 37 weeks (FMF37) were calculated using the FMF model. Associations between fasting (FBG), 1-hour (1h-PG), and 2-hour (2h-PG) glucose values and FMF risk scores were evaluated using multivariable linear regression.

Results: Among 887 pregnant women (mean age 32.2 years; 99.4% Asian), the prevalence of GDM was 31.7%. Participants whose FBG, 1h-PG, or 2h-PG exceeded the diagnostic thresholds for GDM had significantly higher FMF37 risk scores than those with normal glucose levels ($p = 0.027$, 0.037 , and 0.042 , respectively). In multivariable regression analyses, FBG remained consistently associated with both FMF34 ($p = 0.044$) and FMF37 ($p = 0.002$). By contrast, post-load glucose measurements showed weaker associations. The 1h-PG was independently associated with FMF37 ($p = 0.015$) but not with FMF34 after adjustment ($p = 0.183$). The association between 2h-PG and FMF37 was no longer statistically significant after multivariable adjustment ($p = 0.077$).

Conclusion: Among OGTT components, fasting glucose appears most closely linked with predicted preeclampsia risk. These findings suggest that fasting glycaemia may be an important marker connecting gestational diabetes and hypertensive disorders of pregnancy.

Ethnic disparities in Type 2 Diabetes prevalence and trends in Australia: A nationally representative longitudinal analysis

Khan A¹, Rahman M¹, Hashem F^{2,3}, **Nisar M¹**

¹University Of Queensland, Brisbane, Australia, ²Gold Coast University Hospital, Southport, Australia, ³Griffith University School of Medicine, Southport, Australia

Aims: To examine the prevalence and trends of T2D among Culturally and Linguistically Diverse (CALD) and non-CALD populations in Australia over 12 years with additional sub-group analysis.

Methods: Data were drawn from waves 9, 13, 17, and 21 of the nationally representative Household, Income and Labour Dynamics in Australia (HILDA) Survey ($n = 13,301$; age $15 \geq$ years at baseline). The primary outcome was self-reported T2D and CALD status was the exposure. Multivariable logistic regression was employed to examine group differences in T2D prevalence.

Results: Between 2009 and 2021, T2D prevalence nearly doubled in both groups (Fig 1): rising from 7.9% to 15.0% in CALD group and 4.4% to 9.1% in non-CALD group with disparities being pronounced among younger age groups. Multivariable analyses of the 2021 data indicated that participants from CALD backgrounds had 83% higher odds of reporting T2D compared with non-CALD participants (aOR 1.83, 95% CI 1.45–2.29). Males had 57% higher odds of reporting T2D than females (aOR 1.57, 95% CI 1.31–1.88), while individuals not in the labour force had 108% higher odds compared with those who were employed (aOR 2.08, 95% CI 1.62–2.65).

Conclusion: Over the 12 years, T2D prevalence in Australia increased substantially, disproportionately affecting CALD populations, males, and individuals outside the labour force. These findings highlight persistent and widening inequities in T2D and underscore the need for targeted prevention and management strategies tailored to culturally and socioeconomically disadvantaged populations.

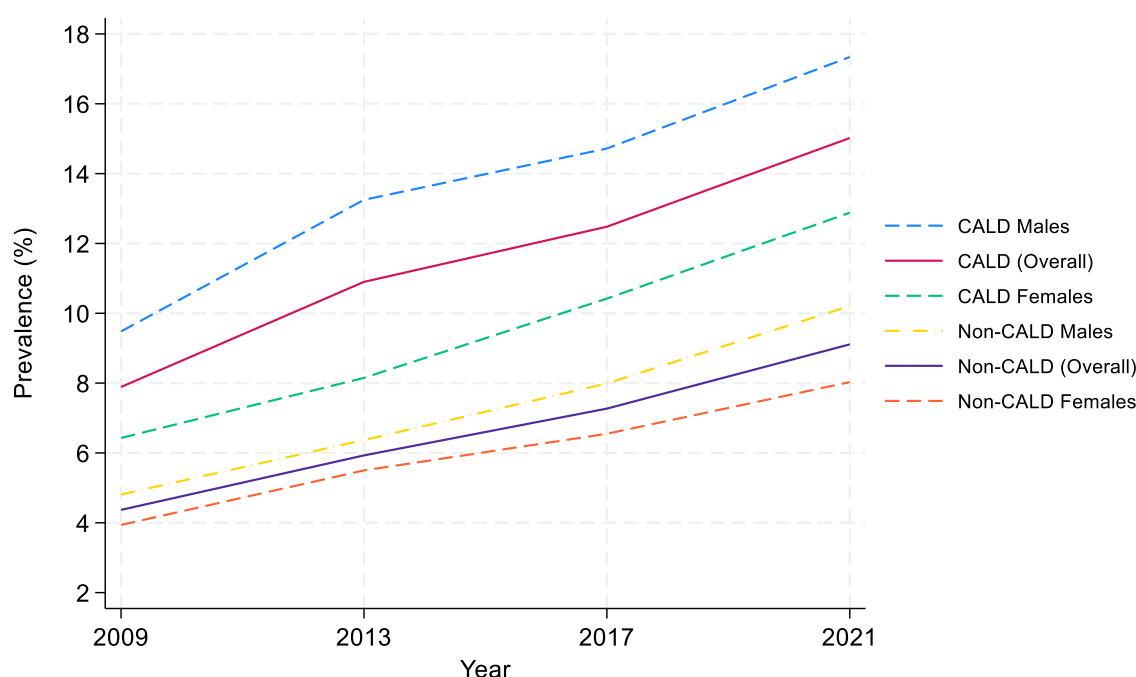


Figure 1. Prevalence of T2D by gender in CALD and Non-CALD groups: 2009–2021

Screening interventions for type 2 diabetes in low- and middle-income countries: a systematic review

Odhiambo C¹

¹University Of Sheffield, Sheffield, United Kingdom

Aim/s: To identify and categorise screening interventions for type 2 diabetes (T2DM) in low- and middle-income countries (LMICs) and to describe their characteristics, implementation outcomes, and contextual factors.

Methods: We conducted a systematic review of studies evaluating T2DM screening interventions in adult populations (≥ 18 years) within LMICs. We searched CINAHL, Embase, MEDLINE, PsycInfo, PubMed, and Scopus in March 2026. Two reviewers independently screened studies, extracted data, and assessed quality using Joanna Briggs Institute (JBI) checklists. A narrative synthesis was performed. From 13,396 identified records, 5,613 duplicates were removed. After screening 7,861 titles and abstracts and assessing 73 full-text reports, 18 studies met the inclusion criteria.

Results: The 18 included studies were conducted across 12 countries, with the majority from India ($n=9$). Screening models included population-based ($n=5$), targeted ($n=7$), and opportunistic ($n=4$) approaches, with two studies using hybrid models. Screening locations varied, including community settings ($n=10$), facilities ($n=8$), and households ($n=2$). Detection rates for newly diagnosed T2DM ranged from 0.9% to 21.3%, with the highest yields observed in targeted approaches. Delivery agents included community health workers, nurses, pharmacists, and physicians. Most studies provided training to screening personnel, with task-sharing with existing health workers emerging as a key facilitator. Although fourteen studies incorporated confirmatory testing and twelve reported linkage to care, only seven documented treatment initiation and just three assessed glycaemic control. Notably, only two studies reported on all four components of the care cascade.

Conclusion: T2DM screening interventions in LMICs are heterogeneous in design and setting. Targeted and integrated approaches achieved higher yields and demonstrated feasibility. However, substantial losses along the care cascade and limited economic evaluations highlight the need for implementation strategies that strengthen linkage to care and are supported by context-specific cost-effectiveness data.

Impact of a co-designed affordable exercise directory on community physical activity engagement in Regional New South Wales

Osuagwu U¹, Vines R¹, Macfarlane T¹, Wong K, McCrossin T¹, John E¹, Lamers A, Fell J, Sethi S, Wilson R¹, Simmons P

¹Western Sydney University, Bathurst, Australia

Aim/s: To address economic and information barriers to physical activity in regional New South Wales by co-designing a low-cost exercise directory and evaluating its subsequent community reach and engagement.

Methods: Western Sydney University's Bathurst Rural Clinical School and the Bathurst Neighbourhood Centre co-developed a digital and printable "LowCost/NoCost" directory. The directory prioritised accessibility by listing 30 local groups costing ≤\$10 per week, specifically featuring seven walking groups and specialised chronic-disease-appropriate options such as cardiopulmonary rehabilitation. Public engagement was evaluated via longitudinal website analytics and social media metrics from 2024 to 2025.

Results: Total annual website views rose from 2,904 in 2024 to 10,377 in 2025, representing a more than threefold increase in overall engagement. The strongest growth was recorded for DanceMoves (+595%), followed by Aquatic Classes (+305%), Tai Chi standing variants (+251%), and Community Yoga (+247%). Walking-based programs demonstrated substantial year-on-year expansion: Women's Walk (+194%), Morse Park Walkers (+193%), Wednesday Walkers (+175%), and Men's Walk & Talk (+153%). Programs targeting older adults or specific conditions also grew, including Flexit Over 50's (+164%), Mind+Move (+146%), and CIRCL Mobility (+155%). Conversely, seated Tai Chi decreased by 29% (see Figure 1). Monthly Facebook engagement corroborates this rising trend, increasing from 7,344 views in March 2024 to 9,126 in April 2024.

Conclusion: Addressing the 25-year "communication gap" through affordable, co-designed directories significantly increases community awareness and interest in physical activity. This model provides a scalable public health strategy to enhance participation in preventative care pathways, which is critical for managing chronic conditions like diabetes and reducing long-term regional healthcare costs.

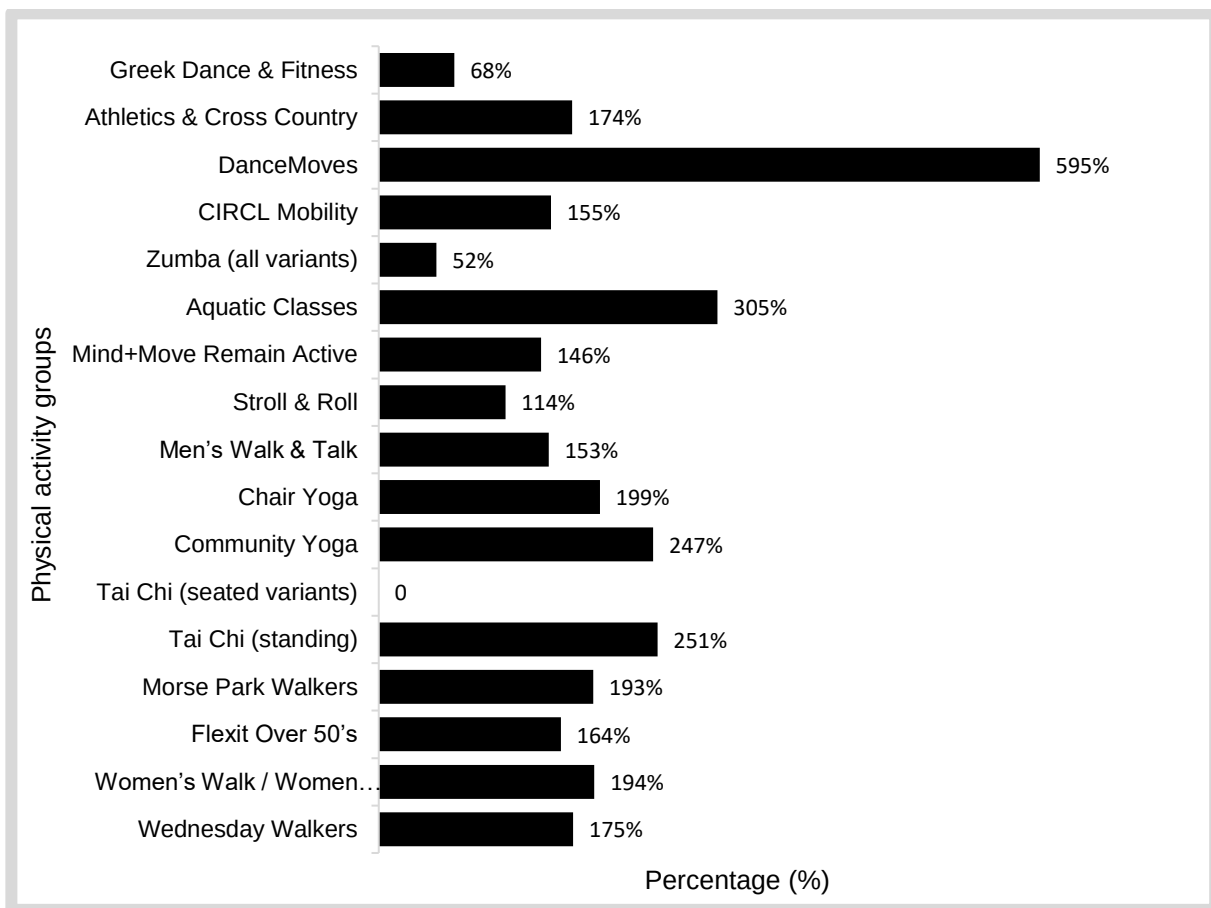


Figure 1: Website engagement growth by low-cost and no-cost activity from 2024 – 2025

Co designed digital feedback system integrating community screening with general practice to improve rural diabetes and cardiovascular care

Osugwu U¹, Wong K², Wenkart E⁴, Bapat Y⁴, McCrossin T¹, Mahns D³

¹Bathurst Rural Clinical School, Western Sydney University, Bathurst, Australia, ²Westmead Applied Research Centre, University of Sydney, Sydney, Australia, ³School of Medicine, Western Sydney University, Campbelltown, Australia, ⁴Strategic Advisor and Board Director, Pen CS, Sydney, Australia

Aims

Diabetes and cardiovascular disease are leading causes of morbidity and mortality in Australia, particularly in rural and underserved communities. Community outreach screening may reduce gaps in care, yet integration with general practice workflows and medico-legal responsibilities remains challenging. This study examined a co-designed digital feedback system that links the Care2U (i.e., “bring care to you”) screening service with general practitioners to improve continuity of care. It also explored provider perspectives on acceptability, feasibility, and sustainability in rural settings.

Methods

A qualitative descriptive study informed by Critical Realism was conducted in April 2025. Twelve stakeholders participated in a 91-minute online focus group, including three general practitioners, three nurses, two practice managers, two health informatics professionals, and two researchers. Participants were recruited through the PenCS rural network. A semi-structured guide explored program design, implementation logistics, patient engagement, screening scope, data integration, and ethical considerations. The discussion was recorded, transcribed verbatim, and thematically analysed using NVivo. Written informed consent was obtained from all participants.

Results

Participants strongly supported the outreach model, particularly for addressing service gaps in remote and Indigenous communities. Four themes were identified. First, the feasibility and value of outreach programs, including operational considerations and population benefit. Second, patient identification and engagement, particularly the challenges of reaching individuals without an existing general practitioner. Third, the scope and modality of screening, with support for broader assessments and exploration of remote heart rhythm monitoring. Fourth, communication, workflow, and responsibility for findings, highlighting the need for seamless integration with practice software and clear delineation of clinical and medico-legal responsibility. Concerns centred on managing abnormal results for patients without a regular practitioner.

Conclusion

The Care2U integrated model was perceived as valuable for rural chronic disease screening. Implementation requires interoperable systems, clear clinical governance, and a phased rollout beginning with general practice-affiliated patients to enhance feasibility and reduce risk.

Declaration

The project received support from the Western Sydney University Collaborative Research Grant.

A community screening program to determine the prevalence of (pre-)diabetes and cardiovascular risk factors in people experiencing housing instability including homelessness in Metropolitan Brisbane.

Page M¹, Buckmaster P¹, Rayner K², Sax J¹, Chen J³, Alam K³, Hayes L¹, Jansen P¹

¹Princess Alexandra Hospital, Woolloongabba, Australia, ²Micah Projects, West End, Australia, ³The University of Western Australia, Crawley, Australia

Aims: People with diabetes mellitus (DM) experiencing housing instability including homelessness are at increased risk of complications and poor outcomes. We run a community screening program to better estimate the burden of DM and cardiovascular risk in this population to optimise care models and enhance early detection.

Methods: We conduct community diabetes screening events across Metropolitan Brisbane at locations including temporary accommodation, supported living facilities, day drop-in centres and community events. Screening of eligible adults involves review of their cardiovascular risk, basic anthropometric measurements and point-of-care for HbA1c, glucose, lipids and urinary albumin-to-creatinine ratio (UACR) to identify people at risk. High risk is defined as HbA1c $\geq 6.0\%$ or a known history of DM.

Results: Since June 2025, we have screened 120 eligible participants. Their mean age ($\pm$ SD) was 47 (± 11.9) years, 74% males and 26% females. The main categories of housing status were “supported living” (31%), “hostel” (22.5%), “public housing” (10%), and “rough sleeping” (9%). A large proportion (76%) had no regular general practitioner. Twelve participants (10%) had a pre-existent diagnosis of DM, whereas 8 (6.7%) screened high-risk (HbA1c $\geq 6.0\%$) without a prior diagnosis. Of those, seven had a HbA1c in the pre-diabetic range (6-6.4%), and one of 9.0%. The people with pre-existent DM had an average HbA1c of 8.6% (highest 13.8%). Other cardiovascular risk factors were prevalent: dyslipidaemia 21.7%, hypertension 30.0%, obesity 29.7% and smoking 60.8%. Of 62 participants who had an UACR measured, 17.7% was found to have albuminuria.

Conclusion: The prevalence of pre-DM, DM and other cardiovascular risk factors are high within people experiencing homelessness. A relevant proportion of people at risk were undiagnosed prior to screening which may be partially explained by the observed low rates of engagement with a regular care provider.

Sponsor/Funding: Metro South Health; MS Research Support Scheme; ADS–AstraZeneca Diabetes Research Grant.

“Everything in moderation”: How South Asians with diabetes perceive and manage cardiovascular risk.

Parackal S¹

¹University Of Otago, Dunedin, New Zealand

Aims: South Asians with diabetes experience a disproportionately high burden of cardiovascular disease (CVD). Despite strong evidence for lifestyle modification, uptake and sustainability of recommended dietary and physical activity behaviours remain suboptimal. This study aimed to understand how individuals with diabetes perceive CVD risk and translate prevention advice into everyday practice.

Methods: Semi-structured telephone interviews (n = 21) were conducted with South Asian adults at risk of cardiovascular disease (CVD) as part of a CVD risk reduction study in New Zealand. Eleven participants had diagnosed diabetes and were included in this sub-study. Data were analysed thematically and interpreted using the Health Belief Model (HBM), examining perceived susceptibility, severity, benefits, barriers, self-efficacy, and cues to action.

Results: Participants perceived CVD risk as high, personal, and cumulative, driven by long-standing diabetes, ageing, family history, and stress. Heart disease was viewed as serious and life-altering, reinforcing a strong motivation to act. While diet and physical activity were widely regarded as beneficial, interpretations of “healthy” behaviours were shaped by diabetes self-management priorities, cultural food traditions, and lived experience rather than generic guidelines. Fruit intake, for example, was often restricted due to concerns about glycaemic control. Major barriers included stress, emotional fatigue, medication side-effects, time constraints, and limited access to early, culturally relevant dietary guidance. Despite these challenges, participants demonstrated high self-efficacy, employing adaptive strategies such as moderation, portion control, substitution, routine-building, and continuous self-monitoring. Diabetes itself functioned as a constant cue to action, reinforcing vigilance and behavioural adjustment.

Conclusion: South Asians with diabetes actively engage in CVD risk reduction but do so through culturally grounded, experience-based self-regulation rather than strict guideline adherence. Interventions that acknowledge diabetes-related concerns, cultural food practices, and psychosocial stressors are more likely to support sustainable behaviour change. These findings underscore the need for culturally tailored, diabetes-sensitive cardiovascular prevention strategies.

Rethinking diabetes prevention: Is prediabetes remission a cardiovascular target? — A scoping review with evidence mapping

Paulus I¹, Dwipayana I², Semadi I², Nugraha I², Saraswati M², Gotera W²

¹Internal Medicine Resident, Faculty of Medicine Udayana University/ Sanglah Hospital, Bali, Indonesia, ²Endocrinology and Metabolism Division Department of Internal Medicine, Faculty of Medicine Udayana University/ Sanglah Hospital, , Indonesia

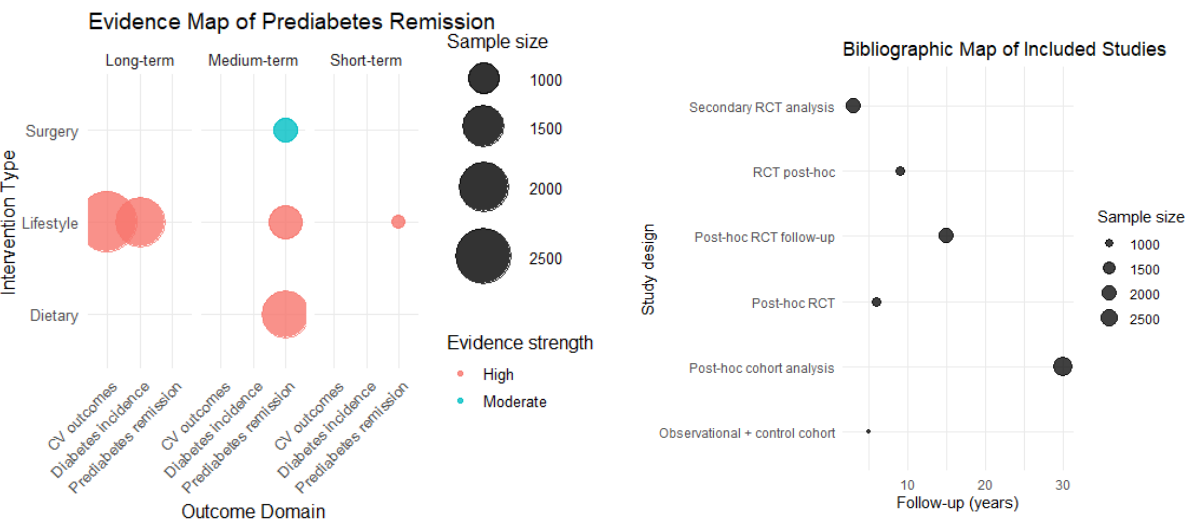
Background: Prediabetes has long been treated as an inevitable precursor to type 2 diabetes rather than a reversible cardiometabolic state. Current prevention strategies focus predominantly on delaying diabetes onset. However, accumulating long-term data raise a critical question: should remission of prediabetes, rather than mere delay of progression, become the primary therapeutic goal? **Objective:** To systematically map global evidence on prediabetes remission and evaluate whether remission signals extend beyond glycaemic normalization toward durable cardiovascular benefit.

Methods: A scoping review was conducted using Joanna Briggs Institute methodology, guided by the Arksey–O’Malley framework with Levac refinements. PubMed, ScienceDirect, and Cochrane databases were searched for studies reporting remission or reversion to normoglycaemia. Independent screening and data extraction followed PRISMA-ScR standards. Evidence charting, bibliographic mapping, and cardiovascular outcome synthesis were performed using R.

Results: Evidence derived from post-hoc analyses of major randomized trials and long-term cohorts with follow-up spanning 1 to >30 years. Between 20–50% of individuals with prediabetes achieved remission following lifestyle or pharmacologic interventions. Remission was consistently associated with a 50–70% reduction in incident type 2 diabetes. Importantly, extended follow-up from DPPOS and DaQing cohorts suggested favorable associations between remission and cardiovascular outcomes, supporting a potential cardiometabolic legacy effect. Evidence mapping revealed geographic concentration in high-income settings, with limited representation from the Western Pacific and other low- and middle-income regions.

Conclusions: Prediabetes remission may represent more than glycaemic normalization—it may signal modification of long-term cardiovascular risk trajectories. These findings challenge the conventional “delay-only” paradigm and support repositioning normoglycaemia as an intentional, measurable cardiometabolic endpoint in prevention strategies.

Keyword :Cardiovascular, Prediabetes Remission, Scoping Review



Prevalence and clinical correlates of diabetes distress among people with Type 2 Diabetes mellitus in a Tertiary Hospital in Bangkok, Thailand

Permsiriphan N^{1,2}, Laichuthai N^{1,2}, Jitchana J², Houngngam ², Santisitthanon P²

¹Division of Endocrinology and Metabolism, Department of Medicine, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand, ²Excellence Center in Diabetes, Hormone and Metabolism, King Chulalongkorn Memorial Hospital, Bangkok, Thailand

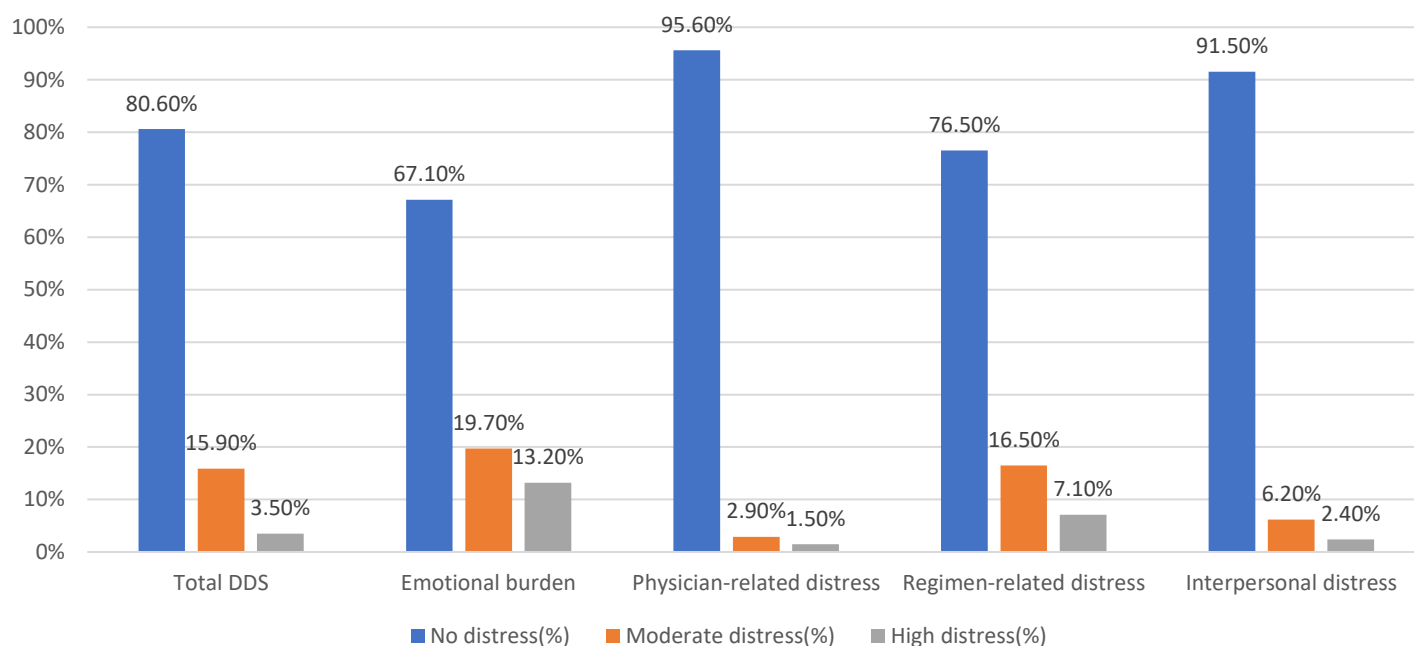
Background: Diabetes distress (DD) is a psychological barrier to self-management that is often underdetected in routine care. This study determined the prevalence of DD and identified clinical and sociodemographic correlates in a tertiary hospital setting where patients commonly have high comorbidity and complex regimens.

Method: A cross-sectional study of 340 people with T2DM attending a tertiary hospital in Bangkok was conducted. Distress was measured using the 17-item Diabetes Distress Scale (DDS-17); mean item scores <2 = little/no distress, 2–2.9 = moderate distress, ≥3 = high distress. Comparisons of mean distress scores used independent t-tests and one-way ANOVA; Spearman's correlation examined the relationship between HbA1c (continuous) and total distress. Categorical associations with distress severity were assessed using chi-square tests.

Results: Participants had a mean age of 62.6 years and mean HbA1c of $7.33 \pm 1.37\%$. DD (DDS-17 mean item score ≥2) was present in 66 participants (19.4%): moderate 15.9%, high 3.5%. Emotional burden and regimen-related distress were the most prominent domains. Mean total distress scores were higher in patients <60 years (1.77 ± 0.64 vs. 1.53 ± 0.49 ; $p < 0.001$), those with HbA1c >7.0% (1.72 ± 0.60 vs. 1.53 ± 0.49 ; $p = 0.003$), and insulin users (1.71 ± 0.59 vs. 1.57 ± 0.54 ; $p = 0.04$). Employment status ($p = 0.03$), HbA1c category ($p = 0.04$), and monthly income ($p = 0.03$) were significantly associated with distress severity. HbA1c correlated positively with total DD scores ($r = 0.192$, $p < 0.001$).

Conclusion: Diabetes distress affected about one in five T2DM patients in this tertiary setting and was associated with higher HbA1c, younger age, and insulin therapy. These findings support routine psychosocial screening in diabetes care to identify and address distress and potentially improve clinical outcomes.

Distribution of respondents according to level of diabetes distress
including 4 sub scale scores (n=340)



402

Does weight loss translate to workplace gains? Results of an employment questionnaire in adults with prediabetes and overweight or obesity.

Bessell E¹, **Picone T**¹, Markovic T¹, Sainsbury A², Nicholas F¹

¹Sydney Local Health District, Camperdown, Australia, ²The University of Western Australia, Perth, Australia

Aims. Excess weight is associated with adverse health and economic disadvantage. Observational studies suggest that people with obesity are less likely to be employed and have lower income, potentially from workplace discrimination. This study examined whether weight loss achieved through a structured, dietitian-supported program improved financial outcomes.

Methods. An employment questionnaire was embedded within a clinical trial conducted between 2015 and 2019, investigating the effect of dietary supplements on metabolic health in adults with prediabetes and overweight or obesity. All participants received dietitian-led counselling for weight loss over six months, followed by six months of maintenance. Data relating to income and workplace experiences were collected at baseline, six months, and 12 months. Analyses were completed to identify any relationship between income and weight or BMI over time.

Results. The questionnaire was completed by 281 participants (64% female). At baseline, 120 females and 83 males reported employment. Modest weight loss over 12 months (-3.3 ± 5.6 kg in females and -3.1 ± 5.6 kg in males) did not improve income or employment outcomes in adults with prediabetes and overweight or obesity. There were clear sex disparities in income, but weight loss did not alter these patterns. Reports of weight-based workplace discrimination were low and stable across timepoints.

Conclusions. Findings suggest that economic disadvantages linked to obesity may not be easily reversed through short-term lifestyle interventions, highlighting the need for broader structural and societal approaches.

Sex disparities in diabetes care in a primary care implementation trial using the clinical decision support system Future Health Today

Preston C^{1,2}, Walalce H^{1,2,3}, Lumsden N^{1,2}, Hunter B², Barmanray R^{1,2}, Kevat D^{1,2}, Nelson C^{1,2}
¹Western Health, Melbourne, Australia, ²The University of Melbourne, Melbourne, Australia, ³The George Institute for Global Health, Sydney, Australia

Aims

Future Health Today (FHT) is a clinical decision support and quality improvement platform that assists screening, diagnosis and management of chronic diseases, with an implementation trial currently underway evaluating its effectiveness to improve diabetes management in primary care. This study aimed to describe the baseline characteristics of this population, in relation to diabetes screening, diagnosis, and management.

Methods

Baseline characteristics were assessed for all adult patients who had attended the 19 participating western Melbourne primary care practices over the 24 months to trial commencement (1 August 2024). Diabetes care was assessed across three key domains: screening, defined as an appropriately timed fasting glucose or HbA1c in at-risk individuals; diagnosis, measured as the appropriate coding of a diabetes diagnosis in the medical record; and management, being the adherence to guideline monitoring recommendations.

Results

Among the study population (n=135,054, mean age 44.7±17.0 years), 7.53% of patients had diabetes, of which 9.26% were undiagnosed. A further 26.18% were at high diabetes risk, with 54.99% appropriately screened. Diabetes prevalence was higher in males than females at all ages, despite lower screening rates in all risk categories, whilst adherence to monitoring guidelines was equally suboptimal across sexes (Figure 1).

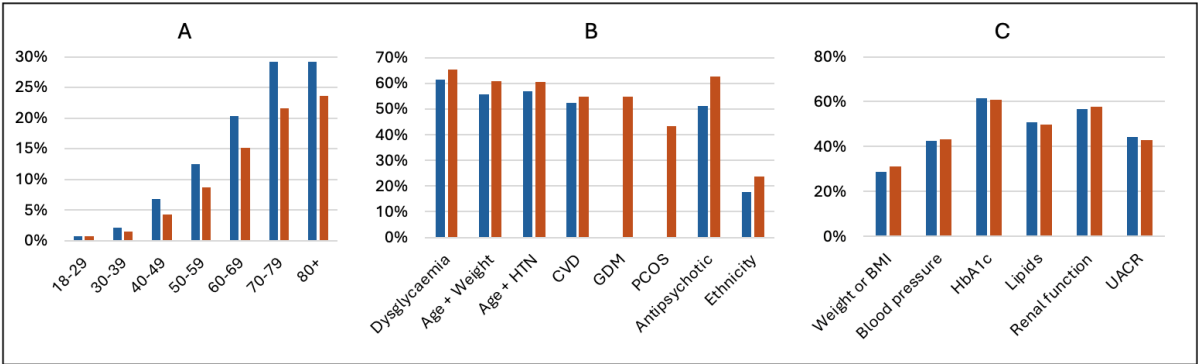


Figure 1: A. Diabetes prevalence by age and sex; B. Diabetes screening rates by risk category and sex; C. Baseline adherence to diabetes cycle of care by sex. Blue, male; Red, female.

Conclusion

Diabetes prevalence exceeded national averages in this primary care population, alongside suboptimal screening rates and management, with contrasting sex disparities between screening and disease prevalence. Together, these findings highlight important opportunities to improve equitable diabetes care, to be targeted in this FHT Implementation Trial.

Decentralised community diabetes screening using point of care HbA1c and digital risk stratification under the STRIDE framework

Qi K¹

¹SG Diagnostics Pte Ltd, Singapore, Singapore

Aim: To evaluate the feasibility and impact of decentralised community-based diabetes screening using point of care HbA1c testing integrated with digital risk stratification in improving early detection and follow up engagement.

Methods: Under the CHISEL programme, community screening events were conducted in collaboration with primary care partners and community centres. Adults aged 40 years and above and high-risk individuals were offered capillary HbA1c testing using a point of care analyser. Demographics and risk factors were captured through a digital platform. Results were stratified into normal, prediabetes, and diabetes risk categories. Individuals with elevated HbA1c were counselled onsite and referred to primary care clinics for confirmatory testing and management. Aggregated anonymised data were analysed to assess detection rates and referral uptake.



Photo 1. Users prick their fingers using a lancet and take a drop of blood using a sampler, a small implement similar to a floss pick. The blood is then placed on a test strip and fed into an analyser.¹

Results: The programme demonstrated operational feasibility in non-hospital settings with rapid turnaround time of less than 5 minutes per test. A substantial proportion of screened participants were identified with previously undiagnosed prediabetes or diabetes risk. Digital dashboards enabled real time monitoring of risk distribution and referral tracking. Community based deployment improved accessibility for seniors and individuals with limited healthcare engagement.

Conclusion: Decentralised HbA1c screening integrated with digital risk stratification is a scalable model for early diabetes detection. Embedding point of care diagnostics within community settings enhances accessibility, supports preventive care, and strengthens population health infrastructure. The STRIDE (Screening, Tailored approach, Risk reduction, Innovation, Data driven and Empowerment) framework provides a replicable approach for integrating diagnostics, data analytics, and coordinated follow up to address the growing diabetes burden.

¹ Source: <https://www.straitstimes.com/singapore/health/singapore-developed-device-for-diabetics-measures-long-term-average-blood-sugar-levels>

The impact of new obesity definitions on prevalence and health outcomes

Qiao X^{1,2}, Pan Q^{1,2}

¹Beijing Hospital, Beijing, China, ²Peking Union Medical College, Beijing, China

Aim

EASO and Lancet Diabetes & Endocrinology have proposed new frameworks for diagnosing obesity. This study aimed to examine the association between different defined obesity subgroups and clinical outcomes.

Methods

Using the UK Biobank, we enrolled individuals based on updated diagnostic criteria and described the variations in obesity prevalence under different definitions. We then calculated the proportion eligible for treatment. Furthermore, we compared the spectrums of obesity-related dysfunctions across definitions and conducted stratified analyses by sex and ethnicity. Finally, we assessed the associations between various obesity subtypes and the incidence of T2D, cardiovascular events, end-stage renal disease (ESRD), and all-cause mortality with adjusted Cox proportional hazards models.

Results

Among 498,353 subjects (median age 58[50, 63] years), 54.4% were female. The EASO and Lancet frameworks identified 29.6% and 63.4% of participants, respectively, as having obesity—representing increases of 4.8% and 38.6% over the BMI-based WHO definition. Hypertension, metabolic disorders, and musculoskeletal conditions were the most prevalent obesity-related dysfunctions overall, with variations by sex and ethnicity, particularly elevated among Asian populations. Notably, overweight as defined by EASO or Lancet criteria was not consistently a risk factor, in some context appeared protective. However, clinical obesity under the Lancet criteria conveyed the highest risk of progression to severe outcomes among all obesity subtypes, with significantly elevated hazards for T2D (HR = 12.33, 95% CI: 11.74–12.96), cardiovascular events (HR = 4.02, 95% CI: 3.89–4.16), ESRD (HR = 7.13, 95% CI: 6.11–8.33), and all-cause mortality, exceeding risks associated with EASO- and WHO-defined obesity.

Conclusion

New obesity criteria significantly increased diagnosed prevalence, especially among Asians. Notably, overweight by EASO or Lancet standards does not uniformly raise health risks. Consequently, the choice of diagnostic framework directly shapes risk stratification and informs personalized treatment strategies that should address body composition beyond weight alone.

The impact of increasing the diagnostic thresholds for gestational diabetes mellitus in Northern Australia

Robbins M¹, Chen W^{1,2,3}, McLean A^{1,4}, Cadet-James Y⁵, Brown K^{1,6}, Marovich-Tadic I¹, Moore E⁷, Kirkham R¹, Maple-Brown L^{1,8}, Hare M^{1,8}

¹Menzies School Of Health Research, Darwin, Australia, ²Danila Dilba Health Service, Darwin, Australia, ³Leader Centre for Health Policy, Economics and Data, University of Sydney, Sydney, Australia, ⁴Cairns Diabetes Centre, Queensland Health, Cairns, Australia, ⁵Jawun Research Institute, Central Queensland University, Cairns, Australia, ⁶Department of Obstetrics and Gynaecology, Royal Darwin Hospital, Darwin, Australia, ⁷Public Health Unit, Aboriginal Medical Services Alliance NT, Alice Springs, Australia, ⁸Endocrinology Department, Royal Darwin Hospital, Darwin, Australia

Aims: The 2025 Australasian Diabetes in Pregnancy Society (ADIPS) guidelines recommend higher diagnostic thresholds for gestational diabetes mellitus (GDM). This study aimed to evaluate the clinical and health service implications of adopting these thresholds for the Northern Territory (NT) and Far North Queensland (FNQ).

Methods: A retrospective cohort study was conducted using the NT and FNQ Diabetes in Pregnancy Clinical Registers. Women with singleton pregnancies between 2015 to 2019 were included. The proportion of women with GDM or overt DIP diagnosed according to the ADIPS 2014 criteria who would retain their diagnosis using ADIPS 2025 diagnostic thresholds was assessed. Maternal and neonatal outcomes were compared between women who met GDM criteria under the revised thresholds, and those who would no longer be diagnosed.

Results: The study cohort of 2,207 pregnancies included 713 (32%) Aboriginal and/or Torres Strait Islander women. Under the new criteria, a GDM or overt DIP diagnosis was retained for 1,378 (62%). The greatest reduction in diagnoses was observed in European women (44%), with a smaller reduction among Aboriginal and/or Torres Strait Islander women (33%). Compared to women who would no longer meet diagnostic thresholds, a greater proportion of women who would retain their diagnosis required treatment with insulin (8.9% v. 6.4%, $p=0.03$) and/or metformin (17% v. 13%, $p<0.01$). Other maternal and neonatal outcomes, including induction of labour, caesarean section, macrosomia, preterm birth, neonatal hypoglycaemia, and admissions to special care were similar across groups.

Conclusion: Within the study cohort, adoption of the ADIPS 2025 thresholds would reduce GDM diagnoses by 38%. This has substantial health service implications for the NT and FNQ.

Hidden in plain sight: Data gaps in estimating the burden of youth-onset Type 2 Diabetes

Rodrigues F^{1,2,3}, Longmore D^{1,3,4}, Buttery J^{1,3,4}, Clothier H^{1,3,4}

¹Murdoch Children's Research Institute, Melbourne, Australia, ²Children's Health Queensland, Brisbane, Australia, ³The University of Melbourne, Melbourne, Australia, ⁴Royal Children's Hospital, Melbourne, Australia

Background:

Youth-onset type 2 diabetes (YT2D) is an evolving public health crisis across the Western Pacific Region, disproportionately impacting socioeconomically disadvantaged and ethnically diverse populations. Early onset drives rapid disease progression, early complications, reduced life expectancy, and substantial long-term healthcare costs. Current prevalence estimates, derived largely from small U.S.-based studies fail to reflect Australia's diverse population or primary care context. This undermines accurate surveillance, delays detection, and constrains effective prevention and policy responses.

Aims:

Estimate and describe population prevalence of YT2D in an Australian context, using large-scale general practice data.

Methods:

De-identified general practice data from Outcome Health's Population Level Analysis and Reporting (POLAR) platform were extracted for January 2018 to July 2025. Individuals aged ≤ 32 years were identified and analysed using RStudio. Initial case identification relied on diagnosis codes recorded in primary care.

Results:

Over two million individuals ≤ 32 years were identified across participating practices. Using diagnosis codes alone, more than 10,000 individuals were flagged as potentially having YT2D. However, a substantial proportion (65%) were coded as "diabetes suspected," "unknown type," or "at risk," without subsequent type 1 or 2 diabetes classification. This highlights both the scale of youth diabetes captured in Australian primary care and limitations of single-element coding approaches.

In younger populations, diagnostic uncertainty, early insulin initiation, and evolving phenotypes contribute to misclassification and distorted burden estimates.

A composite digital phenotype incorporating diagnosis codes, prescribing patterns, laboratory data, and clinical context is therefore being developed to improve YT2D identification and refine prevalence estimates.

Conclusion:

Large-scale primary care data reveal a likely substantial and under-characterised burden of youth diabetes in Australia. Real-world data utility can be improved by use of multifaceted digital phenotypes. Strengthening our ability to measure and respond to the escalating YT2D crisis is crucial to containing its trajectory and safeguarding the lifelong health of our region's children.

Higher circulating calcium concentrations are associated with increased odds of prediabetes but not with incident type 2 diabetes

Rouhani P^{1,2}, Heilbronn L^{1,2}, Gill T^{1,2}

¹Adelaide Medical School, Adelaide University, Adelaide,, Australia, ²Lifelong Health Theme, South Australian Health and Medical Research Institute (SAHMRI), Adelaide,, Australia

Aims: Observational studies suggest that higher circulating calcium concentrations are associated with an increased risk of type 2 diabetes (T2D). However, this relationship has not been examined in Australian populations, and its link with prediabetes remains unclear. We therefore investigated albumin-adjusted circulating calcium concentrations related to prediabetes and incident T2D in an Australian cohort.

Methods: Participants were from the North West Adelaide Health Study, a population-based cohort that commenced in 1999-2003 (stage 1). The analysis included 2,409 adults (mean age 58±10 years; 47.3% male) who attended stage 3 (2008-2010). Blood samples were analysed for fasting plasma glucose (FPG; mmol/L), HbA1c (%), serum calcium (mmol/L), and albumin (g/L), from which albumin-adjusted circulating calcium concentrations were derived. Prediabetes and diabetes at stage 3 were defined according to National Health Measures Survey criteria (i.e. self-reported physician diagnosis, glucose-lowering medications use, FPG, or HbA1c). Incident T2D at stage 4 (2015) was determined by self-reported physician diagnosis and glucose-lowering medications use, as biochemical measurements were not available. Associations between albumin-adjusted circulating calcium and prediabetes were assessed using logistic regression. For incident T2D, participants with diabetes at stage 3 were excluded. Risk ratios (RRs) were estimated using Poisson regression. Dose-response relationships were examined per 1-SD (0.1 mmol/L) increment in albumin-adjusted circulating calcium.

Results: After adjustment for potential confounders, each 1-SD increment in albumin-adjusted circulating calcium concentrations was associated with a 15% higher odds of prediabetes (OR=1.15; 95%CI: 1.02–1.29). The association remained significant in females (OR=1.17; 95%CI: 1.01–1.37) but not males (OR=1.12; 95%CI: 0.93–1.34) following stratified analyses. After a median follow-up of 6.24 years (2008-2015), albumin-adjusted circulating calcium concentrations were not significantly associated with incident T2D (RR=1.09; 95%CI: 0.98–1.25).

Conclusion: These findings suggest potential links between calcium metabolism and early disturbances in glucose regulation and warrant further studies to clarify the underlying mechanisms.

Gestational diabetes mellitus prevalence in low- and middle-income countries: Systematic review and meta-analysis

Sadore A¹, Agho K¹, Fentie E², Osuagwu U³

¹Western Sydney University, Campbelltown, Australia, ²University of New South Wales, Kensington, Australia, ³Western Sydney University, Bathurst, Australia

Background: Gestational Diabetes Mellitus (GDM) is a major public health problem and a known risk factor for developing Type 2 Diabetes (T2DM) in Low- and Middle-Income Countries (LMICs). This study aims to conduct a systematic review and meta-analysis of the prevalence of GDM in LMICs.

Methods: We searched seven electronic bibliographic databases (PubMed, CINAHL, PsycINFO, Scopus, EMBASE, CABI and Google Scholar) for eligible observational studies published in LMICs between 2015 and August 2025. Study quality was assessed using Newcastle-Ottawa Scale (NOS). Statistical heterogeneity was evaluated using the I^2 statistic, and a random-effects model was applied to calculate pooled prevalence estimates. Subgroup analyses were conducted to explore variations across key study factors. The study was registered with PROSPERO (CRD42025110516).

Results: Of 3202 records screened, 140 studies involving 414,509 participants from 32 LMICs were included. The pooled prevalence of GDM in LMICs was 16.0% (95% CI: 14.8–17.1), with East Asia and the Pacific and South Asia having the highest prevalence of (18.3%, 95% CI: 16.6–20.0), and (16.6%, 95% CI: 13.6–18.5), respectively. The prevalence of GDM varied by diagnostic criteria used, ranging from 5.1% (95% CI: 4.2–6.1) with American College of Obstetricians and Gynecologists (ACOG) criteria to 19.9% (95% CI: 16.8–23.1) with country-specific guidelines. International Association of Diabetes and Pregnancy Study Groups (IADPSG)/WHO 2013 yielded a prevalence of 16.9% (95% CI: 15.6–18.2). The one-step GDM screening approach had the higher prevalence (16.4%, 95% CI: 15.3–17.6) compared to the two-step method (12.8%, 95% CI: 10.5–15.1).

Conclusion: This review highlights that GDM affects approximately one in six pregnancies in LMICs, with prevalence varying widely by region and diagnostic criteria and future interventions, including the implementation of standardized screening guidelines, are needed in high-prevalence regions, especially East Asia and the Pacific, to reduce maternal and neonatal complications.

Associations between psychosocial factors and glycaemic management in people with young-adult-onset diabetes

Sajjadi F¹

¹Baker Heart And Diabetes Institute, Melbourne, Australia

Aim

To examine the association between psychological factors and glycaemic management in recently diagnosed young-adult-onset diabetes, and to determine whether these associations differ by diabetes type.

Methods

We conducted a cross-sectional analysis of young-adult-onset type 1 (T1DM) and type 2 diabetes (T2DM) participants recruited across Australia as part of the Progression of Complications in Young-Adult-Onset Diabetes (PREDICTION) study. Analyses included individuals who completed baseline glycated haemoglobin (HbA1c). Participants completed self-report questionnaires assessing diabetes distress (PAID), illness perceptions (BIPQ), self-efficacy (CIDS), and social support (DSS). Diabetes type was determined by self-report. Suboptimal glycaemia was defined as HbA1c $\geq 7\%$. Logistic regression models were performed separately for T1DM and T2DM, adjusting for age, sex, ethnicity, family history of diabetes, diabetes duration, body mass index (BMI), education, and employment status.

Results

Participants included 111 individuals with T1DM and 150 with T2DM. People with T2DM were older (37.9 ± 4.9 vs 32.1 ± 6.3 years) and had higher mean BMI (33.8 ± 8.9 vs 26.2 ± 5.4 kg/m²) compared with people with T1DM. Diabetes duration (4.1 ± 2.9 vs 4.4 ± 2.8 years), gender (56.0% vs 50.5% female), and mean HbA1c (both 6.9%) were similar between groups. Among individuals with T1DM, higher perceived personal control (BIPQ domain) was associated with lower odds of suboptimal glycaemia (adjusted OR 0.70, 95% CI 0.51-0.96). People with T2DM who showed higher perceived illness severity had increased odds of suboptimal glycaemia (adjusted OR 1.04, 95% CI 1.00-1.07). No other psychosocial measures were independently associated with suboptimal glycaemia in people with T1DM or T2DM.

Conclusion

Psychological factors were associated with glycaemia in young-adult-onset diabetes. In T1DM, greater perceived personal control was associated with optimal glycaemia, whereas in T2DM, higher overall illness-perception severity was associated with suboptimal glycaemia. These findings reinforce the need for diabetes-type-specific psychological assessment and intervention strategies that support people with diabetes to achieve a greater sense of agency and control.

Mandatory front-of-package nutrition labeling as a catalyst for reducing Type 2 Diabetes risk factors: A systematic review and trial sequential meta-analysis

Sakti P¹, Rezkiansyah A², Sibarani R¹

¹Diabetes Initiative Indonesia, Jakarta, Indonesia, ²Pembangunan Nasional Veteran Jakarta University, Jakarta, Indonesia

Aim/s: To evaluate the collective effectiveness of interpretive Front-of-Package Nutrition Labeling (FOPL) systems compared to no labeling (control) in reducing caloric, sugar, and fat intake, thereby establishing a fundamental evidence base for mandatory FOPL policy implementation to mitigate Type 2 Diabetes (T2DM) risk.

Methods: Following PRISMA 2020 guidelines, we systematically searched PubMed and ScienceDirect for Randomized Controlled Trials (RCTs) (2010–2026). Data synthesis utilized random-effects meta-analysis and Trial Sequential Analysis (TSA) to compare the impact of interpretive FOPLs—specifically Nutri-Score, Multiple Traffic Lights (MTL), and Warning Labels—against standard control groups on primary (energy intake) and secondary (sugar/fat intake) outcomes.

Results: Analysis of five RCTs (n=3,704) demonstrated that interpretive FOPLs significantly outperform no labeling in reducing nutritional risk factors. Specifically, FOPL interventions such as MTL and Warning Labels achieved a significant reduction in sugar intake (MTL: SMD -0.20, $p<0.0001$; Warning Labels: SMD -0.12, $p=0.010$) compared to control groups. Furthermore, Warning Labels showed a promising trend toward reducing total calorie and fat intake (SMD -0.40; $p=0.06$) compared to no labeling. Collectively, the evidence indicates that the presence of interpretive FOPLs facilitates healthier dietary choices more effectively than conventional packaging.

Conclusion: Interpretive FOPLs are effective public health instruments for reducing the dietary drivers of T2DM. Given their demonstrated efficacy over no labeling, global health policies should transition from voluntary to mandatory FOPL implementation to ensure standardized protection against nutritional risk factors across all populations.

Epidemiology of diabetes in Mongolia: National trends in incidence, complications, and mortality

Sankhuu Y¹, Munkhzaya B¹, Byambasukh O², Sonomtseren S², Khasag A²

¹The First Central Hospital Mongolia, Ulaanbaatar, Mongolia, ²Mongolian National University of Medical Sciences (MNUMS), Ulaanbaatar, Mongolia

Aim: To describe national trends in newly diagnosed diabetes, geographic variation in incidence, and the population burden of complications and mortality in Mongolia.

Methods: A retrospective population-based study was conducted using national registry data on newly diagnosed diabetes cases from 2020 to 2024, complication data from the Mongolian Diabetes Association registry between 2019 and 2023, and mortality records from tertiary hospitals in 2023. Incidence rates were calculated per 10,000 population, and demographic and regional patterns were analysed descriptively.

Results: Between 2020 and 2024, a total of 20,582 new diabetes cases were recorded nationwide. Of these, 52.8 percent were female, and 55.3 percent resided in Ulaanbaatar. The highest proportion of new diagnoses occurred among adults aged 50 to 59 years, accounting for 31.6 percent of cases. Following a decline in 2020, diabetes incidence increased steadily from 2021 onwards. In 2023, incidence was higher in Ulaanbaatar at 21.6 per 10,000 population compared with 17.5 per 10,000 in rural areas. Over the five-year period, type 2 diabetes accounted for 89.9 percent of all registered cases, with incidence increasing from 8.7 to 18.5 per 10,000 population. Among 11,858 registered individuals, 27.7 percent had at least one chronic complication. The most common complications were neuropathy at 41.0 percent, retinopathy at 24.7 percent, and nephropathy at 20.7 percent. Among 100 recorded hospital deaths in people with diabetes, sepsis was the leading cause, accounting for 65.9 percent, followed by acute and chronic renal failure at 7.0 percent.

Conclusion: Diabetes incidence in Mongolia is increasing, with marked urban - rural disparities and a substantial burden of complications and infection-related mortality. Strengthening national surveillance, early detection, and population-level prevention should be public health priorities.

Ethnicity-specific population attributable fractions of gestational diabetes mellitus associated with overweight and obesity in Australia, 2016–2024

Seifu B¹, Beltsi Y¹, Teede H^{1,2}, Enticott J¹, Goldstein R^{1,2}

¹Monash Centre for Health Research and Implementation, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, ²Diabetes and Endocrine Unit, Monash Health, Melbourne, Australia

Aims: This study estimated ethnicity-specific absolute risks of gestational diabetes mellitus (GDM) associated with higher BMI using both standard and Asian-specific World Health Organization (WHO) BMI classifications, and to examine Population Attributable Fractions (PAFs) of GDM due to higher BMI.

Methods: This multicentre retrospective cohort study used routine health records from 78,170 women who gave birth at Monash Health, Melbourne Australia (2016–2024). A generalized linear model with robust Poisson regression was used to assess the association between BMI categories and GDM. PAFs of GDM due to overweight/obesity, were estimated both overall and for Asian women using WHO-recommended Asian-specific BMI cut-offs. Adjusted PAFs (aPAFs) were derived from relative risks, adjusted for maternal socio-demographic characteristics, medical and obstetric history, with 95% confidence intervals estimated using bootstrapping.

Results: One-fifth (20.4%) of women were diagnosed with GDM. aPAFs indicated that 9.3% of GDM cases were attributable to overweight and 16.5% to obesity, corresponding to a combined total of 25.4% of GDM attributable to overweight and obesity. Obesity-attributable fractions varied widely by ethnicity. The largest contribution to GDM was observed among women from Australasia and Oceania, where overweight and obesity accounted for 8.0% and 36.3% of cases, respectively. with a total aPAF of 44.4%. Among Asian women, the total aPAF was higher using Asian-specific BMI cut-offs (21.0%) compared with standard BMI categories (14.7%).

Conclusion: Overweight and obesity account for a substantial proportion of the population burden of GDM in Australia, with marked variation across ethnic groups. Application of ethnicity-specific BMI thresholds revealed a higher obesity impact among Asian women, indicating that standard BMI cut-offs may systematically underestimate risk in some populations. These findings highlight the need for ethnicity-sensitive risk stratification and targeted prevention strategies to improve equity and effectiveness of GDM prevention in multicultural populations.

Residual Maladaptation Score (RMS): A novel risk stratification index for early detection of diabetes and valvular heart disease in hypothyroid patients beyond conventional thyroid markers.

Shabbir A¹, VISHWANATHAN A¹, Sukumaran H¹, S P S¹

¹Tambaram Medical Center, CHENNAI, India

Background:

Hypothyroidism is linked to metabolic and early Structural cardiac changes that routine measures often miss. Conventional markers such as Thyroid profile, Ejection Fractions may appear normal despite ongoing risk. To bridge this gap, we developed the Residual Maladaptation Score (RMS), a composite index that detects subclinical cardiometabolic stress beyond standard thyroid and cardiac parameters.

Methods:

In this study, 277 adults with established hypothyroidism were analyzed. RMS integrates three mechanistic domains: (1) cardiac maladaptation quantified by negative EF prediction residuals derived from multivariable modeling, (2) vascular load using pulse pressure, and (3) thyroid regulatory discordance with TSH–FT4 mismatch. Components were standardized and combined into a continuous score. Associations with diabetes and valvular abnormalities were evaluated using regression adjusted for conventional risk factors. Discriminatory performance was assessed using receiver operating characteristic (ROC) analysis, with internal validation using 5-fold cross-validation and 5,000-sample bootstrap resampling.

Results:

RMS demonstrated superior risk discrimination compared with conventional thyroid and metabolic markers. Mean RMS values were significantly elevated in patients with diabetes (0.14 vs –0.28; $p = 0.001$) and in those with valvular abnormalities (1.04 vs –0.07; $p < 0.001$), while TSH and FT4 showed no significant discriminatory ability. RMS independently predicted diabetes (OR 1.61; $p = 0.002$) and valvular abnormalities (OR 2.48; $p < 0.001$). Model performance showed moderate discrimination for diabetes (AUC 0.66) and good discrimination for valvular disease (AUC 0.75), with consistent cross-validated and bootstrap-corrected results.

Conclusion:

RMS offers a clinically meaningful, early-warning risk signal that enables proactive identification of hypothyroid patients at elevated risk for diabetes and valvular heart disease despite normal conventional markers. Its use can directly stratify earlier diabetes screening, prompt cardiology referral, and intensified cardiovascular surveillance, shifting hypothyroidism management from a reactive, laboratory-focused approach to a preventive, risk-guided clinical strategy with potential to reduce delayed diagnoses and long-term cardiometabolic complications.

Comparison of gut microbiota composition in Type 2 diabetes remission and non-remission (Commuter Study) — A systematic review

Sibarani R¹

¹Diabetes Initiative Indonesia, Bogor, Indonesia

Background & Aim: The purpose of this study was to summarize the existing evidence concerning differences in the gut microbiome composition and diversion between individuals with type 2 diabetes (T2D) who achieve remission and those who do not achieve remission through various interventions.

Methods: The PubMed, Scopus, and Cochrane databases were searched for study articles that compared the gut microbiota composition of pre-T2D or T2D individuals who achieved remission (DR) and nonremission (NDR), in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). The quality of the cohort study was assessed with the Joanna Briggs Institute (JBI) critical appraisal checklist, while the Cochrane Risk of Bias Tool was used for Randomized Controlled Trial (RCT) studies

Results: A total of 7 studies were included, with a total of 303 participants (138 with DR and 165 with NDR). Five studies used bariatric surgery for the main intervention. Most studies showed that the increased abundances of Ruminococcus sp., Firmicutes, and Alistipes sp. in participants achieve diabetic remission, whereas the abundances of Bacteroides, Desulfovibrio, and Escherichia coli increase significantly in participants who do not achieve remission.

Discussion/Conclusion: The gut microbiome composition in individuals who achieved remission shifted compared with that in individuals without remission. These changes were influenced by factors such as the intervention used and the initial microbiome composition. Additionally, meta-analyses are needed to quantify microbiome changes following T2D remission.

Economic impact of a District-wide diabetes case conferencing program from the Australian healthcare system perspective

Simmons D^{1,2}, Wilson S², Matuoka J³

¹Western Sydney University, Sydney, Australia, ²South Western Sydney Local Health District, Campbelltown, Australia, ³Dexcom, San Diego, USA

Aims: Diabetes case conferencing, where an endocrinologist and a general practitioner jointly develop a management plan for a patient with diabetes, improves metabolic and cardiovascular outcomes. The aim of this study was to estimate the economic impact of diabetes case conferencing.

Methods: The incidence and associated costs of micro- and macrovascular complications were compared between diabetes case conferencing (from an existing published case conferencing program without the patient present, lasting 15 minutes) and usual care (UC) using the IQVIA CORE Diabetes Model (CDM) v.10. This model comprises 17 Markov submodels for diabetes complications, using risk factors (e.g. HbA1c, systolic blood pressure) over a lifetime horizon from the Australian healthcare system perspective. Complication risk was calculated using the Fremantle Risk Equation. Only direct medical costs were included based upon Medicare Schedule and published costs inflated to 2024 AUD. Given the short time horizons adopted in the analyses (1 and 3 years), no discount rates were applied. Cohort characteristics were previously published (anonymised) (mean age 64±15 years, 54% male, 8 years diabetes duration; Reductions of HbA1c 1.0%, blood pressure 8.2/2.7 mmHg).

Results: The adoption of the case conferencing program significantly reduced the risk of eye, kidney, peripheral, and cardiovascular complications in one year by 38%, 44%, 20%, and 12%, respectively. That translated into cost savings of A\$24.47, A\$86.11, A\$30.22, and A\$231.23, respectively and total cost savings of A\$303.68/patient/year. A 3-year time horizon was associated with a net saving of A\$1668.58 (i.e. A\$566 per annum). Using 30 minutes slots was associated with a A\$247.78 and A\$537.56 saving over 1 and 3 years.

Conclusion: Substantial cost savings by the Australian healthcare system can be achieved through the metabolic and cardiovascular risk improvements in following diabetes case conferencing consultations. Diabetes case conferencing should be part of business as usual across Australia.

Long-term employment and earnings impacts following diabetes diagnosis: evidence from Australian longitudinal data

Stoneham M¹, Simmons D^{1,2}, Magliano D^{3,4}, Tannous K², Palmer A⁵, Herman W⁷, Hay L⁶

¹Diabetes Australia, Canberra, Australia, ²Western Sydney University, Penrith, Australia, ³Baker Heart and Diabetes Institute, Melbourne, Australia, ⁴Monash University, Melbourne, Australia, ⁵Menzies Institute for Medical Research, University of Tasmania, Hobart, Australia, ⁶New South Wales Ministry of Health, Sydney, Australia, ⁷University of Michigan School of Public Health, Ann Arbor, United States

Aims: The aim of this study was to describe how work participation evolves over the years following diagnosis and the magnitude of earnings losses over time.

Methods: Twenty-three waves of the Household, Income and Labour Dynamics in Australia (HILDA) Survey (2001-2023) were used. Among 34,288 working-age participants (18-67 years) observed across the study period, 719 incident diabetes diagnoses were identified across six diagnosis-year groups spanning 2004 to 2021, with a mean follow-up of 7.7 years post-diagnosis. A Sun-Abraham staggered difference-in-differences estimator was used to compare employment and earnings trajectories before and after diagnosis against a reweighted never-diagnosed comparison group matched on sociodemographic, health behaviour, and pre-diagnosis labour market characteristics. Individual and year fixed effects were included in all analyses with person-clustered standard errors.

Results: Pre-diagnosis employment trends were not statistically different between groups ($p=0.40$). Employment probability showed no significant change at the time of diagnosis (-0.6% (95% CI: -2.8 to $+1.6$)). However, employment declined progressively thereafter. Medium-term reductions (years 3-5 post-diagnosis) averaged -3.3% (95% CI: -5.4 to -1.2), and long-term reductions (years 6-10) averaged -4.0% (95% CI: -6.2 to -1.8). Labour force earnings followed a similar trajectory, with a full post-diagnosis average reduction of -9.3% (95% CI: -15.8 to -2.2). Results were robust across alternative timing assumptions and weighting specifications.

Conclusion: Work participation disparities associated with diabetes diagnosis accumulate progressively following diagnosis, with employment and earnings impacts emerging in the medium term and deepening over the long term. These findings extend prior Australian evidence by documenting the temporal trajectory of workforce participation change after incident diagnosis. Awareness of this impact contributes to a more complete understanding of the total burden of diabetes, and to the case for better designing health, workplace, and social support programs to help people living with diabetes remain engaged in the workforce.

Determinants of prediabetes and diabetes among Indonesian employees: A cross-sectional analysis using medical check-up and body composition data

Susana S¹, Kartawidjaja Putra F¹, Dijaya Muliadi R¹, Antono L¹, Roulina P², Eryando T²
¹Nutrifood Indonesia, Jakarta Timur, Indonesia, ²Universitas Indonesia, Depok, Indonesia

Background & Aim:

The global prevalence of prediabetes and diabetes is increasing and constitutes a significant public health burden due to associated long term health complications, including in Indonesia. According to the IDF Diabetes Atlas 11th edition (2024), Indonesia has an estimated 20.4 million individuals (20-79 years) with diabetes, in addition to approximately 14.2 million individuals with impaired fasting glucose and 29.8 million individuals with impaired glucose tolerance.

As employees spend a significant proportion of their daily time in the office, workplace plays an important role in implementing health initiatives to prevent metabolic diseases including (pre)diabetes. Understanding the risk factors that contribute to metabolic risk will be beneficial to develop more targeted and effective health interventions. However, data related to diabetes risk factors among Indonesian workers is scarce. Therefore, this study aimed to evaluate determinants of pre(diabetes) among employees in a company in Indonesia using medical check up (MCU) and body composition data in 2024.

Methods:

A cross-sectional analysis was conducted using data from 1,443 employees of Nutrifood Indonesia who completed both MCU and body composition assessments. The dataset included demographic characteristics, also body composition and clinical measures. Statistical analysis was performed using IBM SPSS Statistics (ver25), and logistic regression was applied to identify variables independently associated with prediabetes and diabetes.

Results:

We found total prevalence of prediabetes and diabetes was 17.8%. Age demonstrated a strong association with diabetes risk, with workers aged 40–49 years and ≥50 years having 2.5-fold and 3.2-fold higher risks of developing (pre)diabetes, respectively. Male employees were also at elevated risk (AOR: 1.86). Moreover, individuals with the lowest muscle mass and higher waist-to-hip ratio had 2.3-fold and 1.5-fold higher risks of presenting with pre(diabetes).

Discussion & conclusion:

These findings indicated the importance of developing workplace-based interventions that aim to increase participation among male employees, improve muscle mass, and reduce excess body fat.

Psychosocial metrics are associated with the risk of hospitalisation for cardiovascular disease in people with type 2 diabetes, an analysis based on PREDICT study

Tabesh M^{1,2}, Sacre J¹, Magliano D^{1,3}, Shaw J^{1,2,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²Baker Department of Cardiovascular Research, Translation and Implementation, La Trobe University, Melbourne, Australia, ³School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

Aim

To quantify the association of several psychosocial metrics with cardiovascular disease (CVD) related hospitalisation in people with type 2 diabetes mellitus (T2DM).

Methods

This is an analysis of PROgrESSION of DIabetic ComplicaTions (PREDICT) cohort – a longitudinal study of people with T2DM in Victoria, Australia – linked to Victorian hospital data.

The psychosocial metrics were obtained via questionnaires and included measures of quality of life, illness perception, depressive symptoms, anxiety, confidence in self-care, diabetes distress and social support (listed in Figure).

We utilised Cox regression models adjusted for age, sex, diabetes duration, prior history of CVD, study site, HbA1c, albuminuria, LDL cholesterol. The outcome was the first CVD hospitalisation.

Results

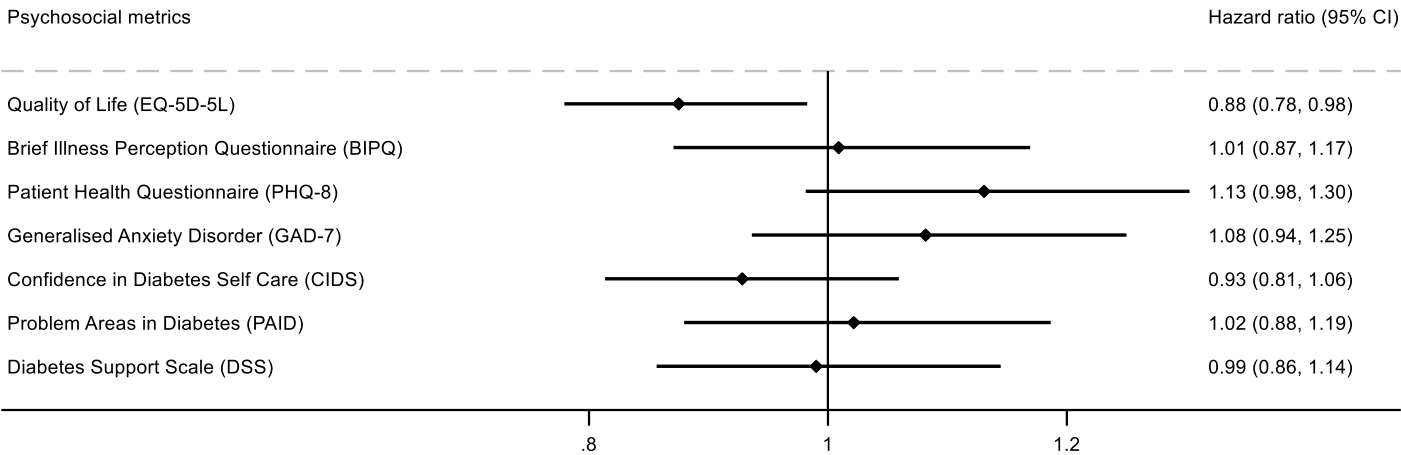
This analysis comprised 1,785 participants (mean age at baseline: 64 ± 10 years; 63.9% male; median diabetes duration: 10 (4–18) years; 23% with prior CVD; median follow-up time: 2.6 years), corresponding to 5,323 person-years risk time and 206 events with an event rate of 38.7 per 1000 person-years.

Figure shows that among the psychosocial metrics analysed, worse quality of life (EQ-5D-5L; HR 0.85 (95% CI 0.76–0.95)) was independently associated with an increased risk of CVD hospitalisation. No associations were observed for other metrics.

Conclusion

Among the psychosocial factors relevant to T2DM, lower quality of life is linked to a higher risk of hospitalisation for CVD. This emphasises the importance of assessments and interventions not only to improve the quality of life in people with T2DM, but potentially to lower burden of hospitalisation.

Figure. Hazard ratios obtained from Cox proportional hazard models illustrating how psychosocial markers are associated with the risk of hospitalisation for cardiovascular diseases. To facilitate comparisons, all metrics were standardised and hazard ratios are per one-standard-deviation of the distribution of each metric in this population.



A cross-sectional study of insulin resistance using estimated glucose disposal rate and lipid based measures among adults with Type 2 Diabetes in Malaysian primary care

Tai C¹, Zahari N¹, Mohd Sofi M¹, Abdullah N¹

¹Ministry Of Health Malaysia, Johor Bharu, Malaysia

Aims:

Insulin resistance (IR) is a central feature of type 2 diabetes mellitus (T2DM), yet its assessment in primary care remains challenging. This study aimed to evaluate the prevalence and clinical correlates of IR using two surrogate indices, the estimated Glucose Disposal Rate (eGDR) and triglyceride to HDL cholesterol (TG/HDL-C) ratio among adults living with T2DM in Malaysia.

Methods:

A cross-sectional analysis was conducted among 569 adults with T2DM attending a primary healthcare clinic in Johor, Malaysia. eGDR was calculated using waist circumference, hypertension status, and HbA1c, while the TG/HDL-C ratio was derived from fasting lipid profiles. The study determined the proportion of individuals with IR based on established cut-offs (eGDR less than 8 mg/kg/min and TG/HDL-C greater than 1.1), examined associations with clinical variables including body mass index (BMI), HbA1c, insulin dose, systolic blood pressure (SBP), kidney function, and assessed the diagnostic agreement between the two indices.

Results:

Using the conventional eGDR cut-off, 95.8 percent of participants were classified as insulin resistant, compared with 46.4 percent identified using the TG/HDL-C ratio, which aligned more closely with local HOMA-IR data. Multivariate analysis revealed that lower eGDR was independently associated with higher HbA1c, BMI, SBP, older age, reduced kidney function, and the presence of diabetes related foot ulcer. Subgroup analysis showed that metabolic and renal parameters were key IR predictors among individuals treated with oral glucose lowering drugs only, while insulin dose and treatment related factors dominated in advanced disease. Agreement between eGDR and TG/HDL-C ratio was minimal (Kappa = 0.014), indicating poor concordance.

Conclusion:

Conventional eGDR thresholds appear unsuitable for people living with T2DM in Malaysia, as they lead to substantial over classification of IR. The findings emphasise the need for population specific recalibration, and the clinical predictors identified here may support improved risk stratification and management in primary care.

Progression and associated factors of Dysglycemia: A two-year preliminary follow-up study of women with abnormal postpartum OGTT

Tantasuwan S¹, Parattanawong P¹, Preechasuk L¹, Wannachalee T², Sriwijitkamol A^{1,2}

¹Siriraj Diabetes Center Of Excellence, Faculty of Medicine, Siriraj Hospital Mahidol University, Bangkok, Thailand, ²Division of Endocrinology and Metabolism, Department of Medicine, Faculty of Medicine, Siriraj Hospital Mahidol University, Bangkok, Thailand

Aim/s: To investigate the progression to diabetes and the persistence of dysglycemia among women with previous gestational diabetes (GDM) in Thailand who exhibited glucose intolerance at 4-12 weeks postpartum and participated in a postpartum diabetes screening and education program.

Methods: This preliminary prospective study followed 70 women with previous GDM who exhibited glucose intolerance (determined by a 75-g OGTT) at 4-12 weeks postpartum. Clinical characteristics and laboratory parameters were assessed from pre-pregnancy through a mean follow-up of 2.3 years. Insulin sensitivity and beta-cell function were evaluated using Matsuda index, HOMA-IR, and HOMA2-%B derived from a 75-OGTT.

Results: Sixty-four women (91.4%) completed the study (mean follow-up 2.3±0.7 years); 6 were excluded due to loss to follow-up (n=3), withdrawal (n=1), and new pregnancy (n=2). Among the 64 participants, the prevalence of overt diabetes, persistent prediabetes, and reversion to normoglycemia was 25.0%, 34.4%, and 40.6% respectively. For associated factor analysis, participants were categorized into two groups: persistent dysglycemia (n=38) and normoglycemia reversion (n=26). The mean age in dysglycemia and normoglycemia groups was 37.1±4.7 years and 39.8±3.5 years respectively ($p=0.016$). Compared to the normoglycemia group, women with persistent dysglycemia had a significantly higher: pre-pregnancy BMI (25.3±5.6 vs. 21.8±3.7 kg/m², $p=0.004$), bodyweight at follow-up (66.3±16.4 vs. 56.2±9.8 kg, $p=0.003$), BMI at follow-up (26.5±6.9 vs. 22.5±3.8 kg/m², $p=0.004$), and body fat percentage (36.9±9.5% vs. 30.2±7.1%, $p=0.003$). Regarding insulin indices, the persistent dysglycemia group had a significantly lower Matsuda index [2.9 (1.8, 5.1) vs. 5.0 (3.0, 8.2), $p=0.004$] and higher HOMA-IR [2.9 (1.2, 5.4) vs. 1.9 (1.0, 2.8), $p=0.054$]. No significant differences were found in exercise levels or breastfeeding duration.

Conclusion: Nearly 60% of women with early postpartum glucose intolerance remain dysglycemic or progress to diabetes within two years. High pre-pregnancy BMI and persistent adiposity are major predictors of non-reversion, driven primarily by reduced insulin sensitivity as shown by the Matsuda index. Notably younger age was associated with persistent dysglycemia, suggesting that intensive weight management is crucial during early postpartum period to prevent long-term type 2 diabetes.

Evolving patterns in the use of glycaemic variability measures in diabetes studies

Templer S^{1,2}, Twigg S^{1,2}

¹University of Sydney, Sydney, Australia, ²Royal Prince Alfred Hospital, Sydney, Australia

Aims: Ever since it has been possible to measure glucose levels, an increasing number of methods to quantitate glycaemic variability (GV) have been developed. We aimed to examine trends in the reporting of GV metrics in research abstracts.

Methods: PubMed was searched from 1 January 1975 to 31 December 2025 using the names of 12 specific measures of GV as search terms: ‘coefficient of variation (CV)’, ‘standard deviation (SD)’, ‘mean amplitude of glycaemic excursion (MAGE)’, ‘mean of daily differences’, ‘continuous overall net glycaemic action’, ‘M-value’, ‘J-index’, ‘high and low blood glucose indices’, ‘average daily risk range’, ‘mean absolute glucose change’, and ‘lability index’. ‘Glucose’ and/or ‘variability’ were used as qualifiers for common phrases such as SD. Of 2,694 identified publications, we screened titles and abstracts for relevance. Animal studies, reviews, commentaries, and references to long-term GV were excluded.

Results: The number of PubMed-indexed abstracts mentioning the most common GV measures is plotted per year, with logarithmic transformation, in Figure 1. Most were in populations with diabetes. Overall, there has been a large increase in abstracts mentioning any measure of GV, from 1 abstract in 1975 to 362 in 2025. Until the early 2000s, M-value and MAGE were the dominating metrics, while CV has been the most reported metric each year since 2019. One-third of abstracts reported multiple GV measures, mainly CV and SD, followed by SD and MAGE.

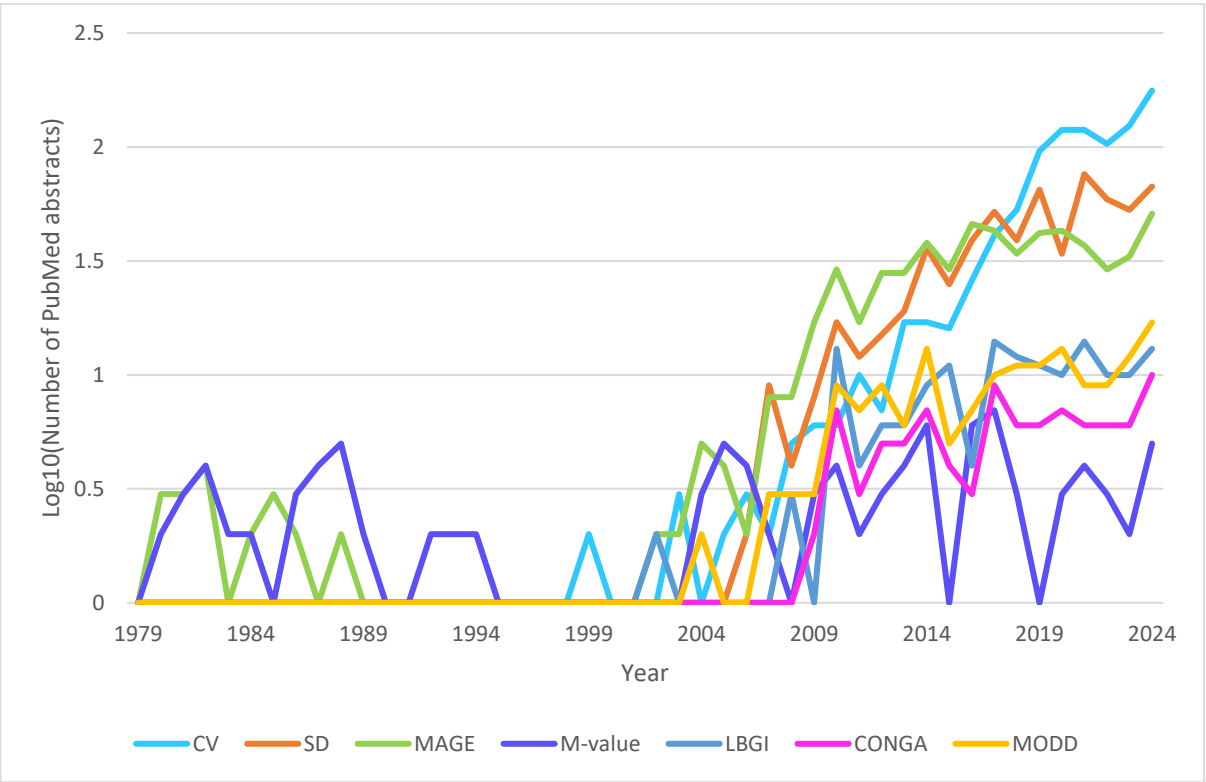


Figure 1

Conclusion: Total publications reporting GV metrics have increased orders of magnitude over the past 50 years, with clear secular trends in preferred metrics type. CV has emerged in recent years as the most commonly reported measure, reflecting changes in glucose monitoring technology and consensus guidelines. The variety of GV metrics used in contemporary studies suggests some debate about optimal GV measures and potential complementarity of multiple GV measures within studies.

Ethnic differences in prediabetes and diabetes management: A systematic review and meta-analysis

Thadani J¹, Okembunachi C¹, Ngozika E², Osuagwu U²

¹Western Sydney University, Campbelltown, Australia, ²Bathurst Rural Clinical School, Western Sydney University, Bathurst, Australia

Aim

To systematically evaluate ethnic differences in the management of diabetes and prediabetes among adults

Methods

This systematic review was conducted in accordance with PRISMA guidelines. PubMed MEDLINE Embase, Scopus, PsycINFO and Web of Science were searched for studies published between January 2014 and December 2024. Eligible studies included observational studies that reported ethnicity-stratified data on management of type 1 diabetes (T1D), type 2 diabetes (T2D) or prediabetes among adults (≥18 years). Management outcomes included glycaemic monitoring, HbA1c testing, blood glucose self-testing, lipid and kidney function screening, blood pressure assessment, pharmacological therapy, treatment intensification, lifestyle interventions such as diet and exercise monitoring and general access to healthcare. Two reviewers independently screened records extracted data and assessed the quality score of the articles using the Joanna Briggs Institute tool.

Results

A total of 2,206 studies were identified, 84 met inclusion criteria. 48 studies examined T2D, 5 examined T1D, 30 included both T1D and T2D, and 1 study specifically examined prediabetes. Pharmacological management was evaluated in 57% of studies (n=48), non-pharmacological approaches in 38% (n=32), and both strategies in 8% (n=7). Across studies reporting clinical outcomes, minority populations were more likely to have higher HbA1c levels at diagnosis and follow-up. First Nations Peoples, South Asian and Middle Eastern populations were less likely to receive recommended HbA1c monitoring, lipid and kidney function screening, and timely treatment intensification compared with people of European background. Disparities were also observed in medication initiation and preventive care delivery.

Conclusion

Despite universal healthcare coverage, clinically meaningful ethnic disparities in diabetes and prediabetes management persist. Inequities in monitoring and treatment intensification are evident across multiple populations. Standardized ethnicity reporting and culturally responsive system-level interventions are required to achieve equitable diabetes care.

HbA1c and risk of major adverse cardiovascular events in Type 2 diabetes: A real-world community hospital cohort from Thailand

Tippimanporn J¹

¹Department of Internal Medicine, Phon Thong Hospital, Phon Thong, Thailand

Aim

Cardiovascular disease remains the leading cause of morbidity and mortality among people with type 2 diabetes. Evidence linking glycemic control to major adverse cardiovascular events (MACE) in real-world community hospital settings remains limited. This study aimed to evaluate the association between HbA1c levels and MACE among patients with type 2 diabetes in a community hospital in Thailand.

Methods

A retrospective cohort study was conducted using electronic medical records of patients with type 2 diabetes attending the chronic disease clinic at Phon Thong Hospital, Roi Et Province, Thailand between 1 January 2023 and 31 December 2025. The primary outcome was MACE, defined as myocardial infarction, stroke, hospitalization for heart failure and cardiovascular death. Associations between HbA1c levels and MACE were analyzed using univariable and multivariable logistic regression analyses.

Results

A total of 572 patients were included, with a mean age of 65.5 ± 8.9 years; 71% were female. The mean HbA1c level was $9.29 \pm 2.04\%$. The proportion of MACE increased significantly across higher HbA1c categories (p for trend = 0.008). In multivariable analysis, each 1% increase in HbA1c was associated with a higher risk of MACE (adjusted OR 1.23; 95% CI 1.07–1.40; $p = 0.003$). Male sex and higher LDL-cholesterol levels were independently associated with increased MACE risk, while metformin use was associated with reduced risk.

Conclusion

Higher HbA1c levels were significantly associated with increased risk of major adverse cardiovascular events among patients with type 2 diabetes in a real-world community hospital setting. These findings highlight the importance of sustained glycemic control alongside comprehensive cardiovascular risk management and may inform practical NCD risk stratification approaches in resource-limited healthcare settings.

Work participation among Australians with diagnosed type 2 diabetes: evidence from a nationally representative cohort study

Tomic D¹, Walker-Bone K¹, Magliano D^{1,2}

¹Monash University, Melbourne, Australia, ²Baker Heart and Diabetes Institute, Melbourne, Australia

Aim: To examine disparities in work participation among Australians living with type 2 diabetes, and to assess whether employment outcomes differ by disease timing.

Methods: We analysed data from adults aged ≥ 18 years in the nationally representative Household, Income and Labour Dynamics in Australia (HILDA) Survey, cross-sectionally in 2017 with longitudinal follow-up to 2021. Type 2 diabetes was self-reported. Outcomes included labour force participation, unemployment, part-time work, supervisory roles, working from home, paid sick leave, and non-standard work schedules. Associations were estimated using Poisson regression to derive prevalence ratios (PR) and incidence rate ratios (IRR), accounting for survey weights, adjusted for factors including age, sex, education, socioeconomic disadvantage, body mass index, and occupation.

Results: In 2017, the weighted prevalence of type 2 diabetes was 5.6% among 16,818 HILDA Survey participants. Compared to those without diabetes, adults with type 2 diabetes were more likely to be outside the labour force (PR 1.24, 95% CI 1.14–1.35), unemployed (PR 2.38, 95% CI 1.35–4.18), or working part-time (PR 1.26, 95% CI 1.05–1.53), and less likely to hold supervisory roles (PR 0.80, 95% CI 0.67–0.97) or work from home (PR 0.70, 95% CI 0.53–0.93). Longitudinally, participants with incident type 2 diabetes were more likely to commence new episodes of paid sick leave (IRR 1.91, 95% CI 1.14–3.20) and non-standard work schedules (IRR 2.41, 95% CI 1.21–4.82) compared to those without diabetes. No changes in work participation were observed among participants with prevalent type 2 diabetes.

Conclusion: Type 2 diabetes is associated with meaningful inequities in work participation in Australia. The period following diagnosis may represent a critical window for changes in employment or work arrangements, highlighting the importance of early workplace support to promote equitable and sustainable labour force participation for people living with type 2 diabetes.

Financial barriers to continuous glucose monitoring among Australians with type 2 diabetes: Who would benefit from subsidised access?

Al Jinabi N¹, Trawley S¹

¹The Cairnmillar Institute, Melbourne, Australia

Aims: This study examined the extent to which financial constraints limit continuous glucose monitoring (CGM) access among Australian adults with type 2 diabetes (T2D), and the proportion who would be eligible for subsidised CGM under proposed Parliamentary recommendations (Recommendation 15).

Methods: A cross-sectional online survey was conducted with 839 Australian adults with T2D. Participants reported their current glucose monitoring method, diabetes management (including insulin use), and financial barriers to CGM access.

Results: Of 839 participants with T2D, only 150 (17.9%) were currently using CGM. Among CGM users, over half (82; 54.7%) were using insulin. Of the 689 (82.1%) not using CGM, 442 (64.3%) reported being unable to afford it. Among those unable to afford CGM, only 85 (19.2%) were using insulin and would therefore qualify for subsidised access under the proposed Parliamentary recommendations. The remaining 357 (80.8%) who reported financial barriers would not be eligible despite reporting an inability to afford CGM.

Conclusion: Financial constraints represent a substantial barrier to CGM access for Australians with T2D, with nearly two-thirds of non-CGM users reporting an inability to afford it. While expanding subsidised CGM access to people with insulin-treated T2D is an important step, these findings suggest that Recommendation 15 would address the needs of fewer than one in five of those experiencing financial barriers. Given emerging evidence that CGM improves glycaemic outcomes in people with non-insulin-treated T2D (Ferreira et al., 2024; Aronson et al., 2025), broader subsidy eligibility criteria warrant consideration to promote equitable CGM access for all Australians with T2D.

Emotional health screening practices and perceived barriers among Australian health professionals in Type 1 Diabetes care

Zeltsman A¹, McAuley S², Trawley S¹

¹The Cairnmillar Institute, Melbourne, Australia, ²School of Public Health and Preventive Medicine, Monash University, Monash University, Australia

Aims: Despite guideline recommendations for routine emotional health monitoring in people with Type 1 diabetes (T1D), recent evidence suggests screening for depression, diabetes distress and anxiety is inadequate in Australian diabetes care settings. This study examined current emotional health screening practices, perceived barriers and facilitators to screening among Australian health professionals (HPs) supporting people with T1D.

Methods: A cross-sectional online survey was developed to capture quantitative and qualitative data from Australian HPs across the T1D care team. A convenience sample was recruited via personalised email invitations sent to 788 clinics and HPs identified through professional directories, supplemented by professional networks. The survey assessed frequency of asking about and screening for depressive symptoms, diabetes distress and anxiety symptoms using validated patient-reported outcome measures (PROMs), perceived barriers to screening, and facilitators that would support implementation.

Results: The final sample comprised 42 HPs, predominantly female (60%), endocrinologists (51%) and based in Victoria (60%). While half of respondents reported regularly asking people with T1D about diabetes distress, less than one-third regularly asked about depressive or anxiety symptoms. Screening using validated PROMs was less common, with over half reporting never using PROMs for depressive symptoms (60%), diabetes distress (52%) or anxiety symptoms (60%). Among those who never screen, primary barriers were lack of time ($\geq 80\%$), limited referral options ($>45\%$) and uncertainty in managing results ($>41\%$). Key facilitators included optimising screening processes (63%), increasing knowledge around managing results and referrals (32%) and improving access to mental health pathways (16%).

Conclusion: Despite recognising the importance of emotional wellbeing in diabetes care, routine screening using validated tools remains uncommon among Australian HPs in T1D care. Addressing identified barriers through streamlined screening processes, professional education and improved mental health referral pathways may enhance emotional health screening and ultimately improve outcomes for people living with T1D.

Healthcare access and equity emerge as dominant research priorities among Australians with diabetes: findings from the HEARD national survey

Trawley S¹, Stephens A², Wilson C¹, Brinkworth G³

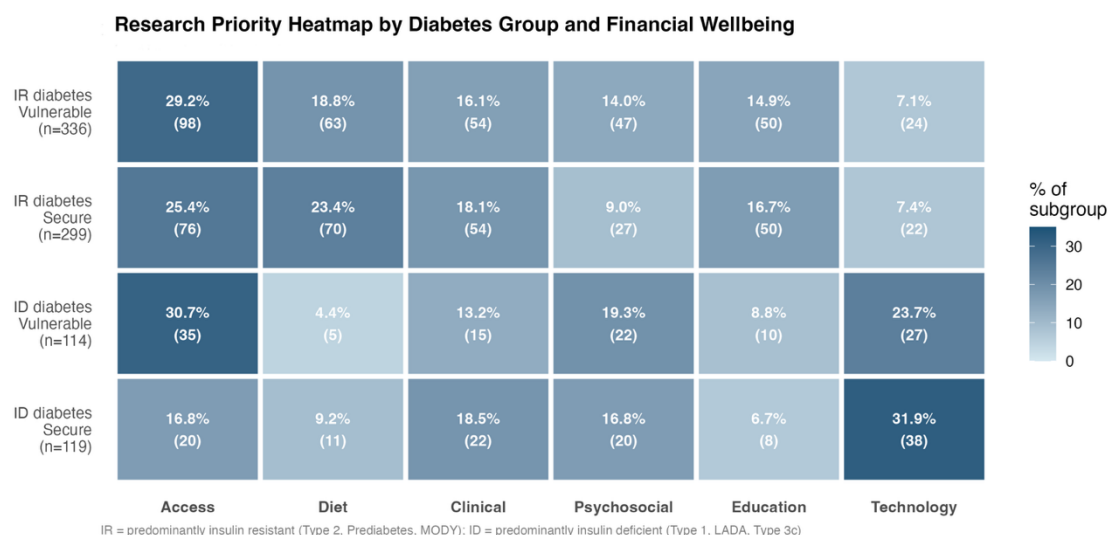
¹The Cairnmillar Institute, Melbourne, Australia, ²Monash University, Faculty of Medicine, Nursing and Health Sciences, Melbourne, Australia, ³Diabetes Australia, Glebe, Australia

Aim To identify research priorities of people with lived experience of diabetes stratified by diabetes pathophysiology and financial wellbeing status.

Methods 981 Australian adults (aged 18+ years) with self-reported diabetes (Type 2 = 719; Type 1 = 234; LADA = 17; other = 11) provided an open-text response on research priorities for people living with diabetes. Excluding 104 non-substantive responses (10.6%), inductive thematic analysis identified themes, stratified by diabetes pathophysiology (predominantly insulin resistant [IR; Type 2] vs predominantly insulin deficient [ID; Type 1 and LADA]) and financial wellbeing status.

Results In rank order, the six research priority themes identified were: Healthcare Access, Affordability and Equity (26.3%), Diet, Nutrition and Lifestyle Strategy (17.1%), Clinical Management and Pharmacotherapy (16.6%), Psychosocial Wellbeing and Daily Living (13.6%), Education, Information and Health Literacy (13.5%), and Technological Integration and Innovation (12.7%). Within the Access theme, affordability of diabetes technology was the leading concern (46.8%). Priority patterns varied by diabetes pathophysiology and financial wellbeing (Figure 1). Healthcare Access was the dominant priority for both IR and ID participants reporting financial vulnerability. For financially secure ID participants, Technological Integration and Innovation was the leading priority (31.9%).

Conclusion Healthcare access, affordability, and equity emerged as the dominant research priority for Australian adults with diabetes. Financial security enabled participants with insulin-deficient diabetes to prioritise technology, while access concerns persisted for those with insulin-resistant diabetes regardless of financial position. These findings can inform research funding investment to align with community priorities.



Cardiometabolic risk profile in patients with diabetes in primary care on the Gold Coast: A regional cross-sectional analysis

Triay J¹, Sveticic J², Mirtalaie M², Ibbotson B², Ross A²

¹Gold Coast Hospital And Health Services, Gold Coast, Australia, ²Primary Health Network Gold Coast, Gold Coast, Australia

Aim:

To describe glycaemic control and cardiometabolic risk profiles in patients with diabetes managed in Primary Care centres using the Primary Sense data from the Gold Coast region.

Methods:

We performed a cross-sectional descriptive analysis of de-identified electronic health record data extracted using the Primary Sense tool from 170 general practices in the Gold Coast Primary Health Network. Patients with a coded diagnosis of diabetes and at least one clinical encounter within the preceding six months were included. Outcomes examined included parameters measured within 6 months for HbA1c, blood pressure and cholesterol levels; and last measured body mass index (BMI), smoking status. Prescribed medications were reviewed.

Results:

A total of 37,909 patients with diabetes were identified, representing 3.2% of active primary care patients. Mean HbA1c was 7.1%, with 43.1% of patients recording HbA1c $\geq 7\%$ (21.6% missing data). Systolic blood pressure was 130-139 mmHg in 23.5%, and >140 mmHg in 28.7% of patients, with missing data in over one-third. Total cholesterol was within recommended targets (≤ 4.0 mmol/L) in 47.1% of patients (mean 4.31 mmol/L; 39% missing data). Overweight and obesity were highly prevalent, affecting 28.1% and 39.6% of patients respectively. Current smoking was documented in 11.2% of patients with recorded smoking status (23.1% unrecorded). Metformin was prescribed in 70% of patients. Cardiometabolic pharmacotherapy was common, including lipid-lowering agents (72%), ACE inhibitors or angiotensin receptor blockers (64%), SGLT2 inhibitors (31%) and GLP-1 receptor agonists (33%).

Conclusion:

A substantial proportion of patients with diabetes managed in primary care demonstrate suboptimal glycaemic control and high burden of cardiometabolic risk factors. These findings highlight opportunities to strengthen risk factor optimisation and integrated models of diabetes care across primary and specialist services to improve regional diabetes outcomes.

Risk factors affecting glycaemic control among individuals with Type 2 Diabetes Mellitus: A cross-sectional study in Pakistan

Uddin F¹, Ayub Khan R¹, Iqbal Hydrie M¹, Adil S¹

¹Dow University Of Health Sciences, Karachi , Pakistan

Introduction

Poor glycaemic control in type 2 diabetes mellitus (T2DM) remains a major clinical challenge, especially in low- and middle-income settings where disease burden is high and management is often suboptimal. Glycaemic outcomes are influenced by multiple demographic, clinical, and behavioural factors rather than pharmacological treatment alone. However, limited evidence from Pakistan has examined the comprehensive risk factors affecting glycaemic control. Therefore, this study aimed to identify the risk factors associated with poor glycaemic control among individuals with T2DM,

Method:

A cross-sectional study was conducted among 377 adults diagnosed with T2DM recruited from three diabetic clinics in Karachi, Pakistan. Glycaemic control was measured using HbA1c levels, and potential risk factors were assessed through structured data collection, including demographic variables, clinical characteristics and lifestyle factors. Data were analysed using SPSS version 29. Bivariate analysis followed by stepwise multivariable logistic regression, including backward logistic regression, was performed to identify independent risk factors associated with poor glycaemic control.

Results:

Poor glycaemic control was observed in 72.9% of participants. Significant risk factors included age above 44 years (aOR: 4.15, 95% CI: 1.81–7.50), obesity (aOR: 3.99, 95% CI: 2.13–5.50), T2DM duration exceeding 10 years (aOR: 3.95, 95% CI: 1.05–8.30), and the presence of diabetes-related complications (aOR: 2.09, 95% CI: 1.04–4.19). Behavioural and lifestyle factors were also identified, as non-smokers had lower odds of poor glycaemic control (aOR: 0.19, 95% CI: 0.06–0.60), while poor sleep quality was significantly associated with higher odds of poor glycaemic control (aOR: 3.46, 95% CI: 1.75–6.85).

Conclusion:

Poor glycaemic control in T2DM is influenced by multiple interrelated risk factors, including older age, obesity, longer disease duration, diabetes-related complications, smoking status, and poor sleep quality.

Keywords: Type 2 diabetes mellitus, Glycaemic control, Risk factors

Prevalence of cardiovascular disease, diabetes and kidney disease in Australian Primary Care: baseline analysis of the Future Health Today Implementation Trial

Wallace H^{1,2,3}, Preston C^{1,3}, Druce T^{1,4}, Hunter B³, Lumsden N¹, Wang Q¹, Jun M^{2,5}, Kevat D^{1,3}, Nelson C^{1,3}

¹Western Health, St Albans, Australia, ²The George Institute for Global Health, Sydney, Australia ,

³Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne , Australia,

⁴School of Nursing & Midwifery, Centre for Quality & Patient Safety Research in the Institute for Health Transformation Deakin University, Geelong, Australia , ⁵Faculty of Medicine and Health, UNSW, Sydney, Australia

Aim: Cardio-kidney-metabolic (CKM) conditions are associated with significant morbidity and mortality. This study aimed to report the prevalence of established CKM conditions in primary care using baseline data from the Future Health Today (FHT) implementation trial. FHT is a clinical decision support and quality improvement software to aid testing, diagnosis and management of cardiovascular disease, diabetes and chronic kidney disease.

Methods: FHT is being implemented in primary care practices in Melbourne, Australia. We assessed the baseline characteristics on 1 August 2024 of adults (≥ 18 years) who had attended one of the 19 participating general practices in the prior 24 months. Age-standardised prevalence of one or more established CKM condition (cardiovascular disease, diabetes and/or chronic kidney disease [CKD]) and at-risk conditions (prediabetes, hypertension, possible CKD, elevated BMI and hypertriglyceridemia) was calculated using the 2021 Australian census data. Medication prescription including statin, ACE inhibitor or ARB and SGLT2 inhibitors were assessed.

Results: 135,054 adults with mean age 44.7 years (SD 17.0) were included. The age-standardised prevalence of one or more established CKM condition was 14.8% (95% CI 14.5-15.0), and an at-risk condition was 28.8% (95% CI 28.5-29.1). In patients with established CKM 44.4% were receiving a statin, 43.6% an ACE inhibitor or ARB and 14.6% an SGLT2 inhibitor. Established CKM was associated with increasing age and lower socioeconomic status and was disproportionate across certain ethnic groups including First Nations Australians.

Conclusion: There is a high burden of CKM conditions with increased risk in patients from First Nations, culturally diverse and lower socioeconomic backgrounds. These findings highlight the urgent need to continue to address primary and preventative population healthcare and improve the implementation of guideline directed medical therapy in primary care.

Type 1 Diabetes in the Western Pacific region: T1D index estimates

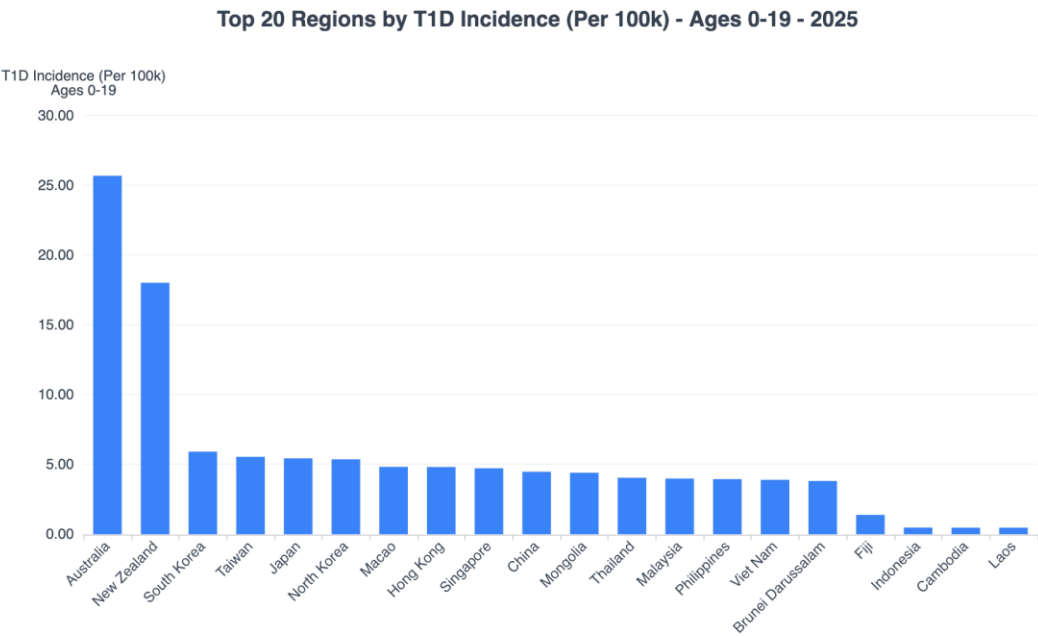
Wang F, Scibilia R
¹Breakthrough T1d, Sydney, Australia

Aims:
To quantify the scope of type 1 diabetes (T1D) in the Western Pacific Region (WPR) in 2025 using the T1D Index, and to describe regional and country-level variation in prevalence and incidence among children and adolescents.

Methods:
We applied the T1D Index Version 3.0, a validated Markov-based modelling framework, to generate 2025 estimates for 33 countries and territories in the Western Pacific Region, integrating population structure, age-specific incidence, prevalence, mortality, and diagnosis rates, with regional extrapolation where direct data were unavailable.

Results:
In 2025, an estimated 1.0 million people are living with T1D in the Western Pacific Region, accounting for approximately 11% of the global T1D population (9.5 million across 202 countries). Among those aged 0–19 years, the highest incidence per 100,000 population was observed in Australia (26) and New Zealand (18), followed by Republic of Korea (6), Taiwan (6), and Japan (5). Australia also had the highest regional prevalence (224 per 100,000), followed by New Zealand (187 per 100,000), while China had the largest absolute number of prevalent cases (~120,000), followed by Australia (~14,000).

Conclusion:
The WPR bears a substantial and heterogeneous T1D profile, with marked contrasts between high-incidence, high-prevalence countries and populous settings with lower rates but large absolute case numbers. These findings underscore the need for region-specific surveillance, improved data coverage, and tailored health system planning in the Western Pacific.



What is this thing called food security?

Ward R¹

¹Wsqa Advisory, Newcastle, Australia

Aim: Food security is a hot topic globally, yet each sector defines food security differently. For people with diabetes, food and beverages can be portrayed as a modifiable risk factor or a treatment strategy, sometimes both.

So what is food security? Who is responsible, what does success look like and what actions are necessary for individuals and communities to be food secure?

This study aims to develop a stakeholder engagement database to capture public understanding of the roles of agriculture, health and food manufacturing sectors in shaping food security.

Method: In Australia, submissions to sequential Federal Inquiries into Food Security (2022 – led by Agriculture), Diabetes (2023 - Health) and Food and Beverage Manufacturing (2024 - Industry) were coded by stakeholder group and analysed to reveal stakeholder composition and engagement across Inquiries.

At IDF-WPA, registrants will have the opportunity to participate in a live survey about what food security means to them.

Results: By reviewing the authorship of submissions, it was possible to track stakeholder interest across Inquiries and identify gaps in engagement. Results will be discussed in context of the FAO definition of food security.

Individuals, for example, contributed 63% of the 473 submissions to the Diabetes Inquiry, indicating strong public engagement when National conversations directly affect personal health and wellbeing. In contrast, individual submissions accounted for less than 20% of contributions to the Food Security Inquiry and less than 10% to the Food and Beverage Manufacturing Inquiry. This suggests reduced community engagement with upstream determinants of food-related health outcomes compared with downstream health impacts.

Conclusion: Mapping stakeholder engagement with the food system across agriculture, health and manufacturing provides a novel systems-based approach to inform and align cross-sector food security policy.

Factors predicting foot disease-related hospitalisation in community dwelling people with and without diabetes

Weerasuriya S^{1,2}, Cramb S^{1,2,3}, Zhang Y^{1,4}, McPhail S^{1,5}, Golledge J^{6,7}, van Netten J^{1,8}, Menz H⁹, Fernando M^{6,10}, Fugelli P¹¹, Jensen S¹², Lazzarini P^{1,13}

¹Australian Centre for Health Services Innovation and Centre for Healthcare Transformation, School of Public Health and Social Work, Queensland University of Technology, Brisbane, Australia, ²Centre for Data Science, Queensland University of Technology, Brisbane, Australia, ³Jamieson Trauma Institute, Metro North Health, Royal Brisbane and Women's Hospital, Herston, Australia, ⁴Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Sweden, ⁵Clinical Informatics Division, Metro South Health Hospital and Health Service, Brisbane, Australia, ⁶Queensland Research Centre for Peripheral Vascular Disease, College of Medicine and Dentistry, James Cook University, Townsville, Australia, ⁷Department of Vascular and Endovascular Surgery, Townsville University Hospital, Townsville, Australia, ⁸Amsterdam UMC, University of Amsterdam, Department of Rehabilitation Medicine, Amsterdam Movement Sciences, Amsterdam, The Netherlands, ⁹School of Allied Health, Human Services and Sport, La Trobe University, Australia, ¹⁰Department of Vascular and Endovascular Surgery, Westmead Hospital, Western Sydney Local Health district, Australia, ¹¹Healthcare Analytics Team, Systems Performance Branch, Department of Health, Brisbane, Australia, ¹²Department of Podiatry, The Prince Charles Hospital, Metro North Hospital and Health Service, Brisbane, Australia, ¹³Allied Health Research Collaborative, The Prince Charles Hospital, Metro North Hospital and Health Service, Brisbane, Australia

Aim

No study to our knowledge has investigated factors predicting foot disease-related hospitalisations among a community-dwelling population with and without diabetes. We investigated factors predicting foot disease-related hospitalisation among community-dwelling adults presenting with foot disease (including ulcers, infection, neuropathy or peripheral artery disease (PAD)) to High-Risk Foot Services and compared those with and without diabetes.

Methods

We conducted a retrospective data linkage cohort study of adults presenting with foot disease to outpatient High Risk Foot Services across Queensland (Australia) from 1st January to 31st December 2020. Socio-demographics, co-morbidities, foot conditions, and treatment factors were documented. Patients were followed-up until first foot disease-related hospitalisation (overnight hospitalisation for the principal diagnosis of foot-disease), death, loss-to-follow-up or 12 months, via linkage to Queensland hospitalisation and death datasets. Factors independently predicting foot disease-related hospitalisation were identified using Least Absolute Shrinkage and Selection Operator for variable selection and flexible parametric survival models considering time-varying effects.

Results

Of 6,098 included patients presenting with foot disease, 5,094 (84%) presented with diabetes (mean age 64 [13] years; 70% males) and 1,004 (16%) without diabetes (mean age 68 [17] years; 64% males). More patients with diabetes than without diabetes experienced foot disease-related hospitalisation (30% versus 22%; $p < 0.001$). Factors independently predicting foot disease-related hospitalisation in both those with and without diabetes included having a foot ulcer, moderate-to-severe PAD, and requiring antibiotic treatment (all; $p < 0.05$). Additional predictors unique to people with diabetes included depression, previous foot disease-related hospitalisation, previous amputation, peripheral neuropathy, suspected acute Charcot foot, moderate-to-severe foot infection, and non-removable knee-high offloading treatment (all, $p < 0.05$). Conversely, predictors unique to people without diabetes included dyslipidaemia and foot deformity (both; $p < 0.05$).

Conclusion

We identified several common risk factors for foot disease-related hospitalisations regardless of diabetes status. However, other risk factors seemed unique to those with or without diabetes and warrant further studies.

Risk Factors and Prognostic Prediction Model for Major Adverse Cardiovascular Events in Patients With Metabolic Syndrome

Xie Q¹

¹Chongqing Emergency Medical Center, Chongqing University Central Hospital, Chongqing, China

Objective This study aimed to identify risk factors associated with MACE in patients with metabolic syndrome and to develop a prognostic prediction model.

Methods A cross-sectional study was conducted among patients with metabolic syndrome who were admitted to the Central Hospital affiliated with Chongqing University between January 2020 and June 2025. Based on the occurrence of MACE within 1 year of follow-up, patients were classified into the MACE group (n=35) and the non-MACE group (n=201).

Results A total of 236 patients with metabolic syndrome were included, comprising 60.2%(142/236) men and 39.8%(94/236) women, with a mean age of 64.7±10.4 years. MACE occurred in 14.8%(35/236) patients, including 5.1%(12/236) cardiac deaths, 4.2%(10/236) nonfatal myocardial infarctions, 3.4%(8/236) nonfatal strokes, and 2.1%(5/236) coronary revascularizations. Compared with the non-MACE group, patients in the MACE group were older (69.0±9.4 years vs 63.9±10.6 years), had a higher prevalence of CKD [31.4%(11/35) vs 10.9%(22/201)], higher HbA1c levels (7.8±1.1% vs 7.3±1.2%), and higher NT-proBNP concentrations [3820 (IQR, 1650–6940) pg/mL vs 1480 (IQR, 620–3590) pg/mL] ($P<0.05$). Multivariable Cox regression analysis identified age ≥ 65 years [aHR=1.93 (95% CI, 1.08–3.47), $P=0.03$], CKD [aHR=2.11 (95% CI, 1.16–3.84), $P=0.01$], HbA1c $\geq 7.5\%$ [aHR=1.71 (95% CI, 1.02–2.92), $P=0.04$], and NT-proBNP ≥ 3000 pg/mL [aHR=2.56 (95% CI, 1.43–4.57), $P=0.01$] as independent risk factors for MACE in patients with metabolic syndrome. The combined predictive model demonstrated good discrimination [AUC=0.83 (95% CI, 0.78–0.87)].

Conclusion Patients with metabolic syndrome whose age ≥ 65 years, had CKD, HbA1c $\geq 7.5\%$, or NT-proBNP ≥ 3000 pg/mL were more likely to experience MACE.

【Keywords】 Metabolic syndrome; MACE

References

- [1] 中华医学会健康管理学分会,《中华健康管理学杂志》编辑委员会,国家老年疾病临床医学研究中心(湘雅医院).成人代谢综合征防控健康教育专家共识[J].中华健康管理学杂志,2024,18(02):81-92.
- [2] 中华医学会老年医学分会老年内分泌代谢疾病学组中国老年代谢综合征药物治疗专家共识(2022)编写组.中国老年人代谢综合征药物治疗专家共识(2022)[J].中华老年医学杂志,2022,41(09):1011-1027.
- [3] 刘亚云,夏经钢.心肾代谢综合征的定义、分期、防治和管理[J].中国医师进修杂志,2025,48(03):269-274.
- [4] 胡浙芳,章荣华,黄李春,等.四种代谢综合征诊断标准在浙江省城市人群中应用情况的比较[J].中华预防医学杂志,2014,48(6):507-511.

备注:主要不良心血管事件(major adverse cardiac events, MACE);慢性肾脏病(chronic kidney disease, CKD);氨基末端脑利钠肽前体(N-terminal pro-brain natriuretic peptide, NT-proBNP);糖化血红蛋白(HbA1c);置信区间(confidence interval, CI);调整后的风险比(adjusted hazard ratio, aHR);四分位间距(interquartile range, IQR);曲线下面积(area under the curve, AUC)。

Association of circulating lipocalin-2 levels and the risk of incident type 2 diabetes in subjects with prediabetes: a population-based cohort study

Shi J, Zhang W, Li X, Zhang H, Qin L, Niu Y, Yang Z¹, **Su Q**

¹Department Of Endocrinology, Xinhua Hospital, Shanghai Jiao Tong University School Of Medicine, Shanghai, China, Shanghai, China

OBJECTIVE

To assess the association of circulating lipocalin-2 levels and risk for the development of type 2 diabetes in individuals with prediabetes.

RESEARCH DESIGN AND METHODS

A population-based prospective study was conducted among 2,737 Chinese subjects with prediabetes (average age 55.9 ± 7.4 years). Incident type 2 diabetes was diagnosed according to 2010 American Diabetes Association criteria. Circulating lipocalin-2 levels were measured using enzyme-linked immunosorbent assay (ELISA). The association of circulating lipocalin-2 levels with the risk of incident type 2 diabetes was assessed by Cox regression analysis.

Results

During a median follow-up period of 3.1 years, 416 subjects developed type 2 diabetes. Baseline circulating lipocalin-2 levels were significantly higher in subjects developing incident type 2 diabetes than in those not developing incident type 2 diabetes ($p < 0.001$). The risk of incident type 2 diabetes was significantly higher in the highest lipocalin-2 quartile group (hazard ratio 1.74; 95% confidence interval 1.17-2.59) than in the lowest quartile group after adjustments for age, sex, body mass index, waist circumference, C-reactive protein, γ -glutamyltransferase, triglycerides, low-density lipoprotein cholesterol, systolic blood pressure, and homeostatic model assessment of insulin resistance score.

Conclusions

Elevated circulating lipocalin-2 levels are associated with an increased incidence of type 2 diabetes in subjects with prediabetes.

Keywords: lipocalin-2, type 2 diabetes, prediabetes

Re-evaluating the causal status of the TG/HDL ratio for cardiovascular disease in the general population

Ng C^{1,2,3}, Yeo L¹, Low J⁴, Huang W⁵, Chua D⁶, Muthiah M^{1,5,7}, Syn N⁵

¹Division of Gastroenterology and Hepatology, Department of Medicine, National University Hospital, Singapore, Singapore, ²Graduate School of Medicine, Yokohama City University, Yokohama, Japan, ³Division of Gastroenterology, Department of Medicine, Kurume University School of Medicine, Kurume, Japan, ⁴Department of Biomedical Engineering, College of Design and Engineering, National University of Singapore, Singapore, Singapore, ⁵Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, ⁶Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, Singapore, ⁷National University Centre for Organ Transplantation, National University Health System, Singapore, Singapore

Background

The triglyceride-to-HDL cholesterol (TG/HDL) ratio is a clinically accessible marker of atherogenic dyslipidemia and insulin resistance, but its independent associations with diverse cardiovascular outcomes, causal relationships with major adverse cardiovascular events (MACE), and detailed genetic architecture remain incompletely characterised.

Methods

We conducted an integrated analysis of 246,869 European-ancestry participants from the UK Biobank. Cox proportional hazards regression estimated associations between TG/HDL ratio and ten cardiovascular and mortality outcomes. Bidirectional two-sample Mendelian randomization (MR) with a split-sample design was used to evaluate causal relationships between TG/HDL ratio and MACE. Genome-wide association study (GWAS) was performed using REGENIE, with functional annotation, gene mapping, and gene-based testing via FUMA and MAGMA.

Results

Elevated TG/HDL ratio was independently associated with increased risk of MI (HR=1.09; 95%CI: 1.07-1.11), angina pectoris (HR=1.11; 95%CI: 1.09-1.14), acute MI (HR=1.11; 95%CI: 1.08-1.14), STEMI (HR=1.10; 95%CI: 1.06-1.14), NSTEMI (HR=1.10; 95%CI: 1.07-1.13), and MACE (HR=1.07; 95%CI: 1.05-1.09). Forward MR analyses provided suggestive evidence for a causal effect of TG/HDL ratio on MACE, with point estimates consistently above 1.0 across all methods and an MR-PRESSO corrected OR of 1.30 (95%CI: 1.10-1.54; P=0.002) in one sample split. GWAS identified 171 independent genomic risk loci ($P < 5 \times 10^{-8}$), with the most significant associations at canonical lipid metabolism genes including LPL, APOC1, ANGPTL4, CETP, and MLXIPL. MAGMA gene-based analysis identified 654 significantly associated genes after Bonferroni correction. Genomic inflation ($\lambda = 1.354$; $\lambda_{1000} = 1.0014$) was attributable to polygenicity rather than population stratification.

Conclusion

The TG/HDL ratio is independently associated with coronary artery disease endpoints and shows suggestive evidence of a causal role in MACE via a predominantly unidirectional pathway. Its genetic architecture is highly polygenic and centred on canonical lipid metabolism pathways, with the most significant associations mapping to LPL, APOC1, ANGPTL4, CETP, and MLXIPL. These findings support the TG/HDL ratio as a clinically meaningful and genetically tractable cardiometabolic risk biomarker.

Bridging methodology and clinical utility: a systematic review of clinical prediction models for type 2 diabetes following gestational diabetes

Yimer N¹, Belsti Y¹, Seifu B¹, Goldstein R^{1,2}, Teede H^{1,2}, Enticott J¹

¹Monash Centre for Health Research and Implementation, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, ²Diabetes and Endocrine Unit, Monash Health, Melbourne, Australia

Aim: Women with prior gestational diabetes mellitus (GDM) face increased risk of developing type 2 diabetes (T2D). Development of statistical and artificial intelligence-based prediction models are emerging to support early identification of high-risk women. This review aims to systematically evaluate the methodological characteristics, reporting quality, and applicability of existing prognostic models for T2D following GDM.

Methods: Five electronic databases were searched from inception to January 24, 2026. Studies developing or validating clinical prediction models for T2D following GDM were eligible. Risk of bias and applicability were assessed using the updated Prediction model Risk Of Bias Assessment (PROBAST+AI) tool. Two reviewers independently screened and assessed quality, resolving disagreements through consensus and involving a third reviewer.

Results: Nineteen studies encompassing 20 models were identified, predominantly based on prospective data (n = 18) in hospital settings across North America, Europe, Asia, and Australia. Logistic regression was commonly applied (n = 9), followed by machine learning (n = 6), and Cox regression (n = 5). Internal validation was performed in 13 studies, while only one was externally validated. Discrimination was widely reported (Area Under the Curve 0.67-0.92); while calibration, and clinical utility measures were underreported. Only one study applied appropriate sample size calculation. Commonly used predictors include maternal age, pregnancy fasting glucose, and BMI. Risk of bias was generally low during in most domains of PROBAST+AI, but applicability concerns were high in 60% of models.

Conclusion: While several models demonstrated acceptable performance, generalizability and clinical usefulness remain limited due to high concerns in applicability and inconsistent reporting. Adherence to best-practice guides such as TRIPOD+AI, external validation, and exploration of novel prediction modelling techniques are recommended to advance deployment of risk tools for personalised medicine post GDM. This review is the first to apply the PROBAST+AI, enabling a comprehensive evaluation of quality and applicability.

Resolving heterogeneity in gestational diabetes based on insulin secretion and sensitivity and associations with pregnancy outcomes: data-driven cluster analysis in a multi-ethnic birth cohort

Zhao C^{1,2,3}, Lin H^{1,2,3}, Yu G^{1,2,3}, Tam C^{1,2,3}, Gibbons K⁴, Madsen L⁵, Lim C^{1,2,3}, Lowe J⁶, Sacks D⁷, Catalano P⁸, McIntyre H⁴, Tam W^{9,10}, Ma R^{1,2,3}

¹Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, ²Chinese University of Hong Kong-Shanghai Jiao Tong University Joint Research Centre in Diabetes Genomics and Precision Medicine, Hong Kong Institute of Diabetes and Obesity, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, ³Laboratory of Molecular Epidemiology in Diabetes, Li Ka Shing Institute of Health Sciences, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, ⁴Children's Intensive Care Research Program, Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, South Brisbane, Australia, ⁵Steno Diabetes Centre Aarhus, Aarhus University Hospital, Aarhus, Denmark, ⁶Department of Medicine, University of Toronto, Toronto, Canada, ⁷Department of Research and Evaluation, Kaiser Permanente, Southern California, Pasadena, USA, ⁸Massachusetts General Hospital, Boston, USA, ⁹Department of Obstetrics and Gynaecology, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong, ¹⁰CUHK Medical Centre, Shatin, N.T., Hong Kong

Aims

To identify heterogeneous metabolic clusters in gestational diabetes mellitus (GDM) and evaluate their associations with pregnancy outcomes.

Methods

We analysed 6,334 participants from five centres of the Hyperglycaemia and Adverse Pregnancy Outcome (HAPO) Study, including 1,084 (17.1%) women with GDM by IADPSG criteria. Homeostatic model assessment 2 estimates of β -cell function (HOMA2- β) and insulin resistance (HOMA2-IR) were derived from blinded 75-g 2-h OGTT. K-means clustering was applied using maternal age, ethnicity-adjusted BMI z-score, HOMA2- β and HOMA2-IR, with the optimal cluster number determined by gap statistics. Relative risks (RRs) for pregnancy outcomes were estimated via robust Poisson regression, and predictive performance was assessed using ROCs.

Results

Five reproducible clusters were identified. Clusters 1-3 mainly comprised normal BMI women, with Cluster 1 representing the oldest group and Cluster 2 the youngest. Cluster 1 showed the most favourable metabolic profile with lower fasting glucose (median [IQR] 4.4 [4.2-4.7] mmol/L), while Cluster 5 had the highest glucose (4.8 [4.5-5.1]) and BMI (36.1 [32.2-40.4] kg/m²). Compared with Cluster 1, preeclampsia risk increased progressively across Clusters 3-5 by 55% (RR 1.55, 95% CI 1.12-2.14), 81% (1.81, 1.30-2.52) and 262% (3.62, 2.61-5.01) respectively. The clustering demonstrated better predictive performance than GDM diagnosis (AUROC 0.668 vs 0.552; $p < 0.001$). Clusters also differed in associations with other outcomes.

Conclusion

Data-driven clustering revealed metabolic heterogeneity in GDM and improved risk stratification, supporting more individualized pregnancy care.

Acknowledgement

This study was supported by a grant from the RGC Area of Excellence Scheme (M-401/24-R). CZ acknowledges support from the Hong Kong PhD Fellowship Scheme.

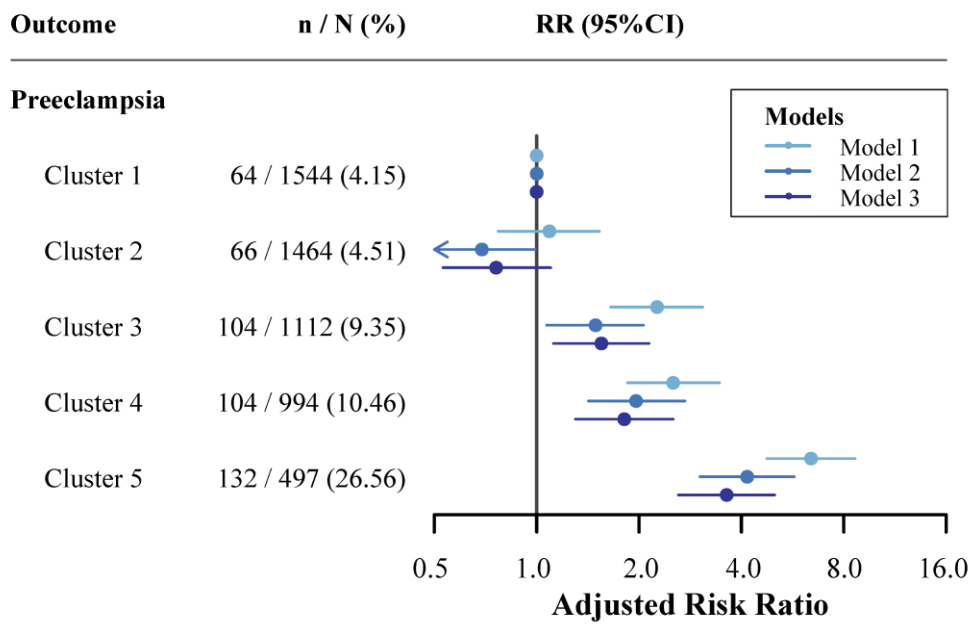


Figure Association between identified clusters and the risk of preeclampsia.

Mapping phenotypic heterogeneity and cardiometabolic risk in obesity using a tree-based dimensionality reduction framework

Zhao Y¹, Wang W¹, Pan Q¹, Guo L¹

¹Beijing Hospital, Beijing, China

Aims

The population-level heterogeneity of obesity has yet to be systematically investigated. We aimed to apply the data dimensionality reduction tree (DDRTree) method to obese individuals and to examine how distinct phenotypic patterns align with different outcomes.

Methods

To characterize the heterogeneity of obesity, a two-dimensional (2D) tree structure based on the DDRTree algorithm was employed. Associations between embedding dimensions and metabolic traits, obesity-related indices, and clinical outcomes were evaluated using multivariable linear, logistic, and Cox proportional hazards regression models.

Results

DDRTree identified distinct continuous phenotypic gradients in obesity. Dimension 1 was strongly associated with insulin resistance, dysglycemia, visceral adiposity, subclinical vascular abnormalities, hyperuricemia, and microalbuminuria (all $p < 0.001$). Dimension 2 was more closely related to β -cell function and was associated with all-cause mortality in the CHARLS cohort ($p < 0.05$). Individuals in the right-sided regions of the tree showed less favorable cardiometabolic profiles, with the lower-right region characterized by marked insulin resistance, hyperglycemia, and hyperuricemia. Waist-based indices aligned predominantly with Dimension 1, whereas lipid- and liver-related indices reflected combined phenotypic gradients.

Conclusion

DDRTree enables population-level mapping of obesity heterogeneity and may support risk-oriented stratification of obese individuals in epidemiological settings.

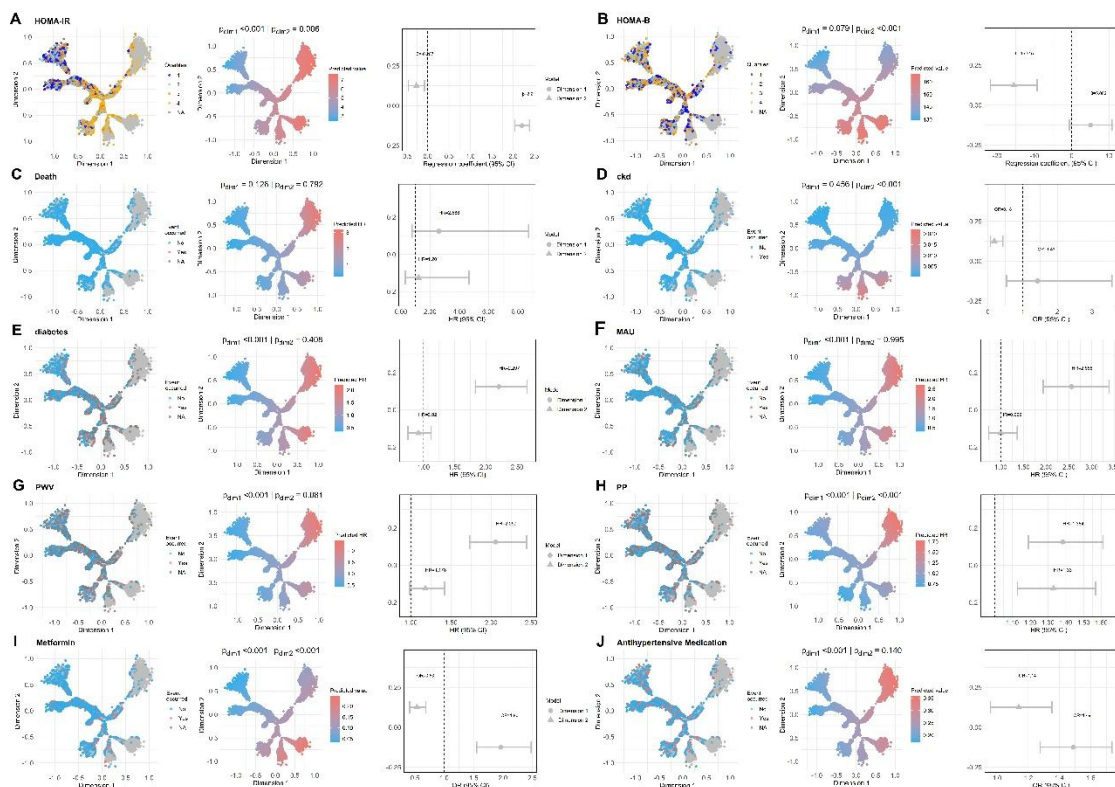


Figure: Visualization of heterogeneity in obesity phenotype-associated adverse outcome risks in the Chinese Physical Examination Cohort.

Panels show distributions of metabolic traits, clinical outcomes, vascular markers, and medication use, including HOMA-IR, HOMA-B, all-cause mortality, CKD, diabetes, MAU, ba-PWV, PP, metformin use, and antihypertensive medication use. Associations with DDRTree dimensions were assessed using multivariable linear, logistic, or Cox regression models.

Abbreviations: HOMA-IR, homeostasis model assessment of insulin resistance; HOMA-B, β -cell function; ACM, all-cause mortality; CKD, chronic kidney disease; MAU, microalbuminuria; ba-PWV, brachial–ankle pulse wave velocity; PP, pulse pressure; HR, hazard ratio; OR, odds ratio; CI, confidence interval.

Subnational burden of cancers attributable to high fasting plasma glucose in China, 2005–2023: an analysis based on the Global Burden of Disease Study 2023

Wang W¹, Zhao Y¹, Pan Q¹, Guo L¹

¹Beijing Hospital, Beijing, China

Background

High fasting plasma glucose is an increasingly important metabolic risk factor for cancer burden. However, long-term trends and subnational disparities in cancer mortality attributable to high fasting plasma glucose in China remain insufficiently characterized.

Methods

Using Global Burden of Disease 2023 data, we estimated age-standardized mortality rates (ASMRs) for cancers attributable to high fasting plasma glucose in China from 2005 to 2023. Analyses were performed at national and provincial levels and stratified by sex, cancer type, and socio-demographic index (SDI). Temporal trends were assessed using age-standardized rates, and the association between SDI and mortality was examined using non-linear regression models.

Findings

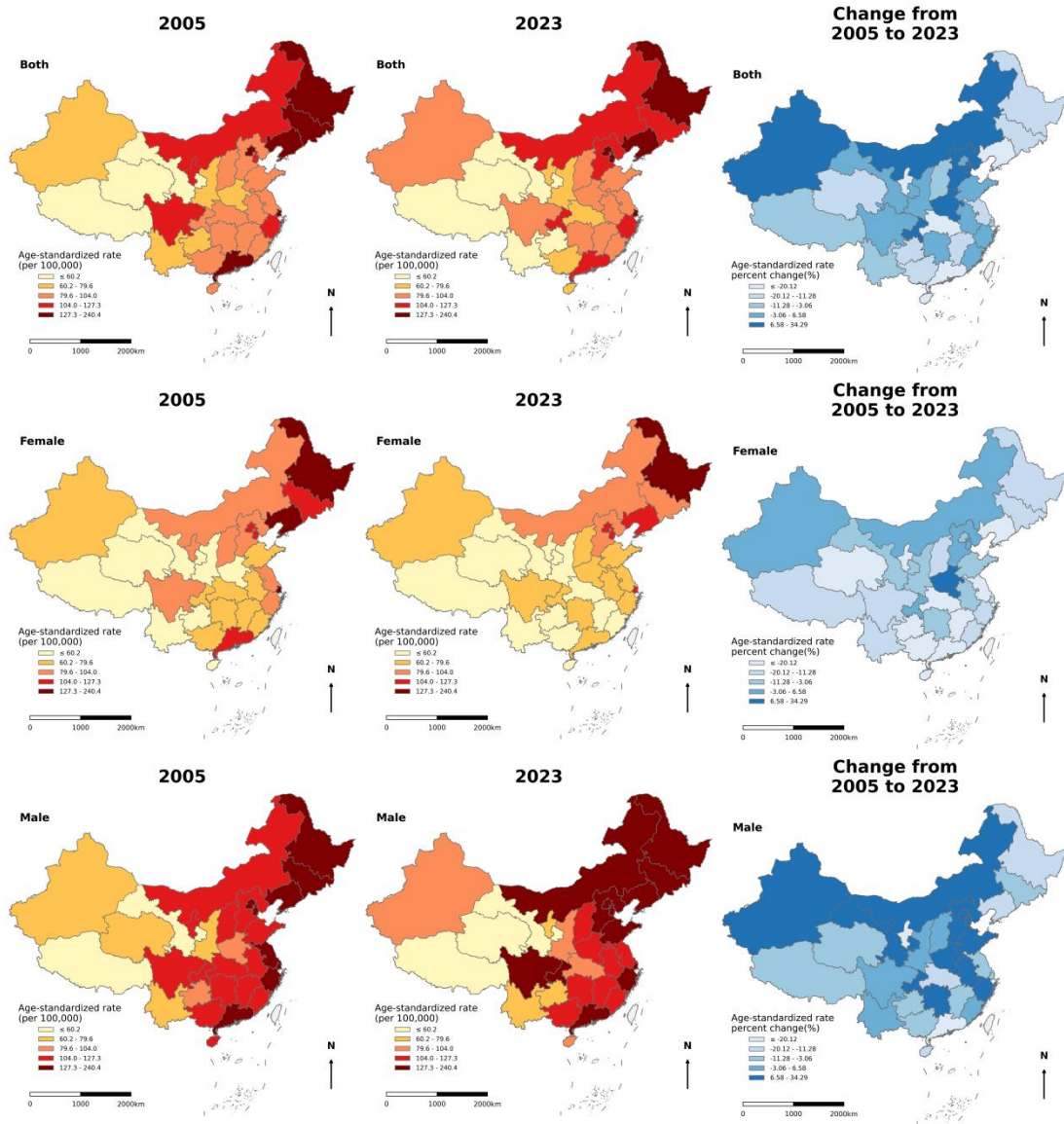
From 2005 to 2023, ASMRs increased steadily in China, with consistently higher rates in males than in females. Tracheal, bronchus, and lung cancer remained the leading contributors throughout the study period, while pancreatic and colorectal cancers accounted for an increasing share of the burden. Higher ASMRs were generally concentrated in provinces with higher SDI levels. The association between SDI and mortality was non-linear, with substantial heterogeneity across provinces and cancer types. Provinces undergoing rapid socioeconomic development showed the fastest increases in mortality.

Interpretation

Cancer mortality attributable to high fasting plasma glucose has risen markedly in China, highlighting the need for region-specific prevention strategies integrating glycemic control and cancer control policy.

Figure: Provincial distribution and temporal changes in age-standardized mortality rates of cancers attributable to high fasting plasma glucose in China, 2005 and 2023.

This figure presents the age-standardized mortality rates (ASMRs) of cancers attributable to high fasting plasma glucose across China's provinces in 2023, together with temporal changes from 2005 to 2023. Rates are expressed per 100,000 population and age-standardized to the GBD standard population. Substantial spatial heterogeneity is observed across provinces.



Associations between estimated cardiorespiratory fitness and major adverse cardiovascular events in elderly patient with type 2 diabetes

Zhou L¹

¹Chinese Medicine Hospital Of Dianjiang County, Chongqing, China

Background: Elderly patients with type 2 diabetes face an elevated risk of major adverse cardiovascular events (MACE) compared to the general population. This study aimed to examine the predictive capabilities of estimated cardiorespiratory fitness (eCRF), a well-established parameter of general health status, for MACE in elderly patients with type 2 diabetes.

Methods: This retrospective cohort study included participants aged ≥ 65 years with type 2 diabetes between October 2020 and September 2021. The eCRF was calculated from age, sex, body mass index, waist circumference, smoking status, and physical activity. The eCRF was categorized as low, intermediate, and high. The primary outcome was MACE, defined as a composite of myocardial infarction, stroke, unstable angina, heart failure, malignant arrhythmia, and cardiovascular death. Multivariate-adjusted Cox proportional hazards models were used to explore the associations between eCRF and MACE by reporting hazard ratios (HRs) and 95% confidence intervals (CIs).

Results: There were 398 patients included, with a mean age of 71 years and female prevalence of 40.95%. Over a median follow-up of 38 months, 52 MACE events occurred. Compared to the reference high eCRF group, HRs (95% CIs) of MACE for patients with moderate and low eCRF were 1.87 (1.42-2.31) and 2.87 (2.52-3.12), respectively. Restricted cubic spline curves demonstrated a linear inverse relationship between eCRF and MACE. Subgroup analysis confirmed consistency across age, sex, and HbA1c.

Conclusion: Higher eCRF was independently associated with reduced MACE risk in elderly T2D patients. Thus, eCRF may be incorporated into the management protocol for elderly patients with type 2 diabetes.

Keywords: Cohort study; Elderly; Estimated cardiorespiratory fitness; MACE; Type 2 diabetes

Stream 5:

Diabetes complications

Reduced odds of depression are associated with higher intakes of whole, but not refined, grain and dietary vitamin D in type 2 diabetes in Iran

Mohammadi M¹, Bahrami G², Shahbazi Azad M³, Sadeghi O⁴, Iranpour S⁵, Jones K^{6,7,8}, Marathe C^{6,7,8}, Horowitz M^{6,7,8}, Anjom-Shoae J^{6,7}

¹School of Nutrition and Food Science, Isfahan University of Medical Sciences, Isfahan , Iran,

²Department of Nutrition, Science and Research Branch, Islamic Azad University, Tehran , Iran,

³Nosocomial Infection Research Center, Isfahan University of Medical Sciences, Isfahan , Iran,

⁴Research Center for Food Hygiene and Safety, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, ⁵Student Research Committee, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran, ⁶School of Medicine, College of Health, Adelaide University, Adelaide, Australia, ⁷Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide, Australia, ⁸Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia

Introduction and aims: Depression is a common comorbidity in individuals with type 2 diabetes (T2D), and is independently associated with worse glycaemic control, reduced treatment adherence and an increased risk of diabetes-related complications. While dietary factors may modulate the risk of depression, evidence among individuals with T2D, particularly from Middle Eastern populations, where both T2D and depression are common, is limited. We investigated the association between depression and dietary factors in T2D in Iran.

Materials and methods: This cross-sectional study included 358 adults with T2D (50.4% female; age: 60 ± 11 years, BMI 30±4 kg/m²) recruited from the community in Iran. Dietary intakes were assessed by a validated food frequency questionnaire. Depression was measured using the Patient Health Questionnaire-9 (PHQ-9), with a score of ≥15 indicating depression. Multiple logistic regression was used to determine associations between the risk of depression with dietary factors after adjustment for age, sex, total energy intake, alcohol consumption, smoking status, socioeconomic status, supplement intake, diabetes-related diseases and BMI.

Results: The odds of depression were reduced when intakes of whole, but not refined, grains (OR=0.46, 95% CI: 0.24-0.88) and dietary vitamin D (OR=0.51, 95% CI: 0.26-0.99) were higher. Non-linear dose–response analyses revealed decreasing trends and U-shaped relationships between the risk of depression and intake of both whole grains (P non-linearity = 0.797) and vitamin D (P non-linearity=0.401), respectively.

Conclusions: In Iranians with T2D, the odds of depression are reduced by 54% and 49% when dietary intakes of whole grain and vitamin D, respectively, are higher. These findings highlight whole grains and dietary vitamin D as potentially modifiable targets to support mental health in this high-risk population.

Lower odds of foot ulceration are associated with higher dietary betaine intake in adults with type 2 diabetes in Iran

Bahrami G¹, Mohammadi M², Shahbazi Azad M³, Sadeghi O⁴, Iranpour S⁵, Jones K^{6,7,8}, Marathe C^{6,7,8}, Horowitz M^{6,7,8}, Anjom-Shoae J^{6,7}

¹Department of Nutrition, Science and Research Branch, Islamic Azad University, Tehran, Iran,

²School of Nutrition and Food Science, Isfahan University of Medical Sciences, Isfahan, Iran,

³Nosocomial Infection Research Center, Isfahan University of Medical Sciences, Isfahan, Iran,

⁴Research Center for Food Hygiene and Safety, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, ⁵Student Research Committee, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran, ⁶School of Medicine, College of Health, Adelaide University,

Adelaide, Australia, ⁷Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide University, Adelaide, Australia, ⁸Endocrine and Metabolic Unit, Royal Adelaide Hospital,

Adelaide, Australia

Introduction and aims: Foot ulceration (DFU) is a common complication of type 2 diabetes (T2D), associated with substantial morbidity, reduced quality of life, and increased healthcare burden. Nutritional factors, which influence inflammation, oxidative stress, and vascular function, may modulate DFU risk. Betaine, a naturally occurring dietary nutrient, acts as a methyl donor and osmolyte, and in preclinical models exhibits anti-inflammatory and antioxidative properties. We investigated, in T2D, the association between the odds of DFU and dietary betaine intake in Iran.

Materials and methods: This cross-sectional study included 409 adults with T2D (50.4% female; age: 61±10 years, BMI 30±3 kg/m²) recruited from the community in Iran. Dietary intakes were assessed by a validated food frequency questionnaire. DFU severity was classified using the Wagner grading system (1-4), and 151 participants (36%) had Wagner grade ≥2. Multiple logistic regression was used to determine associations between the odds of DFU and dietary betaine intake after adjustment for age, sex, total energy intake, alcohol consumption, socioeconomic status, smoking status and BMI.

Results: The odds of DFU (OR=0.40, 95% CI: 0.19–0.83) were reduced when dietary betaine intake was higher. Non-linear dose–response analyses revealed a decreasing, non-significant trend between DFU risk and dietary betaine (P non-linearity = 0.627) (**Figure**).

Conclusions: In Iranians with T2D, the odds of DFU were reduced by 60% when dietary betaine intake was higher. These findings suggest a potential protective role of betaine, possibly mediated through anti-inflammatory and antioxidative pathways, and that betaine may have a role in DFU prevention.

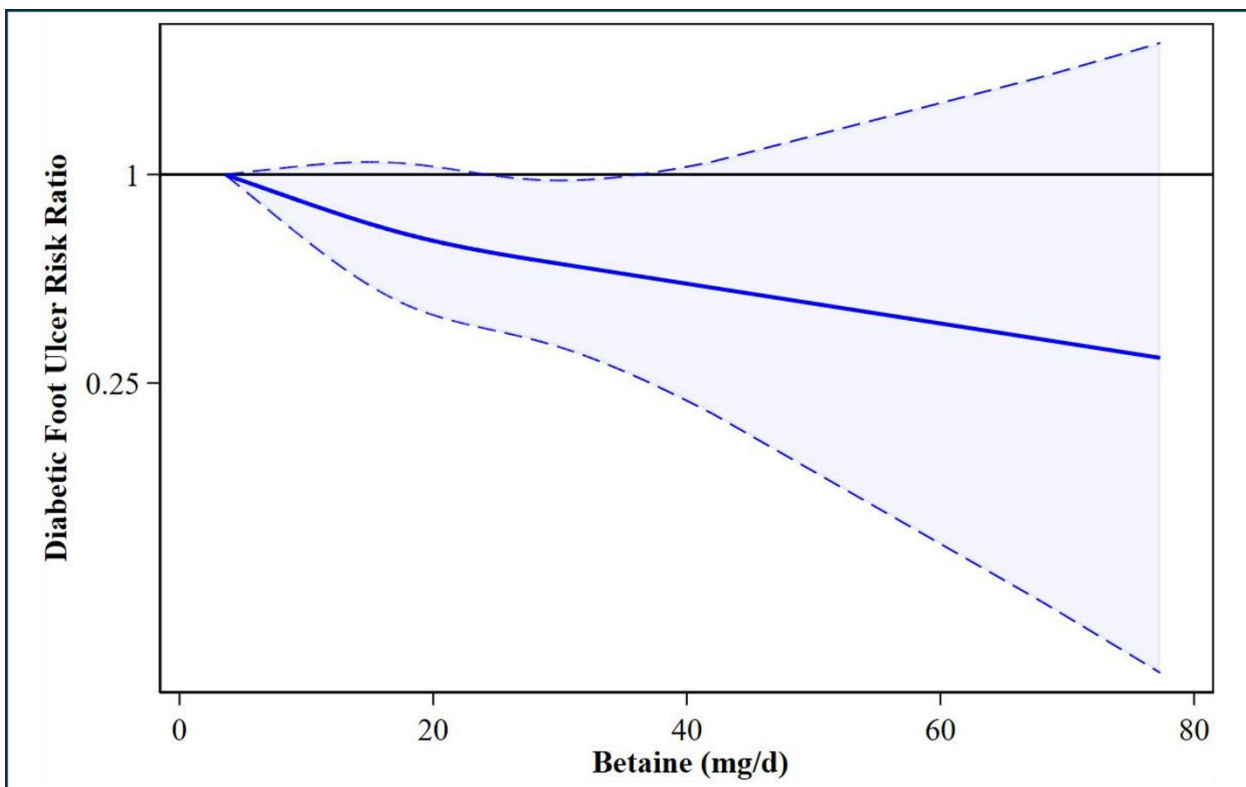


Figure: Non-linear dose–response relationship between DFU and dietary betaine intake

Relationship Between Carotid Femoral Pulse Wave Velocity and Waist Circumference in Prediabetes

Aprilia D^{1,2}, Wahyudi^{3,4}, Hadilofyani P⁵

¹Metabolic Endocrinology and Diabetes Divison, Internal Medicine Department, Medical Faculty, Universitas Andalas, Padang, Indonesia, ²Metabolic Endocrinology and Diabetes Divison, Internal Medicine Department, M. Djamil General Hospital, Padang, Indonesia, ³Cardiology Divison, Internal Medicine Department, Medical Faculty, Universitas Andalas, Padang, Indonesia, ⁴Cardiology Division, Internal Medicine Department, M. Djamil General Hospital, Padang, Indonesia, ⁵Internal Medicine Department, Medical Faculty, Universitas Andalas, Padang, Indonesia

Aim:

Prediabetes is defined as impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) associated with a high risk of cardiovascular injury. It is recommended that prediabetes patients be screened for signs of arterial stiffness. Carotid-femoral pulse wave velocity (cf-PWV) is a standard measure of arterial stiffness and an established predictor of cardiovascular morbidity and mortality. Increased arterial stiffness reflects early vascular damage and plays an important role in the development of cardiovascular disease. Central obesity, commonly assessed by waist circumference, has been strongly associated with metabolic abnormalities and elevated cardiovascular risk. This study aims to determine the association between waist circumference and arterial stiffness, as measured by carotid-femoral pulse wave velocity (cfPWV), in patients with prediabetes.

Methods:

A cross-sectional study was conducted with prediabetes patients (N=48) who underwent clinical evaluation, arterial stiffness assessment using carotid-femoral pulse wave velocity (cfPWV) by Doppler ultrasound, and waist circumference measurement using a standardized measuring tape. A statistical analysis was performed using SPSS software, and values of $p < 0.05$ were considered significant.

Results:

Among 48 participants, a statistically significant positive correlation was found between cfPWV and waist circumference ($r = 0.340$; $p = 0.018$). These findings indicate that higher waist circumference is associated with increased arterial stiffness in individuals with prediabetes.

Conclusion:

There is a significant positive association between waist circumference and arterial stiffness, as measured by cfPWV, in prediabetes patients. Waist circumference may serve as a simple clinical indicator for identifying increased risk of arterial stiffness in this population.

Liraglutide and empagliflozin versus linagliptin on reversion of mild cognitive impairment in Type 2 diabetes (LIGHT-MCI): A multicenter, randomized clinical trial

Bi Y¹, Zhang Z¹, Yu C¹, Wu J², Zhu X³, Ye X⁴, Yang H⁴, Wang K⁵, Yan W⁶, Zhang B⁷

¹Department of Endocrinology, Endocrine and Metabolic Disease Medical Center, Nanjing Drum Tower Hospital, Affiliated Hospital of Medical School, Nanjing University, Nanjing, China,

²Department of Endocrinology, Nanjing First Hospital, Nanjing Medical University, Nanjing, China,

³Department of Endocrinology, The Affiliated Wuxi People's Hospital of Nanjing Medical University, Wuxi People's Hospital, Wuxi Medical Center, Nanjing Medical University, Wuxi, China, ⁴Department of Endocrinology, The Affiliated Changzhou No.2 People's Hospital of Nanjing Medical University, Changzhou, China, ⁵Department of Endocrinology, the Affiliated Jiangning Hospital of Nanjing Medical University, Nanjing, China, ⁶Department of Clinical Epidemiology, Children's Hospital of Fudan University National Children's Medical Center, Shanghai, China, ⁷Department of Radiology, Nanjing Drum Tower Hospital, Affiliated Hospital of Medical School, Nanjing University, Nanjing, China

Background: While glucose-lowering agents have shown potential cognitive benefits in experimental and observational studies, randomized head-to-head evidence evaluating their effects on cognitive outcomes in diabetes remains limited. This study aimed to compare liraglutide and empagliflozin versus linagliptin for mild cognitive impairment (MCI) reversion in type 2 diabetes.

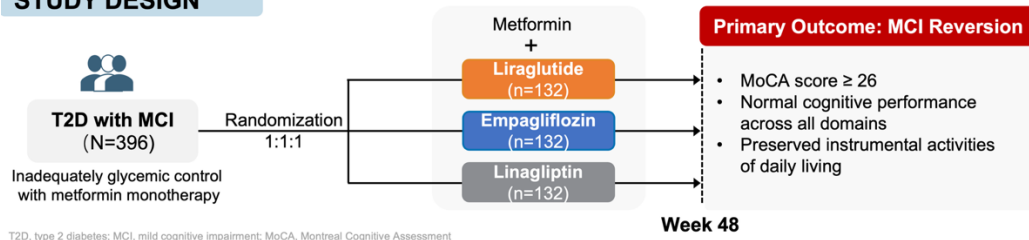
Methods: LIGHT-MCI was an investigator-initiated, multicenter, randomized, open-label trial in China. Participants with type 2 diabetes and MCI were assigned in a 1:1:1 ratio to liraglutide, empagliflozin, or linagliptin added to metformin for 48 weeks. The primary outcome was MCI reversion at week 48 (defined as a Montreal Cognitive Assessment score $\geq$ 26, normal performance across all cognitive domains, and preserved instrumental activities of daily living). Secondary outcomes included changes in cognition, brain imaging, plasma neurodegenerative biomarkers and metabolic measures.

Results: A total of 396 participants were enrolled, with 132 assigned to each group. At week 48, MCI reversion occurred in 49.5% of participants in the liraglutide group compared with 20.4% in the linagliptin group (risk ratio, 2.43; 95% CI, 1.93–3.06; $P < 0.001$), and in 28.6% of participants in the empagliflozin group compared with 20.4% in the linagliptin group (risk ratio, 1.41; 95% CI, 1.19–1.66; $P < 0.001$). Improvements in global cognition, multiple cognitive subdomains and hippocampal activation were observed with liraglutide, whereas empagliflozin demonstrated comparatively smaller effects.

Conclusion: Both liraglutide and empagliflozin were associated with higher MCI reversion than linagliptin at week 48. These findings address the evidence gap of selecting glucose-lowering therapies for type 2 diabetes at early stage of cognitive impairment.

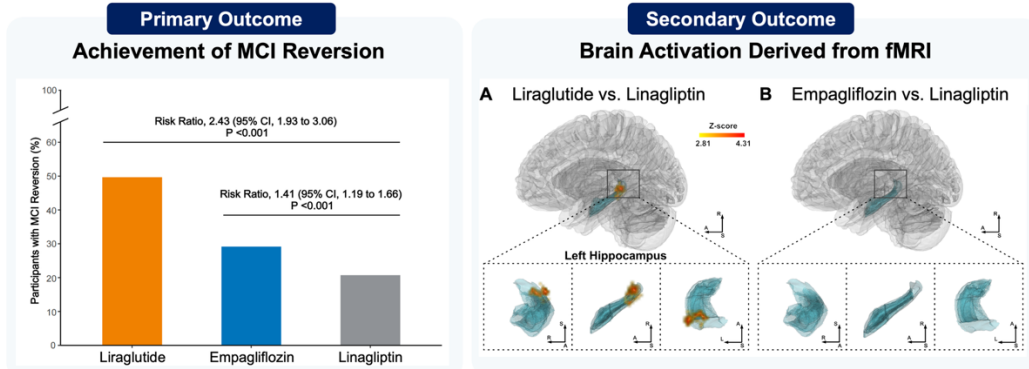
Liraglutide and Empagliflozin vs. Linagliptin on MCI Reversion in T2D

STUDY DESIGN



T2D, type 2 diabetes; MCI, mild cognitive impairment; MoCA, Montreal Cognitive Assessment

KEY OUTCOMES



Both Liraglutide and Empagliflozin Outperformed Linagliptin in Reversing MCI in T2D.

Renoprotective effects of empagliflozin and linagliptin in a rat model of early diabetic nephropathy

Block T^{1,2}, Watson A³, Gill A³, Gray S³, Jandeleit-Dahm K^{1,4}

¹Alfred Health, Melbourne, Australia, ²Department of Diabetes, School of Translational Medicine, Monash University, Melbourne, Australia, ³Atherothrombosis and Vascular Biology, Baker Heart and Diabetes Research Institute, Melbourne, Australia, ⁴Institute for Clinical Diabetology, German Diabetes Centre, Leibniz Centre for Diabetes Research, Heinrich Heine University, Dusseldorf, Germany

Background:

Empagliflozin, a sodium-glucose transport 2 (SGLT2) inhibitor, and linagliptin, a dipeptidyl peptidase-4 (DPP4) inhibitor, are glucose lowering agents widely used in the treatment of type 2 diabetes mellitus and chronic kidney and cardiovascular diseases. Recent studies have shown renoprotective effects with both compounds, which are considered to be at least in part glucose independent although the mechanisms for this effect have not been clearly delineated. We aimed to assess glucose-independent effects of treatment with these agents.

Methods:

Six-week-old male Sprague-Dawley rats were assigned to non-diabetic or diabetic groups (streptozotocin, 55 mg/kg) and randomized to receive either vehicle (water), linagliptin (3 mg/kg/day), or empagliflozin (10 mg/kg/day) by gavage for 12 weeks. Physiological parameters were measured alongside key inflammatory and fibrotic markers in the kidney by ELISA and histological analyses.

Results:

Diabetic animals had significantly increased HBA1c measurements versus non-diabetic animals ($7.0 \pm 0.3\%$ vs $3.1.0 \pm 0.1\%$), without significant attenuation by either empagliflozin ($6.1 \pm 0.3\%$) or linagliptin ($6.3 \pm 0.3\%$). Systolic BP (tail cuff) was unchanged in both treatment groups. Diabetic animals had reduced levels of cystatin C, consistent with hyperfiltration, but neither linagliptin nor empagliflozin significantly altered renal function. There were no significant changes with respect to albuminuria and early renal morphological injury in terms of mesangial area and collagen accumulation with both treatments. Only empagliflozin therapy resulted in lower protein levels of fibronectin, vascular endothelial growth factor (VEGF) and the pro-inflammatory marker, monocyte chemoattractant protein (MCP-1) in the renal cortex of diabetic rats.

Conclusion:

These findings provide new insights into the glucose-independent renoprotective effects of SGLT2 inhibition as compared to DPP-4 inhibition in an animal model of early diabetic nephropathy in the rat. Empagliflozin exerted protective effects on renal fibrosis and significantly reduced renal fibronectin, VEGF and MCP-1 accumulation, providing at least a partial mechanistic explanation for the renoprotective effects reported in clinical trials.

Endogenous recovery of fasting C-Peptide decreases small-fiber neuropathy progression in adults with Diabetes: a real-world cohort study

Cai Q, Guo L, Pan Q

¹Beijing Hospital, Beijing, China

Aims: To determine whether recovery of fasting C-peptide (Δ FCP) reduces small fiber neuropathy (SFN) deterioration, whether a threshold exists, and whether associations are complication-specific.

Methods: Retrospective real-world cohort of 288 hospitalized adults with diabetes with repeated fasting C-peptide and Sudoscan electrochemical skin conductance (ESC). SFN deterioration was defined as worsening foot ESC. Large-fiber neuropathy (LFN) and diabetic kidney disease (DKD) progression were assessed by nerve conduction and kidney outcomes. Cox models, restricted cubic splines, maximally selected rank statistics, and subgroup/landmark/sensitivity analyses were applied.

Results: Over a median 2.2 years, higher Δ FCP was independently associated with lower SFN deterioration risk, but not with LFN or DKD progression. Highest vs lowest Δ FCP tertile: adjusted HR 0.31 (95% CI 0.14–0.69; $P < 0.001$). An optimal Δ FCP cutoff of 126.8 pmol/L was identified; Δ FCP ≥ 126.8 pmol/L was associated with 66% lower SFN risk (HR 0.34, 95% CI 0.17–0.69; $P < 0.001$), remaining robust in landmark and sensitivity analyses. Baseline C-peptide mediated little of the association.

Conclusion: Endogenous fasting C-peptide recovery is linked to a clinically meaningful, SFN-specific, threshold-dependent reduction in neuropathy progression, supporting β -cell preservation/recovery as targets in early diabetic neuropathy.

“Core team” involvement and 12-week ulcer-free survival in people with diabetes-related foot ulcers: an analysis from the Australian Diabetes Foot Registry

Charles B¹, Wischer N¹, Andrikopoulos S², Lazzarini P^{3,4}, Twigg S^{5,6}, Frank G⁷, Lasschuit J^{1,8,9,10}

¹National Association of Diabetes Centres, Sydney, Australia, ²Australian Diabetes Society, Sydney, Australia, ³Queensland University of Technology, Brisbane, Australia, ⁴The Prince Charles Hospital, Brisbane, Australia, ⁵The University of Sydney, Camperdown, Australia, ⁶Royal Prince Alfred Hospital, Camperdown, Australia, ⁷Sydney Local Health District, Sydney, Australia, ⁸St Vincent’s Hospital Sydney, Darlinghurst, Australia, ⁹University of New South Wales Sydney, Darlinghurst, Australia, ¹⁰Victor Chang Cardiac Research Institute, Darlinghurst, Australia

Aims: The National Association of Diabetes Centres introduced the Interdisciplinary High Risk Foot Service (iHRFS) accreditation program in 2018 to standardise and improve diabetes foot care. The standards recommend a co-located minimum core team: physician/endocrinologist, senior podiatrist, and credentialed diabetes educator. However, many services experience challenges assembling the core team. We evaluated whether core team involvement in iHRFS care was associated with ulcer healing.

Methods: Care episodes commencing in the recent 2024-2025 reporting year were included. Descriptive data were summarised as mean (SD) and n (%). The primary outcome was alive and ulcer-free at 12 weeks from initial assessment. Unadjusted associations with alive and ulcer-free were assessed using Fisher’s exact test. The primary analysis used population-averaged GEE logistic regression, clustering by participant and adjusting for service as a fixed effect.

Results: Included were 3,561 participants age 67.0 (SD 13.1), 74.8% male, 6.2% of Aboriginal and/or Torres Strait Islander background and 91.8% with type 2 diabetes. They attended 3,733 care episodes across 32 iHRFS (42 sites). Of all care episodes, the core team was involved in 696 (18.6%) and alive and ulcer-free was met in 833 (22.3%). A higher proportion of alive and ulcer-free outcomes were achieved when the core team was involved compared to when it was not (27.0% vs 21.2%; unadjusted OR 1.37, 95% CI 1.14–1.66, p=0.001). However, after adjustment for service with participant-level clustering there was no association between core-team involvement and alive and ulcer-free (aOR 0.92, 95% CI 0.71–1.19; p=0.50).

Conclusion: The minimum core team was involved in 19% of iHRFS care episodes. Core team involvement was not independently associated with 12-week alive and ulcer-free outcomes. Further study is needed to explore other predictors of ulcer outcomes, impact of the core team on cardiovascular and holistic care, and benefits of alternative interdisciplinary models.

Non-surgical periodontal therapy decreases HbA1c levels in persons living with type 2 diabetes even after controlling for medication change.

Chee H^{1,2}, Tan S⁴, Seneviratne J^{3,5}

¹University of Groningen, , Netherlands, ²National Dental Centre Singapore, , Singapore, ³National Dental Research Institute Singapore, , Singapore, ⁴National University of Singapore Saw Swee Hock School of Public Health, , Singapore, ⁵The University of Queensland Australia School of Dentistry, Brisbane, Australia

Aim:

Majority of studies that assessed the effect of non-surgical periodontal therapy (NSPT) on glycemic management do not account for diabetes medication changes. This longitudinal cohort study assessed the effect of NSPT on HbA1c levels and clinical periodontal measures in persons with Type 2 diabetes (T2D) who have periodontitis, a complication of diabetes. Diabetes medication changes up to one-year prior to and one-year after commencing NSPT were considered.

Methods:

154 non-smoking participants with T2D and periodontitis received initial periodontal treatment (professional mechanical plaque removal, subgingival instrumentation, root surface debridement) and oral hygiene instructions at baseline. Supportive periodontal care with repeated subgingival instrumentation for residual pockets were provided at 3, 6, 9, and 12 months. Full-mouth periodontal examination assessing plaque, bleeding on probing, gingival suppuration, clinical attachment loss and periodontal inflamed surface area (PISA) were conducted at baseline and follow-up visits. Glycemic management was monitored via point-of-care HbA1c testing at each follow-up, with HbA1c records up to 12 months prior NSPT obtained from participants. Participants were stratified by baseline HbA1c into "Acceptable" ($\leq 8.0\%$, $n=77$) and "Unacceptable" ($>8.0\%$, $n=77$) groups. Linear mixed effects models were applied to assess effect of NSPT on HbA1c over time, controlling important confounding effects such as medical history and changes in diabetes medications.

Results:

Mean HbA1c at baseline was $8.4 \pm 1.6\%$. Compared to baseline, overall HbA1c levels decreased by 0.70%, 0.73%, 0.68% and 0.77% at 3, 6, 9, and 12 months, respectively. PISA reduced by 352.7mm² after 12 months. Moreover, other periodontal health parameters were significantly reduced at 3 months and were sustained at 6, 9 and 12 months. The "Unacceptable" group showed a HbA1c reduction of 1.31% at 12 months follow-up compared to 0.24% in the "Acceptable" group.

Conclusion:

The present study demonstrated that NSPT including maintenance significantly improved glycemic outcomes in participants with T2D, particularly those with baseline HbA1c $>8.0\%$.

Impact of a combined lower carbohydrate and Mediterranean diet on Metabolic Syndrome severity: A randomised controlled trial

Cyriac T¹, Oetsch K¹, Wang T¹, Thornton L¹, Sones B¹, Fraiser T¹, Roach L¹, Do Rosario V¹, Meyer B¹, Probst Y¹, Francois M¹

¹School of Medical, Indigenous and Health Sciences, University of Wollongong, Keiraville, Australia

Objective/Aims: Dietary modification remains a feasible strategy to manage Metabolic Syndrome (MetS) to prevent cardiovascular disease. Emerging research has highlighted the benefits of the low carbohydrate and Mediterranean dietary approaches on cardiometabolic health; however, research combining the two approaches remains limited. This trial aimed to compare the effects of a Traditional Mediterranean (TM), Lower Carbohydrate (LC) and Lower Carbohydrate Mediterranean (LCM) diet on MetS severity.

Methods: Adults (n=139) aged 30-75 years, with at least three MetS risk factors were randomised into either a i) TM (~55% of energy carbohydrate[C]: 15% Protein[P]: 30% Fat [F]), ii) LC or iii) LCM (~35%CHO:20%Pro:45%Fat) diet for 12 weeks. The primary outcome was the MetS Severity Z-Score (MetS-Z), a composite score including sex and ethnicity, calculated pre and post intervention using fasted blood samples for plasma triglycerides, HDL-cholesterol, glucose, systolic blood pressure, body weight and waist circumference. A linear mixed model compared changes across time between the diets.

Results: MetS-Z score did not significantly differ between diets (p=0.055). There was a significant main effect of time on individual MetS parameters like systolic blood pressure (p=0.004), diastolic blood pressure (p=0.002), fasting blood glucose (p<.001) and waist circumference (p<.001). There was a clinically meaningful reduction in systolic blood pressure in the LCM arm (MD: -4.2mmHg) compared to the LC (-2.5) and the TM (-0.7) arms. A clinically meaningful reduction in diastolic blood pressure was seen in both lower carbohydrate arms – LCM (-2.7), LC (-2.5).

Conclusions: Although it could not be concluded which diet had the greatest impact on MetS severity, the three dietary patterns improved at least one of the MetS parameters. The findings from this trial could inform further research and clinical practice for dietary advice based on any of the three dietary patterns – TM, LC, LCM and add to the literature of an understudied dietary pattern like LCM.

Baseline PromarkerD predicts acute eGFR decline during fenofibrate run-in: a FAME-1 Eye trial sub-study

Davis T¹, Januszewski A^{2,5}, Peters K³, Huang M^{4,5}, Mangani A⁵, Davis W¹, Jenkins A^{4,5}, Keech A⁵

¹The University of Western Australia, Fremantle, Australia, ²Sydney Pharmacy School, University of Sydney, Camperdown, Australia, ³Proteomics International, Nedlands, Australia, ⁴Baker Heart and Diabetes Institute, Melbourne, Australia, ⁵NNHMRC Clinical Trials Centre, University of Sydney, Camperdown, Australia

Aim: PromarkerD is a validated plasma biomarker-based prognostic test for diabetic kidney disease. Fenofibrate treatment can cause an early reversible reduction in estimated glomerular filtration rate (eGFR) but there is evidence that patients with the largest initial eGFR decline exhibit the greatest long-term renoprotection. We examined whether baseline PromarkerD predicted the magnitude of the acute eGFR response during fenofibrate run-in in participants with type 1 diabetes in the FAME-1 Eye trial.

Methods: Participants with baseline and pre-randomisation measurements were included. Acute eGFR response was defined as percent eGFR change (Δ eGFR%) during the 6-week run-in based on CKD-EPI 2009 and CKD-EPI 2021 equations. Associations between baseline log-transformed PromarkerD and Δ eGFR% were assessed using unadjusted linear regression. Baseline eGFR was examined in parallel as a comparator predictor. Sensitivity analyses included robust regression, quartile analyses, spline models, trimming of extreme biomarker values, and adjusted models including age, sex and baseline eGFR.

Results: Of 253 participants (mean $\pm$ SD age 48.8 $\pm$ 13.7 years; 87 females), 252 had valid data. The mean $\pm$ SD Δ eGFR% was -6.1 $\pm$ 6.7% using CKD-EPI 2009 (from 101.0 $\pm$ 13.6 to 95.1 $\pm$ 15.1 mL/min/1.73m²) and -5.6 $\pm$ 6.6% using CKD-EPI 2021 (from 105.0 $\pm$ 12.7 to 99.3 $\pm$ 14.5 mL/min/1.73m²). A higher baseline Promarker D score was associated with a greater Δ eGFR%: β =-0.40 (95% CI -0.76 to -0.04; p=0.029) and β =-0.44 (-0.79 to -0.09; p=0.015) using CKD-EPI 2009 and CKD-EPI 2021, respectively. Baseline eGFR alone showed weak associations with Δ eGFR%. Promarker D was not associated with absolute Δ eGFR. Results were directionally consistent in robust and trimmed analyses. Spline models suggested modest non-linearity, with steeper declines at higher Promarker D values. In adjusted sensitivity analyses, associations were stronger.

Conclusions A higher baseline PromarkerD score was associated with a larger Δ eGFR% during fenofibrate run-in. Whether this relationship parallels a significant association between PromarkerD score and long-term renal benefit awaits analysis of full trial follow-up data.

Incident distal symmetric polyneuropathy and changes in health status and diabetes-dependent quality of life in type 2 diabetes: The Fremantle Diabetes Study Phase II

Davis W¹, Davis T¹

¹The University Of Western Australia, Fremantle, Australia

Aim: To determine whether, in type 2 diabetes (T2D), the development of distal symmetric polyneuropathy (DSPN) adversely affects health status/diabetes-dependent quality of life (DDQoL).

Methods: We utilised baseline (2008-2011) and biennial in-person review data from the Fremantle Diabetes Study Phase II. Vibration perception threshold identified DSPN. SF-12 Health Survey-derived Mental/Physical Component Scores (MCS/PCS), and an Average Weighted Impact (AWI) score from the Audit of DDQoL assessment of diabetes effects on aspects of life, were generated. ANCOVA assessed unadjusted/adjusted temporal changes by DSPN status.

Results: Of the total T2D cohort without prevalent DSPN (n=896), 490 (mean age 62 years, 49% male) had valid DSPN status/SF-12 scores at baseline/Year 4; AWI scores/DSPN status were available for 431. All baseline scores were lower in those with incident DSPN (iDSPN; Table). PCS worsened significantly in those with versus without iDSPN after adjustment for baseline PCS score, but this became non-significant after additional age-adjustment. MCS scores did not differ by iDSPN status. AWI scores improved significantly in those with iDSPN even after adjustment.

Conclusions: The development of DSPN did not significantly worsen health status/DDQoL in T2D after adjusting for age and the baseline value. Paradoxically, DDQoL improved.

	iDSPN	N	Mean age (yrs)	Baseline	Year 4	Change (95% CI)	P (ANCOVA unadjusted)	P (ANCOVA baseline value-adjusted)	P (ANCOVA age- and baseline value-adjusted)
PCS	No	362	60.7	45.9±9.9	44.4±10.8	-1.5 (-2.4, -0.5)	0.074	0.004	0.063
	Yes	128	67.2	43.0±11.1	39.9±12.0	-3.1 (-4.8, -1.5)			
MCS	No	362	60.7	52.2±9.6	52.0±9.2	-0.2 (-1.2, 0.8)	0.631	0.945	0.450
	Yes	128	67.2	51.2±9.6	51.5±10.8	0.3 (-1.7, 2.3)			
AWI	No	320	60.2	-1.0±1.2	-1.2±1.7	-0.2 (-0.4, -0.1)	<0.001	0.005	0.012
	Yes	111	67.0	-1.4±1.7	-1.2±1.4	0.2 (-0.03, 0.5)			

Relationships between gastrointestinal symptoms, continuous glucose monitoring metrics and diabetes distress in Type 1 Diabetes

De Greef A^{1,2}, Borg M^{1,2}, Saggs S¹, Borg M², Umapathysivam M⁴, Flabouris K, Ephraums L, Marathe C^{1,2}

¹Royal Adelaide Hospital, Endocrine and Metabolic Unit, Adelaide, Australia, ²Adelaide Medical School, Adelaide University, Adelaide, Australia, ³Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide University, Adelaide, Australia, ⁴Flinders Medical Centre, Bedford Park, Australia

Aim/s

Gastrointestinal (GI) symptoms cause substantial morbidity and impact diabetes self-care. Anxiety and depression are closely associated with GI symptoms. The effect of GI symptoms on diabetes distress (DD), which is distinct from depression, is not known in T1DM. We evaluated gastrointestinal symptoms, CGM metrics and DD in T1DM in an outpatient setting.

Methods

69 participants with T1DM underwent validated assessments of the severity and frequency of GI symptoms, PAGI-SYM and Diabetes Bowel Symptom Questionnaire (DBSQ) respectively, alongside the Diabetes Distress Scale (DDS-17) and collation of 14 days' CGM data and recent HbA1c. Relationships were explored by univariable linear regression analysis, with $P < 0.05$ considered significant.

Results

54/69 (78%) participants experienced GI symptoms in the preceding fortnight. Average glucose, GMI and time in range were positively associated with PAGI-SYM mean scores and subscales without associations between other metrics and PAGI-SYM, the DBSQ or HbA1c (Table 1). PAGI-SYM and DBSQ scores were positively associated with the mean DDS-17 score ($r^2 = 0.331$ and 0.291 , $P < 0.001$).

Conclusion

Severity and frequency of GI symptoms in T1DM were positively associated with DD while the severity, but not the frequency, of GI symptoms was positively associated with blood glucose levels when assessed by CGM, but not HbA1c.

Table 1: Univariable linear regression analysis between PAGI-SYM and predictor variables

Outcome	Predictor	Results (95% CI)	P-value
PAGI-SYM mean score	DDS-17 mean	0.488 (0.251 to 0.725)	<0.001
	Average Glucose	0.081 (0.004 to 0.158)	0.044
PAGI-SYM upper abdominal pain cluster	Time in range	-0.012 (-0.022 to -0.002)	0.018
	Time above range	0.012 (0.003 to 0.022)	0.014
	Average glucose	0.127 (0.033 to 0.220)	0.010
	GMI	0.255 (0.046 to 0.464)	0.020
PAGI-SYM lower abdominal pain cluster	Average glucose	0.108 (0.006 to 0.209)	0.042
DBSQ	DDS-17 mean	2.805 (1.333 to 4.278)	0.001

Comprehensive clinical and cardiovascular-kidney-metabolic (CKM) profile of patients with Type 2 Diabetes Mellitus in a Tertiary Referral Hospital

Efendi Y¹, Kam A^{1,2}, Putri A², Aprilia D^{1,2}, Decroli E^{1,2}, Syahbuddin S^{1,2}

¹Metabolic Endocrinology and Diabetes Division, Internal Medicine Department, Medical Faculty, Universitas Andalas, Padang, Indonesia, ²Metabolic Endocrinology and Diabetes Division, Internal Medicine Department, M. Djamil General Hospital, Padang, Indonesia

Aim:

Type 2 diabetes mellitus (T2DM) is a major driver of cardiovascular disease and chronic kidney disease (CKD). The cardiovascular–kidney–metabolic (CKM) framework highlights the interconnected pathophysiology linking metabolic dysregulation, vascular injury, and renal impairment. This study aimed to describe the clinical and CKM profile of patients with T2DM treated at a tertiary referral hospital.

Methods:

A retrospective cross-sectional study was conducted using medical records of patients with T2DM treated at RSUP M. Djamil Padang, Indonesia, in 2023. Demographic characteristics, anthropometric parameters, blood pressure, glycemic indices, lipid profile, renal function markers, hematologic parameters, peripheral neuropathy screening (monofilament and tuning fork), and ankle–brachial index (ABI) were analyzed. Descriptive statistics were used to summarize CKM-related clinical profiles.

Results:

A total of 668 patients were included (mean age 56.7 years; 56.6% female). Mean BMI was 23.6 kg/m², with 63.2% within the normal range. Mean systolic and diastolic blood pressures were 131.8 mmHg and 76.5 mmHg. Mean HbA1c levels were above the commonly recommended targets (8.34%), with mean fasting glucose of 151.96 mg/dL and postprandial glucose of 202.63 mg/dL. Dyslipidemia was observed, with a mean total cholesterol of 171.16 mg/dL, HDL of 33.35 mg/dL, LDL of 105.03 mg/dL, and triglycerides of 168.15 mg/dL. Mean creatinine was 2.65 mg/dL. Peripheral neuropathy was identified in 29.5% of patients, while ABI findings suggested peripheral arterial disease in a subset of patients.

Conclusion:

Patients with T2DM demonstrate a substantial burden of CKM components, including metabolic dysregulation, renal dysfunction, and vascular complications, highlighting the importance of integrated CKM-oriented risk stratification.

Table 1. Burden of Cardiovascular–Kidney–Metabolic (CKM) Components in Patients with Type 2 Diabetes Mellitus (n = 668)

CKM Domain	Key Indicator	Value
Metabolic Dysregulation	HbA1c (%)	8.34 ± 2.12
	Fasting plasma glucose (mg/dL)	151.96 ± 61.27
Adiposity	BMI (kg/m ²)	23.64 ± 4.29
Atherogenic Lipid Profile	LDL cholesterol (mg/dL)	105.03 ± 36.79
	Triglycerides (mg/dL)	168.15 ± 99.51
Hemodynamic Component	Systolic BP (mmHg)	131.79 ± 19.83
Kidney Dysfunction	Serum creatinine (mg/dL)	2.65 ± 2.68
Microvascular Complication	Peripheral neuropathy, n (%)	197 (29.5)
Macrovascular Indicator	Abnormal ABI (<0.9), n (%)	~8%

Developments in topical antimicrobials in diabetes-related foot ulcers with concurrent infection, a new and improved vehicle; Eutectogels

Evans C^{1,2}, Bryant S⁴, Elbourne A⁴, Bos N⁴, Glastras S^{1,2,3}

¹University Of Sydney, St Leonards, Australia, ²Kolling Institute, St Leonards, Australia, ³Department of Endocrinology, RNSH, St Leonards, Australia, ⁴Royal Melbourne Institute of Technology, Melbourne, Australia

Aims:

To assess the efficacy, delivery and safety profile of topically delivered eutectogel-loaded antimicrobials for future use in diabetes-related foot ulcers (DFU) with concurrent infection.

Methods:

Tetracycline-loaded eutectogels were evaluated using in vitro bacterial sensitivity assays and ex vivo human skin studies. Antimicrobial activity against *Escherichia coli* was assessed using agar well diffusion and colony enumeration assays. Following 24 h incubation at 37 °C, 5% CO₂, zones of inhibition (ZOI) and bacterial colony counts were measured. Skin explants from abdominoplasty waste tissue (n = 5 donors) were cultured overnight. Treatments included topical tetracycline gel (2%, 1%, or 0.5%), vehicle control, 2% sodium dodecyl sulphate, or untreated control. Following incubation, tissues were cleaned, snap-frozen, and stored at -80 °C. Sections were prepared for histology (7 µm) and DESI-MSI (20 µm), and culture media were collected for future analyses. Explants used in this study were obtained from WSLHD HREC Protocol number: 2021/ETH12256 after written informed consent.

Results:

Tetracycline-loaded eutectogels between 0.25-1 wt% of gelling agent exhibited the greatest % cell reduction of *E.Coli*, >99%, with 1.5% exhibiting reduced performance and increased variation. *m/z* [M H-] 443.16116 (Tetracycline) is observed by DESI-mass spectrometry imaging in skin sections after topical application of tetracycline hydrochloride-loaded eutectogel onto ex-vivo human skin. Peaks are isolated to treated sections and are not seen in sections with vehicle or no treatment skin. TUNEL and cleaved caspase-3 imaging and TNFα and IL-6 release ELISA results are pending (estimated completion 25/05/2026).

Conclusions:

Poor perfusion in DFU limit systemic antimicrobial delivery to the ulcer site. Our preclinical data show the optimised eutectogel-loaded tetracycline formulation is effective against gram-negative bacteria, successfully delivered, and potentially safe in human skin pending further results.

Youth with Type 1 Diabetes temporal show temporal changes in kidney function during transition from paediatric to adult care

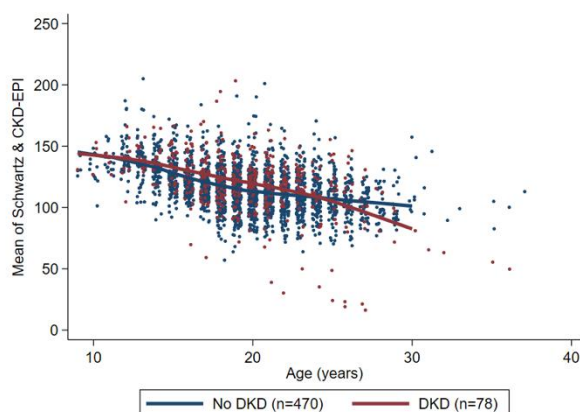
Forbes J^{1,3}, Pham U^{1,3}, Cardinal S¹, Baskerville T¹, fotheringham a^{1,3}, D'Silva N², Nisbet J², Teasedale S², Johnson D^{3,4}, Barrett H^{1,2,3}, Phillips L^{1,2,3}

¹Mater Research - The University Of Queensland, Woolloongabba, Australia, ²Mater Health - Endocrinology and Diabetes, Woolloongabba, Australia, ³The University of Queensland, St Lucia, Australia, ⁴Kidney and Transplant Services, Princess Alexandra Hospital, Woolloongabba, Australia

Aims: With increasing rates of diabetes in youth, understanding modifiable factors predicting kidney (DKD) and cardiovascular disease in early life is key for maximising utility of kidney protective agents.

Methods: All youth with type 1 diabetes presenting at a single centre, Mater Hospital, Brisbane (N=548, M 49% : F 51%, aged 12-27yrs, median diabetes duration 5.5(3.5)) with >2 eGFR measurements at least ~5.8(2.7) yrs apart (Mean of CKiDCr and CKD-EPICr) were retrospectively assessed between 2011-2020.

Results: During follow up, 14.4% were diagnosed with DKD (2.5% ESKD, ISPAD criteria) with significantly greater rates of acute diabetic ketoacidosis (DKA) ($p<0.001$), DKA with acute kidney injury (AKI) (6.2 vs 17.7%; $p<0.001$) and concomitant complications (retinopathy, 10.4 vs 22.8% and peripheral neuropathy 2.1 vs 8.9%; both $p<0.006$) despite the RASi and/or SGLT2i/GLP-RA therapy in ~33%. Baseline eGFR, median of repeated HbA1C, lipids, logUACR, SBP and DBP were each higher in subjects with DKD. Mean of CKiD and CKD-EPI showed slower eGFR decline initially followed by more rapid decrease from ~25 years of age in those diagnosed with DKD at any stage (Figure 1, left).



Multivariable binary logistic regression modelling (age, sex and baseline eGFR adjusted) showed a 52% increase in DKD for each unit increase in mean HbA1C OR 1.52[1.23–1.88]. Similarly, DKD increased by 141% for every unit increase in loguACR OR 2.41[1.84–3.16].

Conclusion: Youth with T1DM in this Australian cohort showed significant acute and chronic complication rates including DKD, despite advances in diabetes care, with residual risk of DKD remaining high.

Systemic immune profiling in a CD-1 mouse model of diabetes complications following RAGE antagonism therapy.

Zambre S^{1,2}, Whiddett R¹, McCarthy D¹, Du C^{1,2}, Tejo E^{1,2}, Loaiza Naranjo J¹, Buckle I^{1,2}, Forbes J^{1,2,3}, Fotheringham A^{1,2}

¹Mater Research Institute- The University of Queensland, Translational Research Institute, Brisbane, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, Brisbane, Australia, ³Department of Medicine, The University of Melbourne, Austin Health, Melbourne, Australia

Aims: RAGE antagonists are immunomodulatory in models of Type 1 diabetes prevention. In this study, systemic immunomodulatory effects were examined following administration of a small molecule RAGE antagonist therapy in an outbred model of diabetes and kidney disease.

Methods: Multiple low dose STZ (5 x 50 mg/kg) was used to induce diabetes in male CD1 outbred mice at 6 weeks of age. Groups of mice with/without diabetes (n=7-12) were treated from 10-22 weeks of age with the RAGE antagonist Azeliragon (Az) or placebo (intragastrically, 3 mg/kg/day, 3x per week). Flow Cytometry was performed at study end on whole blood, mesenteric lymph nodes (MLNs) and spleen to identify key immune cell subsets. Data was tested for normality and one-way ANOVA, Kruskal-Wallis testing with post-hoc testing or students T tests used

Results: Diabetes or RAGE antagonism did not alter major circulating lymphocyte or antigen presenting immune cell populations. In the spleen, diabetes increased live cell proportions of MHCII+F480^{lo}CD11b+CD11c+ monocyte derived DCs (moDCs) (~3-fold, p<0.005), CD4+ T cells (~0.2-fold increase; p<0.05) and increased expression of proinflammatory receptor RAGE expression on CD8+T cells (p<0.05). Azeliragon treatment attenuated the diabetes related increases in splenic moDCs (p<0.05), also increasing splenic CD4+CD25+FoxP3+ Tregs (~0.6-fold, P<0.05) and decreasing MHCII+CD11c+CD11b-CD8+ conventional DCs (~0.5-fold decrease; p<0.05).

In the MLN, with diabetes there were changes in live cell proportions of MHCII+F480+CD11b+ macrophages (~0.6-fold increase P<0.01) which trended towards decreasing with Azeliragon (p=0.053). Diabetes increased RAGE expression on CD4+ and CD8+T cells (p<0.05). Azeliragon decreased RAGE expression on CD4+ T cells (p= 0.01) and trended towards decreasing CD8+ T cell RAGE (p=0.07).

Conclusion: Diabetes specific immune changes were seen in splenic and mesenteric immune compartments but not in the blood. RAGE antagonism showed immunomodulatory effects, increasing Tregs and attenuating diabetes associated increases in moDCs and RAGE expression on T cells.

Comparison of mRNA and proteins in complications of type 2 diabetes: Integrating proteomics with transcriptomics

Francis H¹, Januszewski A^{1,2}, Mangani A¹, O'Rourke M³, Huang M⁴, Ema F¹, Hardikar A⁵, Joglekar M⁵, Sullivan D⁶, Scott R⁷, Jenkins A⁴, Molloy M³, Keech A^{1,6}

¹NHMRC Clinical Trials Centre, The University of Sydney, Camperdown, Australia, ²Sydney Pharmacy School, The University of Sydney, Camperdown, Australia, ³Kolling Institute, The University of Sydney, Camperdown, Australia, ⁴Baker Heart and Diabetes Institute, Melbourne, Australia, ⁵Western Sydney University, Campbelltown, Australia, ⁶Royal Prince Alfred Hospital, Camperdown, Australia, ⁷New Zealand Clinical Research Ltd, Christchurch, New Zealand

Aims

Measure mRNA expression of potential protein biomarkers identified previously using proteomics analysis, allowing further analysis of transcriptional regulation and pathway activation underlying vascular complications (CX) in T2D.

Methods:

Total RNA was extracted from citrate plasma samples of 543 individuals with T2D from the FIELD trial (mean±SD: age: 62±7 yrs; T2D duration: 6±6 yrs; HbA1c: 6.8±1.3%). 224 participants had microCX, 142 had macroCX (51 had both types of CX) and 228 had no CX. mRNA expression was quantified using the OpenArray platform and analysed using $\Delta \Delta CT$ values. Pathway analysis was conducted using DAVID software. Neutrophil elastase (NE) protein levels were measured using ELISA.

Results:

Genes (11) detectable in >20% samples were selected for analysis. In the microCX group, the most pronounced gene expression changes vs. the no CX group were observed for clusterin (~2-fold upregulation) and integrin alpha-IIb (~50% downregulation). Similarly, in the macroCX group, clusterin exhibited the strongest upregulation (~2.5-fold), while apolipoprotein F showed the greatest reduction (~20%). Comparative analysis of proteomic and transcriptomic data across study groups revealed that only 32% of gene expression changes (vs no CX) were mirrored at the protein level ($R^2=0.02$), e.g. talin1 showed reduced mRNA and protein expression in individuals who developed micro- and/or macroCX. Gene expression changes not reflected at the protein level suggested potential post-transcriptional or -translational regulation.

Pathway analysis identified the NET formation pathway as a key finding. Elevated levels of NE, a central enzyme of this pathway, were observed in people with CX vs no CX. NE ELISA levels correlated inversely with actin protein expression, a substrate of NE ($R^2=0.92$), suggesting NE enzymatic activity and highlighting elevated NE as a potential pathogenic mechanism in CX.

Conclusion:

These findings underscore the importance of integrating transcriptomic and proteomic analyses to better understand the molecular mechanisms driving vascular complications in T2D.

Among inpatients with diabetes, cardiovascular disease prevalence is high and cardioprotective medication usage is low

Gong J^{1,2,3,4,5}, Barmanray R^{1,3,5}, Kyi M^{1,5,6}, Shaw J^{2,4,7}, Magliano D^{2,4}, Rasyidi F⁵, Dharma M^{1,5,6,8}, Rayman G^{9,10,11,12}

¹Melbourne Health, Melbourne, Australia, ²Baker Heart and Diabetes Institute, Melbourne, Australia, ³Western Health, Melbourne, Australia, ⁴Monash University, Melbourne, Australia, ⁵University of Melbourne, Melbourne, Australia, ⁶Northern Health, Melbourne, Australia, ⁷La Trobe University, Melbourne, Australia, ⁸Monash Health, Melbourne, Australia, ⁹The Diabetes Centre and Diabetes Research Unit, East Suffolk and North East NHS Foundation Trust, Suffolk, United Kingdom, ¹⁰University of East Anglia, Norwich, United Kingdom, ¹¹University of Suffolk, Suffolk, United Kingdom, ¹²Cambridge University, Cambridge, United Kingdom

Background/Aim: Australian reports of inpatients with diabetes that examine their prevalence of cardiovascular diseases, procedures, and devices are scant. We aimed to characterise this population, and to examine cardioprotective glucose-lowering medication use (SGLT2 inhibitors and injectable incretin mimetics).

Methods: We performed a hospital-wide audit in November 2025 of all acute inpatients with diabetes admitted for any condition to a quaternary hospital in Victoria. Data were collected at two timepoints: during admission (demographic and clinical data) and at 30-day follow-up (medications for inpatients discharged by this time).

Results: 162/537 (30%) inpatients had diabetes. Among those with diabetes, 49% were women, the median age was 72 years-old (IQR 63–81 years), and 8.6% had newly-diagnosed diabetes. Of the inpatients with diabetes, 95/162 (59%) had prior or current cardiovascular disease, had undergone a cardiac procedure, and/or had a cardiac device *in situ* (Figure). Of the inpatients with diabetes and cardiovascular disease, 91/95 were discharged by 30-day follow-up. Of these 91 discharged inpatients, 27/91 (30%) were taking an SGLT2 inhibitor prior to admission, of whom six ceased it on discharge. 2/91 (2.2%) patients had a new SGLT2 inhibitor commenced during admission. 8/91 (8.8%) inpatients were taking an injectable incretin mimetic prior to admission and all continued it on discharge. No patients had an incretin mimetic started during admission.

Conclusions: Most inpatients with diabetes have cardiovascular disease. Among inpatients with diabetes and prior or current cardiovascular disease, rates of cardioprotective glucose-lowering medication prescribing are low.

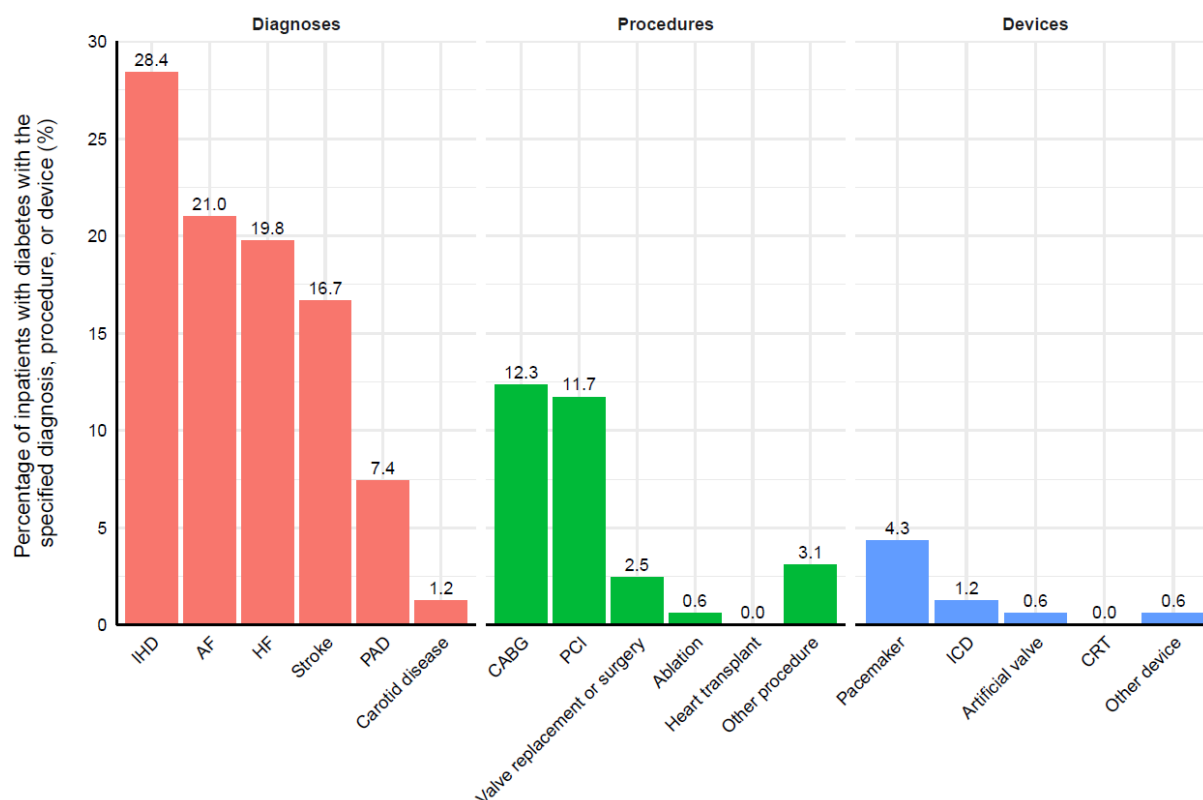


Figure. Point prevalence (%) of cardiovascular diagnoses, procedures, and devices among 162 inpatients with diabetes. Bars arranged in descending order within colour groups, with the exception of 'Other procedure' and 'Other device'. IHD = ischaemic heart disease; AF = atrial fibrillation; HF = heart failure; PAD = peripheral artery disease (lower limb only); CABG = coronary artery bypass graft; PCI = percutaneous coronary intervention; Ablation = cardiac ablation procedure; Other procedure = other cardiovascular procedure; ICD = implantable cardioverter-defibrillator; CRT = cardiac resynchronisation therapy; Other device = other cardiovascular device.

Lipidomic features of gestational diabetes mellitus phenotypes and the mediating effect in predicting fetal overgrowth

Gong Y¹, Wang J², Luo S², Weng J¹

¹Anhui Medical University, Hefei, China, ²University of Science and Technology of China, Hefei, China

Aims

Gestational diabetes mellitus (GDM) is associated with increased risks of adverse pregnancy outcomes. Our previous work demonstrated the heterogeneity of GDM that impaired fasting glucose (IFG) and impaired glucose tolerance (IGT) phenotypes have distinct characteristics and outcomes. In the current study, we further investigate lipidomic profiles and examine the mediating role of lipid metabolite in the associations between prepregnancy obesity and fetal overgrowth.

Methods

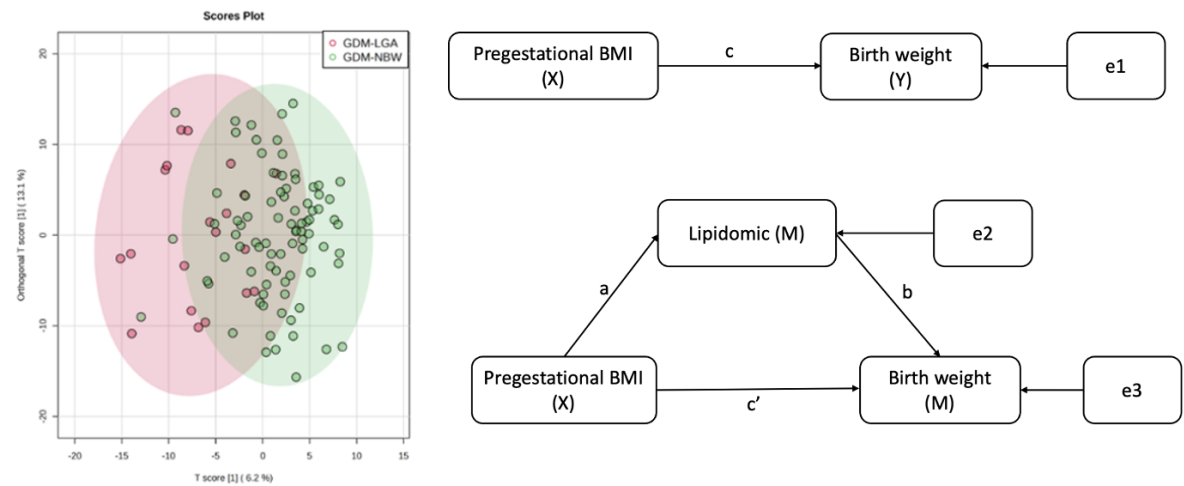
This study is a prospective cohort study (ChiCTR2000030972). Pregnant women were recruited and followed up until delivery. We collected serum samples in mid-pregnancy and used LC-MS to detect lipid metabolites. We used PCA and OPLS-DA to evaluate the distribution of serum lipid metabolites. Bootstrap method was used to explore the mediation effect of lipid metabolites in pregestational obesity and fetal overgrowth.

Results

Of the 1500 women with GDM, 25.2% were IFG and 49.07% were IGT. 226 samples were tested for identifying lipid metabolites. IFG phenotype showed elevated DG 16:0/18:1, Cer d18:0/22:0, SM d36:0, and decreased PC 32:0, PC 28:0, PC 30:3 compared with normoglycemia. IGT phenotype showed elevated FA 22:4, OAHFA 38:4, DG 18:1/22:1, DG 22:1/18:2 and decreased PC 16:0/12:0, PC 29:0, and PC 30:3 compared with normoglycemia. After adjustment, increased FA 22:5, OAHFA 38:4, DG 16:0/18:1 and decreased PC 37:5 were associated with higher birth weight. PC 37:5 mediates pregestational obesity and fetal overgrowth and contributed 10.08% to the total effect.

Conclusion

Phosphatidylcholine 37:5 plays a mediating role linking pregestational obesity and fetal overgrowth in women with GDM.



Proposed evaluation of cardiovascular-kidney-metabolic comorbidities in diabetes-related foot ulceration

Lan N^{1,2,3}, Lasschuit J^{4,5}, Dwivedi G^{1,2,3}, Hamilton E^{1,2}

¹Fiona Stanley Hospital, Perth, Australia, ²Medical School, The University of Western Australia, Perth, Australia, ³Harry Perkins Institute of Medical Research, Perth, Australia, ⁴St Vincent's Hospital, Sydney, Australia, ⁵University of New South Wales, Sydney, Australia

Aims: Diabetes-related foot ulceration (DFU) remains one of the most serious complications of diabetes, associated with high morbidity and premature mortality. Whilst traditionally considered a local wound problem, DFU is increasingly recognised as a marker of systemic multi-morbidity, particularly cardiovascular-kidney-metabolic (CKM) diseases. We aim to determine the prevalence of CKM comorbidities, examine how their prevalence varies according to clinically relevant subgroups, and whether they are associated with foot-related outcomes in patients with DFU.

Methods: This will be an observational, registry-based study using non-identifiable prospectively collected data from the Australian Diabetes Foot Registry. Patients age ≥ 18 years with a diagnosis of diabetes and DFU, but without Charcot foot will be included. The first episode of care per person will be analysed and the prevalence of CKM comorbidities will be assessed descriptively. Stratified analyses will be performed to compare prevalence of CKM comorbidities across peripheral arterial disease status, diabetes type and sex. Associations between CKM comorbidities and foot-related outcomes (ulcer healing and amputation) will be evaluated using multivariable regression analyses.

Results: A total of 49 sites across 38 services have contributed data to the Australian Diabetes Foot Registry by 30 June 2025. To date, approval has been received to include data from 44 sites across 34 services for this study.

Conclusion: By leveraging existing registry data, this study will systematically examine the prevalence of key CKM comorbidities and their associations with foot-related outcomes. In the context of CKM syndrome and the increasing availability of evidence-based treatments to improve CKM outcomes, a shift from the “at-risk foot” to the “at-risk person” has been advocated. However, there remains a gap in evidence to support this shift, particularly in the Australian context. Results will ultimately contribute to improved care of people with DFU.

Malnutrition and probable sarcopenia in individuals admitted with diabetic foot ulcers: A prospective observational study

Harris A¹, Badra M¹, Armstrong E^{1,2}, Wraight P²

¹Clinical Nutrition Department, Royal Melbourne Hospital, Parkville, Australia, ²Department of Diabetes & Endocrinology, Royal Melbourne Hospital, Parkville, Australia

Aim: Diabetes-related foot ulcers (DFU) are a common complication of diabetes and cause of hospitalisation. As a result of impaired wound healing, they are often chronic, and regularly associated with infection and functional decline, placing individuals at high risk of malnutrition and sarcopenia. The prevalence of sarcopenia in this cohort is not well described. This study aims to describe the prevalence of malnutrition and probable sarcopenia in individuals admitted to a diabetic foot unit.

Methods: A single centre, prospective observational study conducted over three months (March – May 2025) for individuals admitted to a tertiary hospital diabetic foot unit. All were referred for dietetic assessment. Data collected included nutritional status, weekly hand grip strength (HGS) and length of stay. Malnutrition was diagnosed using the Global Leadership Initiative on Malnutrition (GLIM) criteria. HGS cut off values were taken from The European Working Group on Sarcopenia in Older People (EWGSOP II). Chi-Squared and Mann-Whitney U tests were used for statistical analysis.

Results: Forty individuals were included (mean age 68 ± 13.5 years, 93% male), with a mean BMI of $28.6 \pm 5.5 \text{ kg/m}^2$ and HbA1c of $8.6 \pm 1.7\%$. Dietetic assessment diagnosed 43% (17/40) as malnourished. Those identified as malnourished on admission had longer hospital admissions compared with well-nourished individuals (15.1 vs 12.6 days, $p=0.546$). Malnutrition was associated with a significantly lower average HGS ($p=0.005$), and probable sarcopenia was identified in 63% (25/40) of the cohort. A decline in HGS throughout admission occurred in 25% (10/40) of the cohort.

Conclusions: Malnutrition and probable sarcopenia were common among individuals admitted to the diabetic foot unit, with malnutrition associated with significantly lower HGS. This highlights the importance of early individualised nutritional assessment including routine monitoring of muscle strength, and implementation of targeted interventions that also consider glycaemia in this high-risk cohort.

A case of severe insulin oedema following closed-loop pump initiation

Hartley E¹, Toumas M¹, Taylor F¹, Wilson C¹, Subedi M¹, Jiang S¹

¹South West Sydney Lhd, Bellevue Hill, Australia

Insulin omission for weight control in type 1 diabetes (T1D) is associated with eating disorders, diabetes-related distress, and suboptimal glycaemic control. Rapid improvement in glycaemia following treatment intensification may precipitate insulin oedema,¹ a rare but distressing complication that can undermine treatment adherence.

Case:

A 21-year-old woman with a four-year history of poorly controlled T1D (HbA1c >14%) and high diabetes distress (PAID 78.75) transitioned to closed-loop insulin delivery (t:slim insulin pump with Control-IQ). One week later, she presented with generalised oedema and acute 15kg weight gain (19% body weight).

She had a prior diagnosis of other specified feeding or eating disorder (OSFED), bulimia nervosa type (low frequency/limited duration), characterised by binge eating, insulin omission, and excessive exercise. Since her T1D diagnosis, she had lost 42 kg (35% body weight). Examination revealed bilateral pitting oedema to the thighs, mild upper limb oedema, without pleural effusion or ascites; and normotension. Investigations demonstrated normal renal, liver, and thyroid function; normal urine albumin–creatinine ratio (1.3 mmol/L); hypoalbuminaemia (26 g/L); clear chest radiograph; and no deep vein thrombosis on Doppler ultrasound. Continuous glucose monitoring (CGM) showed rapid improvement in glycaemia since pump start. Insulin oedema was diagnosed after excluding alternative causes.

Management: Pump therapy was continued with multidisciplinary input, including psychological support. Frusemide 40 mg daily was initiated and gradually weaned. Oedema resolved within two weeks, with weight stabilising 7kg above baseline. At 2–4 weeks, CGM showed marked improvement (time in range 91%, glucose management indicator 6.8%), with high device engagement (CGM wear 100%, Control-IQ use 97%). Meal bolusing became consistent, though anxiety regarding weight and exercise persisted.

Conclusions: Insulin oedema may follow rapid glycaemic normalisation in individuals including those with T1D and disordered eating. Early recognition, continuation of insulin therapy, and intensive multidisciplinary support are essential to preserve metabolic and behavioural gains.

Reference:

1. Vasigh, M., Hopkins, R. Insulin edema after initiation of hybrid closed-loop insulin pump therapy with continuous glucose monitoring: a case report. *Clin Diabetes Endocrinol* 8, 6 (2022).

Auditing clinic-wide complication risk and comparing type 1 diabetes specific macrovascular and microvascular risk calculators

Hemphill M^{1,2,3}, Huang M^{1,3}, Antonius A³, Ryan C^{1,3}, Brazionis L^{1,3}, Cohen N^{1,3}, Jenkins A^{1,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²The University of Notre Dame Australia, Sydney, Australia, ³The University of Melbourne, Melbourne, Australia

Aims: Type 1 diabetes (T1D) complication risk calculators may guide therapy. Using 10 calculators for cardiovascular disease (CVD), diabetic retinopathy (DR), sight-threatening DR (STDR), nephropathy (DN), end-stage kidney disease (ESKD) and neuropathy (peripheral (DPN) and autonomic (DAN)) we determined: high-risk rates; association with demographics; and calculator correlation and concordance.

Methods: Ethics-approved audit (10-years coverage) of Baker Heart and Diabetes Institute T1D clinic adults using calculators: Steno T1 CVD Risk Engine (5-, 10-yr) and ESKD (5-yr); QRISK3 for CVD (10-yr); MSD Cardiovascular Risk Assessment in T1D (5-yr); Diabetes Epidemiology Group (DEG) CVD Risk Prediction T1D (10-yr); LIFE-T1D (5-yr, 10-yr and Life); Fremantle Diabetes Study Phase II (FDSII) for CVD (5-yr); RetinaRisk STDR (1-yr); DRRISK for DR (Current); T1DMicro for DR, DAN, DPN and DN (Current); GFRDecline for kidney failure (2-3-yrs). High-risk rates, Spearman Correlation Coefficients, equality (Wilcoxon Signed-Rank test) and differences by age, sex, technology use (Kruskal-Wallis or Mann-Whitney test) are tested, at $p < 0.05$. Calculator accuracy is being evaluated in a longitudinal dataset.

Results: $n=1447/1480$ without CVD or missing data; male 56%; median age 50 years, T1D 22 years, HbA1c 60mmol/mol.

'High-risk' rates differed by calculator (e.g. 42-55% for 10-yr CVD).

Males higher-risk: CVD (QRISK3, DEG, LIFE-T1D Life) ($p < 0.0001$ -0.0143), kidney complications (except GFRDecline) ($p < 0.0001$ -0.0134), DR (only DRRisk) ($p < 0.0001$), DAN ($p = 0.0048$).

High-risk with *older age*: CVD (except LIFE-T1D-Life), kidney complications (except Steno-ESKD), DR, STDR, DPN (all $p < 0.0001$).

Technology lower-risk: Pumps: CVD (except LIFE-T1D-Life) ($p < 0.0001$), kidney failure (only GFRDecline) ($p = 0.0004$), DPN ($p < 0.0001$). Continuous glucose monitor: CVD (except MSD and LIFE-T1D 5-yr, 10-yr and Life) ($p = 0.0004$ -0.0284), kidney failure (GFRDecline, $p = 0.0003$).

Calculator correlations: CVD ($r = 0.52$ -0.99, $p < 0.0001$), retinopathy ($r = 0.33$ -0.74, $p < 0.0001$) and kidney complications ($r = 0.20$ -0.82, $p < 0.0001$).

Concordance: Median differences $p < 0.0001$. IQRs exceeded limits based on risk categories.

Conclusions: High complication risk is common, higher in males and non-technology users. Calculator correlation is good, but concordance is suboptimal.

Dual inhibition of SGLT1 and 2 promotes cardiorenal protection in mice with Type 1 Diabetes.

Herat L^{1,7}, Balmer L^{1,2}, Oltean S³, Snelson M⁴, Rakoczy E⁵, Schlaich M^{1,6,7}

¹Dobeny Hypertension Centre, University of Western Australia, Perth, Australia, ²School of Medical and Health Sciences, Edith Cowan University, Joondalup, Australia, ³Department of Clinical & Biomedical Sciences, University of Exeter Medical School, St Luke's Campus, Exeter, United Kingdom, ⁴Nutrition & Health Innovation Research Institute (NHIRI), School of Medical and Health Sciences, Edith Cowan University, Joondalup, Australia, ⁵Department of Molecular Ophthalmology, University of Western Australia, Crawley, Australia, ⁶Department of Cardiology and Department of Nephrology, Royal Perth Hospital, Perth, Australia, ⁷Royal Perth Hospital Research Foundation, Perth, Australia

Introduction:

Sodium Glucose Co-transporter (SGLT) proteins are expressed in various organs and play an important role in glucose regulation. SGLT inhibitors are a novel therapeutic strategy for managing glycaemic control in diabetes, with proven cardiorenal benefits. Recently, dual SGLT1/2 inhibitors like Sotagliflozin (SOTAG) were developed targeting both SGLT1 and 2 proteins to further optimise glucose control and reduce adverse cardiorenal events in diabetes.

Aim:

To investigate whether SGLT1/2 inhibition with SOTAG exerts cardiorenal protection in a mouse model of Type 1 Diabetes (T1D).

Method:

SOTAG or Vehicle was administered to T1D Akimba mice (21-week-old) for 2 weeks at a dose of 25mg/kg/day in drinking water. Urine glucose levels, water consumption and body weight were measured weekly. Urine and blood pressures (BP) measurements were collected before and 2 weeks after treatment. Serum, kidney and heart tissues were harvested at the end of the experiment. Tissues were assessed using immunohistochemistry (H&E, PAS, Maser's Trichrome) or biochemistry techniques.

Results:

Short-term SOTAG treatment in T1D Akimba mice significantly improved fasting blood glucose levels (Veh vs SOTAG: 33.3 vs 20.3mmol/l; $p=0.01$), polydipsia, kidney/body weight ratio and systolic BP (Veh vs SOTAG: 4 vs -19mmHg; $p=0.01$). SOTAG also reduced albuminuria, blood urea nitrogen (Veh vs SOTAG: 14.11 vs 10.63mmol/l), serum creatinine (Veh vs SOTAG: 8.28 vs 7.23 μ mol/l) levels and improved kidney pathology. Furthermore, SOTAG improved interstitial fibrosis in the T1D heart.

Conclusion:

SOTAG shows promise as a therapeutic for protecting the heart and kidneys in T1D, with early treatment potentially preventing severe multi-organ damage.

Efficacy and safety of oral semaglutide 25 mg in adults with overweight/obesity: the OASIS 4 RCT

Hocking S¹, Garvey W², do Vale R³, Karlsson T³, Lingvay I⁴, Shaji C⁵, Rubino D⁶

¹Royal Prince Alfred Hospital, Sydney, Australia, ²Department of Nutrition Sciences, University of Alabama at Birmingham, Birmingham, USA, ³Novo Nordisk A/S, Søborg, Denmark., ⁴Department of Internal Medicine/Endocrinology and Peter O' Donnell Jr. School of Public Health, University of Texas Southwestern Medical Center, Dallas, USA, ⁵Novo Nordisk, Bangalore, India, ⁶Washington Center for Weight Management and Research, Arlington, USA

Aims: OASIS 4 (NCT05564117) evaluated once-daily oral semaglutide 25 mg (half the OASIS 1 [NCT05035095] dose) vs placebo in adults with overweight/obesity.

Methods: Participants (≥ 18 years; BMI ≥ 30 kg/m² or ≥ 27 kg/m² with ≥ 1 weight-related comorbidity) were randomised 2:1 to oral semaglutide escalated to 25 mg or placebo for 64 weeks, with lifestyle intervention. Co-primary endpoints were percent weight change and achievement of $\geq 5\%$ weight loss (WL). Confirmatory secondary endpoints were $\geq 10\%$ WL, $\geq 15\%$ WL, $\geq 20\%$ WL, and change in IWQOL-Lite-CT Physical Function score. Efficacy was analysed using the treatment policy estimand with in-trial data unless stated otherwise.

Results: Participants (semaglutide n=205; placebo n=102) were mostly female (78.8%), with a mean age of 48 years, and mean bodyweight of 105.9 kg. Mean weight change was -13.6% with semaglutide vs -2.2% with placebo ($p < 0.0001$), and -16.6% vs -2.7% ($p < 0.0001$) using on-treatment data. More participants achieved $\geq 5\%$ WL (79.2% vs 31.1%), $\geq 10\%$ WL (63.0% vs 14.4%), $\geq 15\%$ WL (50.0% vs 5.6%), and $\geq 20\%$ WL (29.7% vs 3.3%) with semaglutide vs placebo (all $p < 0.0001$). Greater improvements in IWQOL-Lite-CT Physical Function score occurred with semaglutide vs placebo (estimated treatment difference 7.7 points, 95% confidence intervals 3.3 to 12.2; $p = 0.0006$). Significant improvements in cardiometabolic risk factors (glycated haemoglobin, fasting plasma glucose, C-reactive protein, triglycerides) were observed with semaglutide vs placebo. Incidence of all adverse events (AEs) was 93.1% for semaglutide and 85.3% for placebo. AEs leading to permanent treatment discontinuation (semaglutide 6.9% vs placebo 5.9%; mostly gastrointestinal AEs) were comparable between groups. Serious AEs were lower for semaglutide (3.9%) vs placebo (8.8%).

Conclusion: Once-daily oral semaglutide 25 mg significantly reduced bodyweight, increased physical function, and improved metabolic health in adults with overweight/obesity, with comparable efficacy to semaglutide 50 mg in the OASIS 1 trial. Safety and tolerability were consistent with the well-established profile of semaglutide.

Sexual dysfunction and its Associated psychological factors in women with Type 2 Diabetes: A cross-sectional study from Iran

Hosseini-Marnani E^{1,2}, Hosseini A³, Rostampour K³, Shams-Rad S³, Salehi-Abargouei A^{3,4}, Jones K^{1,2,5}, Horowitz M^{1,2,5}, Marathe C^{1,2,5}

¹Adelaide University, Adelaide, Australia, ²Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide University, Adelaide, Australia, ³Research Center for Food Hygiene and Safety, Department of Nutrition, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, ⁴Yazd Cardiovascular Research Center, Non-communicable Diseases Research Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, ⁵Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia

Aims

Female sexual dysfunction (FSD) is common in women with type 2 diabetes (T2D) and adversely affects quality of life. However, data from Asian countries such as Iran remain limited. We evaluated the prevalence of FSD and associated psychological factors among women with T2D in Iran.

Methods

In this cross-sectional study, we recruited 270 women (150 with T2D and 120 controls) from Yazd, Iran.

Sexual function was assessed using the Female Sexual Function Index (FSFI).

Psychological factors including depressive symptoms and diabetes-related distress were assessed using the Patient Health Questionnaire-9 (PHQ-9) and Diabetes Distress Scale-17 (DDS-17), respectively.

Results

Although sexual dysfunction was common in both groups (94.0% in T2D vs. 84.2% in controls), women with T2D had significantly lower FSFI scores in domains of arousal, lubrication, orgasm, satisfaction, and pain after age adjustment (all $p \leq 0.002$). Furthermore, FSFI score declined with increasing depressive symptom severity and remained lower in women with T2D across PHQ-9 categories (Fig 1). Depressive symptoms were associated with higher odds of FSD in unadjusted analyses (OR 1.23, 95% CI 1.03–1.54), but not after adjustment (adjusted OR 1.32, 95% CI 0.87–2.31). Similarly, diabetes-related distress was not independently associated with FSD (adjusted OR 1.06, 95% CI 0.79–1.37).

Conclusion

Women with T2D experienced impaired sexual function across domains compared with controls and associated with depressive symptoms. Longitudinal studies are warranted to assess the impact of co-existing FSD and depression on glycaemic control and diabetes outcomes.

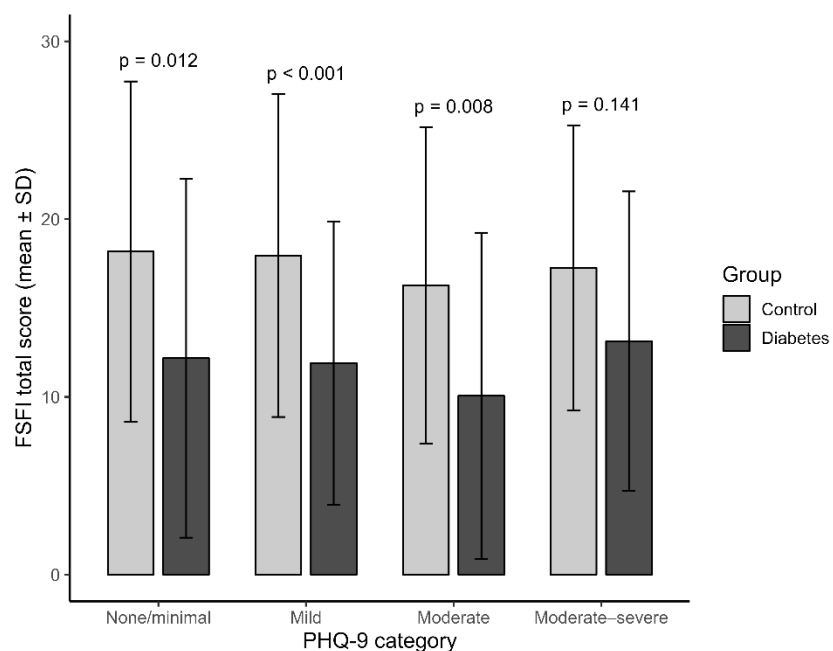


Figure 1. FSFI total score across PHQ-9 categories in women with and without T2D.

Anthropometric indices of obesity and their association with diabetic neuropathy in type 2 diabetes: A systematic review and meta-analysis

Hosseini-Marnani E^{1,2}, Salehi-Abarghouei A^{3,4}, Rostampour K³, Kamruzzaman M^{1,2}, Shams-Rad S³, Triplett J^{1,2,5,6}, Marathe J^{1,7,8}, Jones K^{1,2,9}, Horowitz M^{1,2,9}, Marathe C^{1,2,9}

¹Adelaide Medical School, Adelaide University, Adelaide, Australia, ²Centre of Research Excellence in Translating Nutritional Science to Good Health, Adelaide University, Adelaide, Australia, ³Research Center for Food Hygiene and Safety, Department of Nutrition, School of Public Health, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, ⁴Yazd Cardiovascular Research Center, Non-communicable Diseases Research Institute, Shahid Sadoughi University of Medical Sciences, Yazd, Iran, ⁵Department of Neurology, Royal Adelaide Hospital, Adelaide, Australia, ⁶Department of Neurology, Flinders Medical Centre, Adelaide, Australia, ⁷Department of Cardiology, Central Adelaide Local Health Network, Adelaide, Australia, ⁸Lifelong Health Theme, South Australian Health and Medical Research Institute, Adelaide, Australia, ⁹Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia

Aims

Obesity is an independent risk factor for the development of neuropathy (DN) in type 2 diabetes (T2D). However, it remains unclear which index of obesity correlates best with DN. We conducted a systematic review and meta-analysis to evaluate associations between multiple obesity indices and DN.

Methods

PubMed, Scopus, Web of Science, and Embase were systematically searched from 1980 to 2025 for observational studies comparing body weight, visceral fat (%), body mass index (BMI), waist circumference (WC), and waist-to-hip ratio (WHR), between people with and without DN. Mean differences (MDs), odds ratios (ORs), and hazard ratios (HRs) were pooled using random-effects models. Subgroup and meta-regression analyses explored heterogeneity by neuropathy type, region, study design, diabetes duration, and HbA1c.

Results

Sixty-nine studies (53 cross-sectional, 11 cohort, 5 case-control) were included. Higher BMI was associated with DN (OR = 1.09; 95% CI: 1.02–1.16) and mean differences (MD = 0.55; 95% CI: 0.22–0.89). WC was also associated with increased DN risk (MD = 2.05 cm; 95% CI: 1.15–2.94; HR = 1.25; 95% CI: 1.04–1.51), but not in pooled OR analyses (OR = 1.02; 95% CI: 1.00–1.05). WHR showed only a weak association (MD = 0.01; 95% CI: 0.00–0.01). Body weight alone was not associated with neuropathy (MD = 0.26, 95% CI: –2.45–2.96). Similarly, visceral fat (%) showed no significant association (MD = 1.14%; 95% CI: –2.77–5.05).

Associations were stronger for peripheral than for autonomic neuropathy. Meta-regression suggested diabetes duration and HbA1c contributed to heterogeneity.

Conclusion

BMI and WC were the most consistent indices associated with DN in individuals with T2D, whereas body weight showed no significant association. These findings suggest that both general and central obesity contribute to DN risk. Routine assessment of these indices may improve detection and risk stratification of DN in T2D.

Construction and validation of prediction model for late-stage dysfunction of arteriovenous fistula in maintenance hemodialysis patients with diabetic kidney disease

Huang J¹, CAO W², SUN C¹

¹Clinical Nursing Teaching and Research Section, The Second Xiangya Hospital of Central South University, Changsha City, China, ²Xiangya School of Nursing, Central South University, Changsha City, China

Aim/s: This study aimed to develop and validate a robust prediction model for late-stage arteriovenous fistula (AVF) dysfunction in patients with diabetic kidney disease (DKD) on hemodialysis, to enable early intervention.

Methods: We conducted a retrospective multicenter study including 728 DKD patients from two hospitals. A machine learning-based prediction model was developed using clinical and laboratory variables, validated internally and externally, and evaluated with ROC analysis, calibration, and decision curve analysis.

Results: The analysis identified several significant risk factors associated with late-stage arteriovenous fistula dysfunction in diabetic kidney disease patients undergoing maintenance hemodialysis. Key predictors included intra-dialytic hypoglycemia, post-dialysis compression time exceeding 30 minutes, diabetic peripheral vascular disease, cardiovascular disease, HDL levels, gender, and history of temporary catheter placement. Machine learning model development demonstrated that the Random Forest model achieved superior performance compared to other predictive models. In internal validation, the model showed excellent discriminative ability with an area under the curve (AUC) of 0.911, while external validation maintained strong performance with an AUC of 0.84. The prediction model demonstrated good calibration and clinical utility in both validation cohorts.

Conclusion: This study successfully developed and validated a robust prediction model for late-stage arteriovenous fistula dysfunction in diabetic kidney disease patients on maintenance hemodialysis. The model shows promising clinical applicability and can assist clinicians in early identification of high-risk patients, enabling timely interventions to improve vascular access outcomes and patient quality of life.

Keywords: diabetic kidney disease, maintenance hemodialysis, autogenous arteriovenous fistula, arteriovenous fistula failure, prediction model

Variability in traditional risk factors in a large Type 2 diabetes clinic cohort, their correlates and associates with renal damage.

Galhinderachchi M^{1,3}, Huang M^{1,2,3}, Nanayakkara N¹, Cohen N¹, Jenkins A^{1,2,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²University of Melbourne, Melbourne, Australia, ³Monash University, Melbourne, Australia

Aim: In Type 2 diabetes (T2D), risk factor variability is associated with chronic complication risk. We aimed to determine (i) risk factor levels, variability, and their correlation; and (ii) whether risk factor variability and treatments were associated with most recent urine albumin creatinine ratio (UACR) and eGFR (CKD-Epi 2021).

Methods: Ethics-approved audit of 2020-2025 Baker Institute medical records. Demographics, risk factors and their variability were analysed: descriptive statistics, Spearman's correlation, uni- and multi-variate regression analyses with adjustments for confounders and baseline levels. Significance at $p < 0.05$.

Results: *Characteristics:* n=6042 T2D adults, age: 64.7(15.4)years, 59% male, HbA1c: 7.7(1.4)%, BMI: 29.9(6.3)kg/m², BP: 132(15)/76(11)mmHg, ln(total cholesterol (TC)): 1.4(0.2)mmol/L, ln(triglycerides): 0.5(0.5)mmol/L, ln(LDL-C): 0.5(0.5)mmol/L, ln(HDL-C): 0.2(0.3)mmol/L, ln(UACR) 1.14(1.47)mg/mmol, eGFR: 75(24)mL/min/1.73m². Data as mean(SD) or coefficient(standard error).

Risk factors mean and variability significantly but weakly ($R^2 < 0.1$) correlated. Table shows the variability (SD) in HbA1c, SBP, DBP, ln(HDL), ln(LDL), ln(TC), eGFR, and ln(UACR) were significant independent associate of worsened latest renal function (eGFR and ln(UACR)), with and without adjustment for age, sex, and baseline values. Treatments (insulin, metformin, sulfonylurea, DPP4, SGLTi) are also independent associates of renal function.

Conclusions. Variability in traditional risk factors weakly correlated. Higher HbA1c, blood pressure, and lipid variability were associated with renal damage.

<u>Coefficient (SE)</u>	<u>Latest eGFR</u>	<u>Latest eGFR†</u>	<u>Latest ln(UACR)</u>	<u>Latest ln(UACR)†</u>
HbA1c SD	-0.85(1.08)	-2.28(0.71)**	0.17(0.06)**	0.03(0.04)
SBP SD	-0.81(0.11)***	-0.30(0.07)***	0.04(0.01)***	0.01(0.00)**
DBP SD	-1.09(0.17)***	-0.64(0.11)***	0.06(0.01)***	0.01(0.01)*
ln(HDL-C) SD	-14.14(7.27)	-9.98(4.73)*	0.93(0.44)*	0.35(0.28)
ln(LDL-C) SD	-6.14(2.99)*	-1.77(1.93)	0.44(0.18)*	0.33(0.12)**
ln(TC) SD	-1.01(6.29)	-9.73(4.11)*	1.00(0.38)*	0.60(0.25)*
eGFR SD	-0.53(0.07)***	-0.33(0.05)***	0.02(0.01)***	0.01(0.00)**
ln(UACR) SD	-8.60(1.63)***	-5.29(1.09)***	0.61(0.08)***	0.28(0.05)***
†, Adjusted for age, sex, and baseline value. *, $p<0.05$; **, $p<0.01$; ***, $p<0.001$.				

Mechanistic study on the pathogenic role of cell division autoantigen 1 in diabetic kidney disease

Huang M¹, Tang J¹, Wu T¹, Cooper M¹, Chai Z¹

¹Department of Diabetes, School of Translational Medicine, Monash University, Melbourne, Australia

Aims: This study aims to evaluate the effectiveness of CDA1 deletion in reducing DKD progression in Akita mice. Additionally, transcriptomic profiling (mRNA-seq) of kidney tissues was conducted to systematically identify CDA1-regulated biochemical and signaling pathways and downstream effector networks.

Methods: A novel hybrid Akita/CDA1 knockout (KO) mouse strain was generated and analyzed across three independent cohorts at 10, 16, and 20 weeks of age to assess the temporal contribution of CDA1 to DKD progression. Transcriptomic profiling was performed using total RNA isolated from kidney tissues at 16 weeks of age (n = 6/group).

Results: At 16 weeks, Akita mice demonstrated significant renal injury, characterized by a 2.9-fold elevation in albumin-to-creatinine ratio (ACR), a 1.7-fold increase in glomerulosclerosis index (GSI), and a 2-fold upregulation of profibrotic markers. CDA1 deletion markedly attenuates these alterations, resulting in a 30% reduction in ACR, a 29% decrease in GSI, and normalization of collagen I and collagen III expression to near non-diabetic control levels. Notably, the renoprotective effects of CDA1 deletion were more pronounced at 20 weeks, with further reductions in ACR and GSI. Mechanistically, CDA1 deletion attenuated TGF- β /Smad pathway by reducing diabetes-induced TGFBR1 and p-Smad3 expression at 20 weeks. RNA-seq analysis revealed that CDA1 deletion significantly modulates fibrosis-related pathways and identifies dysregulated pathways involved in cell cycle regulation.

Conclusion: Targeting CDA1 effectively attenuated diabetes-associated glomerular injury and fibrosis in Akita mice, providing a rationale for developing CDA1 inhibitors as a potential therapeutic strategy for DKD.

Activated oligoadenylate synthetase-ribonuclease L pathway promotes endothelial pyroptosis and impairs diabetic wound healing via thioredoxin-interacting protein m6A methylation

Huang Y², Pan Q¹

¹Department of Endocrinology, Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing, China, ²Department of Endocrinology, Beijing Hospital, Fifth School of Clinical Medicine, Peking University, Beijing, China

Aim: Diabetic skin exhibits aberrant activation of antiviral enzymes even in the absence of infection, yet the pathological significance of this dysregulation remains unclear. This study aimed to determine whether sustained activation of the OAS/RNase L pathway under hyperglycemic conditions contributes to endothelial pyroptosis and impaired wound healing in diabetes.

Methods: Human umbilical vein endothelial cells (HUVECs) were cultured under high-glucose conditions and stimulated with lipopolysaccharide (LPS) to mimic diabetic inflammatory stress. RNase L expression was down-regulated using small interfering RNA (siRNA) to assess its role in pyroptosis. The activity of the OAS/RNase L pathway, levels of pyroptosis-related markers, METTL3 expression, m6A methylation of TXNIP mRNA, and TXNIP expression were evaluated in vitro. In vivo, the therapeutic effect of the RNase L inhibitor ellagic acid (EA) was examined in streptozotocin (STZ)-induced diabetic mice, with assessments of skin pyroptosis and wound healing outcomes following oral administration.

Results: High glucose conditions induced abnormal activation of the OAS/RNase L pathway in HUVECs, which significantly exacerbated LPS-induced pyroptosis. Silencing RNase L attenuated endothelial pyroptosis, indicating a critical role for RNase L in this process. Mechanistically, hyperactivated RNase L suppressed the expression of the m6A methyltransferase METTL3, resulting in reduced m6A methylation of TXNIP mRNA. Hypomethylation of TXNIP mRNA decreased its degradation, leading to elevated TXNIP expression and enhanced pyroptotic signaling. In STZ-induced diabetic mice, oral administration of ellagic acid markedly reduced skin pyroptosis and significantly improved wound healing.

Conclusion: Hyperglycemia-driven activation of the OAS/RNase L pathway increases endothelial cell susceptibility to pyroptosis by disrupting METTL3-dependent m6A methylation of TXNIP mRNA. Pharmacological inhibition of RNase L alleviates inflammatory pyroptosis and promotes wound repair in diabetic conditions. These findings identify the OAS/RNase L-METTL3-TXNIP axis as a critical pathogenic mechanism and a potential therapeutic target for diabetic wound healing.

Geographic access to healthcare and risk of sight-threatening diabetic retinopathy in Australians with type 2 diabetes

Januszewski A^{1,2}, Li L², O'Connell R², Colman P³, d'Emden M⁴, Sullivan D^{5,6}, Keech A²

¹University Of Sydney, Sydney Pharmacy School, Camperdown, Australia, ²University Of Sydney, NHMRC Clinical Trials Centre, Camperdown, Australia, ³Royal Melbourne Hospital, Parkville, Australia, ⁴Royal Brisbane Hospital, Brisbane, Australia, ⁵Royal Prince Alfred Hospital, Department of Chemical Pathology, Camperdown, Australia, ⁶University of Sydney, Faculty of Medicine and Health, Camperdown, Australia

Background

Limited geographic access to healthcare may delay detection and management of diabetic retinopathy. Whether reduced access is associated with the development of sight-threatening diabetic retinopathy remains uncertain.

Methods

We analysed 2,566 participants with type 2 diabetes randomised to the placebo arm of the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) trial. Residential addresses were geocoded and linked to national healthcare facility datasets. Mean distance to the 10 nearest health care facilities was calculated.

Area-level socioeconomic status (SES) was assessed using Census-derived Index of Relative Socioeconomic Disadvantage (IRSD), Index of Education and Occupation (IEO), and Index of Economic Resources (IER), dichotomised at the state-specific median. Analyses focused on sight-threatening retinopathy.

Results

Among participants residing in areas with SES values below the median, those who developed retinopathy lived further from healthcare services than those who did not. Median distance to the nearest GP practices was greater among affected versus unaffected participants across all indices (IRSD: 2.3 [1.9–8.0] vs. 1.9 [1.4–3.8] km, $p=0.028$; IER: 2.5 [1.9–9.7] vs. 1.9 [1.4–4.4] km, $p=0.011$; IEO: 2.5 [1.9–7.3] vs. 2.1 [1.5–4.6] km, $p=0.046$). For hospital access, distances were longer among affected participants for IER (13.9 [6.3–28.9] vs. 9.7 [5.1–21.6] km, $p=0.033$) and IEO (13.9 [8.9–26.9] vs. 10.5 [6.4–21.5] km, $p=0.030$), similar difference in IRSD ($p=NS$).

Among participants residing in areas with SES indices values above the median, distances to health care services did not differ significantly by retinopathy status. Across both outcome groups, absolute distances in higher-SES areas were consistently shorter than those observed in lower-SEIFA areas (all $p<0.05$).

Conclusions

Greater distance to healthcare services was associated with sight-threatening diabetic retinopathy only among participants residing in socioeconomically disadvantaged areas, highlighting geographic access as a potential structural modifier of advanced diabetic eye disease risk.

Nox5 deficiency mitigates renal injury in a rabbit model of metabolic syndrome through modulation of oxidative stress, ER stress and ferroptosis

Jha J¹, Ran E², Yang J², Cai L², Yang Q², Cai F², Chai Z¹, Cooper M¹, Liu F², Jandeleit-Dahm K¹

¹Department of Diabetes, Monash University, Melbourne, Australia, ²Department of Nephrology, West China Hospital of Sichuan University, Chengdu, China

Background and Aim

Elevated NADPH oxidase 5 (NOX5) increases reactive oxygen species (ROS), promoting inflammation, fibrosis, and cellular stress that contribute to diabetic kidney disease. In vivo studies have been limited because common rodent models lack the NOX5 gene, and transgenic systems may not fully replicate its role in human pathophysiology. As rabbits naturally express NOX5, this study aimed to determine NOX5's pathogenic role in kidney injury in metabolic syndrome (MetS) with diabetes using a Nox5 knockout (KO) rabbit model.

Methods

A Nox5 KO rabbit strain was generated via CRISPR/Cas9. WT and KO rabbits (8–10 weeks, 2.0–2.5 kg; n=6/group) were fed a high-fat diet (0.5% cholesterol, 4% peanut oil, 8% sucrose) for 16 weeks. At week 9, rabbits received intravenous alloxan (120 mg/kg) to induce insulin deficiency, while controls on chow received saline. Animals were euthanized at the study endpoint, and kidney, plasma, and urine samples were analysed for renal function, fibrosis, oxidative stress, endoplasmic reticulum (ER) stress, and ferroptosis.

Results

High-fat diet induced insulin resistance in both WT and KO rabbits at 8 weeks (HOMA-IR: WT 9.4 ± 2.1 vs 3.1 ± 0.8 ; KO 6.6 ± 1.1 vs 2.9 ± 0.7). Alloxan caused hyperglycaemia (WT 22.1 ± 3.6 vs 6.1 ± 1.1 mmol/L; KO 20.5 ± 1.5 vs 6.2 ± 0.8). Both groups developed dyslipidaemia, fatty liver, and elevated AST, confirming MetS. MetS-induced albuminuria in WT rabbits (UACR 65.1 ± 6.1 vs 13.6 ± 5.8) was attenuated in KO rabbits (45.9 ± 5.4 , $p < 0.01$). Nox5 deletion reduced renal fibrosis (collagen IV, fibronectin), oxidative stress ($\approx 40\%$ nitrotyrosine), ER stress ($\approx 50\%$ calnexin), and ferroptosis ($\approx 50\%$ ACSL4).

Conclusion

This study provides the first in vivo evidence that NOX5 drives renal injury in MetS, identifying it as a potential therapeutic target to reduce kidney damage in MetS and type 2 diabetes.

Predictive value of traditional and novel obesity indicators for diabetic retinopathy: A 5-year cohort study

Jia W^{1,4}, Li J¹, Chen H¹, Li Z^{2,1}, Bao P¹, Yu R¹, Tian J^{2,1}, Lang D^{2,1}, Bao Y¹, Wang X³, Wang Q³, Cai C^{1,4}, Liu Y^{1,4}

¹Shanghai Diabetes Institute, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Department of Endocrinology and Metabolism, Shanghai Key Laboratory of Diabetes Mellitus, Shanghai Clinical Center for Diabetes, Shanghai Key Clinical Center for Metabolic Disease, Shanghai Research Center for Endocrine and Metabolic Diseases, Office for Primary Diabetes Care of the National Basic Public Health Service Program, Shanghai, China, Shanghai, China, ²School of Public Health, Shanghai Jiao Tong University School of Medicine, Shanghai, China, Shanghai, China, ³Department of Ophthalmology, Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, Shanghai, China, ⁴Institute for Proactive Healthcare of Shanghai Jiao Tong University, Shanghai, China, Shanghai, China

Aim

The contribution of obesity to diabetic retinopathy (DR) remains controversial. This study aims to compare the predictive value of various obesity indicators for DR incidence.

Methods

Obesity indicators—including BMI, waist circumference (WC), waist-to-hip ratio (WHR), waist-to-height ratio (WHtR), body roundness index (BRI), and magnetic resonance imaging–derived visceral fat area (VFA)—were assessed. Incident DR over a median follow-up of five years was ascertained. Multivariable logistic regression and restricted cubic spline analyses were used to examine associations between obesity indicators and DR risks.

Results

A total of 1,031 Chinese adults with diabetes and no retinopathy at baseline were included. During follow-up, 65 participants (6.3%) developed DR. WHR showed the strongest association. Each standard deviation increase in WHR was associated with a 33% higher risk of DR after full adjustment (odds ratio 1.33, 95% CI 1.08–1.64), and participants in the highest WHR tertile had more than twice the risk of DR compared with those in the lowest tertile. Associations of WHR with DR were more pronounced in females. WHtR, BRI, WC, and VFA showed borderline associations with DR.

Conclusion

WHR provides a simple, low-cost indicator for identifying individuals with diabetes at increased risk of retinopathy in communities.

Keywords: Diabetic retinopathy, Central obesity, Waist-to-hip ratio, Visceral adiposity, Prospective cohort

A multidimensional nomogram for early risk stratification of probable cognitive impairment in adults with Type 2 diabetes: A multicenter study

Jiang X¹, Ye C¹, Liu Q¹

¹Hainan Medical University, Haikou, China

Aim: This study aimed to develop and internally validate a multidimensional model to predict probable cognitive impairment in adults with type 2 diabetes.

Methods: A multicenter cross-sectional study was conducted among 1,018 hospitalized adults with type 2 diabetes recruited from the endocrinology departments of five tertiary hospitals in southern China between October 2023 and December 2024. Cognitive function, sleep quality, and frailty were assessed using the AD8, Pittsburgh Sleep Quality Index, and Tilburg Frailty Indicator. Variables associated with probable cognitive impairment in univariate analyses ($P < 0.05$) were entered into multivariable logistic regression. A dynamic nomogram was constructed and internally validated using 1,000 bootstrap resamples. Model performance was evaluated by discrimination, calibration, and decision curve analysis.

Results: Probable cognitive impairment was identified in 48.8% of participants. Six variables were independently associated with cognitive impairment risk, including sleep latency, habitual sleep efficiency, sleep disturbances, use of sleeping medication, physical frailty, and psychological frailty. The nomogram demonstrated good discrimination ($AUC=0.855$; 95% CI 0.831–0.879), with similar performance after internal validation (bootstrap-corrected $AUC=0.854$). Calibration showed close agreement between predicted and observed risks (mean absolute error=0.009). Decision curve analysis indicated meaningful net clinical benefit across a wide range of threshold probabilities (14%–94%).

Conclusion: This multidimensional nomogram provides an accurate and clinically applicable tool for early risk stratification of probable cognitive impairment in adults with type 2 diabetes. By incorporating modifiable sleep and frailty indicators, the model may support targeted screening and timely preventive strategies in routine endocrinology practice. The nomogram is intended as a screening and risk stratification tool rather than a diagnostic or etiological model.

Urinary L-FABP as a potential early marker of subclinical tubular injury in prediabetes with central obesity

Kam A^{1,2}, Decroli E^{1,2}, Aprilia D^{1,2}, Yudanda V³

¹Metabolic Endocrinology and Diabetes Division, Internal Medicine Department, Medical Faculty, Universitas Andalas, Padang, Indonesia, ²Metabolic Endocrinology and Diabetes Division, Internal Medicine Department, Dr. M. Djamil General Hospital, Padang, Indonesia, ³Internal Medicine Department, Medical Faculty, Universitas Andalas, Padang, Indonesia

Aim:

Prediabetes affects hundreds of millions globally and is increasingly recognized as a stage at risk for early organ damage. Renal tubular injury may precede overt diabetic kidney disease, yet sensitive biomarkers for early detection remain underutilized. This study aimed to investigate urinary liver-type fatty acid binding protein (L-FABP) as a marker of early tubular injury in individuals with prediabetes and central obesity, a high-risk metabolic phenotype characterized by insulin resistance and visceral adiposity.

Methods:

This analytical cross-sectional study was conducted at Dr. M. Djamil General Hospital, Padang, Indonesia, from December 2024 to August 2025. Twenty-six adults with prediabetes and central obesity (defined by Asian waist circumference criteria) were enrolled through proportional random sampling. Prediabetes was diagnosed based on impaired fasting glucose and/or impaired glucose tolerance. Urinary L-FABP levels were measured using an enzyme-linked immunosorbent assay and corrected for urinary creatinine ($\mu\text{g/gCr}$). Clinical and metabolic parameters were recorded and analyzed descriptively.

Results:

Participants had a mean age of 37.46 ± 1.57 years and a mean waist circumference of 106.57 ± 2.39 cm. Mean fasting plasma glucose was 112.5 ± 1.69 mg/dL, and mean 2-hour post-load glucose was 159.69 ± 4.53 mg/dL. The mean urinary L-FABP level was 7.84 ± 0.57 $\mu\text{g/gCr}$, indicating elevated tubular injury marker levels despite the absence of clinically overt diabetic kidney disease. These findings suggest that subclinical renal tubular stress is already present in prediabetic individuals with central obesity.

Conclusion:

Prediabetes with central obesity is associated with elevated urinary L-FABP levels, supporting the presence of early renal tubular injury prior to overt diabetic kidney disease. Urinary L-FABP may represent a valuable tool for early renal risk stratification in high-risk metabolic populations. Early identification of tubular injury could inform timely preventive strategies to mitigate progression to diabetic kidney disease.

Insulin's signature: An abdominal plaque in a patient with type 2 diabetes mellitus

Kang R¹, Kovacevic W¹, Curtin L², Cachia A³, Barker G⁴, Hoang J^{1,5}

¹Department of Endocrinology, Hornsby Ku-ring-gai Hospital, Hornsby, Australia, ²Dr Lloyd Curtin, Hornsby, Australia, ³Kossard Dermatopathology Laboratory, Macquarie Park, Australia, ⁴Diabetes Service, Hornsby Ku-ring-gai Hospital, Hornsby, Australia, ⁵University of Sydney, Camperdown, Australia

Background

Exogenous insulin-induced acanthosis nigricans (AN) is a rare cutaneous complication of insulin therapy with approximately twenty cases reported since 1969.

Aim

Present a case of extensive insulin-induced AN in a patient with type 2 diabetes (T2D) and outcomes following injection site modification and optimisation of therapy.

Case Report

A 76-year-old man of South-Asian background with T2D of over 30 years was on extended-release metformin 2g daily and insulin lispro 48-56 units daily. HbA1c was 7.1%. Examination revealed an extensive grey-brown hyperkeratotic plaque extending across his anterior lower abdomen at a site of repeated insulin injections (figure 1A). Punch biopsy demonstrated verrucous epidermal hyperplasia with acanthosis, papillomatosis and basket-weave hyperkeratosis, consistent with AN. Management involved strict avoidance of insulin injections into the affected area, reinforcement of systematic injection site rotation, transition to basal-bolus insulin with insulin glargine, and initiation of dapagliflozin 10mg daily.

Clinical Outcomes

Substantial regression of the plaque was observed within 3 months (figure 1B). At 7 months (figure 1C), HbA1c decreased to 6.4%, total daily insulin requirements decreased to 24-30 units, and body weight reduced by 9.1kg (>10%). While introduction of an SGLT-2 inhibitor and weight loss were potential confounders, the magnitude of insulin dose reduction exceeded typical expectations, suggesting improved insulin absorption following injection site avoidance was a key contributing factor.

Figure 1



Figures 1A-C: Anterior lower abdominal plaque at initial review (1A), 3 month (1B) and 7 month (1C) follow-ups, respectively.

Conclusion

Insulin-induced AN is a rare but clinically significant insulin injection site complication. Routine inspection of injection sites and reinforcement of rotation technique may improve dermatologic outcomes, glycaemic control and insulin requirement.

Comparative risk of end-stage renal disease, myocardial infarction and stroke in young and older onset diabetes in UK Biobank

Kar D¹, Molokhia M³, Byng R¹, Pinkney J¹, Lusignan S²

¹University of Plymouth, Plymouth, United Kingdom, ²University of Oxford, Oxford, United Kingdom,

³King's College, London, London, United Kingdom

Aims: Over the past two decades, the global burden of diabetic kidney disease and end-stage renal disease (ESRD) has risen rapidly, while the relative contribution of cardiovascular complications appears to be declining. The drivers of this shift remain unclear. We investigated whether the increasing prevalence of young-onset diabetes contributes to higher ESRD risk compared with older-onset diabetes in the UK Biobank.

Methods: We conducted a retrospective cohort study including 502,490 UK Biobank participants. Diabetes was categorised by age at diagnosis (<20, 20–40, 41–60, >60 years). Outcomes were ESRD, myocardial infarction, and stroke. Univariable and multivariable logistic regression models were fitted. Multivariable models adjusted for sex and albuminuria. A secondary model replaced age at diagnosis with diabetes duration. Discrimination was assessed using receiver operating characteristic curves, and sensitivity analyses examined alternative age cut-offs and sex-stratified samples.

Results: In univariable analyses, compared with diabetes onset >60 years, odds of ESRD were higher for onset <20 years (OR 5.26, 95% CI 3.00–9.40), 20–40 years (OR 7.78, 95% CI 4.81–13.16), and 41–60 years (OR 2.33, 95% CI 1.50–3.84). No significant associations were observed for myocardial infarction or stroke. After adjustment, higher ESRD risk persisted for onset <20 years (OR 4.71, 95% CI 2.47–9.28), 20–40 years (OR 4.67, 95% CI 2.63–8.78), and 41–60 years (OR 1.94, 95% CI 1.16–3.49). When diabetes duration was modelled, each additional year increased ESRD odds by 2%. The multivariable model demonstrated good discrimination (area under the curve approximately 0.80).

Conclusion: Young-onset diabetes is associated with substantially higher ESRD risk and may be a key contributor to the rising burden of kidney failure. Young-onset diabetes may cause microvascular complications more aggressively than older onset diabetes. Therefore, a targeted precision medicine approach is needed.

Navigating the complexities of end-stage kidney disease in people with diabetes from risk factors to outcomes: insights from the UK Biobank

Kar D^{1,2,3}, Byng R¹, de Lusignan S², Pinkney J¹, Kar O

¹University of Plymouth, Plymouth, United Kingdom, ²University of Oxford, Oxford, United Kingdom,

³Imperial College London, London, United Kingdom, ⁴University of Birmingham, Birmingham, United Kingdom

Aims - Prevalence of end-stage kidney disease (ESKD) due to diabetes is rising worldwide despite optimal management of hyperglycaemia, hypertension and dyslipidaemia. This study aims to explore wider determinants of ESKD in this population for targeted management in primary care.

Methods – This cross-sectional study analysed data from 502,408 UK Biobank study participants recruited between 2006 and 2010. Multivariable logistic regression models were fitted to assess risk factors for ESKD, with results presented as adjusted odds ratio (aOR) and 95% confidence intervals (95% CI).

Results - A total of 1191 (0.2%) of the study participants reported ESKD. Diabetes increased ESKD risk by 62% [1.62 (1.36–1.93)], with early-onset diabetes (before age 40) conferring higher odds compared to later-onset (after age 40) [2.26 (1.57–3.24)]. Similarly, early-onset hypertension (before age 40), compared to later onset (after age 40), increased ESKD odds by 73% [1.73 (1.21–2.44)]. Cardiovascular comorbidities, including stroke, hypertension, myocardial infarction and angina, were strongly associated with ESKD [5.97 (3.99–8.72), 5.35 (4.38–6.56), 4.94 (3.56–6.78), and 4.89 (3.47–6.81)], respectively. Males were at 22% higher risk of ESKD than females [1.22 (1.04–1.43)]. Each additional year of diabetes duration increased ESKD odds by 2% [1.02 (1.01–1.03)]. Non-white ethnicity, compared to white and socioeconomically most deprived, compared to the least deprived quintiles, were at 70% and 83% higher odds of ESKD. Each unit of HbA1c rise increased the odds of ESKD by 2%. Compared to microalbuminuria, macroalbuminuria increased the odds of ESKD by almost 10-fold [9.47 (7.95–11.27)] while normoalbuminuria reduced the odds by 73% [0.27 (0.22–0.32)].

Conclusions - Early onset of diabetes and hypertension, male sex, non-white ethnicity, deprivation, poor glycaemic control, and prolonged hyperglycaemia are significant risk factors for ESKD. These findings highlight the complexity of ESKD and the need for multifactorial targeted interventions in high-risk populations.

Indices of obesity, malnutrition and inflammation are strong predictors of mortality in adults with Type 2 diabetes: the FIELD study

Keech A^{1,2}, O'Connell R¹, Januszewski A^{1,3}, Li L¹, Dalton C¹, Simes J¹, Sullivan D², Taskinen M⁴, Scott R⁵, Best J⁶, Jenkins A^{1,7}, Otvos J⁸

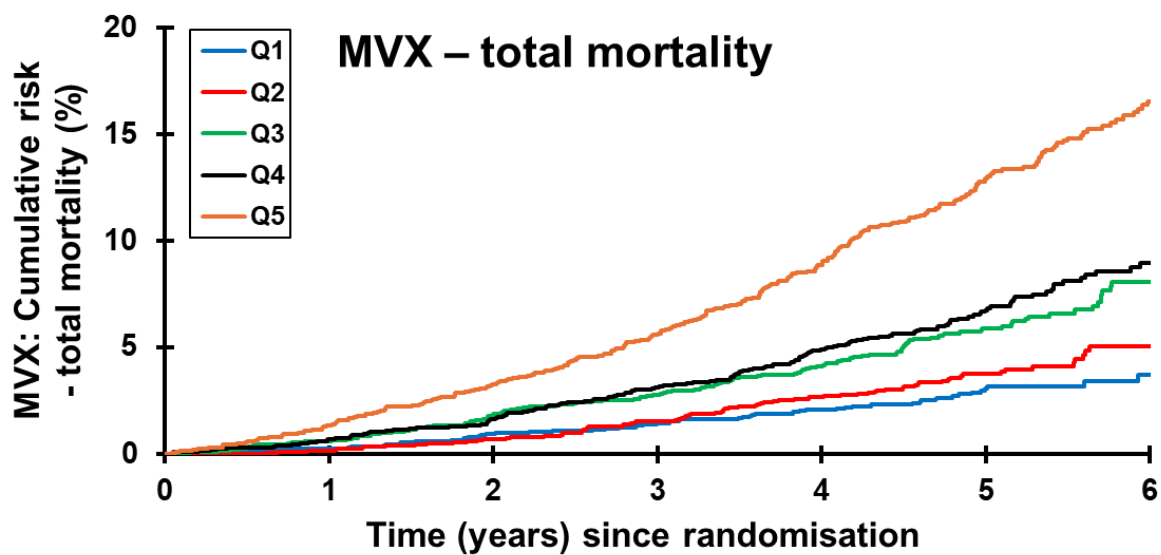
¹NHMRC Clinical Trials Centre, Faculty of Medicine and Health, The University of Sydney, Camperdown, Australia, ²Royal Prince Alfred Hospital, Camperdown, Australia, ³Sydney Pharmacy School, Faculty of Medicine and Health, The University of Sydney, Camperdown, Australia, ⁴Helsinki University Central Hospital, University of Helsinki, Helsinki, Finland, ⁵Christchurch Hospital and NZ Clinical Research Ltd, Christchurch, New Zealand, ⁶Lee Kong Chian School of Medicine, Nanyang Technological University, Singapore, Singapore, ⁷Baker Heart and Diabetes Institute, Melbourne, Australia, ⁸University of North Carolina School of Medicine, Chapel Hill, USA

Background: Metabolic risk in type 2 diabetes (T2D) is not fully captured by standard clinical measures. Nuclear magnetic resonance (NMR)-based metabolomic indices may enhance risk prediction.

Methods: In 9,550 adults with T2D followed for 5 years in the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study, the composite index MVX (metabolic vulnerability), and its components IVX (inflammation vulnerability) and MMX (metabolic malnutrition) were derived from baseline plasma NMR. Associations with mortality were assessed using Cox models adjusted for clinical variables and treatment. Predictive performance was assessed using C-statistics and variable contribution analysis.

Results: All indices were associated with all-cause mortality. Participants in the highest MVX quintile (Q5) had over 4-fold greater unadjusted mortality risk, and more than double the risk after adjustment (HR 2.31, 95%CI 1.71-3.12). Each standard deviation increase in MVX showed a 75% higher mortality risk (95%CI 62-89%; $p < 0.001$). MVX was associated with cardiovascular and cancer mortality separately, and independently predicted non-fatal cardiovascular events and new incident cancer. MMX and IVX showed weaker and less consistent associations. MVX improved risk model discrimination (C-statistic from 0.725 to 0.737; $p = 0.0003$) and outperformed prior CVD history as a predictor.

Conclusions: MVX independently predicts all-cause and cardiovascular mortality in T2D, offering prognostic value beyond traditional risk factors. Absolute event rates reflect the treatment standards of the FIELD recruitment period (1997–2000), prior to widespread use of several contemporary cardioprotective therapies. Results support further investigation of its clinical utility for personalised risk.



Number at risk:

1897	1892	1877	1867	1853	980	257
1931	1928	1916	1898	1874	1011	304
1913	1900	1874	1857	1831	1049	324
1890	1876	1857	1828	1793	1066	405
1919	1892	1854	1809	1747	1050	429

A rare cause of refractory hypoglycaemia: a case report of the Warburg effect in aggressive lymphoma.

Khan Z¹, Khan M¹, Wong V¹

¹Liverpool Hospital, Liverpool, Australia

Background: The Warburg effect describes the preference of tumour cells to utilise aerobic glycolysis over oxidative phosphorylation, resulting in disproportionate glucose consumption and lactate production. It presents a rare but clinically significant cause of refractory hypoglycaemia and lactic acidosis in malignancy.

Case: We present a 61-year-old male with stage IV high-grade B-cell lymphoma awaiting chimeric antigen receptor (CAR) T-cell therapy. He was admitted with fevers and lethargy with initial investigations showing a blood glucose of 1.8 mmol/L, lactate dehydrogenase (LDH) 2355 U/L and lactate 10 mmol/L. Pre-admission positron emission tomography (PET) imaging revealed disease progression and multi-organ involvement including bone marrow, liver, lungs and adrenal glands. He was treated for presumed sepsis and adrenal insufficiency with broad-spectrum antibiotics and IV hydrocortisone, before urgent commencement of bridging chemotherapy. On day 10 of admission, despite being afebrile, haemodynamically stable and with negative infectious screening, he developed persistent hypoglycaemia with random glucose levels of 1.6–3.4 mmol/L despite frequent IV dextrose supplementation and hydrocortisone. This was associated with increasing LDH to 4164 U/L and worsening metabolic acidosis with lactate 14–20 mmol/L and pH < 7.15. Hypoglycaemia screening found suppressed insulin (<1 mIU/L), normal C-peptide levels (256 pmol/L), normal early morning cortisol (644 nmol/L), negative insulin antibodies and insulin-like growth factor-binding protein 3 (IGFBP3) in normal range (4.1 mg/L). He was transferred to ICU for refractory hypoglycaemia and metabolic acidosis but died from multi-organ failure on Day 16 of admission.

Conclusion: This case illustrates a rare manifestation of the Warburg effect causing profound hypoglycaemia and hyperlactaemia in advanced lymphoma. Given its association with overwhelming tumour burden and grave prognosis, increased awareness of this metabolic phenomenon is crucial to allow early diagnosis, initiation of directed therapies and goals-of-care discussions.

Analysis of heart rate variability characteristics in peoples with Type 2 Diabetes mellitus and cardiovascular autonomic neuropathy

Kim C¹, Jeong S¹, Kang S², Kim S³

¹Division of Endocrinology and Metabolism, Department of Internal Medicine, Sejong General Hospital, Bucheon, South Korea, ²Division of Endocrinology and Metabolism, Department of Internal Medicine, University, School of Medicine, , Cheonan, South Korea, ³Division of Endocrinology and Metabolism, Department of Internal Medicine, The Catholic University of Korea, Bucheon St. Mary's Hospital, Bucheon, South Korea

Objectives: This multicenter study aimed to investigate the physiological characteristics of heart rate variability (HRV) and identify independent clinical factors associated with cardiovascular autonomic neuropathy (CAN) in Korean individuals with type 2 diabetes mellitus (T2DM).

Methods: We retrospectively analyzed data from 867 patients with T2DM across eight hospitals in South Korea. DCAN was defined by the presence of early, definite, or severe CAN in cardiovascular autonomic reflex tests (CARTs) or prolonged QTc intervals (men >450 ms, women >460 ms). Participants were divided into the DCAN group (n=766) and the non-DCAN group (n=101) based on corrected QT (QTc) intervals and Ewing's battery of autonomic function tests. We compared cardiovascular autonomic parameters and conducted multivariable logistic regression analysis to identify independent predictors of CAN, adjusting for age, sex, diabetes duration, and metabolic factors.

Results: Significant impairments in autonomic regulation were observed in the DCAN group. Supine systolic blood pressure (SBP) was substantially higher in the DCAN group compared to the non-DCAN group (124.63±18.33 mmHg vs. 115.19± 14.38 mmHg, $P < 0.0001$), while upright heart rate was lower (80.79 ±12.83 vs. 83.87 ±10.96 mmHg, $P = 0.0215$). All HRV indices, including SDNN and RMSSD in both supine and upright positions, were significantly reduced in the DCAN group (all $P < 0.005$). Frequency-domain components (TP, LF, and HF) were also markedly decreased, although the LF/HF ratio showed no significant difference. Multivariable analysis revealed that advancing age (adjusted OR 1.062, $P < 0.001$), fasting C-peptide levels (adjusted OR 1.398, $P = 0.0058$), and the use of calcium channel blockers (adjusted OR 4.273, $P = 0.0002$) were independently associated with CAN. Notably, HbA1c levels did not show a significant correlation with the presence of CAN across all models.

Conclusions: Patients with T2DM and CAN exhibit extensive impairment of autonomic regulation, characterized by diminished HRV profiles and prolonged QTc intervals. The lack of association between HbA1c and CAN suggests that clinical markers such as age, SBP, and C-peptide may be more critical indicators for assessing autonomic dysfunction in long-standing T2DM.

Integrating liver fibrosis screening in a dedicated type 2 diabetes care model

Knott J¹, Jagarlamudi N¹, Ong T¹, Paulose J¹, Jayaballa R¹, Ahlenstiel G¹, Maberly G¹

¹Blacktown & Mt Druitt Hospitals, Sydney, Australia

Introduction:

Metabolic-associated fatty liver disease (MAFLD) is highly prevalent in type 2 diabetes mellitus (T2DM) and contributes to cirrhosis, hepatocellular carcinoma, and liver-related mortality. The impact of fibrosis screening in patients with T2DM and normal liver enzymes within a dedicated diabetes care model is unknown. In August 2023, the Western Sydney Diabetes (WSD) service introduced routine screening for fibrosis using the Fib-4 score followed by transient elastography (FibroScan).

Aims:

To determine the prevalence and risk factors for liver fibrosis and steatosis among patients with T2DM and elevated Fib-4 scores referred to WSD.

Methods:

This single-centre cohort study analysed consecutive patients with T2DM and Fib-4 ≥ 1.45 between 1 August 2023 and 31 July 2024. Eligible patients underwent a FibroScan. Demographic, clinical and biochemical data were collected.

Results:

Of 814 patients reviewed, 119 (14.6%) met Fib-4 criteria (mean Fib-4 2.1 ± 0.7 ; mean age 67.2 ± 9.8 years; 63.9% male; mean BMI 31.2 ± 7.5 kg/m²). FibroScan identified fibrosis $\geq$ F2 in 48.8% (41/84), and advanced fibrosis $\geq$ F3 in 31.0% (26/84). Mean liver stiffness was 10.4 ± 1.8 kPa. Mean controlled attenuation parameter (CAP) was 279.8 ± 58 dB/m with 56% (47/84) > 260 dB/m, suggestive of moderate steatosis. Liver stiffness correlated with BMI ($r = 0.50$, $p < 0.0001$), age ($r = 0.36$, $p < 0.0001$) and Fib-4 ($r = 0.35$, $p < 0.0001$). Steatosis correlated with BMI ($r = 0.31$, $p < 0.0001$) and HbA1c ($r = 0.16$, $p = 0.0002$). ALT, Hba1c, and platelet count showed no significant associations.

Conclusion:

Systematic Fib-4 screening with confirmatory transient elastography in patients with T2DM identified a high prevalence of significant fibrosis and steatosis. Integrating this pathway into diabetes care may enable earlier detection and intervention to reduce progression to cirrhosis and hepatocellular carcinoma.

Integrating specialist diabetes input into peri-operative care: a collaborative audit

Knott J¹, Wu A¹, Ong T¹, Hodson C¹, Badasu U, Ranote P¹, Jayaballa R¹, Maberly G¹, Lal R¹

¹Blacktown & Mt Druitt Hospitals, Sydney, Australia

Introduction:

Diabetes is associated with increased peri-operative morbidity, including diabetic ketoacidosis, hyperosmolar hyperglycaemic state, surgical site infections and delays in surgical clearance. In December 2022, the Western Sydney Diabetes (WSD) service established a collaborative peri-operative model of care with the pre-admission clinic (PAC) at Blacktown and Mount Druitt Hospitals. This integrated model embedded specialist diabetes input early in the surgical journey and incorporated multidisciplinary review and continuous glucose monitoring (CGM) to optimise glycaemic management and expedite surgical clearance.

Aims:

To evaluate the impact of an integrated WSD–PAC peri-operative diabetes care model on referral volume, timeliness of specialist review, surgical clearance, and post-operative diabetes-related complications.

Methods:

We conducted a retrospective audit comparing outcomes in the two years prior to implementation (November 2020–November 2022) with the two years following implementation (December 2022–December 2024). Primary outcomes included the number of peri-operative diabetes referrals, time-to-specialist review, time-to-surgical clearance, surgical clearance rates, CGM utilisation, and diabetes-related complications within three months post-operatively.

Results:

Following implementation, referrals to the WSD–PAC clinic increased from 14 to 76 patients. Mean time-to-specialist review decreased by 2.4 weeks (6.4 weeks pre- vs 4.0 weeks post-collaboration). Surgical clearance was achieved in 73.7% (56/76) of referred patients. Mean time-to-surgical clearance decreased by 7 weeks (10 weeks pre- vs 3 weeks post-collaboration). CGM utilisation increased from 0% to 68.7% following implementation. No diabetes-related post-operative complications were observed in either period.

Conclusion:

Integration of specialist diabetes care into the peri-operative pathway was associated with increased referrals, earlier specialist review, increased CGM utilisation and reduced time to surgical clearance. This integrated model demonstrates a scalable approach to improving peri-operative diabetes care and surgical readiness.

Engagement with a cystic fibrosis diabetes support service is associated with reduced rate of decline in lung function

Kumar S^{1,2}, Smith D^{1,2}, Moore V¹, Loel F¹, Matson A¹

¹Adult Cystic Fibrosis Centre, The Prince Charles Hospital, Metro North, Queensland Health, Chermiside, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, St Lucia, Australia

Aims

Clinical landscape for people with cystic fibrosis (pwCF) has transformed since introduction of CF modulator therapies. We co-designed and embedded a CF diabetes model-of-care (MOC) at our centre. Here we present differences in pulmonary outcomes between those engaged versus disengaged with our MOC.

Methods

Our Adult Centre for Cystic Fibrosis (ACFC) implemented a diabetes MOC (EX/2023/MNHB/103775) in June 2023. Engagement was defined as pwCF living with diabetes attending ≥ 2 consultations over 12-months. Using database-driven diagnostics, we ascertained pre- and post-implementation change in pulmonary (forced expiratory volume in one second FEV₁ and percentage predicted [ppFEV₁]).

Results

A total of 85 pwCF with diabetes attended ACFC with median age of 32. 8years Seventeen people were excluded due to incomplete datasets. 75% (51/68) engaged with diabetes MOC. Baseline characteristics between those engaged versus disengaged were comparable. Average follow-up duration was 11.8 months. A significant decline in FEV₁ and ppFEV₁ in disengaged compared to engaged group was noted (See Table 1). Engagement with diabetes MOC was associated with a significant decline in HbA1c of -0.54% versus increase of +0.33% in disengaged group (p-value=0.004).

Conclusion

Our findings indicate pwCF engaged with our diabetes MOC demonstrated preserved lung function compared to those who were disengaged.

Variable	<u>Disengaged</u> (mean $\pm$ SD)	<u>Engaged</u> (mean $\pm$ SD)	P value
FEV₁			
Pre-implementation	2.48 $\pm$ 0.89	2.35 $\pm$ 1.0	0.64
Post-implementation	2.35 $\pm$ 0.85	2.38 $\pm$ 0.96	0.90
Change	-0.12 $\pm$ 0.27	+0.04 $\pm$ 0.27	0.046
ppFEV1			
Pre-implementation	68.2 $\pm$ 20.82	66.9 $\pm$ 23.42	0.81
Post-implementation	65.3 $\pm$ 20.10	68.2 $\pm$ 23.15	0.63
Change	-2.88 $\pm$ 7.0	+1.87 $\pm$ 7.1	0.027

Integrated management of Wagner grade III diabetic foot ulcer with sepsis in a geriatric person with Type 2 Diabetes and multisystem complications: A case report

Kusumaadhi Z¹

¹Dr Kariadi General Hospital, Semarang, Indonesia

Aim:

To highlight the complexity of managing advanced diabetic foot infection with systemic complications in a geriatric person living with type 2 diabetes and to emphasize the role of coordinated multidisciplinary care.

Methods:

We report the case of a geriatric person with a 13 year history of type 2 diabetes who presented with an infected right foot ulcer. Clinical evaluation included detailed history taking, physical examination, vascular and neurological foot assessment, laboratory investigations, microbiological culture, and imaging studies. Systemic involvement was evaluated using clinical parameters including the quick Sequential Organ Failure Assessment score. Management included early antimicrobial therapy, glucose monitoring with insulin therapy, surgical wound management, and collaborative care across multiple specialties.

Results:

Clinical examination identified two open ulcers on the medial plantar region of the right foot with necrotic tissue and signs of infection, consistent with Wagner grade III diabetic foot ulcer. Laboratory findings showed severe anemia hemoglobin 7.5 g per dL, leukocytosis 34200 per uL, glucose level above target random glucose 250 mg per dL, and azotemia creatinine 2.0 mg per dL. Imaging revealed lytic destruction of the distal phalanx suggestive of osteomyelitis. Wound cultures grew *Streptococcus dysgalactiae* and *Staphylococcus aureus*. Treatment involved intravenous antibiotics, insulin therapy, blood transfusion, and surgical debridement followed by coordinated care involving internal medicine, vascular surgery, nephrology, cardiology, and ophthalmology. Clinical status improved after infection control and surgical management.

Conclusion:

Advanced diabetic foot infection in a person living with diabetes may occur alongside multiple systemic complications in older adults. This case highlights the importance of early recognition, individualized antimicrobial therapy, surgical intervention, and multidisciplinary collaboration.

Novelty:

This case demonstrates how integrated management across specialties can support recovery in complex diabetic foot infection with sepsis and multiple diabetes related complications.

Diabetes in Motion: Hemiballismus-Chorea from Diabetic Striatopathy in an 80 year old female

Lan A¹, Khan M¹, Wong V¹

¹Diabetes & Endocrinology, Liverpool Hospital, , Australia

Clinical Case:

We report the case of an 80-year-old female who presented with involuntary right upper and lower limb movements on the background of B-cell acute lymphoblastic leukaemia (B-ALL), Type 2 Diabetes Mellitus, hypertension and gastro-oesophageal reflux disease. She reported a 2-day history of right-sided abnormal movements, subjective weakness and associated pain. On examination she had writhing, choreiform movements on the distal right upper and lower limb. She otherwise had a normal neurological examination. She was normotensive with a systolic blood pressure ranging between 110-130mmHg. She was hyperglycaemic with BSLs ranging between 16-25mmol/L within first 24 hours of admission, and a HbA1c of 130 mmol/mol. Non contrast CT brain demonstrated subtly increased attenuation of the left basal ganglia. A subsequent MRI brain also demonstrated asymmetric T1 signal hyperintensity in the left basal ganglia with normal T2 intensity, as well as two tiny punctate foci of susceptibility artefact in the left lentiform nucleus. A lumbar puncture was performed with a negative meningitis nucleic acid detection on CSF.

Her clinical presentation, investigations and radiological findings are consistent with diabetic striatopathy, a rare movement disorder associated with prolonged poor glycaemic control. Other initial differentials for this case included the possibility of B-ALL treatment related neurotoxicity given her previous use of blinatumomab, or basal ganglia haemorrhage. Her management included aggressive glycaemic control with the introduction of insulin therapy, and the use of tetrabenazine for symptom management. Her symptoms resolved within 2 weeks of treatment. This was associated with improved glycaemic control at the 1-month time point with a HbA1c of 88 mmol/mol (reduction of 32.3%). There was no recurrence of her symptoms 3 months later.

Conclusion:

Diabetic striatopathy is a rare manifestation of poorly controlled diabetes and should be considered as a differential for movement disorders in patients with diabetes.

Prevalence and diagnostic reclassification of sarcopenia in Type 2 Diabetes according to AWGS 2019 and AWGS 2025 criteria

Phudphong P¹, Adulkasem N², Laoticharoen K¹

¹Division of Endocrinology and Metabolism, Department of Medicine, Faculty of Medicine, Vajira Hospital, Bangkok, Thailand, ²Department of Orthopedics Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Aim

Sarcopenia is an age-related muscle health condition with reduced muscle quantity and quality, and it has been shown to be associated with type 2 diabetes mellitus (T2DM). In 2025, the Asian Working Group for Sarcopenia (AWGS) introduced updated diagnostic criteria, which include major changes such as removing physical performance from the diagnostic algorithm and adding BMI-adjusted appendicular skeletal muscle mass (ASM). These updates may influence sarcopenia detection in populations with altered body composition, including those with T2DM. This study compared sarcopenia prevalence and diagnostic transitions between AWGS 2019 and AWGS 2025 in patients with T2DM.

Methods

This secondary analysis used cross-sectional data collected from adults with T2DM between February and November 2025. Participants were aged 40–90 years, had been treated for T2DM for at least one year, and were able to complete physical performance tests. Muscle mass was assessed using multi-frequency bioelectrical impedance analysis, and handgrip strength and physical performance were evaluated using standardized protocols. Sarcopenia was defined according to both AWGS 2019 and 2025 criteria. Prevalence, clinical characteristics, and diagnostic transitions between the two criteria were compared.

Results

A total of 250 patients were included (mean age 65.1±8.5 years; mean BMI 27.9±5.5 kg/m²). Sarcopenia prevalence was substantially higher under AWGS 2025 than AWGS 2019 (48.4% vs. 23.2%). Increases were observed across most age groups. Patients classified as sarcopenic by AWGS 2025 had higher BMI, more frequent insulin use, and higher urine albumin–creatinine ratio (uACR). Diagnostic transitions showed that 74 patients (29.6%) were newly identified as sarcopenic under AWGS 2025.

Conclusions

The AWGS 2025 criteria substantially increased sarcopenia detection in T2DM. These findings highlight the importance of recognizing sarcopenia in diabetes care, particularly in patients with greater insulin requirements or elevated uACR. Further research should refine diagnostic cut-offs and improve muscle mass assessment in this population.

Keywords: Sarcopenia, Type 2 diabetes mellitus, Asian Working Group for Sarcopenia (AWGS), Body mass index, Diagnostic criteria

Assessing fracture risk in sarcopenic Type 2 Diabetes (T2DM) patients: A cross-sectional study in a Tertiary Care Hospital

Phudphong P¹, Laoticharoen K¹, Adulkasem N²

¹Division of Endocrinology and Metabolism, Department of Medicine, Faculty of Medicine, Vajira Hospital, Navamindradhiraj University, Bangkok, Thailand, ²Department of Orthopedics Surgery, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand

Aim

Sarcopenia, characterized by reduced skeletal muscle quantity and quality, is frequently observed in individuals with type 2 diabetes mellitus (T2DM). Both conditions are independently associated with an increased risk of fragility fractures. However, the relationship among T2DM, sarcopenia, and fragility fracture risk remains unclear. This study aimed to compare fracture risk between T2DM patients with and without sarcopenia and to examine factors associated with sarcopenia.

Methods

We conducted a cross-sectional study involving 250 adults with T2DM. Sarcopenia was diagnosed according to the Asian Working Group for Sarcopenia (AWGS) 2025 criteria. Ten-year probabilities of major osteoporotic and hip fractures were estimated using the Thai FRAX® tool. Demographic data, anthropometric measurements, basal metabolic rate (BMR), diabetes-related variables, laboratory parameters, and medication use were collected. Univariable and multivariable logistic regression analyses were performed to determine factors independently associated with sarcopenia.

Results

Sarcopenia was identified in 48.4% of participants. FRAX®-estimated 10-year hip fracture probability was significantly higher among participants with sarcopenia (1.3% vs 1.0%, $p=0.035$), whereas no significant difference was observed for major osteoporotic fracture risk (4.7% vs 3.8%, $p=0.066$). Diabetes duration, glycemic control, and medication use were comparable between groups. Multivariable analysis identified low BMR (OR 6.30; 95% CI 3.21–12.34) and low calf circumference (OR 2.48; 95% CI 1.00–6.12) as independent factors associated with sarcopenia.

Conclusions

Among patients with T2DM, sarcopenia was associated with higher FRAX®-estimated hip fracture risk, whereas major osteoporotic fracture risk did not differ. These findings suggest that sarcopenia may represent an additional determinant of hip fracture risk in T2DM, underscoring the potential importance of optimizing muscle health alongside glycemic management. Patients with low BMR and small calf circumference may require closer evaluation for sarcopenia. Prospective studies are needed to further elucidate the relationship among T2DM, sarcopenia, and fragility fracture risk.

Keywords: Type 2 diabetes, sarcopenia, fracture risk

ADFR – an evolving national quality-improvement platform highlighting opportunities in care of diabetes foot disease

Lasschuit J^{1,2,3,4}, Andrikopoulos S⁵, Twigg S^{6,7}, Lazzarini P^{8,9}, Frank G¹⁰, Wischer N¹

¹National Association of Diabetes Centres, Sydney, Australia, ²St Vincent's Hospital Sydney, Darlinghurst, Australia, ³University of New South Wales Sydney, Darlinghurst, Australia, ⁴Victor Chang Cardiac Research Institute, Darlinghurst, Australia, ⁵Australian Diabetes Society, Sydney, Australia, ⁶The University of Sydney, Camperdown, Australia, ⁷Royal Prince Alfred Hospital, Camperdown, Australia, ⁸Queensland University of Technology, Brisbane, Australia, ⁹The Prince Charles Hospital, Brisbane, Australia, ¹⁰Sydney Local Health District, Sydney, Australia

Aims: The Australian Diabetes Foot Registry (ADFR) is a prospective, longitudinal clinical quality registry enabling standardised reporting of High Risk Foot Service (HRFS) care and outcomes. We aimed to evaluate key process and management indicators from the latest reporting period.

Methods: Participants with diabetes and foot ulceration who commenced care episodes between 1 April 2024 and 1 April 2025 were included. Descriptive data were reported as n (%), using valid (non-missing/non-erroneous) denominators, mean (SD) and median (IQR). Significance was assessed using Mann–Whitney U-test and site-clustered GEE logistic regression (two-sided $p < 0.05$).

Results: 3,590 participants across 32 HRFS (42 sites) contributed 3,766 care episodes and 5,865 ulcerations. Participants were age 67 (SD 13), 75% male and 6% Aboriginal and/or Torres Strait Islander. Diabetes was predominantly type 2 (92%), duration 17 (IQR 10–25) years and HbA1c 7.9 (6.8–9.7)%. Time from ulcer onset to initial review was 30 (11–73) days. Time from referral to initial review was 4 (1–11) business days (80% within 14 business days), and severe ulceration (SINBAD ≥ 3 vs < 3) was associated with shorter time from referral to initial review (median 2 [0–8] vs 5 [1–12] days, $p < 0.001$). Minimum core staffing (per accreditation standards) was met in 19% of care episodes, and site accreditation was not associated with meeting this indicator (OR 1.51, 95% CI 0.51–4.45; $p = 0.46$). Of 1,342 care episodes involving ischaemic ulceration, vascular consultation was obtained in 75%, at a median of 7 (1–21) days from referral. Of 2,014 care episodes involving plantar ulceration, non-removable knee-high devices were used in only 4%, most limited by patient circumstances/preferences (34%) and clinical contraindication (23%).

Conclusion: The ADFR highlights local quality-improvement priorities aligned with national and international standards. These include reducing delays to initial review, increasing core team involvement, ensuring timely vascular consultation, and improving uptake of non-removable knee-high offloading.

Diabetes related foot disease in NSW & SA: Comparison of social and cultural measures, mental health & wellbeing, self-assessed function and quality of life

Do M¹, Schwarzer S², Snelling H³, Lau N^{1,4}

¹South West Sydney Clinical School, Faculty of Medicine & Health, UNSW Sydney, , ²South West Sydney Limb Preservation and Wound Research, Ingham Institute of Applied Medical Research, ,

³High Risk Foot Service, The Royal Adelaide Hospital, , ⁴Liverpool Diabetes Collaboration, Ingham Institute of Applied Medical Research,

Background. People with acute diabetes related foot diseases (DRFD) not only have to live with a relapsing and remitting condition but also have longer diabetes duration and more related complications and larger medication burden, than those without DRFD. What is less known is how DRFD impacts functional status, their mental health and wellbeing, and their overall quality of life, nor how these measures interact with the progression of DRFDs.

Aims/ Methods. People with active DRFS attending ambulatory care in HRFS' based in quaternary level health institutions in NSW and SA, had recorded routine baseline diabetic foot parameters and detailed diabetes profile, related therapies and adherence to them, and cardiovascular risk and diabetes complications status.

Also measured were cultural and linguistic diversity, assessing home and household (including number of pets), functional status, education and employment, mental health and wellbeing, and quality of life measures.

These were recorded at baseline and across serial points through their active DRFD disease journey.

Results. Baseline data for NSW n=34 and SA n=19 included significant differences (favouring NSW) in %T1D, duration of DM, age and BMI; in %Female and % and %pets ownership. Differences favouring SA were English as first language & and %culturally Caucasian. Other measures to present: Medication Adherence by MARS, Education, employment and other household measures; QoL by validated measures of Function & Well-being, Diabetes Self-Care & Activities and EQ5D5L. Mental Health by Beck Depression Inventory, UCLA Loneliness Score and Multidimensional Health, Loss of Control & Perceived Social support will also be presented.

Discussion / Conclusion. While of differing demographics, people with DRFD in SA and NSW have reduced measures of physical & mental health & personal wellbeing than that of general population and those without DRFD. The interactions between these measures and their DRFD remains a topic of interest.

Outcomes of surgical offloading of apical diabetes-related toe ulcers in an Australian tertiary hospital podiatry department

Lee A¹, Baba M¹, Dodd J¹, Joseph S¹

¹Sir Charles Gairdner Osborne Park Hospital Care Group, Nedlands, Australia

Aim:

Diabetes affects an estimated 1.5 million Australians with diagnosed disease and as the prevalence continues to rise, diabetes-related foot complications remain a major cause of morbidity. Each year, 47,100 Australians are hospitalised for diabetic foot problems, and 6,300 undergo partial foot or leg amputations. This study aimed to evaluate the impact and outcomes of surgical offloading by utilising flexor tenotomy (FT) for management of apical diabetes-related toe ulcers in an Australian tertiary hospital podiatry department.

Methods:

A retrospective audit of all documented flexor tenotomies performed at Sir Charles Gairdner Hospital (SCGH) between 2020 and 2025 was conducted, utilising data entered into the National Association of Diabetes Centres High Risk Foot Service (NADC HRFS) database. Eighteen digits that underwent FT were reviewed at one month, three months and six months after FT, and cross-referenced. Outcomes were compared with a control cohort of patients with apical toe ulcers managed without surgical offloading.

Results:

Among digits treated with FT, 77.8% achieved ulcer healing and resolution of digital clawing by six months following FT, and 5.5% progressed to digit amputation. In contrast, the control group demonstrated 29.4% wound healing and 70.6% digit amputation, indicating a substantially higher risk of poorer outcomes and amputation of the toe without surgical offloading.

Conclusion:

The findings align with 2023 International Working Group on the Diabetic Foot (IWGDF) and 2021 Diabetes Feet Australia (DFA) recommendations supporting digital flexor tendon tenotomy for individuals with diabetes who present with abundant callus or non-healing apical toe ulcers, which have failed conservative offloading therapy. The markedly lower amputation rate and higher healing rate in the FT cohort reinforce FT as a valuable treatment option for management of apical toe ulcers in tertiary care settings. Future research should incorporate prospective multicentre studies, evaluate long-term recurrence rates, and explore patient-reported outcomes to refine clinical decision-making and strengthen guideline development.

Lifestyle factors and renal function decline among Indigenous people with diabetes-related kidney disease: A matched cohort study

Lee J¹, Lee J¹, Lee Y¹

¹Lee's Clinic/ Tacd, Pingtung City, Taiwan, Taiwan

Aim

Diabetes-related kidney disease (DKD) is a major complication of type 2 diabetes and an important cause of kidney function decline. This study examined differences in renal function decline and lifestyle characteristics between Indigenous and Han Chinese people living with DKD.

Methods

A retrospective cohort study was conducted among people with stage 3–4 DKD receiving care at a primary care clinic between 2015 and 2025. The original dataset included 42 Indigenous and 708 Han Chinese participants. Han Chinese participants were matched to Indigenous participants at a 1:2 ratio based on age and duration of diabetes, resulting in 126 participants. Clinical variables were compared using independent t-tests and lifestyle factors using chi-square tests. Multivariable linear regression analysis was performed to identify factors associated with renal function decline.

Results

After matching, age and diabetes duration were similar between groups. Indigenous participants showed a faster rate of renal function decline compared with Han Chinese participants ($p < 0.001$). Higher BMI, uric acid, and triglyceride levels and lower serum albumin were observed among Indigenous participants. Alcohol consumption and betel nut chewing were also more common (both $p < 0.001$). Multivariable analysis showed that Indigenous ethnicity ($\beta = -3.846$, $p = 0.002$) and smoking ($\beta = -2.685$, $p = 0.024$) were independently associated with faster renal function decline.

Conclusion

People with DKD from Indigenous communities experienced faster renal function decline and a higher prevalence of lifestyle-related risk factors. These findings highlight the importance of culturally appropriate prevention and care strategies to support kidney health in people living with diabetes.

Statin therapy and cardiovascular outcomes in older adults with diabetes for primary prevention: a nationwide Korean cohort study

Lee M¹, Bae J¹, Kim J¹, Khang A¹, Yi D¹, Kang Y¹

¹Pusan National University School Of Medicine, Yangsan-si, South Korea

Aim

The cardiovascular benefit of statin therapy for primary prevention in older adults with diabetes remains debated. We evaluated the association between statin use and cardiovascular outcomes in older adults with diabetes using nationwide Korean claims data.

Methods

We conducted a population-based cohort study using the Korean National Health Insurance Service database. Adults aged ≥ 75 years with diabetes and without prior cardiovascular disease were included. Participants were classified as statin users or non-users at baseline. The primary outcome was major adverse cardiovascular events (MACE), defined as a composite of cardiovascular death, nonfatal myocardial infarction, or nonfatal ischemic stroke. Multivariable Cox proportional hazards models were used to estimate hazard ratios (HRs) after adjustment for demographic characteristics and cardiovascular risk factors.

Results

Among 128,000 adults aged ≥ 75 years with diabetes and no prior cardiovascular disease, 54,300 were statin users and 73,700 were non-users at baseline. During a median follow-up of 5.8 years, 8,420 MACE events occurred. Statin use was associated with a significantly lower risk of MACE compared with non-use (adjusted HR 0.80, 95% CI 0.76–0.84). Similar associations were observed for myocardial infarction (HR 0.78, 95% CI 0.71–0.85) and ischemic stroke (HR 0.82, 95% CI 0.76–0.88). Cardiovascular mortality was also lower among statin users (HR 0.86, 95% CI 0.79–0.93).

Conclusion

In this nationwide cohort of older adults aged ≥ 75 years with diabetes and no prior cardiovascular disease, statin therapy was associated with a lower risk of major cardiovascular events. These findings support the potential role of statins for primary prevention of cardiovascular disease in older adults with diabetes.

Perceptions of cardiovascular risk, lipid management and statins in patients with type 1 diabetes and foot ulceration: preliminary results of a patient survey

Leong A¹, Hiew J¹, Ryan C^{2,3}, Yeap B^{1,4}, Dwivedi G^{1,4,5,6}, Fegan G^{1,7}, Hamilton E^{1,4}, Jenkins A^{2,3,8}, Lan N^{1,4,5}

¹Fiona Stanley Hospital, Murdoch, Australia, ²University of Melbourne, Melbourne, Australia, ³Baker Heart and Diabetes Institute, Melbourne, Australia, ⁴University of Western Australia, Perth, Australia, ⁵Harry Perkins Institute of Medical Research, Perth, Australia, ⁶Victor Chang Cardiac Research Institute, Sydney, Australia, ⁷Curtin University, Perth, Australia, ⁸St Vincents Hospital Melbourne, Melbourne, Australia

Aims: Patients with diabetes-related foot ulceration (DFU) are at high cardiovascular risk. Lipid-lowering reduces cardiovascular risk, but dyslipidaemia is often under-treated in patients with type 1 diabetes (T1D), including those with DFU. We aimed to identify patient-related factors contributing to lipid care.

Methods: As part of the ENACT-T1D study, patients with T1D attending a tertiary hospital multidisciplinary DFU clinic were invited to complete an anonymous survey. The survey was developed by the investigators with a clinical psychologist and hosted on RedCap. This sub-study commenced in October 2025 and preliminary data was extracted in February 2026.

Results: Of 26 patients, 58% were male, median age was 53 (interquartile range 49.25-62) years, T1D duration was 37.5 (interquartile range 23.5-42) years, 85% were prescribed a statin and 8% were prescribed non-statin lipid-lowering therapies (all ezetimibe). Medical history included 42% with coronary heart disease, 31% peripheral artery disease, 23% chronic kidney disease and 8% stroke. Over three-quarters (81%) did not know their cholesterol level, although 77% “agreed”/“strongly agreed” that it is important to know. One-third reported that their doctor did not discuss cholesterol (39%) or cardiovascular risk (31%). 38% “agreed”/“strongly agreed” that lifestyle changes are preferred over cholesterol medication and 73% that managing glycaemia was more important than cholesterol. Three-quarters (73%) “agreed”/“strongly agreed” that risk of myocardial infarction is higher in T1D and 65% that statins reduce the risk of heart attacks even with “normal” cholesterol levels. Of 22 patients taking a statin, 9% were concerned about adverse effects, 19% “agreed”/“strongly agreed” that television/internet changed their thoughts and none were concerned about costs.

Conclusion: Patients with T1D and DFU have a high prevalence of cardiometabolic comorbidities and are often treated with statin, but not additional lipid-lowering drugs. Patient knowledge and perceptions on cholesterol and cardiovascular risk need to be considered to optimise lipid care.

Associations of combined modifiable risk factor control with incident lower-limb ulceration and population-attributable burden in diabetes: A prospective UK Biobank study

Li P^{1,2}, Pan Q^{1,2}, Guo L^{1,2}

¹Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing, China, ²Peking Union Medical College, Chinese Academy of Medical Sciences, Beijing, China

Aims

To evaluate the association between combined control of modifiable risk factors and incident lower-limb ulceration (LLU) among UK Biobank participants with diabetes, and to estimate population-attributable fractions (PAFs) for suboptimal control of each component.

Methods

Using guideline-based thresholds aligned with UK Biobank data availability, we defined control of eight modifiable risk factors: adiposity (BMI <25 kg/m² and waist-to-hip ratio <0.90 in men/<0.85 in women), blood pressure (<140/90 mmHg), HbA1c (<53 mmol/mol), LDL cholesterol (<2.6 mmol/L), kidney function (eGFR ≥60 mL/min/1.73 m²; UACR <30 mg/g when available), physical activity (meeting 2017 UK recommendations), non-current smoking, and diet quality (diet score ≥1). Participants were stratified by the number of targets achieved: low (≤2), moderate (3–5), and high (≥6). Multivariable Cox proportional hazards models estimated hazard ratios (HRs) for incident LLU by joint and component control. PAFs were estimated for suboptimal control of each factor.

Results

Among 28,268 participants, 784, 18,968, and 8,516 were classified as low, moderate, and high control, respectively. LLU-free survival differed across strata (log-rank p<0.001). Compared with low control, moderate and high control were associated with 33% (HR 0.67, 95% CI 0.53-0.85) and 60% (HR 0.40, 0.31-0.53) lower LLU risk, respectively (both p<0.001). Each additional target achieved was associated with a 20% lower risk (HR 0.80, 0.76-0.84). Except for LDL cholesterol, each component was independently associated with lower LLU risk (all p<0.05). PAFs were highest for suboptimal adiposity (37.7%), with smaller contributions from other factors.

Conclusion

Higher combined risk factor control was associated with a graded reduction in incident LLU. Suboptimal adiposity accounted for the largest population-attributable burden, underscoring adiposity control as a key target for LLU prevention.

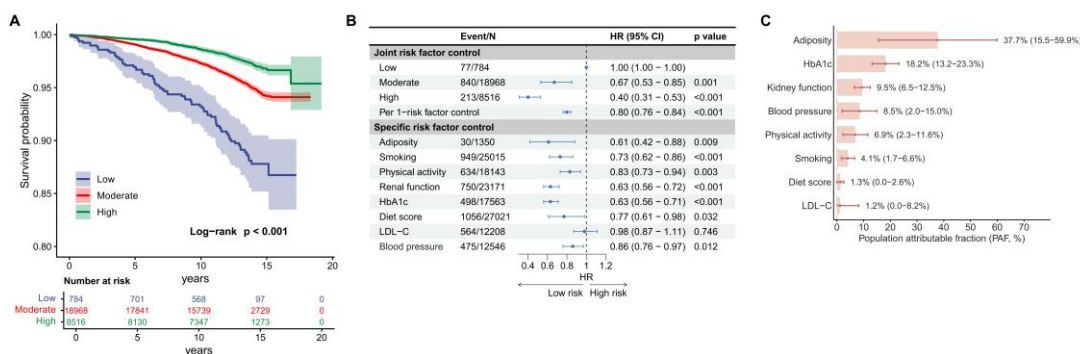


Figure 1. Joint and component risk-factor control and incident LLU risk and attributable burden. (A) Kaplan-Meier curves by joint control strata: low (≤2), moderate (3-5), high (≥6). (B) Multivariable-adjusted HRs (95% CI) for joint and component control. (C) PAFs for suboptimal control of each component.

Impact of dietary patterns on the development of type 2 diabetes-related complications: A systematic review

Li X¹, Devlin B¹, Dunstan D^{2,3}, McNaughton S¹

¹The University Of Queensland, St Lucia, Australia, ²Deakin University, Burwood, Australia, ³Baker Heart and Diabetes Institute, Melbourne, Australia

Aim: Type 2 diabetes (T2D) can lead to serious complications if poorly managed. Diet plays an important role in the management of T2D. Dietary patterns can address the combined effect of multiple dietary components. However, the optimal dietary pattern for T2D management remains inconclusive. The aim of this systematic review is to examine the impact of dietary patterns on the development of T2D-related complications in adults with T2D.

Methods: A systematic literature search was performed using PubMed, Embase, Web of Science, CENTRAL, and CINAHL databases. Inclusion criteria were as follows: 1) randomised controlled trials (RCT) and prospective observational studies, 2) adults with T2D, 3) dietary patterns assessed using investigator-defined/data-driven methods, and 4) diabetic retinopathy, nephropathy, neuropathy, and cardiovascular disease (CVD) outcomes.

Results: Two RCTs and twelve cohort studies were included. Thirteen studies used investigator-defined dietary pattern approaches, and two studies used data-driven methods. The outcomes of included studies were CVD (n = 9), diabetic retinopathy (n = 6), nephropathy (n = 6), and neuropathy (n = 4). The findings suggest that adherence to mediterranean diet, Dietary Approaches to Stop Hypertension (DASH), American Diabetes Association (ADA)'s dietary guidelines were associated with reduced risk of complications. Low carbohydrate diets that were categorised as "healthy" based on favourable vegetable fat and protein composition rather than animal fat and protein were also associated with reduced risk of complications. While high ultra-processed food consumption (NOVA category 4), especially dietary patterns characterised by a high intake of mixed beverages and savoury snacks, were associated with increased risk of complications.

Conclusion: Mediterranean diet, DASH, ADA's dietary guidelines, and healthy low carbohydrate diets may prevent the development of T2D-related complications. To better inform the development of dietary recommendations for T2D management, future studies should use data-driven approaches to examine the relationship between dietary patterns and T2D-related complications.

Community-based diabetic retinopathy screening in a Chinese rural elderly population with type 2 diabetes: epidemiological findings from the Shaoguan Diabetic Eye Study

Li Y¹, Yu X², Wang H², Huang W¹

¹Zhongshan Ophthalmic Center, Sun Yat-Sen University, Guangzhou, China, ²School of Public Health, Sun Yat-Sen University, Guangzhou, China

Background and Aim: As the predominant cause of diabetes-related visual impairment and blindness globally, diabetic retinopathy (DR) represents a critical public health challenge, particularly in areas with limited healthcare access. This community-based study aimed to examine the prevalence and determinants of DR in a rural elderly population in Shaoguan, Guangdong province, China.

Methods: A free-of-charge, comprehensive ocular examination was conducted among village-dwelling adults aged 60 years or above with previously-diagnosed type 2 diabetes (T2D), recruited via primary care referrals following telephone invitations by clinical staff. Participants completed a standardised, interviewer-administered survey alongside colour stereoscopic fundus photographs taken in both eyes using a digital retinal camera (NFC-700). Trained ophthalmic specialists independently graded images according to the UK National Screening Committee classification system for countrywide community-based DR screening programmes.

Results: Among 1,357 screened T2D patients, over one-third (538/1,357 [39.6%, 95%CI: 37.0%-42.3%]) had the presence of DR, among which, 79%, 16%, and 5% of patients had mild non-proliferative DR, severe non-proliferative DR, and proliferative DR, respectively. Multivariable-adjusted logistic regression analysis showed that diabetes duration (5-10 years: adjusted odds ratio [aOR]=1.581, 95%CI 1.201-2.082; >10-15 years: aOR=2.533, 95%CI 1.781-3.603; >15 years: aOR=3.655, 95%CI 2.476-5.395; all $P<0.001$), and elevated haemoglobin A1c levels (aOR=1.235, 95%CI 1.142-1.335, $P<0.001$) were factors independently associated with DR.

Conclusion: Our findings document a substantial DR burden in rural elderly population and highlight the imperative for targeted primary care interventions. Individualised prevention strategies should prioritise long-standing diabetics and those with suboptimal glycaemic control, particularly in resource-limited settings.

Plantar pressure and gait analysis in people with diabetes

Li Z¹, Chen L¹, Li Y², Zha P¹, Gong H^{1,3}, Ren Y¹, Li Y¹, Gao Y¹, Chen D¹, Ran X¹, Wang C¹

¹Department of Endocrinology and Metabolism / Diabetic Foot Care Center / West China Hospital / Sichuan University, Sichuan Province, Chengdu City, China, ²Department of Clinical Research Management, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ³General Practice Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China

Aim: To investigate changes in plantar pressure and gait in people with diabetes.

Methods: This study included 480 people with diabetes and 109 people without diabetes. The plantar surface of each foot was divided into 10 regions: toes (T1, T2-5), metatarsals (M1-M5), midfoot (MF), and medial/lateral heel (HM, HL). Peak force (PPF), peak pressure (PPP), and impulse were recorded by FOOTSCAN platform.

Results:

- (1) Compared to those without diabetes, participants with diabetes showed significantly higher PPF in the M1, M4, HM, HL and left M5 regions ($p < 0.05$). After weight adjustment, PPF in the left T2-5 and right T1 regions tended to be lower.
- (2) PPP was significantly higher in people with diabetes in the M1, HM, left M5, HL and right MF regions ($p < 0.05$). After weight adjustment, PPP was significantly lower in the M3, right M2 and left T2-5 regions.
- (3) Impulse was significantly higher in people with diabetes in the M1, M2, M4, MF, HM, HL and left M5 regions ($p < 0.05$). After weight adjustment, impulse remained significantly higher in the M4, HM, HL, left M5 and right M1 regions.
- (4) People with diabetes had significantly shorter step length ($p < 0.001$) and longer contact time ($p < 0.05$) compared to those without diabetes. No significant difference in contact area was observed.
- (5) Step length in people with diabetes showed positive correlations with pressure parameters in toe and central metatarsal regions, but negative correlations in midfoot and heel regions.

Conclusion: A "pressure transfer" phenomenon exists in people with diabetes, with pressure shifting from the M2-3 regions to the M1 and M5 regions, making these "hot spots" for foot ulcers. Impulse is significantly increased in heel regions. People with diabetes walk with shortened step length and prolonged contact time, which correlate with plantar pressure parameters.

Bilateral plantar pressure and gait analysis in people with diabetes

Li Z¹, Chen L¹, Li Y², Zha P¹, Gong H^{1,3}, Ren Y¹, Li Y¹, Gao Y¹, Chen D¹, Ran X¹, Wang C¹

¹Department Of Endocrinology And Metabolism, Diabetic Foot Care Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ²Department of Clinical Research Management, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ³General Practice Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China

Aim: To investigate bilateral differences in plantar pressure and gait in people with diabetes.

Methods: This study included 480 people with diabetes and 109 people without diabetes. A FOOTSCAN platform measured plantar pressure and gait. Each foot was divided into 10 regions: toes (T1, T2-5), metatarsals (M1-5), midfoot (MF), medial and lateral heel (HM, HL). Peak force (PPF), peak pressure (PPP), impulse, contact time, contact area, and step length were recorded.

Results:

- (1) The diabetes group included 480 participants [median age 59.0 (52.0, 68.0) years]. The control group included 109 participants [median age 34.0 (25.0, 53.0) years].
- (2) After weight adjustment, both groups showed significantly higher PPF in right M1, M2, HM, and HL regions versus left ($p < 0.05$), while right M5 and MF regions were lower ($p < 0.001$). People with diabetes also showed lower PPF in right M3 and M4 ($p < 0.05$).
- (3) Both groups had higher PPP in right M1 and M2 ($p < 0.05$) but lower PPP in right M3-5 and MF ($p < 0.05$). In people with diabetes, PPP was higher in right T1 and T2-5 ($p < 0.001$) and lower in right HM ($p = 0.005$).
- (4) The degree of asymmetry (assessed by the symmetry index) in PPF at T1, M5, and HM was more pronounced in the diabetes group ($p < 0.05$). For PPP, only the T1 region showed a greater degree of asymmetry ($p = 0.010$).
- (5) Impulse was higher in right M1, M2, HM, HL ($p < 0.05$) but lower in right M5, MF ($p < 0.001$) in both groups. People with diabetes also showed lower impulse in right M3 ($p = 0.005$).
- (6) Left foot contact time was longer than right in people with diabetes ($p < 0.001$). No bilateral differences in contact area or step length were observed.

Conclusion: People with diabetes exhibit more extensive bilateral asymmetry in plantar pressure distribution, with the right forefoot bearing higher pressure loads.

Plantar pressure and gait analysis in people with diabetic complications

Li Z¹, Chen L¹, Li Y², Zha P¹, Gong H^{1,3}, Ren Y¹, Li Y¹, Gao Y¹, Chen D¹, Ran X¹, Wang C¹

¹Department Of Endocrinology And Metabolism, Diabetic Foot Care Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ²Department of Clinical Research Management, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ³General Practice Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China

Aim: To investigate plantar pressure and gait changes in people with diabetic complications.

Methods: This study included people with diabetes stratified into four groups: diabetes only (DM), diabetes with peripheral neuropathy (DPN), diabetes with peripheral arterial disease (PAD), and diabetes with both complications (DPN+PAD), plus healthy controls. Plantar pressure and gait were measured using a FOOTSCAN platform. Each foot was divided into 10 regions: toes (T1, T2-5), metatarsals (M1-M5), midfoot (MF), and medial/lateral heel (HM, HL). Peak force (PPF), peak pressure (PPP), impulse were recorded.

Results:

The DPN+PAD group showed significantly lower PPF in bilateral T1 compared to controls and DM group ($p < 0.05$), with similar trends in T2-5 and M2-3 regions. The DM group showed significantly higher PPP in the bilateral M4, left M5, and right M1 regions compared to healthy controls ($p < 0.05$). After weight adjustment, DPN+PAD group had significantly lower PPP in bilateral M2-3 versus controls ($p < 0.05$) and other diabetes subgroups. The DPN group showed higher right M1 PPF versus controls ($p = 0.001$) and DM group ($p = 0.013$). PAD group showed elevated left M5 PPP versus DPN and controls ($p < 0.05$). All diabetes groups exhibited significantly higher heel impulse bilaterally ($p < 0.05$), most pronounced in DPN and PAD groups.

All diabetes subgroups showed shorter step length and longer contact time versus controls ($p < 0.05$), with DPN+PAD group showing the most pronounced changes ($p < 0.05$).

Conclusion: A "pressure transfer" phenomenon exists in people with diabetes, with pressure shifting from M2-3 to M1 and M5 regions, creating "hot spots" for ulceration. This redistribution is most pronounced in those with DPN and PAD. Heel impulse is significantly elevated, particularly in complicated cases. Gait alterations (shortened step length, prolonged contact time) are evident. Standardized pressure testing with focused attention on M1, M5, and heel regions is recommended for early intervention to prevent foot ulcers.

Influence of gender on plantar pressure and gait in people with diabetes

Li Z¹, Chen L¹, Li Y², Zha P¹, Gong H^{1,3}, Ren Y¹, Li Y¹, Gao Y¹, Chen D¹, Ran X¹, Wang C¹

¹Department Of Endocrinology And Metabolism, Diabetic Foot Care Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ²Department of Clinical Research Management, West China Hospital, Sichuan University, Sichuan province, chengdu city, China, ³General Practice Center, West China Hospital, Sichuan University, Sichuan province, chengdu city, China

Aim: To investigate the effect of gender on plantar pressure and gait in people with diabetes and people without diabetes.

Methods: This study included 480 people with diabetes (201 female, median age 59.0 years) and 109 people without diabetes (61 female, median age 34.0 years). A FOOTSCAN platform measured plantar pressure and gait. The plantar surface of each foot was divided into 10 regions: toes (T1, T2-5), metatarsals (M1-M5), midfoot (MF), and medial/lateral heel (HM, HL). Peak force (PPF), peak pressure (PPP), and impulse were recorded and averaged over three trials.

Results:

After adjusting for body weight, significant gender differences emerged.

People with Diabetes: Females showed significantly higher PPF and PPP in the MF and higher PPP in the M2-M3 regions compared to males ($p < 0.05$). Conversely, males exhibited significantly higher PPF in the toes, lateral metatarsals (M4, M5), and heels ($p < 0.05$). Impulse was lower in females in the toes, lateral metatarsals, and heels, but higher in the MF.

People without Diabetes: Females had significantly higher PPP in the toes (T2-5), central metatarsals (M2-4), and heels (HM, HL) ($p < 0.05$). Conversely, males exhibited significantly higher impulse in the MF.

Gait: Male participants with diabetes had a significantly shorter left foot contact time than females ($p = 0.043$). In participants without diabetes, males had significantly greater contact time and area for both feet ($p < 0.05$). Step length did not differ between genders in either group.

Conclusion:

Gender influences plantar pressure distribution and gait. Compared to males, female participants with diabetes endure higher pressure loads in the M2-3 and midfoot regions. In contrast, male participants with diabetes experience greater pressure in the lateral metatarsals (M5) and heels, which are common "hot spots" for foot ulceration.

Identification of a novel severe hyperglycaemic diabetes subgroup in Chinese individuals with Type 2 Diabetes and its epigenetic characterisation

Lin H¹, Tam C¹, Lim C¹, Shi M¹, O C¹, Wu H¹, Luk A¹, So W¹, Chan J¹, Ma R¹

¹The Chinese University of Hong Kong, New Territory, Hong Kong SAR

Background and aims: Type 2 diabetes is a heterogeneous condition with clinically distinct subgroups of prognostic significance. This study aimed to identify a novel subgroup among Chinese individuals with type 2 diabetes and explore its epigenetic mechanisms through subgroup-specific methylation risk scores (MRSs).

Materials and methods: We analysed two independent cohorts comprising 12,678 individuals with type 2 diabetes (4,813 from the Hong Kong Diabetes Register [HKDR]; 7,865 from the Hong Kong Diabetes Biobank [HKDB]). Individuals were clustered by age at diagnosis, BMI, HbA1c, HDL-C, and C-peptide using the k-means algorithm, stratified by sex. Cox regression predicted clinical outcomes. A subset of HKDR participants underwent genome-wide DNA methylation profiling (Illumina 450K array). MRSs were developed via *limma*-based differentially methylated position identification followed by elastic net regression.

Results: Beyond replicating known subgroups (SIDD, SIRD, MOD, MARD, MDH), we identified a novel subgroup — severe hyperglycaemic diabetes (SHD) — characterised by younger age at onset (43.6 ± 11.6 years), longer diabetes duration (8.7 ± 7.5 years), markedly elevated HbA1c ($10.5 \pm 1.4\%$), and low C-peptide levels (383.9 ± 281.7 pmol/L). Over 14.6 years of follow-up, individuals with SHD had higher incidence of cardio-renal complications than the MARD subgroup. EWAS identified *TXNIP* as a SHD-specific differentially methylated site. The SHD-MRS demonstrated high predictive accuracy (AUC: 0.774 discovery; 0.710 internal replication) using two CpG sites, and was associated with increased risk of chronic kidney disease and end-stage renal disease (FDR < 0.05).

Conclusion: SHD is a novel diabetes subgroup among Chinese individuals, characterised by younger onset, severe hyperglycaemia, and worse prognosis detectable at early stages of the condition. The SHD-MRS, derived from two CpG sites, highlights distinctive epigenetic features of this subgroup and supports the potential of methylation-based scores for diabetes subtyping and risk stratification.

Enhancing limb salvage through multidisciplinary management: One year experience from a guidelines-based diabetic foot program

Lin J¹, Lim J¹, Shao Y¹, Ang A¹, Seng D¹, Chan S¹

¹Woodlands Hospital, Singapore, Singapore

Aims

Diabetic foot complications remain a leading cause of morbidity, hospitalisation, and lower extremity amputation (LEA) among individuals with diabetes mellitus. The Diabetic Foot Program (DFP) is a newly established, multidisciplinary initiative aimed at optimising medical care, improving limb salvage, and reducing LEA through coordinated care. This study presents the 1-year evaluation of clinical outcomes among patients enrolled in our DFP.

Methods

A total of 355 patients were enrolled in the DFP between 2 May 2024 to 1 May 2025. A descriptive statistical analysis was performed to evaluate clinical characteristics and outcomes at 1 year. Baseline demographics, glycaemic control, surgical interventions and outcomes were analysed. Risk stratification was performed using the Wound, Ischaemia and Foot Infection (WIFI) classification.

Results

The mean age was 63.7 years, with a male predominance (65.0%). The majority of patients were Malay (41%), followed by Chinese (33%), and Indian (22%). At enrolment, 71.0% of patients had poor glycaemic control (mean HbA1c 8.9%), which improved significantly to 8.1% at the last follow-up. 58.0% required inpatient management, 35.2% underwent revascularisation, and 37.7% required foot-related surgeries. Among patients requiring surgery, 29.6% underwent minor LEA and 5.6% required major LEA.

Among those with WIFI risk stratification (68%), 39% of patients were classified as medium-to-high risk for major LEA. These patients had higher LEA rates (minor 43.6% and 61.3%; major 6.5% and 19.4%, respectively). The mean time from admission to revascularisation and foot surgery was 4.4 and 4.2 days, respectively. The mean length of stay was 12.1 days. Wound healing was achieved in 51.6% of patients at 1 year, with a mean follow-up duration was 215.2 days. The 30-day mortality rate was 3.9%. 36.3% of patients required readmission, and re-ulceration occurred in 23.9%.

Conclusions

The first-year evaluation of our Diabetic Foot Program demonstrated favourable limb salvage outcomes despite high predicted amputation risks, and measurable improvements in glycaemic control. These findings underscore the importance of a structured, multidisciplinary diabetic limb salvage program in improving clinical outcomes and reducing the burden of diabetic foot disease.

Proteomic insights into the healing mechanisms of negative pressure wound therapy for diabetic foot ulcers

Liu D¹, Jiang S¹, He H¹

¹Endocrinology Department, Zhongda Hospital, Southeast University, Nanjing, China

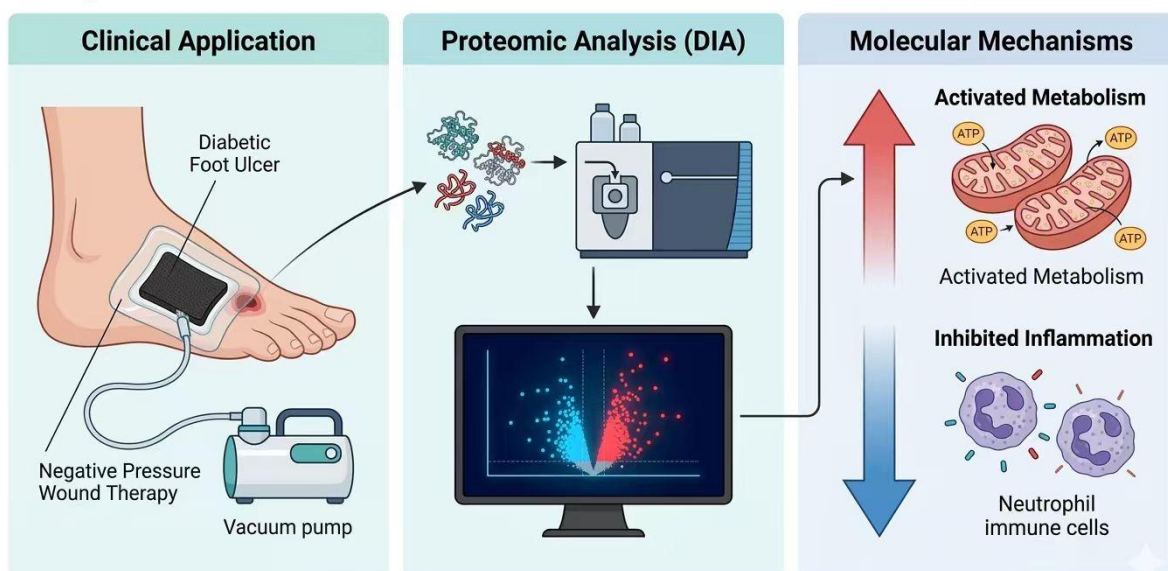
Aim: This study aimed to elucidate the tissue-level molecular mechanisms underlying negative pressure wound therapy (NPWT) for diabetic foot ulcers (DFU) using Data-Independent Acquisition (DIA) quantitative proteomics.

Methods: Paired skin tissue samples were obtained from six DFU patients before and after NPWT. DIA proteomics was performed to identify differentially expressed proteins (DEPs) (fold change ≥ 1.5 or ≤ -1.5 , $P < 0.05$). Bioinformatic analyses including GO, KEGG, Reactome, and Signaling Pathway Impact Analysis (SPIA) were used to characterize biological functions and pathways.

Results: NPWT induced a marked shift in the tissue proteome, as shown by principal component analysis. A total of 1,821 DEPs were identified, with 1,225 up-regulated and 596 down-regulated post-treatment. Up-regulated proteins were predominantly enriched in metabolic pathways, including carbon metabolism, amino acid biosynthesis, and the citrate cycle (TCA cycle). Down-regulated proteins were significantly associated with inflammatory and immune pathways, such as chemokine signaling, leukocyte transendothelial migration, lysosomes, neutrophil extracellular trap formation, and phagosomes. SPIA further confirmed inhibition of chemokine signaling. DEPs were also involved in extracellular matrix organization and defense responses.

Conclusion: NPWT promotes DFU healing via a dual mechanism: revitalizing local energy and amino acid metabolism to support tissue regeneration, while suppressing excessive inflammatory damage. These proteomic insights provide a molecular rationale for the clinical efficacy of NPWT.

Graphical Abstract



The impact of automated insulin delivery on glucose control in people with diabetes and advanced chronic kidney disease

Lu J¹, Meyer-Olesen C², Halim B¹, Vogrin S¹, Christensen M⁸, Apostolopoulos J¹, Bomholt T², MacIsaac R³, Lee P³, Trawley S⁴, Cohen N⁵, Fourlanos S¹, Stranks S⁷, Jenkins A⁵, Ekinici E⁶, Hornum M², Nørgaard K⁸, O'Neal D¹

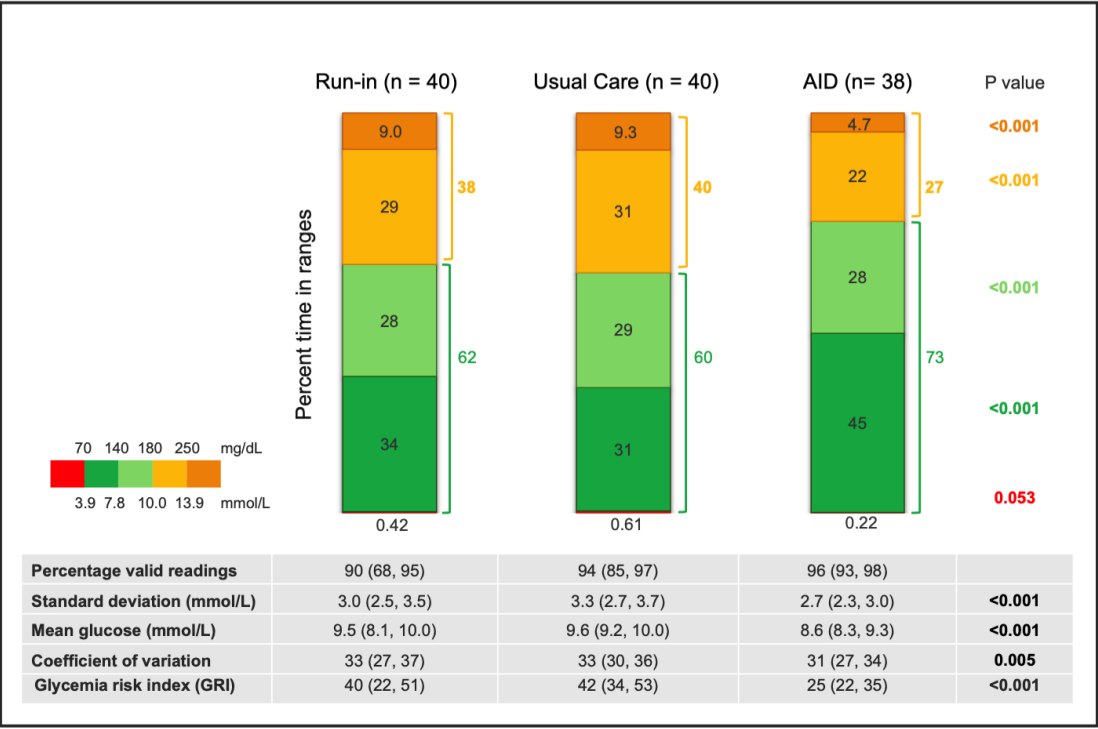
¹University Of Melbourne, Parkville, Australia, ²Copenhagen University Hospital, Rigshospitalet, Denmark, ³St Vincent's Hospital Melbourne, Fitzroy, Australia, ⁴Cairnmillar Institute, Hawthorn, Australia, ⁵Baker Heart and Diabetes Institute, Prahran, Australia, ⁶The Australian Centre for Accelerating Diabetes Innovations, Melbourne, Australia, ⁷Southern Adelaide Diabetes and Endocrine Services, Adelaide, Adelaide, Australia, ⁸Steno Diabetes Center, Herlev, Denmark

Background and aims: Chronic kidney disease (CKD) complicates insulin dosing and increases glycemic instability in diabetes. We aimed to compare feasibility, safety, and efficacy of automated insulin delivery (AID) with usual care in people with diabetes and advanced CKD.

Materials and methods: In this multicenter, randomised, crossover trial, adults with type 1 or type 2 diabetes receiving multiple daily insulin injections or open-loop pump therapy and with stage $\geq 3b$ chronic kidney disease underwent two 8-weeks interventions in random order: continuous glucose monitoring (CGM; Medtronic Guardian™ 3 or 4) with usual care or AID (MiniMed™ 780G), followed by crossover. Primary analyses used CGM data from the final 3-weeks of each phase. Psychosocial, cognitive, and functional assessments were conducted at the completion of each phase.

Results: Forty participants (24 type 1 diabetes, 16 type 2 diabetes; median [IQR] age 60 [55, 69] years; HbA1c 64 [54, 73] mmol/mol (8.0 [7.1, 8.8] %); eGFR 30 [18, 37] mL/min/1.73m²) were enrolled: 33 not on dialysis, 4 on peritoneal dialysis, and 3 on hemodialysis. AID significantly improved all hyperglycemic CGM metrics compared to usual care. Time in range (3.9-10.0 mmol/L) improved from 60 (51, 66)% at the end of usual care to 73 (65, 78)% at the end of AID ($p < 0.001$) (Figure 1). Participants were predominantly pre-frail at baseline and remained stable on-trial. No serious adverse events were attributed to the study devices. Nonetheless, 25% of participants experienced hospital admissions during the trial period for medical issues unrelated to device use.

Conclusion: AID is feasible, safe, and compared with usual care provides superior glucose control in predominantly pre-frail people with diabetes complicated by advanced CKD.



Results are presented as median (IQR). P values on median differences between study arms were calculated using the sign-rank test adjusted for period effect.

Figure 1: Primary and secondary glycemc outcomes.

Vitamin D status and early cardiac dysfunction in Type 2 Diabetes: Association with Diastolic dysfunction and implications for risk stratification

Bai M¹, Gao Y¹, Luo B

¹Diabetic Foot Care Center, Department Of Endocrinology And Metabolism, West China Hospital, Sichuan University, Chengdu, China, ²People's Hospital of Rongchang District, ,

Aims: Vitamin D status has been implicated in cardiovascular disease, but its role in early cardiac dysfunction in individuals with type 2 diabetes mellitus (T2DM) remains unclear. This study aimed to investigate the association between serum 25-hydroxyvitamin D (25(OH)D) levels and cardiac structure and function in individuals with T2DM.

Materials and Methods: We conducted a cross-sectional study involving 933 individuals with T2DM. Serum 25(OH)D levels were measured, and participants were categorized into normal, insufficient, and deficient groups. Echocardiographic parameters, including left ventricular mass index (LVMI), left ventricular posterior wall thickness (LVPW), interventricular septum thickness (IVS), E/e' ratio and E/A ratio were assessed. Logistic regression analyses were used to evaluate the association between vitamin D status and left ventricular diastolic dysfunction (LVDD), with subgroup analyses to explore potential sex and age differences.

Results: Lower 25(OH)D levels were significantly associated with higher E/e' and E/A ratios, as well as increased LVMI, LVPW, and IVS in individuals with T2DM. After adjusting for confounders, vitamin D deficiency remained independently associated with elevated E/e' ratio and a higher prevalence of LVDD. Subgroup analysis revealed a stronger association between vitamin D deficiency and LVDD in females.

Conclusions: Lower serum 25(OH)D levels are associated with impaired diastolic function and an increased prevalence of LVDD in individuals with T2DM. These findings suggest that vitamin D status may serve as an early marker of subclinical cardiac dysfunction and aid in risk stratification, particularly in high-risk groups such as females.

Asia-Pacific expert consensus on NT-proBNP for cardiovascular and kidney risk assessment in people with diabetes: who to test, when to test, and how to interpret

Ma R^{1,2,3}, Bee Y^{4,5}, Deerochanawong C⁶, Joshi A⁷, Lam C^{5,8}, Lim L^{1,9,10,11}, Pop-Busui R^{12,13}, Shetty S¹⁴, Shimabukuro M¹⁵, Sindone A¹⁶, Tanaka A¹⁷, Wang C¹⁸, Yu M¹⁹

¹Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Hong Kong Special Administrative Region, China, ²Hong Kong Institute of Diabetes and Obesity, The Chinese University of Hong Kong, Hong Kong Special Administrative Region, China, ³Li Ka Shing Institute of Health Sciences, The Chinese University of Hong Kong, Hong Kong Special Administrative Region, China,

⁴Department of Endocrinology, Singapore General Hospital, , Singapore, ⁵Medicine Academic Clinical Programme, Duke-National University of Singapore Medical School, , Singapore, ⁶Department of Medicine, College of Medicine, Rangsit University, Bangkok, Thailand, ⁷Department of Endocrinology, Bhaktivedanta Hospital and Research Institute, Thane, India, ⁸National Heart Centre Singapore, , Singapore, ⁹Department of Medicine, Faculty of Medicine, Universiti Malaya, Kuala Lumpur, Malaysia, ¹⁰Asia Diabetes Foundation, Hong Kong Special Administrative Region, China, ¹¹Baker Heart and Diabetes Institute, Melbourne, Australia, ¹²Harold Schnitzer Diabetes Health Center, Division of Endocrinology, Diabetes and Clinical Nutrition, Oregon Health & Science University, Portland, USA,

¹³Department of Internal Medicine, University of Michigan, , USA, ¹⁴Department of Endocrinology, Kasturba Medical College, Manipal Academy of Higher Education, Manipal, India, ¹⁵Department of Diabetes, Endocrinology, and Metabolism, Fukushima Medical University School of Medicine, Fukushima, Japan, ¹⁶Department of Cardiology, Concord Hospital, Sydney, Australia, ¹⁷Department of Cardiovascular Medicine, Saga University, , Japan, ¹⁸Division of Endocrinology and Metabolism, Department of Internal Medicine, National Taiwan University Hospital, Taipei, Taiwan, ¹⁹Peking Union Medical College Hospital, Beijing, China

Background & Aim: The Asia-Pacific (APAC) region carries more than half of the global diabetes burden, with cases projected to rise sharply by 2050, driving a surge in cardiovascular and chronic kidney disease. Existing risk-stratification tools show modest, variable discrimination in people with diabetes, and although NT-proBNP demonstrates superior prognostic performance for cardiovascular and kidney outcomes, no APAC-wide guidance currently defines how to apply it in routine diabetes care. With the regional disease burden escalating, practical guidance is urgently needed. We aimed to develop the first APAC expert consensus on NT-proBNP use for cardio-kidney risk assessment in people with diabetes, addressing who to test, when to test, and how to interpret results.

Methods: A panel of twelve cardiologists and endocrinologists from nine APAC countries or regions, supported by a non-voting US subject matter expert, developed recommendations through a modified Delphi process, with consensus predefined as $\geq 75\%$ agreement.

Results: Eight consensus statements were developed, addressing patient selection, timing of testing and result interpretation. The panel endorsed NT-proBNP as an accurate, practical and clinically meaningful biomarker for cardio-kidney risk assessment in people with diabetes. Baseline testing at diagnosis was recommended for all adults with type 2 diabetes; where universal testing is not feasible, priority should be given to asymptomatic individuals with one or more secondary risk factors. NT-proBNP ≥ 125 pg/mL was endorsed as a pragmatic threshold indicating elevated heart failure, cardiovascular and kidney disease risk, prompting optimisation of modifiable risk factors, initiation of disease-modifying therapies and further evaluation, including echocardiography, per local pathways. Results should be interpreted alongside age, sex, ethnicity, adiposity, kidney function, comorbidities and concurrent medications, with at least annual reassessment supporting ongoing monitoring.

Discussion / Conclusion: These expert-led APAC consensus statements provide a standardised framework for using NT-proBNP to guide clinical decision-making and optimise cardio-kidney outcomes across the rapidly growing APAC diabetes population.

Prevalence of cardiac autonomic neuropathy in Indigenous and Non-Indigenous Australians with type 2 diabetes

Marathe C^{1,2}, Davis W³, Kamruzzaman M², Horowitz M^{1,2}, McAullay D⁴, Brown A⁵, Marathe J⁶, Davis T²

¹Royal Adelaide Hospital, Adelaide, Australia, ²Adelaide University, Adelaide, Australia, ³University of Western Australia, Perth, Australia, ⁴Kurongkurl Katitjin, Centre for Indigenous Australian Education and Research, Edith Cowan University, Joondalup, Australia, ⁵Telethon Kids Institute, Perth, Australia, ⁶Central Adelaide Local Health Network, Adelaide, Australia

Aim: To compare the prevalence of cardiac autonomic neuropathy (CAN), a complication associated with increased mortality, between Indigenous and non-Indigenous Australians with type 2 diabetes (T2D).

Methods: CAN data from the Fremantle Diabetes Study Phase II (2009-2012; n=844, 8% Indigenous) and the South Australian cohort (2023-2024; n=23, 100% Indigenous) were analysed. CAN was defined using modified Toronto criteria (no CAN score 0/3, possible CAN 1/3, definite CAN ≥2/3) based on heartrate variation during deep breathing, Valsalva manoeuvre, and standing. Multinomial regression examined associations between Indigenous status and CAN category (reference: no CAN; presented as odds ratio (95% confidence interval)).

Results: Among 867 participants (mean age 62 years, 54% male, median diabetes duration 7 years, 10.5% Indigenous), 258 (30.6%) had possible and 108 (12.8%) definite CAN. The proportion of Indigenous participants increased across CAN categories (7.1%, 12.0% and 20.4% no, possible and definite CAN, respectively; *P*<0.001). In unadjusted Model 1, Indigenous Australians were 1.8 and 3.3 times more likely to have possible/definite CAN; this association was attenuated after adjustment for cardiometabolic and clinical characteristics (Model 2; see Table).

Conclusion: CAN prevalence is higher in Indigenous Australians with T2D, reflecting greater cardiometabolic risk.

Model	Variable	Possible CAN	Definite CAN
1	Indigenous	1.78 (1.07, 2.97)	3.33 (1.86, 5.98)
2	Indigenous	1.59 (0.90, 2.80)	1.90 (0.93, 3.88)
	Age at diabetes diagnosis (increase of 10 years)	0.84 (0.72, 0.98)	0.65 (0.53, 0.80)
	Heart rate (increase of 10 beats/min)	1.16 (1.003, 1.34)	1.49 (1.22, 1.83)
	eGFR (CKD-EPI) (increase of 10 mL/min/1.73m ²)	0.96 (0.87, 1.05)	0.87 (0.78, 0.98)
	Ln(urinary albumin:creatinine ratio (mg/mmol))	1.06 (0.93, 1.20)	1.28 (1.09, 1.51)
	On antidepressant medication	1.36 (0.88, 2.11)	2.41 (1.38, 4.19)
	On beta blockers	1.57 (1.01, 2.45)	2.57 (1.44, 4.62)
	On calcium channel blockers	1.40 (0.94, 2.08)	2.37 (1.38, 4.06)

ApoB–LDL discordance in Type 2 Diabetes: Residual atherogenic risk despite LDL-C target achievement

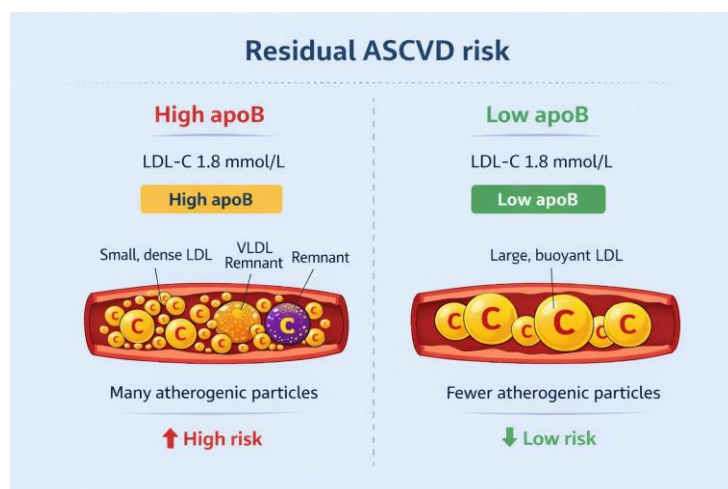
McAndrew K¹, O'Brolchain A¹

¹Gold Coast Univeristy Hospital, Southport, Australia

Low-density lipoprotein cholesterol (LDL-C) is the primary therapeutic target in dyslipidaemia management; however, it reflects cholesterol mass rather than the number of circulating atherogenic particles. Apolipoprotein B (ApoB) is present on all atherogenic lipoproteins, and it is the trapping of apoB particles within the arterial wall that is the fundamental driver of atherosclerosis. ApoB may therefore provide a more accurate measure of cardiovascular risk, particularly in insulin-resistant states where triglyceride-rich particles predominate.

We present a case demonstrating clinically significant ApoB–LDL discordance in a patient with type 2 diabetes mellitus (T2DM) and established atherosclerotic cardiovascular disease. A 74-year-old man with long-standing T2DM and prior ST-elevation myocardial infarction (STEMI) was reviewed in a tertiary diabetes clinic while receiving high-intensity statin therapy (rosuvastatin 20 mg daily). His lipid profile showed LDL-C of 0.8 mmol/L, meeting contemporary guideline targets, but triglycerides were elevated at 4.0 mmol/L. Measurement of ApoB revealed a level of 0.94 g/L (above consensus guideline targets), indicating persistent atherogenic particle burden despite apparently optimal LDL-C control. Lipid-lowering therapy was subsequently intensified with the addition of ezetimibe.

This case highlights that reliance on LDL-C alone may underestimate cardiovascular risk in patients with diabetes and hypertriglyceridaemia. ApoB measurement can identify residual atherogenic risk and influence therapeutic decision-making. Broader integration of ApoB into routine lipid assessment may improve risk stratification and guide treatment intensification in diabetic dyslipidaemia.



Epilepsia partialis continua as a neurological manifestation of hyperosmolar hyperglycaemic state

Mohandas D^{1,2}, Huang Y¹

¹Blacktown Hospital, Blacktown, Australia, ²Western Sydney University, , Australia

Background

Neurological complications in Hyperosmolar Hyperglycaemic State (HHS) are common and diverse. They range from mild lethargy to profound coma, with focal seizures, stroke-like deficits (hemiparesis, hemianopia), and hyperkinetic movement disorders (chorea-hemiballismus). Epilepsia Partialis Continua (EPC) is a rare syndrome of continuous focal motor seizures and is a recognized neurological manifestation of severe hyperglycaemia, particularly HHS.

Case presentation

A 54 year old lady with poorly controlled type 2 diabetes, class III obesity, hypertension, chronic kidney disease, hypercholesterolaemia and peripheral neuropathy presented with acute left-sided weakness and persistent involuntary movements of the left upper and lower limbs.

Examination demonstrated continuous jerky movements of the left side resembling hemiballismus with mild weakness of the left arm. Diabetic striatopathy was considered as a potential differential diagnosis.

Investigation

Biochemistry revealed glucose of 39.3 mmol/L, serum osmolality 332 mOsm/kg, ketones 1.7 mmol/L and an extremely high HbA1c at 21.7%, consistent with HHS.

MRI brain showed no acute infarction and no T1 basal ganglia hyperintensity, arguing against diabetic striatopathy. Electroencephalography demonstrated a reactive posterior dominant rhythm without epileptiform discharges.

The patient was managed with intravenous fluids and insulin according to HHS protocol, and levetiracetam was commenced. Abnormal movements resolved completely within 24 hours of metabolic correction.

Discussion

Severe hyperglycaemia can precipitate EPC even in the absence of structural neuroimaging abnormalities. The seizures are typically resistant to anticonvulsants but resolve with insulin and rehydration. Proposed mechanisms include hyperosmolar neuronal dysfunction, reduced gamma-aminobutyric acid availability and reversible cortical metabolic disturbance. This case highlights EPC as a reversible metabolic complication of HHS and underscores the importance of considering both seizure disorders and diabetic striatopathy in hyperglycaemia-associated movement presentations to avoid misdiagnosis and ensure prompt treatment.

Bone health as an overlooked complication of Type 1 diabetes: A 5-year retrospective audit

Moroney E¹, Komesaroff M¹, Damasiewicz M², MacIsaac R^{1,3,4}, Aleksova J^{1,5,6}, Lee M^{1,3}

¹Department of Endocrinology & Diabetes, St Vincent's Hospital Melbourne, Fitzroy, Australia,

²Department of Nephrology, St Vincent's Hospital Melbourne, Fitzroy, Australia, ³Department of Medicine, The University of Melbourne, , Australia, ⁴Australian Centre for Accelerating Diabetes Innovations, University of Melbourne, Parkville, Australia, ⁵Hudson Institute of Medical Research, Monash Health, Australia, ⁶Department of Endocrinology, Monash Health, Clayton, Australia

Aim: To explore current practices in the assessment and management of bone health in patients with Type 1 Diabetes mellitus (T1DM).

Method: We performed a retrospective review of T1DM patients attending outpatient clinics at St Vincent's Hospital Melbourne between 2021-2025. Clinical information collected included diabetes duration and management, fracture risk factors, relevant biochemistry, imaging and bone-modifying therapies. Primary outcome was dual-energy X-ray absorptiometry (DXA) screening and initiation of bone-modifying agents.

Results: Preliminary analysis included 30 T1DM patients attending T1DM (n=10), Islet Transplant (n=10), Renal Transplant (n=5) and Dialysis (n=5) clinics. 63% females; mean (SD) age 50.2 (14.6) years; diabetes duration 33.8 (17.1) years, most recent HbA1c 6.9% (0.8%) and vitamin D 75 (32.7) nmol/L.

Bone health assessment varied across cohorts (Figure 1). Overall prevalence of bone health screening was 40%, with higher rates of DXA assessment in those on dialysis or post-islet/kidney transplant. Of 12 patients who underwent DXA, 10 (83%) had osteopenia and 1 had osteoporosis. Nine fractures were recorded in 7 patients (23%). Bone-modifying medications prescribed included cholecalciferol (n=16), calcium and/or calcitriol (n=7) and anti-resorptive therapy (n=1).

Conclusion: Despite T1DM being a recognised risk factor for osteoporosis (1, 2), our initial results show bone health assessment and treatment were inconsistently implemented. Osteopenia and fractures were common among those assessed, yet few patients received targeted osteoporosis therapy. This highlights an important gap in routine bone health surveillance in T1DM and supports more systematic assessment and proactive fracture prevention strategies.

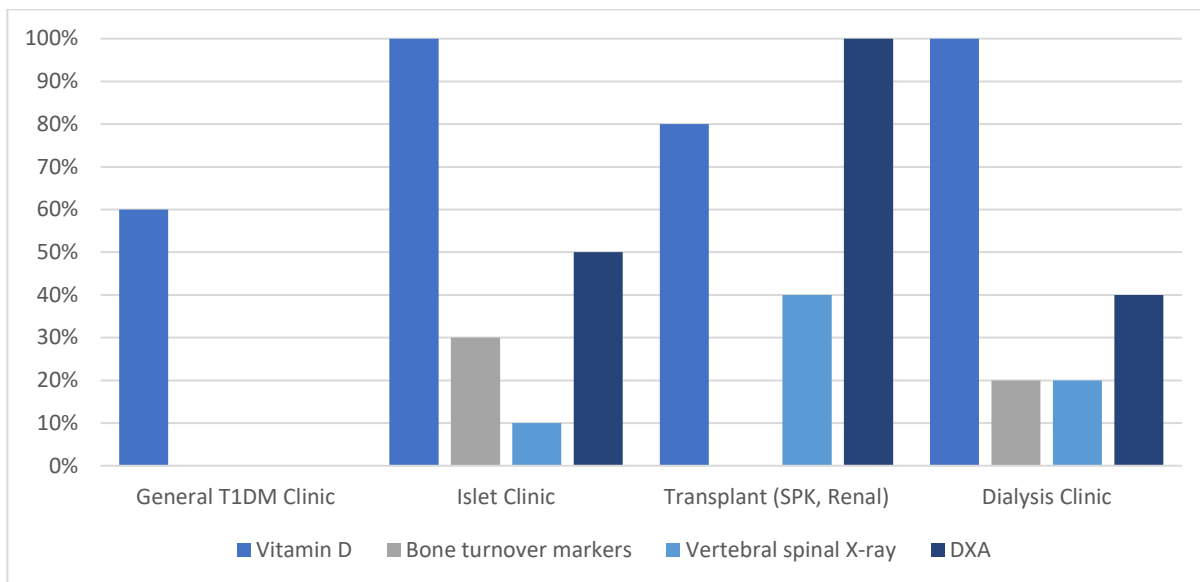


Figure 1: Bone Health Screening Measured by Clinic Cohort

References

1. Aleksova J, Ebeling P, Elder G. The effects of type 1 and type 2 diabetes mellitus on bone health in chronic kidney disease. *Nat Rev Endocrinol*. 2025;21(5):301-13.
2. Thong EP, Herath M, Weber DR, Ranasinha S, Ebeling PR, Milat F, et al. Fracture risk in young and middle-aged adults with type 1 diabetes mellitus: A systematic review and meta-analysis. *Clin Endocrinol (Oxf)*. 2018;89(3):314-23.

Single Centre Retrospective Cohort Study of Renal Disease among Type 2 Diabetes Patients

Nguyen J¹, Getie K¹, Muruges A¹, Piya M¹, Simmons D¹, Naumovski V¹

¹Faculty of Health, Western Sydney University, Campbelltown, Australia

Aims:

This study examined the achievement of guideline-recommended metabolic and kidney-protective therapy targets in adults with type 2 diabetes mellitus (T2DM) and chronic kidney disease (CKD).

Methods:

A single-centre, retrospective cohort study was conducted among adults with T2DM attending specialist diabetes outpatient services between January and December 2023. Demographic, clinical, biochemical and medication data were extracted from physical and electronic medical records (eMR). CKD stage was identified from nephrologist documentation or eMR coding. Kidney Disease: Improving Global Outcomes (KDIGO) kidney risk categories were determined by combining CKD stage with baseline urinary albumin-to-creatinine ratio (UACR). Continuous variables were summarised using descriptive statistics and compared using t-tests or Kruskal-Wallis tests, as appropriate, while categorical variables were compared using chi-square tests.

Results:

Of 324 patients with T2DM, 231 (71%) had both CKD stage and UACR available at baseline (mean age 62.9±12.1 years, 42.0% female, HbA1c 8.0±1.6%, T2DM duration 16.0±9.1 years [n=223]). Patients were stratified into KDIGO low-risk (n=131, 56.7%), moderate-risk (n=39, 16.9%), high-risk (n=26, 11.3%), and very-high-risk (n=35, 15.2%) groups. The table shows that target attainment remained limited across KDIGO risk groups, with inconsistent use of therapies; SGLT2 inhibitor use was lowest in very-high-risk patients, and none received finerenone.

Target/Group (n)	Low (131)	Moderate (39)	High (26)	Very-High (35)	p-value
HbA1c≤7.0%, n (%)	43 (32.8%)	7 (18.0%)	11 (42.3%)	13 (37.1%)	0.153
BP≤140/90 mmHg, n (%)	57 (77.0%)	15 (75.0%)	12 (80.0%)	13 (46.4%)	0.017
LDL<2.0 mmol/L, n (%)	70 (53.4%)	18 (46.2%)	11 (42.3%)	18 (51.4%)	0.693
RAAS blockade, n (%)	71 (54.2%)	25 (64.1%)	18 (69.2%)	21 (60.0%)	0.429
SGLT2 inhibitor, n (%)	79 (60.3%)	29 (74.4%)	16 (61.5%)	5 (14.3%)	<0.001

Conclusion:

Achievement of guideline-recommended cardiometabolic and kidney-protective therapy targets was limited across KDIGO risk groups, highlighting opportunities to strengthen the development and implementation of integrated diabetes-renal care models.

Centralized resourcing versus distribution service models: a comparative exploration of implementing hybrid inter-disciplinary in-reach acute foot disease services in rural/remote Queensland.

Nevin M¹, Ryan L², Walker A³, Ward B⁴

¹Logan Hospital Queensland Health, Meadowbrook, Australia, ²Townsville University Hospital , Townsville, Australia, ³Royal Brisbane and Women's Hospital , Brisbane, Australia, ⁴Cairns Hospital , Cairns, Australia

Aims:

This study evaluated outcomes of four-metropolitan Foot Care Hub models established across Queensland, improving access to specialist care for regional patients with acute foot disease. Specific aims were to compare differences in service design across hubs, quantify impacts on patient access and travel burden, and examine associations between service models and clinical outcomes.

Methods:

Four Foot Care Hubs (Far Northern, Northern, Central, and Southern) were established, each servicing multiple Hospital and Health Services. All hubs were supported by interdisciplinary teams comprising clinical coordinators, senior podiatrists, endocrinology, infectious diseases and vascular surgery specialists, diabetes educators, Indigenous liaison officers, and psychologists, with composition adapted to local context. During establishment hubs co-designed service models, engaged stakeholders across Queensland Health and primary care, delivered clinician education, established escalation pathways, and implemented telehealth services. A subsequent refinement phase focused on improving accessibility and performance evaluation.

Results:

Cumulatively, 3,940 occasions of service were delivered. The Far Northern hub employed centralised modelling, Northern and Central adopted hybrid centralised–distributed models, and Southern used distribution modelling. Engagement with non-Queensland Health providers was highest in hybrid and distributed models (up to 72%). Patient travel savings exceeded 3.1 million kilometres, with substantial reductions in travel subsidy expenditure. Hybrid and distributed models achieved earlier patient interception, fewer tertiary admissions, and stronger primary care engagement, while centralised models facilitated faster time to surgery.

Conclusion:

All Foot Care Hub models reduced unnecessary patient travel and associated costs while improving access to specialist care for rural and remote populations. Hybrid and distribution models supported earlier escalation and service integration, whereas centralised models enabled rapid surgical intervention access. Further evaluation is required to define the optimal application of each model across diverse geographical contexts.

Iron biomarkers and atherogenic dyslipidemia in Asian adults with diabetic kidney disease: Insights for cardiometabolic risk stratification

Tran T¹, Hoang H², Do T³, Kao C⁴, Nguyen N⁵

¹Department of Internal Medicine, Thai Nguyen University of Medicine and Pharmacy, Thai Nguyen, Viet Nam, ²Department of Internal Medicine, Bac Kan General Hospital, Bac Kan, Viet Nam,

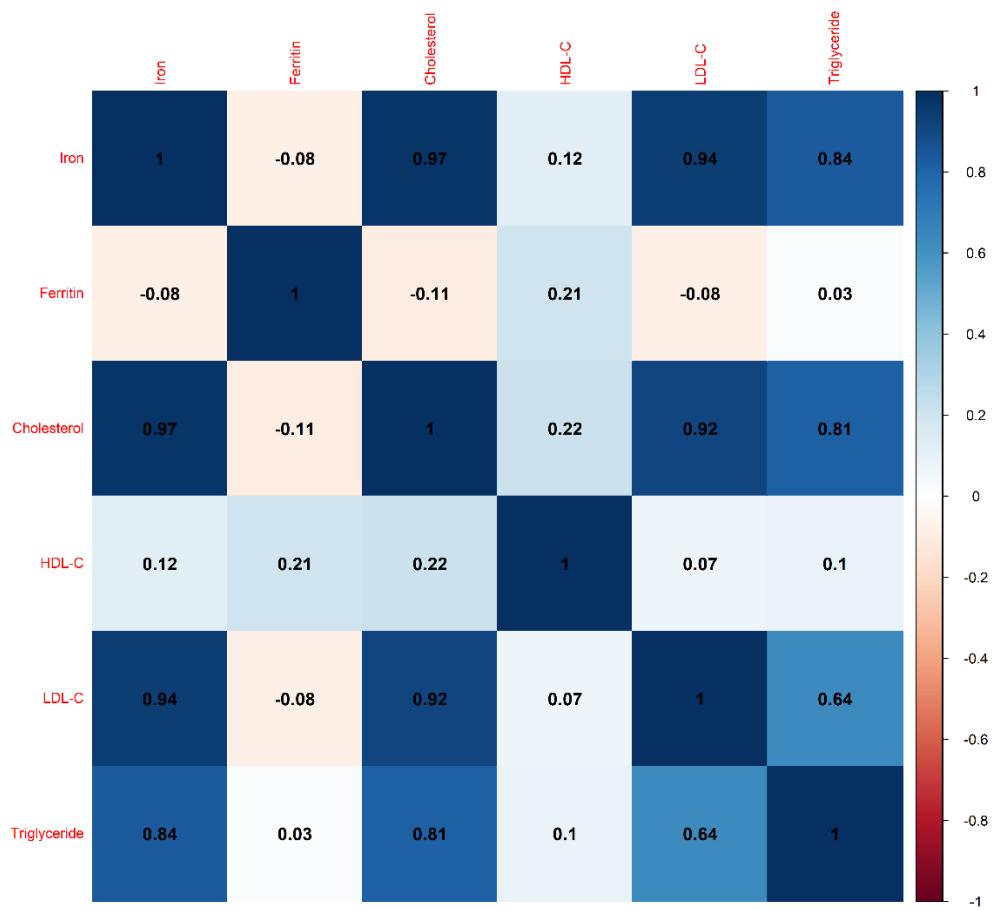
³Department of Geriatrics, Hanoi Medical University, Hanoi, Viet Nam, ⁴Division of Nephrology, Department of Internal Medicine, Taipei Medical University, Taipei, Taiwan, ⁵Endocrinology Clinic, Hanh Phuc International Hospital, Ho Chi Minh City, Viet Nam

Aims: Diabetic kidney disease (DKD) and cardiometabolic complications are highly prevalent across Asian populations. While disturbances in iron metabolism and lipid abnormalities frequently coexist in DKD, their interrelationship remains incompletely understood. This study investigated associations between iron-related biomarkers and lipid profile components in Asian adults with DKD.

Methods: We performed a cross-sectional study including 150 adults diagnosed with DKD. Iron status was assessed using serum iron and ferritin levels. Lipid parameters included total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglycerides. Associations were examined using Spearman correlation analyses and further evaluated with partial correlation models adjusting for relevant confounders.

Results: Serum iron concentrations showed strong positive correlations with total cholesterol ($r = 0.97$), LDL-C ($r = 0.94$), and triglycerides ($r = 0.84$), all with $p < 0.001$ (Figure). Ferritin was weakly but significantly associated with HDL-C ($r = 0.21$, $p = 0.010$) and showed no meaningful relationship with other lipid fractions. After multivariable adjustment, the associations between serum iron and atherogenic lipid parameters remained significant, and a modest positive association between serum iron and HDL-C became evident ($r = 0.23$, $p = 0.006$).

Conclusion: Among Asian patients with DKD, circulating iron levels are closely linked to an atherogenic lipid profile. These findings suggest that altered iron metabolism may contribute to dyslipidemia in DKD and support the potential role of iron status assessment in cardiometabolic risk evaluation and management in high-risk populations within the Western Pacific Region.



A cross-sectional review of the cardiovascular risk of older people with Type 1 Diabetes Mellitus

Nham S^{1,2}, Wong V^{1,2}

¹Endocrinology Department, Liverpool Hospital, Liverpool, Australia, ²South Western Sydney Clinical School, University of New South Wales, Sydney, Australia

Background

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality in people with type 1 diabetes mellitus (T1DM). CVD risk is particularly increased in those diagnosed in early life, despite optimal glycaemic control. Despite this, there is a paucity of clinical trial evidence to guide management of cardiovascular risk in T1DM.

Aims

Demographics of people with T1DM aged ≥ 40 years attending Diabetes Clinic at Liverpool Hospital, Sydney, were reviewed. We calculated their 5-year CVD risk by a model published by Cederholm et al.¹, described the pattern of statin therapy prescription and attainment of LDL-cholesterol (LDL-c) targets as defined by the ADA 2024 guidelines.²

Results

Amongst the 40 individuals reviewed, mean age was 57 ± 10 years. 45% were male, 14% current smokers and median diabetes duration was 29 ± 14.8 years. Retinopathy was prevalent in 50%, and macroalbuminuria in 10%. Mean systolic blood pressure 121 ± 16 mmHg with 20% having blood pressure $> 130/80$ mmHg. 23% had established atherosclerotic CVD (44% of these had complications of ischaemic heart disease and 56% had stroke). 70% were taking a statin regularly, 5% ezetimibe, and 5% fenofibrate.

Five-year CVD risk was categorised as low ($< 5\%$) in 64%, intermediate (5-10%) in 12% and high ($\geq 10\%$) in 24%. All individuals with high CVD risk received statin therapy. However, only 71% achieved an LDL-c < 1.8 mmol/L.

Among those CVD, all were treated with statins. LDL-c targets were less frequently achieved: only 17% achieved LDL-c < 1.4 mmol/L, and 43% had LDL-c < 1.8 mmol/L.

Discussion

Statin therapy was prescribed in the majority of our cohort, but a significant proportion had LDL-c above recommended targets especially those with established CVD.

A gluco-centric approach is often utilised in T1DM management. Established guidelines on managing cardiovascular risk specifically for T1DM are lacking. Further clinical trials addressing cardiovascular risk management in T1DM are required to guide optimal therapy and improve patient outcomes.

References:

1. Zethelius, B., Eliasson, B., Eeg-Olofsson, K., Svensson, A. M., Gudbjörnsdottir, S., & Cederholm, J. (2011). A new model for 5-year risk of cardiovascular disease in type 2 diabetes, from the Swedish National Diabetes Register (NDR). *Diabetes research and clinical practice*, 93(2), 276-284.
2. 10. Cardiovascular disease and risk management: Standards of Care in Diabetes—2024." *Diabetes care* 47, no. Supplement_1 (2024): S179-S218.

Impact of chronic low back pain on psychological factors in adults with Type 2 Diabetes

Nilajgi S^{1,2}, Marathe C^{2,3}, Marathe J^{2,4}, Horowitz M^{2,3}, Yull D⁵, Yao Y⁵, Whittle I^{5,6}

¹Specialist Medical Centre, Norwood, Australia, ²Adelaide Medical School, Adelaide University, Adelaide, AU, ³Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, AU, ⁴Department of Cardiology Royal Adelaide Hospital, Adelaide, AU, ⁵3DResearch@TISC, Parkside, AU, ⁶CCBS, University of Edinburgh, Edinburgh, Scotland

Aim: A recent systematic review reported an increased prevalence of chronic low back pain (CLBP) in people with type 2 diabetes (T2D). In this prospective cross-sectional study, we aimed to evaluate the impact of CLBP on emotional distress, depression, mood, function and quality of life (QoL) in adults with T2D.

Methods: We recruited 78 adults (T2D alone (n=33); T2D+CLBP (n=19); and CLBP alone (n=26)) from two independent South Australian outpatient clinics. CLBP was defined as pain present for >3 months with no spinal surgery for >1 year. Primary outcome measures were differences in diabetes distress (DDS-17), depression and anxiety (DASS-21), QoL (EQ-5D-5L), and disability (Oswestry Disability Index (ODI)). Secondary outcomes included pain severity (Brief Pain Inventory-Short Form (BPI-SF)), and neuropathic pain symptoms (PainDETECT)). Demographic and clinical data, and pain intensity (Visual Analog Score) were also recorded. Group differences were analysed using appropriate parametric or non-parametric statistical tests, with P<0.05 indicating statistical significance.

Results: There were no significant differences in age and sex between the cohorts. There were no differences in DDS-17 scores (P=0.20) nor ODI (P=0.17), but QoL scores in all five domains of the EQ-5D-5L were less (all P<0.01), and DASS-21 scores were higher (P<0.001) in the T2D+CLBP compared to T2D alone cohort. Comparing the T2D+CLBP to the CLBP alone cohort, there were no differences in DASS-21 (P=0.41), ODI (P=0.17), incidence of neuropathic pain, pain levels or any EQ-5D-5L domains.

Conclusions: Adults with T2D and CLBP have similar impairments in mood, QoL and function to individuals with CLBP alone, but greater impairments in mood, and QoL compared to those with T2D without CLBP. Structured interventions to treat CLBP in people with T2D should be explored to improve mood, diabetes distress and QoL.

Clinically significant hearing loss (≥ 40 dB HL) in adults with diabetes and prediabetes: a systematic review and meta-analysis

Nisar M¹

¹The University of Queensland, Brisbane, Australia

Aim/s

Diabetes impairs hearing through microvascular damage and neuropathy, yet the prevalence of moderate-to-severe hearing loss (≥ 40 dB HL) remains inadequately explored. Variations by age, condition duration, and socioeconomic factors are inadequately characterised. This systematic review quantified the prevalence and comparative risk of moderate-to-severe hearing loss in people with diabetes and prediabetes, exploring variations across age, national income level, and condition duration.

Methods

We searched PubMed, Scopus, Web of Science, SPORTDiscus, and CINAHL (2000–2025) for observational studies reporting audiometric thresholds in people with diabetes or prediabetes (PROSPERO: CRD42018100742). Quality was assessed using the Newcastle–Ottawa Scale. Random-effects meta-analyses generated pooled prevalence and odds ratios (ORs) with 95% confidence intervals (CIs). Publication bias was evaluated via funnel plots and Egger's regression.

Results

Of 3,490 records, 29 studies qualified. Most examined type 2 diabetes; one included prediabetes. Twenty-three studies ($n=5,221$) yielded a pooled prevalence of 24% (95% CI: 19–30%; $I^2=94\%$). Eleven studies showed diabetes doubled hearing loss odds versus controls (OR=2.41, 95% CI: 1.62–3.60; $I^2=86.6\%$). Risk was significantly elevated in younger adults (<60 years: OR=3.03, 95% CI: 2.17–4.22) but not older adults (≥ 60 years: OR=1.52, 95% CI: 0.72–3.22). Low- and middle-income countries showed the highest risk (OR=4.51, 95% CI: 2.43–8.40) versus high-income countries (OR=1.78, 95% CI: 1.05–3.02). A condition duration of <10 years conferred elevated risk (OR=2.68).

Conclusion

One in four adults with diabetes has clinically significant hearing loss, particularly younger individuals and resource-limited populations. These findings support integrating routine audiometric screening into diabetes care.

Risk of Myocardial Infarction (MI) and Ischemic Stroke (IS) following Herpes Zoster (HZ) In older adults with T2DM in the US

Stempniewicz N¹, Steffens A², Hague S², O'Callaghan E³, Steiger C², Koka P², Carrico J¹

¹GSK, Philadelphia,, United States, ²Optum, Eden Prairie,, United states, ³GSK, Abbotsford,, Australia

Aims: HZ has been associated with a higher risk of cardiovascular events, but evidence in T2DM is limited. This analysis assessed associations between HZ and MI/IS in older adults with T2DM.

Methods: Using US administrative claims and EHR data (Optum Market Clarity, 2016–2024), adults with T2DM and HZ were identified by ICD-10 diagnosis codes. Four adults with T2DM and no HZ were sampled per HZ case. Index was the first HZ diagnosis or an assigned date for the non-HZ cohort. MI/IS were identified from inpatient ICD-10 diagnosis codes. Crude cumulative MI and IS incidence proportions were described in each cohort among adults aged ≥50 years. Adjusted HRs for MI/IS were estimated using Cox proportional hazards models with time-stratified follow-up.

Results: Patients with HZ were older and had greater comorbidity burden than those without HZ. Adjusted HRs, accounting for baseline differences between cohorts, indicated a higher risk of MI following HZ in weeks 1–2 (3.38; 95% CI 2.27–5.02) and months 2–3 (1.45; 1.11–1.90) and a higher risk of IS in weeks 1–2 (7.11; 4.43–11.40), weeks 3–4 (2.08; 1.11–3.89), and months 2–3 (1.49; 1.09–2.05).

Conclusion: HZ was associated with a short-term increase in MI and IS risk among older adults with T2DM, highest in the first 2 weeks and generally declining thereafter, highlighting a potential additional burden of HZ.

Encore from ADA 2026.

Phase Angle in Relation to Sarcopenia and Glycemic Status in Older Outpatients with Type 2 Diabetes

Ono K¹, Ekawa H¹, Sugimoto R¹, Fukuoka M¹, Hirao A², Shintani H², Yamaguchi Y¹, Yamada T³, Hirota Y³

¹Kobe University Graduate School of Health Sciences, Kobe, Suma, Tomogaoka, Japan, ²Kobe University School of Medicine, Faculty of Health Science, Kobe, Suma, Tomogaoka, Japan, ³Kobe University Graduate School of Medicine, Department of Internal Medicine Division of Diabetes and Endocrinology, Kobe, Chuo, Kusunoki-cho, Japan

Aims: To determine sarcopenia prevalence and examine whether sarcopenia and glycemic status are associated with phase angle in older outpatients with type 2 diabetes.

Methods: This study included 46 older outpatients with type 2 diabetes (74.1 ± 6.3 years; 18 females and 28 males). Sarcopenia was defined according to the AWGS 2025 criteria using low skeletal muscle index and low handgrip strength. Dietary intake including protein intake was assessed. Participants were categorized by HbA1c < 7.0% or ≥ 7.0%. Outcomes included phase angle, Short Physical Performance Battery (SPPB), and skeletal muscle index. Group comparisons and multivariable linear regression adjusted for age, sex, and body mass index were performed.

Results: Sarcopenia prevalence was 17.4%. Sarcopenia was more frequent in participants with HbA1c < 7.0% than in those with HbA1c ≥ 7.0% (29.2% vs 4.5%, p = 0.050). Phase angle was lower in participants with sarcopenia and in those with HbA1c < 7.0%, whereas differences in SPPB and gait speed were not clear. In multivariable regression, sarcopenia (β = -0.582, 95% CI -1.070 to -0.094, p = 0.021) and HbA1c < 7.0% (β = -0.396, 95% CI -0.762 to -0.029, p = 0.035) were independently associated with lower phase angle.

Conclusion: In older outpatients with type 2 diabetes, both sarcopenia and HbA1c < 7.0% were independently associated with lower phase angle. Phase angle may complement functional assessment when evaluating muscle health in older adults with type 2 diabetes.

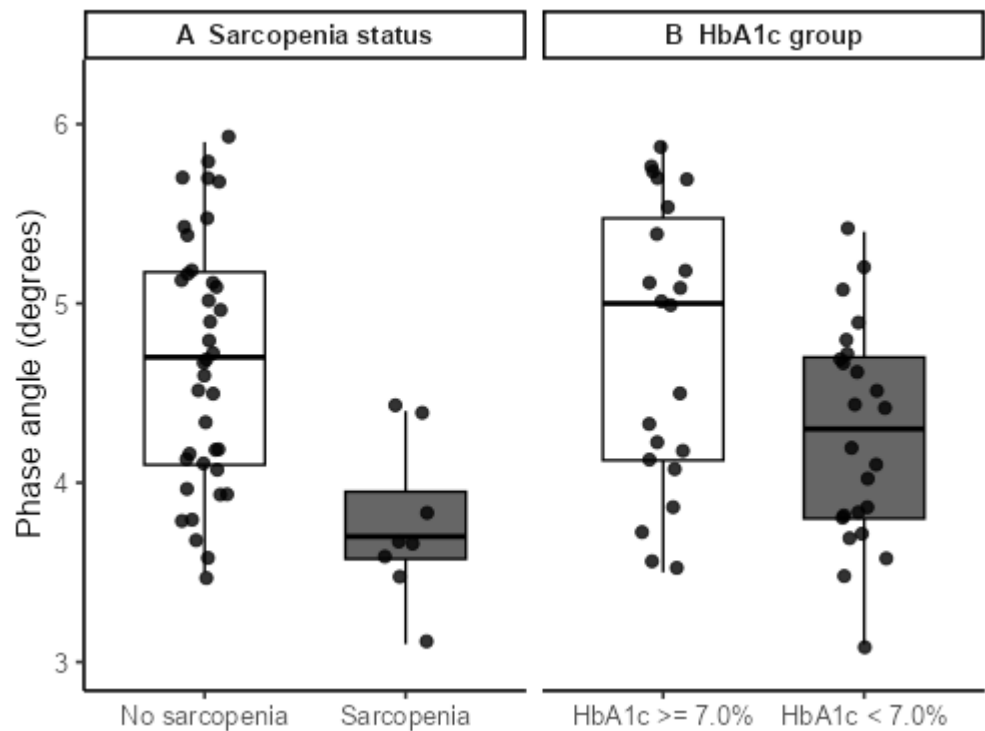


Fig. Phase angle according to sarcopenia status and HbA1c group

The burden of oral disease in individuals living with diabetes in Australia: the forgotten story

Pant A¹, Kim A^{2,3}, Jegathees S², Marschner S¹, Gibson A^{4,5}, George A^{6,7,8}, Christian B^{6,8,9}, King S^{1,8,9}

¹Westmead Applied Research Centre, Faculty of Medicine and Health, University of Sydney, Sydney, Australia, ²Department of Diabetes and Endocrinology, Westmead Hospital, Sydney, Australia,

³Sydney Medical School, Faculty of Medicine and Health, University of Sydney, Sydney, Australia,

⁴Leeder Centre for Health Policy, Economics and Data, School of Public Health, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia, ⁵Charles Perkins Centre, The University of Sydney, Sydney, Australia, ⁶Australian Centre for Integration of Oral Health, School of Nursing and

Midwifery, Faculty of Health, Western Sydney University, NSW, Australia, Sydney, Australia, ⁷Ingham Institute Applied Medical Research, NSW, Australia, Sydney, Australia, ⁸The Sydney Dental School, Faculty of Medicine and Health, Sydney, Australia, ⁹The Westmead Centre for Oral Health Research,

The University of Sydney, Sydney, Australia

Aims: To estimate the proportion at risk of poor oral health, including gum disease (periodontitis), and characterise self-reported oral health among individuals with diabetes in a tertiary referral Hospital in Sydney.

Methods: A cross-sectional study of 278 adult patients with type 2 Diabetes Mellitus attending the diabetes clinic at Westmead Hospital, Sydney was performed. Risk of poor oral health was assessed using a validated 3-item survey: dental/gingival symptoms, smoking status and recent (within 12 months) review by a dental professional. Periodontitis was assessed using a validated 8-item screening tool and tooth loss and oral hygiene behaviours were assessed using a self-report oral health survey administered by the study team.

Results: Majority of participants (n=233) [(84.4%, 95% CI (79.5–88.1%))] were identified at risk of poor oral health requiring a dental referral. Of those at increased risk, almost three quarters 174/233 [74.4%, 95% CI (69.2–80.4%)] had oral health problems, 37/184 [20.0%, 95% CI (14.3–25.9%)] were current smokers and 128/231 [54.4%, 95% CI (48.9, 61.8%)] had not seen a dental professional in 12 months. Over half 151/253 [59.7%, 95% CI (53.6–65.7%)] screened positive for periodontitis and more than a third 105/287 [36.6%, 95% CI (31.0–42.2%)] had fewer than 20 teeth indicating a non-functional dentition. Only 156/260 [(60.0%, 95% CI (54.0–66.0%))] brushed their teeth twice daily and 135/260 [51.9%, 95% CI (45.8–58.0%)] cleaned between their teeth.

Conclusion: Individuals living with diabetes attending a tertiary level diabetes clinic have sub-optimal oral hygiene behaviours and a high burden of oral disease which in turn can worsen glycaemic control. Routine oral health education, oral health screening and improved access to basic oral health care could improve both oral and diabetes outcomes in people living with diabetes.

Clinical correlates associated with diagnosis, progression or regression of liver fibrosis in people with type 2 diabetes: a retrospective audit

Gauld A¹, McGill M^{1,2}, Hocking S^{1,2}, Wong J^{1,2}, Wu T¹, Strasser S^{2,3}, Twigg S^{1,2}, Parry S^{1,2}

¹Diabetes Centre, Royal Prince Alfred Hospital, Camperdown, Australia, ²Central Clinical School, University of Sydney, Camperdown, Australia, ³AW Morrow Gastroenterology and Liver Centre, Royal Prince Alfred Hospital, Camperdown, Australia

Background: People with type 2 diabetes (PwT2D) have increased risk of both development and progression of severe liver fibrosis.

Aim: To identify clinical and metabolic correlates associated with diagnosis, progression or regression of liver fibrosis.

Methods: A retrospective audit of PwT2D attending the Royal Prince Alfred Hospital Diabetes and Liver Clinic was performed. Transient elastography by Fibroscan® was used to assess fibrosis (LSM, kPa). Fibrosis-4 Index (FIB-4) and NAFLD Fibrosis Score (NFS) were calculated. Routine clinical and biochemical data were collected. Pearson correlation was used to assess relationship of clinical and metabolic variables to liver fibrosis severity and progression or regression.

Results: A total of 225 patients were reviewed: 45.8% female, age 56.5±12.4 yrs, diabetes duration 11.1±8.8 yrs, BMI 32.7±6.7 kg/m² and HbA1c 7.8±1.7%. Overall, 24.0% had severe liver fibrosis (LSM ≥10.3kPa). On univariate analysis, older age, BMI and FIB-4 (all p<0.05), but not HbA1c, diabetes duration or NFS, were associated with severe liver fibrosis. Over a mean follow-up duration of 3.0±1.9 yrs, there were 119 patients that had serial transient elastography assessment (≥12 months apart): 42.0% female, age 61.2±10.3 yrs, BMI 31.1±5.5 kg/m², HbA1c 7.5±1.6% and 24.8% severe liver fibrosis. Female gender (p=0.02) and greater bodyweight increase (p=0.03), but not follow-up HbA1c (p=0.07) or follow-up duration (p=0.59), were associated with greater LSM increase. A ≥2kPa LSM increase (29/119) was associated with higher delta HbA1c (p=0.02), whereas a ≥2kPa LSM decrease (31/119) was associated with male gender, lesser bodyweight gain (or bodyweight loss) and longer follow-up duration (all p<0.05).

Conclusions: Results suggest both bodyweight and glycaemia, and their changes over time, remain important clinical targets in liver fibrosis in T2D. Larger cohorts with longer follow-up duration are needed to further elucidate the natural history of liver disease in T2D, and determine how newer therapeutic agents (e.g. GLP1-RAs) affect clinical outcomes.

Quality of life changes and trajectories after very-low-calorie diet with or without bariatric surgery in adolescents with severe obesity and youth-onset Type 2 Diabetes risk

Perera K^{1,2,3}, Baker J^{4,5}, Smallman K⁶, Pickering K⁶, Harry P⁶, Anderson D⁶, Orr-Walker B⁴, Barbor R⁷, Simmons D^{1,5,6}

¹Western Sydney University, Cambelltown, Australia, ²Uniformed Services University of the Health Sciences, Bethesda, United States of America, ³Metis Foundation, San Antonio, United States of America, ⁴Department of Endocrinology, Te Whatu Ora Counties Manukau, Otara, New Zealand, ⁵Aotearoa Clinical Trials, Middlemore Hospital, Otara, New Zealand, ⁶Diabetes Foundation Aotearoa, Otara, New Zealand, ⁷Department of Surgery, Te Whatu Ora Counties Manukau, Otara, New Zealand

Aim: Adolescents with severe obesity are at high risk for youth-onset type 2 diabetes (Y-T2D). Health-related and weight-related quality of life (HRQoL, WRQoL respectively) are key patient-reported outcomes influencing engagement with diabetes prevention and remission strategies but remain incompletely characterised in this population. This study evaluated HRQoL and WRQoL changes following a very-low-calorie-diet (VLCD), with or without bariatric surgery.

Methods: Adolescents aged 15-17 years with severe obesity (BMI ≥ 35 kg/m²) completed a 12-week VLCD (Optifast® program). HRQoL was assessed using the Short Form-36 (SF-36), and WRQoL using the Impact-of-Weight-on-Quality-of-Life-Lite (IWQoL-Lite), 100 indicating highest QoL, at baseline, post-VLCD, and follow-up (6-36 months). Eligible participants were offered bariatric surgery following VLCD completion. Domain and total scores were analysed using linear mixed-effects models including time, surgery status, and interaction terms. Clinically meaningful change was defined as ≥ 3 -5 for SF-36 and ≥ 7 -12 for IWQoL-Lite.

Results: At baseline, participants demonstrated impaired HRQoL (SF-36 total 50.0 ± 12.9) and WRQoL (IWQoL-Lite total 54.8 ± 20.8). Following VLCD, the SF-36 total score improved +8.9, with significant gains in physical functioning (+18.1), role-physical (+29.8), role-emotional (+32.1), and social functioning (+21.5) (all $p < 0.05$). Although the magnitude of improvement varied between individuals, improvements were observed across multiple domains. The IWQoL-Lite total score increased by +20.0 ($p = 0.001$), exceeding thresholds for clinical significance, with improvements across all subdomains. Vitality and mental health declined modestly during the VLCD phase but improved during longer-term follow-up. Bariatric surgery was associated with earlier and more sustained improvements in selected physical and stigma-related domains, whereas responses in the VLCD-only group were more variable. Y-T2D remitted in all surgical participants (43% to 0%) but remained unchanged in the VLCD-only group (46%).

Conclusions: VLCD produced rapid, clinically meaningful improvements in both HRQoL and WRQoL among adolescents with severe obesity. Bariatric surgery further modified longer-term trajectories, conferring earlier and sustained functional benefits.

Circulating microRNA profiles associated with familial risk of Type 2 Diabetes and renal failure in Māori and Pasifika first-degree relatives

Perera K^{1,2,3}, Joglekar M¹, Hardikar H¹, Hayward R¹, Baker J^{4,5}, Sundborn G⁶, Hardikar A¹, Simmons D^{1,5,7,8}

¹School of Medicine, Western Sydney University, Campbelltown, Sydney, Australia, ²Military Cardiovascular Outcomes Research Program, Uniformed Services University of the Health Sciences, Bethesda, United States of America, ³Metis Foundation, San Antonio, United States of America, ⁴Department of Endocrinology, Te Whatu Ora Counties Manukau, Auckland, New Zealand, ⁵Aotearoa Clinical Trials, Auckland, New Zealand, ⁶Department of Pacific Health, University of Auckland, School of Population Health, Faculty of Medical and Health Sciences, Auckland, New Zealand, ⁷Diabetes Foundation Aotearoa, Otara, New Zealand, ⁸Translational Health Research Institute (THRI), Western Sydney University, Campbelltown, Sydney, Australia

Aim: Circulating microRNAs (miRNAs) regulate metabolic and inflammatory pathways and may reflect genetic risk for type 2 diabetes (T2D) and renal failure (RF), often captured through family history. Whether circulating microRNA profiles reflect different familial risks is currently unclear. We therefore aimed to determine whether circulating miRNA abundance differs according to familial risk of T2D and RF.

Methods: This cross-sectional design assessed a discovery subset (n=81) from a historical 2×2 factorial cohort (N=288) of unaffected first-degree relatives of Māori and Pasifika individuals with T2D and/or RF. Circulating miRNA abundance was measured using TaqMan PCR on the OpenArray platform. miRNAs with detectable signal (fold-over-detection, FoD>1) in ≥20% of participants were retained for analyses. Missing miRNA values were imputed using the median within the T2D/RF group. Log₂-transformed miRNA abundance was analysed using linear regression models adjusted for age, sex, ethnicity, and mean arterial pressure (primary model), with additional adjustment for C-reactive protein as a sensitivity analysis. Multiple testing was controlled using the Benjamini-Hochberg false discovery rate (FDR q<0.05). Principal component analysis (PCA) and t-distributed stochastic neighbour embedding (t-SNE) were used to explore clustering of miRNA profiles by familial risk.

Results: Of 754 assayed miRNAs, 111 met the detectability threshold with 17-99 miRNAs detected per individual. In models evaluating T2D, microRNAs miR-215, miR-1274A, miR-145, miR-320, miR-194, and miR-648 showed significantly lower abundance (2^{-18} to <0.5 -fold, q<0.05, all). The strongest signals came from the T2D×RF familial risk interaction, with miR-648 demonstrating the largest effect (2^{21} -fold, q<0.001). Positive interaction effects were also observed for miR-1274B, miR-215, miR-99b, miR-122, and miR-145 (2^4 to $<2^{12}$ -fold, q<0.05, all). PCA and t-SNE demonstrated clear clustering by familial risk using circulating miRNA profiles.

Conclusions: Circulating miRNA profiles differed between familial risk strata, suggesting genetic/epigenetic risk may be reflected in miRNA dysregulation and could inform early risk stratification.

Predicting prolonged length of stay following diabetic foot amputation to guide early clinical intervention

Puri G^{1,2}, Khanna S³, Lu A², Van Den Bergen G², Diouf I³, Zhibin L³, Hassanzadeh H³, Boyle J³, Garrigan E²

¹Logan Endocrine And Diabetes Swrvices, Meadowbrook, Australia, ²Clinical Excellence Queensland, Brisbane, Australia, ³The Australian e-Health Research Centre, CSIRO Health & Biosecurity, Herston, Australia

Aim: To develop and validate a machine learning powered clinical decision support tool that identifies patients at high risk of prolonged post-operative length of stay (LOS) in hospital following diabetic foot amputation, enabling targeted early interventions and optimised discharge planning.

Methods: We analysed a retrospective cohort of 7,744 adult patients (≥16 years) who underwent diabetic foot amputation across hospitals in Queensland, Australia, between July 2020 and September 2025. Advanced predictive modelling techniques including Logistic Regression, Naïve Bayes, Random Forest, Artificial Neural Networks, Least Absolute Shrinkage and Selection Operator (LASSO) and Gradient Boosting Machine (GBM) were applied to demographic, clinical, and surgical data to forecast prolonged post-operative LOS, defined as exceeding the 75th percentile of the cohort.

Results: The 75th percentile for post-operative LOS was 10 days. The optimal predictive model demonstrates good performance and excellent specificity, ensuring that clinical resources are targeted effectively without over-classifying low-risk patients. Key clinical and demographic drivers of prolonged admission included ASA (American Society of Anesthesiologists) physical status classification, emergency versus planned surgery, active wound infections, diabetic ulcers, baseline comorbidities, and sociodemographic factors (age, marital status, and residential area).

Conclusion: We have developed a predictive model to identify patients at risk of prolonged post-operative LOS following diabetic foot amputation. The next step is to integrating this predictive model into hospital workflows to test its efficacy as an early warning system. By identifying high-risk patients early in their surgical journey, multidisciplinary teams can proactively implement targeted care pathways—such as enhanced wound care, early antimicrobial management, and coordinated outpatient rehabilitation planning. This proactive approach has the potential to mitigate post-operative complications, improve patient recovery trajectories, and optimise acute bed flow across the healthcare system.

Resolvin D2 promotes diabetic wound healing by reprogramming macrophage polarization via GPR18/TNF/p65 signaling

Qi C¹, Caimin X¹

¹Southwest Medical University Affiliated Hospital, Luzhou, China

Objective: Resolvin D2 (RvD2) exerts potent pro-resolving effects; however, its role in diabetic wound healing remains unclear. This study aimed to evaluate the therapeutic potential and underlying mechanisms of RvD2 in diabetic wound repair.

Research Design and Methods: We integrated clinical profiling of diabetic foot ulcers (DFU) tissues with a streptozotocin (STZ)-induced diabetic mouse model: inflammatory markers and RvD2/GPR18 expression were first quantified in human wound biopsies, RvD2 was then applied topically to diabetic mice and wound closure was tracked for 14 days, while LPS-stimulated macrophages were used in parallel to verify RvD2-mediated modulation of cytokine output and polarization.

Results: Diabetic wounds displayed dominance of pro-inflammatory macrophages and impaired RvD2/GPR18 signaling. Topical RvD2 treatment markedly accelerated wound healing in diabetic mice by shifting macrophages from pro-inflammatory to reparative phenotypes. *In vitro*, RvD2 suppressed inflammatory cytokine production while enhancing anti-inflammatory mediators through GPR18/TNF/p65 signaling pathways.

Conclusions: These findings demonstrate that RvD2 restores defective inflammation resolution in diabetic wounds through regulation of GPR18/ TNF/p65 signaling pathways. Topical RvD2 may represent a promising therapeutic strategy for improving diabetic wound healing.

Real-World Pharmacological Treatment Patterns Among Chinese Patients with Diabetic Peripheral Neuropathic Pain: The Retrospective, Observational ReTARdant Study

Qi P¹, Wang H², Du J³, Wang Y³, Yu X⁴, Liu Z⁴, Yan S⁵, Zhang Y⁵, Wu X⁶, Hu Y⁶, Zhang Y⁷, Du J⁷, Liu M⁷, Fan B², Guo L¹

¹Beijing Hospital, Beijing, China, ²China-Japan Friendship Hospital, , China, ³The First Affiliated Hospital of Dalian Medical University, , China, ⁴Tongji Hospital, Tongji Medical College, Huazhong University of Science and Technology, , Wuhan, China, ⁵the First Affiliated Hospital, Fujian Medical University, Fuzhou, China, ⁶Zhejiang Provincial People's Hospital, Hangzhou, China, ⁷Daiichi Sankyo (China) Holdings Co., Ltd, Shanghai, China

Aim: To assess the real-world pharmacological treatment patterns in Chinese patients with diabetic peripheral neuropathic pain (DPNP).

Background: DPNP is the common chronic complication of diabetes. But evidence is limited for treatment patterns among Chinese DPNP patients in real-world clinical practice.

Methods: This retrospective, observational study (NCT06546202) collected data from electronic medical records from 5 hospitals in China. Patients who were diagnosed with DPNP and initially received index regimens between January 1, 2018, to December 31, 2021, were identified. Targeted regimens included tricyclic antidepressants, serotonin-norepinephrine reuptake inhibitors, calcium channel ligands [CaLs], sodium channel blockers, nonsteroidal anti-inflammatory drugs [NSAIDs], opioids, and neuropathic drugs [NeuDs]. Data were collected from the index date (the initiation date of the index regimens) to December 31, 2022. Patient characteristics and treatment patterns were summarized descriptively.

Results: A total of 820 patients (mean age $\pm$ standard deviation, 61.3 ± 12.9 years) with DPNP were included. The duration (mean $\pm$ standard deviation) of diagnosed diabetes mellitus and DPNP was 12.6 ± 8.0 years and 26.2 ± 44.5 months, respectively. Most patients ($n=578$, 70.5%) were DPNP treatment-naïve. At the index date, NeuDs ($n=775$, 94.5%), NSAIDs ($n=480$, 58.5%), and CaLs ($n=185$, 22.6%) were most frequently prescribed, with NeuDs ($n=248$, 30.2%) being the most common monotherapy and NSAIDs + NeuDs ($n=333$, 40.6%) being the most common combination therapy. During the observation period, discontinuation, switch, and add-on of the index treatment regimens were observed in 805 (98.2%), 116 (14.2%), and 59 (7.2%) patients, respectively. The discontinuation rates of the index treatment regimens were 56.9% at 30 days and 95.9% at 60 days.

Conclusion: Chinese patients with DPNP were most commonly treated with NeuDs and NSAIDs, which is not recommended by the guideline. Treatment discontinuation was frequently observed. There is an urgent need to improve the awareness of DPNP management and standardize the treatment in clinical practice in China.

A randomized controlled trial of Kangfuxin Liquid for diabetic peripheral neuropathy

Qiao X^{1,2}, Pan Q^{1,2}

¹Beijing Hospital, Beijing, China, ²Peking Union Medical College, Beijing, China

Aim

To evaluate the efficacy and safety of Kangfuxin Liquid when applied topically to the lower legs in patients with DPN.

Methods

A single-center, randomized, controlled design was employed. DPN patients were enrolled and randomly assigned in a 1:1 ratio to either the Kangfuxin Liquid group or the placebo group. All participants underwent a daily 20-minute topical application for two weeks, using gauze saturated with 50 mL of the assigned solution on both lower limbs, covered with cling film. Assessments were performed at baseline and post-treatment, including the Toronto Clinical Neuropathy Score (TCSS), nerve conduction velocity (NCV), inflammatory markers (CRP, TNF- α , IL-6), and glycemic-related parameters.

Results

The study enrolled 73 patients (42 males [57.5%] and 31 females [42.5%]) with a mean age of 66.85 ± 8.70 years. After 2 weeks of treatment, the Kangfuxin Liquid group demonstrated significant improvements from baseline in the total TCSS score, symptom score, and sensory test score, with both the total score and symptom score being significantly lower than those in the placebo group ($P < 0.05$). Regarding nerve conduction, the sensory conduction velocity of the common peroneal nerve and tibial nerve increased significantly from baseline in the Kangfuxin Liquid group, and the post-treatment tibial nerve conduction velocity was superior to that of the placebo group. Additionally, fasting plasma glucose in the Kangfuxin Liquid group decreased significantly from baseline. There were no statistically significant differences in inflammatory markers or the incidence of adverse events between the two groups. Only two cases of skin allergy were reported in the Kangfuxin Liquid group.

Conclusion

Short-term use of Kangfuxin Liquid can improve symptoms, signs, and partial nerve conduction function, as well as glycemic control, in DPN patients, with a favorable safety profile.

Association between the CHG index and all-cause and cardiovascular mortality in diabetic kidney disease: A population-based study

Quan Z¹

¹Bishan Hospital Of Chongqing, Chongqing, China

Background: Chronic kidney insufficiency is a common and potentially fatal complication of diabetes, yet effective risk stratification tools remain scarce. The novel CHG Index, derived from total cholesterol, high-density lipoprotein cholesterol (HDL-c), and fasting plasma glucose, may serve as a composite biomarker reflecting dyslipidemia and inflammation.

Objective: To investigate the association between the CHG Index and all-cause and cardiovascular disease (CVD) mortality in a nationally representative cohort of adults with diabetic kidney disease (DKD).

Methods: This population-based study analyzed data from 2,452 adults with DKD (men age 62 years; 49.8% men) from the 1999-2018 the National Health and Nutrition Examination Survey (NHANES). The CHG Index was calculated as: $\ln [\text{total cholesterol (mg/dL)} \times \text{fasting blood glucose (mg/dL)} / 2 \times \text{HDL-c (mg/dL)}]$. Participants were categorized into quartiles (Q1-Q4) based on the CHG Index. Hazard ratios (HRs) and 95% confidence intervals (CIs) for mortality were estimated by the weighted Cox proportional hazards models.

Results: Over a median follow-up of 7.1 years, 836 all-cause and 252 CVD deaths were recorded. Compared to the lowest Q1 quartile, participants in the highest Q4 quartile of the CHG Index had significantly increased risks of all-cause mortality (adjusted HR: 1.72, 95% CI: 1.41-2.09) and CVD mortality (adjusted HR: 1.85, 95% CI: 1.33-2.57). A linear, dose-response relationship was observed between the continuous CHG Index and mortality risks (P for non-linearity > 0.05). Subgroup analyses demonstrated consistent associations across age, sex, and body mass index categories.

Conclusion: A higher CHG index was independently and linearly associated with increased risks of all-cause and CVD mortality among individuals with DKD. Thus, the CHG index may serve as a valuable prognostic tool for risk stratification in DKD.

Association of microvascular and macrovascular disease burden with amputation in diabetic foot disease: A Regional Australian cohort study

Rana A¹, Gupta R¹, Shenoy V², Vangaveti V², Deshmukh H¹, Malabu U²

¹Gold Coast University Hospital, Australia, Australia, ²James Cook University, Townsville, Australia

Background and Aim

Diabetic foot disease remains a leading cause of non-traumatic lower-limb amputation. While both macrovascular and microvascular complications are implicated in its pathogenesis, their relative contribution to amputation risk is incompletely defined.

Methods:

We conducted a retrospective audit of 205 adults managed for diabetic foot disease. Macrovascular complications (ischaemic heart disease, stroke, peripheral vascular disease) and microvascular complications (retinopathy, neuropathy, nephropathy/albuminuria) were summarised as cumulative burden scores. Logistic regression was used to examine associations between vascular burden and amputation, adjusting for age, sex, and smoking status.

Results:

The mean age was 62.2 ± 14.1 years, and 64% were male. Amputation occurred in 39% of patients. Microvascular complications were common, with a mean microvascular burden score of 1.33 ± 0.74 , compared with a mean macrovascular burden of 0.52 ± 0.68 . In adjusted analyses, increasing microvascular burden was strongly associated with amputation risk (odds ratio [OR] 3.72 per additional microvascular complication; 95% confidence interval [CI] 2.19–6.60; $p < 0.001$). In contrast, macrovascular burden was not independently associated with amputation (OR 1.07; 95% CI 0.55–2.06; $p = 0.85$). Age, sex, and smoking status were not significant predictors after accounting for vascular burden. Model fit was acceptable (AIC 249.7), and findings were consistent across sensitivity analyses.

Conclusions:

In this cohort, cumulative microvascular disease burden was the dominant vascular determinant of amputation risk, whereas macrovascular disease showed no independent association after adjustment. These findings suggest that tissue-level vulnerability driven by microvascular complications may be more critical to limb loss than large-vessel disease alone.

Comparing management of cardio-metabolic risk in Diabetes-Related Foot Disease

Ryan P¹, Do K¹, Malaty M¹, Lau N^{1,2,3}

¹Liverpool Hospital, South Western Sydney Local Health District, Sydney, Australia, ²University of Sydney, Camperdown, Australia, ³University of New South Wales, Kensington, Australia

Aim/s:

The HRFS presents a unique multi-disciplinary opportunity for Endocrinology, Vascular Surgery, and General Medicine clinicians to address cardiometabolic disease management in a high risk population. We aimed to assess and compare cardio-metabolic risk factor management among clinicians at the Liverpool Hospital HRFS.

Methods:

We performed a retrospective data audit of outpatients attending Liverpool Hospital's HRFS from May 2022-July 2024. Data were analysed through SPSS using 2 sample *t*-tests or Chi-squared tests.

Results:

150 patients were included. 37% were managed by Endocrinology, and 63% by Vascular Surgery/General Medicine.

The average age was 63. 91% had T2DM, 39% CVD, 93% DFIs and 49% required amputation. 55% were obese, 82% had hypertension, 69% PVD, 15% had a past stroke, 82% dyslipidemia, and 46% were current/ex-smokers.

No differences were observed between Endocrinology and Vascular Surgery/General Medicine patients regarding use of ACEi(18%), ARB(45%), SGLT2i(48%), statins (70%) or aspirin (47%), nor in the measured cardiometabolic clinicopathology(*Table 1*).

Conclusion:

The HRFS encapsulates a population with a high burden of cardio-metabolic disease, providing pertinent opportunity for intervention. While most cardiometabolic indices were near-target; blood pressure, HbA1c, and certain medications (ACEi/ARB, SGLT2i, statins) were not meeting recommendations. There were no differences between patients managed by Endocrinology and Vascular Surgery/General Medicine.

Table 1: Clinicopathology – parameters measured within 3 months of visit

Parameter	Mean (SD) or Median (IQR)
SBP (mmHg)	134 (20)
DBP (mmHg)	73 (11)
HbA1c (%)	7.9 (7 – 8.9)
Total Cholesterol (mmol/L)	3.8 (3.2 – 4.5)
Triglycerides (mmol/L)	1.9 (1.4 – 2.7)
HDL (mmol/L)	1.02 (0.87 – 1.22)
LDL (mmol/L)	1.8 (1.25 – 2.35)
eGFR (ml/min/1.73m ²)	62 (30)
Urine A:CR (mg/mmol)	7.9 (1.9 – 72.9)

List of Abbreviations:

- HRFS: High Risk Foot Service
- ACEi: Angiotensin Converting Enzyme Inhibitor
- ARB: Angiotensin Receptor Blocker
- SGLT2i: Sodium-Glucose Cotransporter 2 Inhibitor
- T2DM: Type 2 Diabetes Mellitus
- CVD: Cardiovascular Disease
- DFI: Diabetic Foot Infection
- PVD: Peripheral Vascular Disease

Synergistic potential of rosmarinic acid and angiotensin receptor blockers in Attenuating Glomerular mesangial expansion within diabetic rat models

Sakti P¹, Samsu N¹, Rifai A¹

¹Faculty of Medicine Brawijaya University, Malang, Indonesia

Aims: Diabetic nephropathy (DN) is driven by oxidative stress and renin-angiotensin system (RAS) overactivation. Given the limitations of current therapies, this study investigated whether combining Rosmarinic Acid (RA)—known for its antioxidant and anti-fibrotic properties—with the ARBs candesartan or losartan could effectively inhibit mesangial expansion in diabetic rats.

Methods: Using a randomized post-test only control design, Wistar rats were induced with diabetes via a high-fat diet and streptozotocin (40 mg/kg). Subjects were assigned to four groups: negative control, positive control (untreated diabetic), and two treatment groups receiving RA combined with either candesartan or losartan. Following eight weeks of intervention, mesangial matrix percentages were quantified using ImageJ software by a blinded pathologist. Statistical significance was determined using One-way ANOVA and Tukey's post hoc tests.

Results: The positive control group exhibited significantly higher mesangial matrix percentages ($81.49\% \pm 1.45$) compared to healthy controls ($58.82\% \pm 0.99$, $p=0.000$). Both the RA+candesartan ($61.56\% \pm 0.35$) and RA+losartan ($62.28\% \pm 0.77$) cohorts demonstrated a marked reduction in mesangial expansion compared to the positive control (Mean Difference: -19.92 and -19.21 respectively; $p=0.000$). While the RA+candesartan group showed a slightly greater inhibitory effect than the RA+losartan group, the difference between these two treatment arms was not statistically significant ($p=0.735$).

Conclusion: Integrating rosmarinic acid with either candesartan or losartan significantly mitigates mesangial matrix expansion. These findings suggest a promising synergistic approach for slowing the structural progression of diabetic kidney disease.

HbA1c–fasting glucose based prediabetes phenotypes and liver fibrosis risk in metabolic dysfunction–associated steatotic liver disease

Seo D¹, Ha K², Kim D³, Lee H², Kim H², Kim S¹

¹Inha University School of Medicine, Incheon, South Korea, ²Yonsei University College of Medicine, Seoul, South Korea, ³Ajou University School of Medicine, Suwon, South Korea

Aim

Metabolic dysfunction–associated steatotic liver disease (MASLD) is common in dysglycemia and strongly linked to advanced fibrosis and adverse outcomes. Impaired fasting glucose or type 2 diabetes mellitus (T2DM) is the strongest MASLD-related predictor of significant fibrosis, yet current guidance largely treats prediabetes as a single category. We therefore examined MASLD and fibrosis across HbA1c–FPG–based glucose phenotypes in the community-based Cardiovascular and Metabolic Diseases Etiology Research Center (CMERC) cohort.

Methods

In this cross-sectional analysis, we included 6,255 adults after excluding those with significant alcohol intake or other chronic liver diseases. Glucose phenotypes were defined using ADA-aligned thresholds: normal glucose tolerance (NGT), isolated impaired fasting glucose (isolated IFG), isolated high HbA1c, IFG+high HbA1c, and T2DM. Steatotic liver disease was defined by fatty liver index (FLI) and liver fibrosis by NAFLD fibrosis score (NFS). Multivariable logistic regression estimated adjusted odds ratios (ORs) for moderate-to-advanced fibrosis across phenotypes, controlling for age, sex, obesity, hypertension, and dyslipidemia.

Results

Of 6,255 participants, 3,399 were NGT, 341 isolated IFG, 1,304 isolated high HbA1c, 591 IFG+high HbA1c, and 620 T2DM. FLI-defined steatotic liver disease increased from 23.5% in NGT to 39.0% in isolated IFG, 34.4% in isolated high HbA1c, 45.7% in IFG+high HbA1c, and 56.9% in T2DM ($p<0.001$). NFS-defined moderate-to-advanced fibrosis was present in 3.4%, 22.0%, 4.8%, 24.0%, and 30.2%, respectively ($p<0.001$). Compared with NGT, adjusted ORs (95% CI) for moderate-to-advanced fibrosis were 5.78 (4.06–8.23) in isolated IFG, 0.96 (0.69–1.33) in isolated high HbA1c, 5.91 (4.43–7.87) in IFG+high HbA1c, and 5.74 (4.36–7.56) in T2DM.

Conclusion

In this study, HbA1c–FPG–defined prediabetes phenotypes were heterogeneous: isolated IFG and IFG+high HbA1c carried fibrosis risk comparable to T2DM, whereas isolated high HbA1c did not. These findings support specifying IFG-based prediabetes phenotypes as priority groups for targeted noninvasive fibrosis screening beyond diabetes.

Decoding the biochemical signature of diabetic nephropathy: A precision biomarker panel for early detection and pathophysiological insight in high-prevalence Arab populations

Siddiqui M¹

¹Department of Biochemistry, College of Medicine, Kuwait University, P. O. Box 24923 Safat 13110 , Kuwait

Background: While T2DM prevalence exceeds 20% in Saudi and Kuwaiti populations, conventional diagnostic markers often miss early-stage diabetic nephropathy. Fourteen years of longitudinal data show that relying on creatinine and albuminuria overlooks the early tubular dysfunction and metabolic dysregulation driving disease progression in these obesity-prone cohorts.

Conceptual Framework: This framework proposes an integrated biochemical signature for Diabetic Nephropathy (DN) that moves beyond albuminuria-centric models to capture multifaceted pathophysiology. It incorporates three critical dimensions: the Tubular Injury Axis (KIM-1, RBP, NGAL, MCP-1, transferrin) to detect early proximal tubule dysfunction; the Endothelial/Inflammatory Axis (VCAM-1, ICAM-1, selectins) to monitor microvascular injury; and the Metabolic Dysregulation Axis (trace elements, uric acid, electrolytes) to reflect systemic metabolic stress.

Pathophysiological Rationale: Our research shows that urinary markers (KIM-1, NGAL, MCP-1) and cell adhesion molecules identify early DN and systemic microvascular damage before conventional tests. Additionally, trace element shifts and uric acid predict progression via oxidative pathways. Critically, a 10-year 'metabolic memory' threshold renders these patterns irreversible despite glycemic control, highlighting the failure of reactive diagnosis.

Clinical Translation: Integrating data from the Saudi-DKD cohort and validation studies, this precision panel facilitates stratified renal surveillance. Initial screening of metabolic markers (uric acid, electrolytes, trace elements) identifies high-risk patients, followed by targeted tubular (KIM-1, NGAL) and cell adhesion profiling for those with metabolic memory risk. This proactive strategy enables intervention before irreversible structural damage—a critical advantage for Arab populations.

In conclusion, this framework leverages over a decade of biochemical insights to provide a scalable model for the early detection of diabetic nephropathy. By identifying metabolic signatures before clinical symptoms arise, we can move beyond reactive care and implement proactive strategies that effectively preserve renal function within rapidly expanding diabetic populations.

Keywords: Diabetic nephropathy, KIM-1, NGAL, cell adhesion molecules, metabolic markers, trace elements, Arab populations, Saudi-DKD study

Weight-dependent and independent effects of semaglutide in participants with MASH: secondary analysis of the phase 3 ESSENCE trial

Sinclair M¹, Newsome P², Armstrong M³, Bakulin I⁴, Belloum A⁵, Cali A⁶, Geerts A⁷, George J⁸, Janczewska E⁹, Krarup N⁵, Liu C¹⁰, Midgard H¹¹, Opuni K⁵, Ratzu V¹², Rinella M¹³, Roden M¹⁴, Sanyal A¹⁵, Schattenberg J¹⁶, Vestergaard T⁵, Bugianesi E¹⁷

¹The University Of Melbourne, Victoria 3010, Australia, ²King's College Hospital, London, UK, ³Queen Elizabeth Hospital Birmingham and NIHR Biomedical Research Centre, Birmingham, UK, ⁴North-Western State Medical University, St Petersburg, Russia, ⁵Novo Nordisk A/S, Bagsværd, Denmark, ⁶Eli Lilly Denmark A/S, Copenhagen, Denmark, ⁷Department of Gastroenterology & Hepatology, University Hospital Ghent, Ghent, Belgium, ⁸Storr Liver Centre, The Westmead Institute for Medical Research, Westmead Hospital New South Wales, Australia, ⁹Hepatology Outpatient Clinic, ID Clinic, Mysłowice, Poland, ¹⁰Department of Internal Medicine, National Taiwan University College of Medicine, Taipei, Taiwan, ¹¹Department of Gastroenterology, Oslo University Hospital, Oslo, Norway, ¹²Institute of Cardiometabolism and Nutrition, INSERM UMRS 1138 CRC, Hospital Pitié Salpêtrière (ICAN), Sorbonne Université, Paris, France, ¹³Division of Gastroenterology, Hepatology and Nutrition, University of Chicago, Chicago, USA, ¹⁴Department of Endocrinology and Diabetology, Medical Faculty and University Hospital of Düsseldorf, Heinrich Heine University of Düsseldorf, Düsseldorf, Germany, ¹⁵Stravitz-Sanyal Institute for Liver Disease and Metabolic Health, Virginia Commonwealth University School of Medicine, Richmond, USA, ¹⁶Department of Internal Medicine II, Saarland University Medical Center, Homburg, Germany, ¹⁷Department of Medical Sciences, University of Turin, Turin, Italy

Aims: In the phase 3 ESSENCE trial (NCT04822181), once-weekly subcutaneous semaglutide 2.4 mg demonstrated superiority over placebo for histological outcomes and non-invasive tests (NITs). We assessed whether therapeutic effects were fully dependent on weight loss and quantified the magnitude of weight-dependent and weight-independent effects.

Methods: The first 800 randomised participants were evaluated. NIT endpoints were ≥ 17 -unit reduction in ALT, ≥ 0.22 reduction in FAST score, 30% reduction in VCTE and ≥ 0.5 -unit reduction in ELF score. Histological endpoints were MASH resolution and fibrosis improvement. Logistic regression assessed total, weight loss-dependent and independent effects (expressed as odds ratios [OR]), with percentage weight loss as the mediator and treatment as the exposure. Analyses adjusted for baseline co-variables: diabetes status, fibrosis stage and body weight. Responder rates were stratified by weight reduction thresholds ($\leq 2\%$, $\leq 5\%$, $\leq 7\%$, $> 7\%$).

Results: The total effect of semaglutide (OR [95% CI]) for ALT reduction and MASH resolution without fibrosis worsening was 4.7 (3.3–6.6) and 3.9 (2.8–5.5) respectively. The corresponding weight loss-independent effects were 3.0 (2.0–4.6) and 2.0 (1.4–3.0), whilst weight loss-dependent effects were 1.5 (1.2–2.0) and 1.9 (1.6–2.4). The total effect of semaglutide for VCTE and fibrosis improvement without MASH worsening was 3.0 (2.0–4.4) and 2.1 (1.5–3.1), respectively. The corresponding weight loss-independent effects were 1.7 (1.1–2.7) and 1.5 (1.0–2.4), and weight loss-dependent effects were 1.7 (1.4–2.2) and 1.4 (1.1–1.8). Histological response increased with greater weight loss: MASH resolution rose from 48.4% to 71.5% and fibrosis improvement from 27.2% to 41.8% across the $< 2\%$ to $> 7\%$ weight loss range, with preservation of the estimated difference in responder proportions (EDP) versus placebo. Placebo-adjusted improvements (EDP) in ALT, FAST, VCTE and ELF with semaglutide were observed across all weight loss categories.

Conclusion: Semaglutide confers weight-independent liver benefits, with further improvements proportionate to weight loss.

HbA_{1c}-independent benefits of semaglutide on liver histology and non-invasive tests in participants with biopsy-defined MASH: insights from post-hoc analysis of the ESSENCE trial part 1

Sinclair M¹, Sanyal A², Bugianesi E³, Arias-Loste M⁴, Castera L⁵, Eklöf N⁶, Kim W⁷, Krarup N⁶, Ludvik B⁸, Newsome P⁹, Ratziu V¹⁰, Rinella M¹¹, Trifan A¹², Vestergaard T⁶, Roden M¹³

¹The University Of Melbourne, Victoria 3010, Australia, ²VCU School of Medicine, Richmond, USA,

³University of Turin, Turin, Italy, ⁴Valdecilla Research Institute (IDIVAL), Santander, Spain, ⁵Hospital

Pitié-Salpêtrière, INSERM, Paris, France, ⁶Novo Nordisk A/S, Bagsværd, Denmark, ⁷Seoul National

University College of Medicine, Seoul, Korea, ⁸Landstrasse Clinic and Karl Landsteiner Institute for

Obesity and Metabolic Disorders, Vienna, Austria, ⁹King's College Hospital, London, UK, ¹⁰Hospital

Beaujon, Université Paris Cité, Paris, France, ¹¹University of Chicago, Chicago, USA, ¹²Grigore T. Popa

University of Medicine and Pharmacy, Iasi, Romania, ¹³Department of Endocrinology and

Diabetology, Medical Faculty, Heinrich-Heine University Düsseldorf, Düsseldorf, Germany

Aims: To assess the effects of baseline (BL) glycemia on histology and non-invasive tests (NIT), and HbA_{1c} change on histology with semaglutide 2.4 mg treatment vs placebo in the ESSENCE trial (NCT04822181).

Methods: Participants were stratified into three groups: Normoglycemia (investigator-assessed [I-A] non-type 2 diabetes [T2D] and BL HbA_{1c} ≤5.6%); prediabetes (IA T2D and BL HbA_{1c} 5.7–6.4%); T2D (IA T2D and BL HbA_{1c} ≥6.5%). Week 72 responses included the histology endpoints of resolution of steatohepatitis with no worsening of liver fibrosis, and reduction in liver fibrosis with no worsening of steatohepatitis, ≥25% decrease from BL in liver stiffness measurement by vibration-controlled transient elastography (VCTE LSM) and ≥0.5 units decrease from BL in enhanced liver fibrosis (ELF) score. Changes in FibroScan-AST (FAST) score, alanine aminotransferase (ALT) and N-terminal propeptide of type III collagen (PRO-C3) were assessed as continuous endpoints. Mediation analysis assessed the effects of HbA_{1c} change on histology endpoints with treatment as exposure and HbA_{1c} change from BL to week 72 as mediator. Responder proportions for these endpoints were previously reported¹

Results: Across nearly all BL glycemia groups, differences in responder proportions favoured semaglutide for histology and NITs. Semaglutide showed positive effects on FAST score, PRO-C3 and ALT across all glycemia groups. Total effects of semaglutide (odds ratio [95% confidence interval]) for resolution of steatohepatitis with no worsening of liver fibrosis, and reduction in liver fibrosis with no worsening of steatohepatitis were 4.0 (2.8–5.6) and 2.1 (1.5–3.1), respectively. Corresponding HbA_{1c} change-independent effects were 3.2 (2.1–4.7) and 2.1 (1.4–3.2); HbA_{1c} change-dependent effects were 1.3 (1.0–1.5) and 1.0 (0.8–1.3).

Conclusion: Semaglutide demonstrated histologic improvements independent of HbA_{1c} change. Irrespective of BL glycemic status, semaglutide showed better histologic and NIT responses vs placebo. **Reference:** ¹Bugianesi E, et al. Presentation at EASD; Sep 15–19, 2025, Vienna, Austria.

Cognitive impairment among adults with diabetes in medical outpatient clinics at Teaching Hospital Jaffna, Sri Lanka; A descriptive cross-sectional study

Sivagurunathan K¹, Jegathesan N², Thambipillai P²

¹District General Hospital Kilinochchi, Kilinochchi, Sri Lanka, ²Teaching Hospital Jaffna, Jaffna, Sri Lanka

Aims: To estimate the prevalence of cognitive impairment and examine diabetes related factors among adults with diabetes attending medical outpatient clinics at Teaching Hospital Jaffna in Northern Sri Lanka.

Methods: A descriptive cross-sectional study was conducted from June to September 2024 among adults aged 40 to 70 years with type 1 or type 2 diabetes (n = 339). Sociodemographic data were collected using an interviewer administered questionnaire and clinical variables including glycaemic indices, diabetes duration and complications were extracted from medical records. Cognitive impairment was assessed with the validated Tamil Sri Lanka Montreal Cognitive Assessment. A MoCA score below 24 defined cognitive impairment with a one-point adjustment for 12 years of education or less. Bivariate analyses used nonparametric tests, chi square tests and Spearman correlation as appropriate. Multivariable binary logistic regression was used to identify independent factors, adjusting for age, sex, education level, diabetes duration and neuropathy.

Results: Participants were predominantly female (67.8 percent). Median age was 60 years, and median diabetes duration was 9 years. Cognitive impairment prevalence was 52.2 percent (95 percent CI 46.9 to 57.5), with a median MoCA score of 23. In bivariate analyses, longer diabetes duration (p value 0.034) and neuropathy (p value 0.013) were associated with cognitive impairment, while glycaemic indices and other vascular complications were not (all p values greater than 0.05). Age was negatively correlated with MoCA score (p value less than 0.001), and MoCA scores differed by education level (p value less than 0.001). In multivariable analysis, education level was the only independent predictor of cognitive impairment (overall p value less than 0.001).

Conclusion: Cognitive impairment was common in this tertiary care clinic population. Education level was the strongest independent marker of risk, supporting routine cognitive screening and tailored support for patients with lower educational attainment.

Optimising the development of a kidney organoid towards diabetes modelling

Sullivan Z¹, Bian P¹, Glastras S^{1,2}, Chen X¹, Longfield M^{1,2}

¹Kolling Institute, University Of Sydney, St Leonards, Australia, ²Department of Diabetes, Metabolism and Endocrinology, Royal North Shore Hospital, St Leonards, Australia

Organoids offer a clinically relevant alternative to animal models and 2D cell culture for studying the mechanisms of diabetes-related kidney disease. However, the clinical translatability of findings relies on robust models with high levels of reproducibility.

Aim: To identify the optimal seeding density for kidney organoid development based on complexity, reproducibility, and yield.

Kidney organoids were developed in a 96-well plate from induced pluripotent stem cells over 21 days using a commercial kit, at seeding densities of 750, 1195 and 3000 cells/well (n=4). Organoids were stained with DAPI, LTL, ECAD and WT1 to identify structures of the nephron. Confocal images of each well were analysed in ImageJ. Yield was calculated from total glomeruli count, and reproducibility assessed via standard deviations of organoid count. Complexity was characterised by the ratio of organoid-covered well area to glomeruli number. This study successfully recapitulated the key nephron features, including glomeruli, proximal and distal tubules (Figure 1). No organoids were identified at a seeding density of 3000. The highest organoid yield was observed at a density of 1195cells/well, though highest reproducibility occurred at a density of 750cells/well, meaning that differences were non-significant (46.0 ± 20.2 vs 36.0 ± 6.7 glomeruli/well, $P=0.364$). No significant difference was observed in the complexity of organoids at either density.

This work paves the way for optimising kidney organoid development for diabetes-related research. With this technology we may be able to better understand the mechanisms behind diabetes-related kidney disease using these improvements.

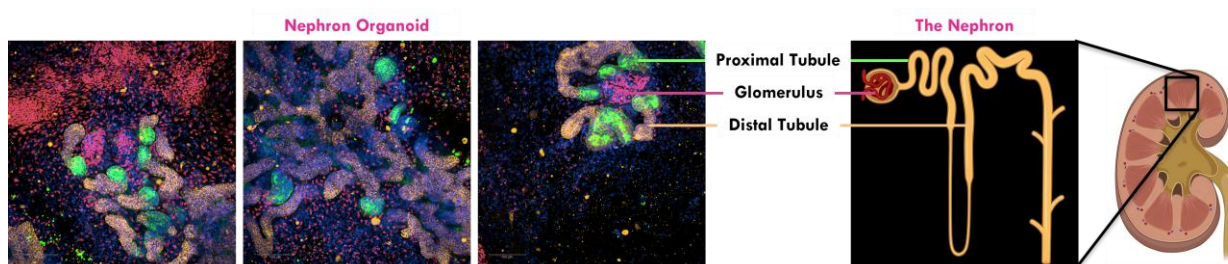


Figure 2 Sample images of nephron organoids stained with WT1 (red), LTL (green), ECAD (yellow), and DAPI (blue).

Hepatic and serum metabolomic landscape in participants receiving glimepiride and tofogliflozin: a post-hoc analysis

Takeshita Y¹, Honda M², Kaneko S², Takamura T¹

¹Department of Endocrinology and Metabolism, Kanazawa University Graduate School of Medical Sciences, Kanazawa, Japan, ²Department of Gastroenterology, Kanazawa University Graduate School of Medical Sciences, Kanazawa, Japan

Aims

The mechanism by which sodium-glucose cotransporter 2 (SGLT2) inhibitors and sulfonylureas alter hepatic metabolism in humans with metabolic dysfunction-associated steatotic liver disease (MASLD) and type 2 diabetes mellitus remains unclear.

Methods

In this 48-week, randomized, open-label, parallel-group trial, 40 participants with biopsy-confirmed MASLD and type 2 diabetes were assigned to receive tofogliflozin or glimepiride once daily (NCT02649465 and jRCTs041180132). Changes in serum and hepatic metabolites were evaluated, and their associations with liver histology, liver enzymes, and metabolic markers were analyzed. All CE time-of-flight MS experiments were performed using an Agilent CE capillary electrophoresis system.

Results

Glycemic improvement was similar between groups. Urinary CPR levels decreased significantly in the tofogliflozin group, with significant differences between the groups. Tofogliflozin significantly improved liver histology (steatosis, hepatocellular ballooning, lobular inflammation, and fibrosis) and reduced serum liver enzymes, body weight, and BMI. Tofogliflozin treatment significantly increased hepatic levels of glucose 1-phosphate and acetyl-CoA, reflecting a metabolic shift toward ketogenesis and gluconeogenesis. Among tricarboxylic acid cycle intermediates, serum citrate increased, and succinate decreased without hepatic changes. Reduced serum succinate correlated with decreases in ALT and GGT, and higher baseline succinate predicted improvements in ballooning, inflammation, and liver enzymes. In contrast, glimepiride specifically reduced hepatic branched-chain amino acids, which was associated with decreased steatosis. Tofogliflozin also elevated serum urea cycle intermediates, suggesting a distinct “aestivation-like” response to hypovolemia.

Conclusion

SGLT2 inhibition produced a distinct metabolic signature consistent with starvation-induced glucose production and a hypovolemia-related aestivation-like hepatic response. Serum succinate may serve as a biomarker reflecting MASLD pathology.

BMI trajectories in youth with Type 1 Diabetes are associated with sex and age of diagnosis

Taplin C^{1,2}, Pihoker C³, Hayes E^{1,2,4}, Burnside M^{1,2,5}, Smith G², Davis E^{1,2}

¹Department of Endocrinology and Diabetes, Perth Children's Hospital, Nedlands, Australia,

²Children's Diabetes Centre, Kids Research Institute, Nedlands, Australia, ³University of Washington Department of Pediatrics, Seattle, USA, ⁴Children's Health Ireland, Crumlin, Ireland, ⁵University of Otago, Christchurch, New Zealand

Aim

BMI in youth is associated with cardiovascular risk. The aim of this study was to explore BMI trajectories in youth with T1D and associations with clinical and demographic variables.

Methods

Youth with T1D diagnosed <12 years in the Western Australia Children's Diabetes Database from 2000-2024 were included. Latent class modelling with a minimum cluster size of 5% was performed; BMI trajectory was modelled from age 6 in youth diagnosed age < 6, and from age 12 in those diagnosed age 6-12. Association between BMI trajectory and patient characteristics was explored through bivariate analysis and logistic regression.

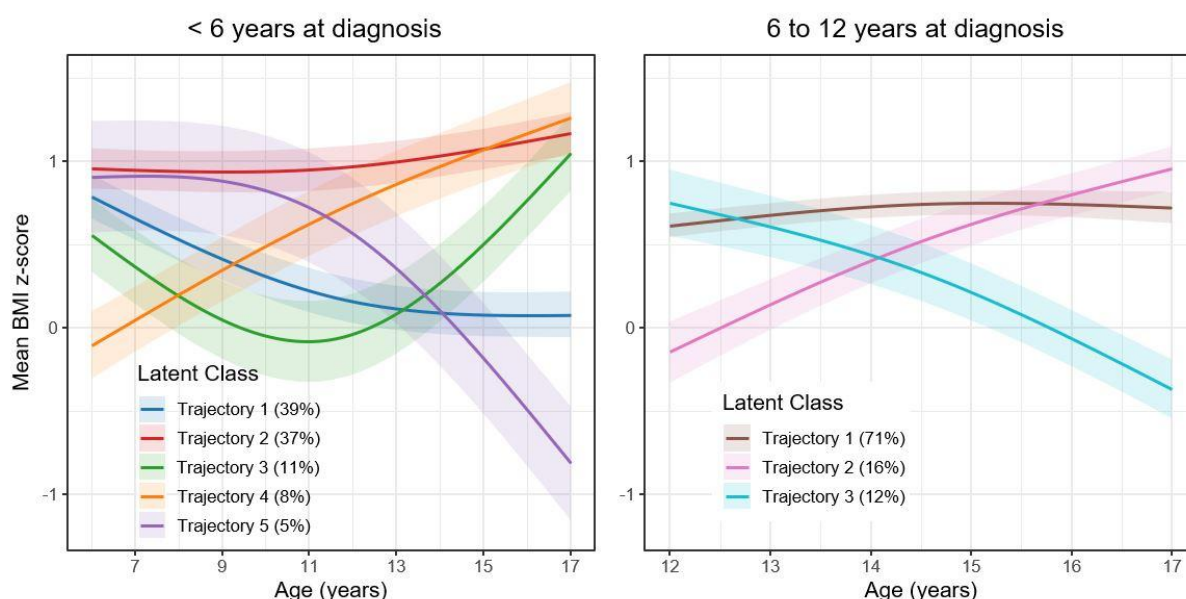
Results

496 youth aged < 6 and 927 aged 6 - 12 years at diagnosis of T1D provided 4416 and 4939 observations respectively. Five BMI trajectories were identified in those diagnosed age < 6, and three in those diagnosed age 6 - 12 (Figure). Sex ($p < 0.001$) and age at diagnosis ($p = 0.038$) predicted trajectory in those diagnosed young; sex remained as a predictor with girls more likely to have rising BMI SDS after age 12 ($p < 0.001$).

Conclusion

Sex and age of diagnosis predict BMI trajectory in youth with T1D; girls are overrepresented in groups with rising BMI SDS.

Figure- Latent class mean BMI z-score trajectories in youth with Type 1 Diabetes



Machine learning–based clustering of macrovascular complications in diabetic foot disease: a real-world regional Australian cohort

Mathew M², Teh W², Vangaveti V³, Shenoy V³, Seidu A³, Sathyapalan T⁴, Deshmukh H¹, Malabu U³

¹Gold Coast University Hospital, Southport, Australia, ²Mackay Hospital and Health Services, Mackay, Australia, ³James Cook University, Townsville, Australia, ⁴University of Hull, Hull, UK

Aims:

Macrovascular disease is highly prevalent among people with diabetic foot ulceration (DFU), yet the extent to which macrovascular complications cluster within this population and define clinically meaningful phenotypes remains poorly understood. We aimed to identify latent macrovascular phenotypes among individuals with DFU and to characterise their demographic and clinical profiles.

Methods:

We conducted a retrospective observational study of adults with diabetes and DFU (n = 381) in Townsville University Hospital in Queensland. Latent class analysis (LCA) was performed using four macrovascular indicators: ischaemic heart disease (IHD), stroke, peripheral vascular disease (PVD), and heart failure. Model selection was guided by Akaike and Bayesian information criteria.

Results:

A two-class solution provided the best model fit. Class 1 (n = 94, 24.7%) represented a high macrovascular burden phenotype, while Class 2 (n = 287, 75.3%) represented a lower macrovascular burden phenotype. Individuals in Class 1 were older (68.8 ± 11.5 vs 63.9 ± 13.4 years; $p = 0.001$) and had significantly worse renal function (eGFR 51.1 ± 27.0 vs 63.6 ± 25.6 mL/min/1.73 m²; $p < 0.001$). Hypertension, dyslipidaemia, and chronic kidney disease were substantially more prevalent in Class 1 (all $p \leq 0.002$). Current smoking was more common in the high macrovascular burden phenotype (40.4% vs 26.5%; $p = 0.001$). Macrovascular conditions were markedly enriched in Class 1, including IHD (91.5% vs 18.1%;), stroke (34.0% vs 4.2%), PVD (75.5% vs 22.3%), and heart failure (50.0% vs 7.7%) (all $p < 0.001$). Glycaemic control (HbA1c) did not differ significantly between classes.

Conclusions:

Among people with DFU, LCA identified a distinct high-risk polyvascular phenotype characterised by older age, renal dysfunction, smoking, and a heavy burden of cardiovascular disease. Further prospective studies are needed to validate these phenotypes and to determine whether targeted cardiovascular and smoking-cessation interventions can improve clinical outcomes in this high-risk population.

Outcomes of elderly people with hospitalized diabetic foot ulcers: A retrospective study from Thailand

Thewjitcharoen Y¹, SRIPATPONG J¹, KRITTIYAWONG S¹, CHATCHOMCHUAN W¹, WANOTHAYAROJ E¹, SRIKUMMOON T¹, KLINOUBOL P¹, CHOTWANVIRAT P¹, BUTADEJ S¹, NAKASATIEN S¹, HIMATHONGKAM T¹

¹Vimut-Theptarin Hospital, Bangkok, Thailand

Background & Aim: Diabetic foot syndrome is a leading cause of hospitalization and one of the costliest complications in individuals with diabetes. Elderly patients often present with multiple comorbidities and polypharmacy, which may negatively impact diabetic foot ulcer (DFU) outcomes. Limited data exist regarding DFU outcomes and mortality in this vulnerable population in Western-Pacific region. This study aimed to assess the clinical characteristics and outcomes of hospitalized elderly Thai patients with DFUs at a tertiary diabetes center.

Methods: A retrospective review of DFU admissions from 2019 to 2023 was conducted at Vimut-Theptarin Hospital. Ulcer-related outcomes included complete wound healing at 12 months, major and minor amputations, and 1-year mortality were compared between patients age ≥ 75 years and younger individuals.

Results: A total of 265 DFU admissions from 225 patients were included (male 60.4%, mean age 66.7 ± 13.4 years, A1C $8.2 \pm 2.3\%$, advanced CKD 26.1%, peripheral arterial disease 54.7%, age ≥ 75 years 29.1%). Severe DFU accounted for 60.0% and 32% had prior amputations. Overall, complete healing was achieved in 69.8%. Major and minor amputation rates were 4.9% and 30.9%, respectively. One-year mortality was 11.7%. In patients age ≥ 75 years old, outcomes were worse: healing rate 58.4%, major amputations 9.1%, and 1-year mortality rate 27.3% ($P < 0.05$). The presence of peripheral arterial disease among elderly people was associated with much lower completed healing rate at only 50.8%. Leading causes of death were sepsis (46.9%), cardiovascular events (28.1%), and cancer (9.4%).

Discussion / Conclusion: Elderly patients with DFUs experience poorer outcomes and higher mortality. PAD is common and impairs healing in this group. Individualized management considering comorbidities and functional status is essential. High-risk elderly patients should be referred to foot care specialists for comprehensive evaluation and tailored intervention.

Foot-ankle exercise in people with diabetic peripheral neuropathy – a systematic review

Tian Q¹, LAU Y², LI W²

¹The First Affiliated Hospital Of Shandong First Medical University, Jinan, China, ²The Chinese University of Hong Kong, Hong Kong, China

Aims: We conducted a systematic review and meta-analysis of foot-ankle exercise for people with diabetic peripheral neuropathy to assess its effectiveness in improving diabetic peripheral neuropathy (DPN) symptoms and plantar pressure.

Methods: We searched the following online databases from the earliest record to 20 March 2026: MEDLINE, EMBASE, PsycINFO, CINAHL, Web of science, Cochrane Library and <https://clinicaltrials.gov>. Data was extracted on publication status, participants' characteristics at baseline, intervention and control group, study design, and data for primary and secondary outcomes, change in Michigan Neuropathy Screening Instrument (MNSI) score, change in central forefoot peak pressure (kPa).

Results: Nine RCTs were included in the systematic review. In the meta-analysis there was a small statistically significant improvement in MNSI score in the foot-ankle exercise group compared to control conditions (N = 5 studies, n = 255 participants, SMD = -0.76, 95% CI = -1.43, -0.08, I² = 84%, p < 0.01). There was no statistically significant difference between the foot-ankle exercise program and usual care for central forefoot peak pressure. Quality of evidence was rated low to very low.

Conclusions: Foot-ankle exercise is potentially effective in improving DPN symptoms for people with diabetic peripheral neuropathy. Further research is required to reach robust conclusions.

Association of diabetes-related lower limb peripheral neuropathy with other diabetes-related neuropathic complications: The diabetes neuropathy study (DNS)

Tilley R¹, Leone L², White J¹, Noonan S¹, Gauld A¹, McGill M¹, Wu T^{1,2}, Wong J^{1,2}, Rao P¹, Wu B¹, Lin C³, Twigg S^{1,2}

¹Royal Prince Alfred Hospital Diabetes Centre, Camperdown, Australia, ²Central Clinical School, Faculty of Medicine and Health and the Charles Perkins Centre University of Sydney, Camperdown, Australia, ³Central Clinical School, Faculty of Medicine and Health and the Brain and Mind Centre University of Sydney, Camperdown, 2050

Background:

In people with diabetes with lower limb peripheral neuropathy (PN), associations of clinical upper limb neuropathy and autonomic neuropathy (AN) are yet to be established. Understanding whether these neuropathic domains commonly co-occur is crucial, as overlapping complications may compound functional impairment and influence both prognosis and targeted intervention strategies.

Aims:

- To compare the prevalence of upper limb neuropathy, AN and other clinical characteristics in people with diabetes-related foot disease (DFD) versus those with long-standing diabetes without foot disease (non-DFD) attending an Australian tertiary hospital diabetes centre.

Methods:

People with DFD, defined by history/active ulceration, lower limb PN and/or peripheral arterial disease (PAD) (n=30), and non-DFD (n=30), defined by no history of PN, PAD or ulceration, were recruited. Assessments included micro- and macrovascular complications, with validated screening for retinopathy (RET-Eval), cognitive dysfunction (MOCA), depressive symptoms (PHQ-9), Duruoz Hand Index (DHI), and upper/lower limb PN (Semmes-Weinstein Monofilament, Neurothesiometer).

Results:

Sixty patients were assessed: 32%F, age 56.1±14.8yrs, diabetes duration 21.1±10.7yrs, HbA1c 7.6±1.4%. Overall, micro- and macrovascular complications, respectively, were significantly more prevalent in DFD (100% and 53%) vs non-DFD (20% and 7%). This was particular for retinopathy (36.7% vs 10%), ischaemic heart disease (20% vs 0%) in DFD and non-DFD, respectively. Subscale analysis revealed unfavourable scores in DFD compared to non-DFD, respectively, for RET-Eval score (24.2±5.0 vs 21.5±3.9) and DHI (8.1±16 vs 1.1±2.6) as well as BMI (31.3±6.3 vs 26.6±4.2kg/m²) systolic (135.1±19.8 vs 118.4±12.4mmHg) and diastolic (78.7±11.5 vs 71.5±8.5mmHg) blood pressure. The prevalence of clinical upper limb PN was minimal in both groups, (13.3% vs 0%) and autonomic neuropathy (13.3% vs 1.3%). There were no significant differences observed between other complications assessed.

Conclusion:

Clinical upper limb neuropathy and hand dysfunction occur in some people with DFD but are uncommon. Larger series and subsequent nerve conduction lab studies will better refine such relationships.

Prevalence of liver fibrosis using the Fibrosis-4 (FIB-4) Index in patients with type 2 diabetes attending a public hospital diabetes clinic

Tran D¹, Piya M^{1,2}, Simmons D^{1,2}, Chai T^{1,2,3}

¹Macarthur Diabetes Endocrinology and Metabolism Service, Campbelltown and Camden Hospitals, Campbelltown, Australia, ²School of Medicine, Western Sydney University, Campbelltown, Australia,

³Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

Background/Aims:

Metabolic dysfunction–associated fatty liver disease (MAFLD) is highly prevalent in people with type 2 diabetes (T2D). T2D increases the risk of progressive liver disease. This study aimed to:

1. Determine the prevalence of liver fibrosis using the Fibrosis-4 (FIB-4) index among patients with T2D.
2. Determine patient characteristics associated with low versus intermediate/high-risk of liver fibrosis.

Methods:

A retrospective single-centre cohort study was conducted in adults (≥ 18 years) with T2D attending diabetes clinics at a major metropolitan hospital in Sydney, Australia between January 2023 and July 2025. FIB-4 scores were calculated using age (years), aspartate aminotransferase (AST) concentration, alanine aminotransferase (ALT) concentration, and platelet count. Patients were stratified into low-risk (≤ 1.3) and intermediate/high-risk (> 1.3) for liver fibrosis. Categorical variables were compared with Pearson's chi-squared or Fisher's exact test, and continuous variables with Mann–Whitney U test (reported as median [interquartile range]).

Results:

325 patients with T2D, 303 (93%) had their FIB-4 index calculated. Among these, 195 (64.4%) were classified as low-risk and 108 (35.6%) as intermediate/high-risk for liver fibrosis. The intermediate/high-risk group were older (70 [61–74] vs. 57 [48–65] years, $p < 0.001$), had lower body mass index (BMI) (29.6 [26.7–35.2] vs. 33.0 [28.0–37.8] kg/m², $p = 0.005$), lower diastolic blood pressure (73 [62–79] vs. 78 [70–83] mmHg, $p < 0.001$) and higher rates of macrovascular complications (48.4% vs. 34.1%, $p = 0.026$). HbA1c (9.4% [7.7–10.5] vs. 9.3% [7.6–11.3], $p = 0.240$), insulin use (62.0% vs. 60.0%, $p = 0.728$), hypertension (66.3% vs. 55.5%, $p = 0.072$) and dyslipidaemia (65.4% vs. 67.0%, $p = 0.776$) rates did not differ between groups.

Conclusion:

Over one-third of patients attending public hospital T2D clinics were identified as having intermediate or high risk of liver fibrosis based on FIB-4. Given the greater burden of cardiometabolic complications in this group, routine non-invasive screening and referral for liver fibrosis assessment in people with T2D may facilitate earlier detection and management.

The cardiac autonomic neuropathy risk score in an Australian population with diabetic foot disease

Triplett J^{1,2,3}, Marathe J^{1,3}, Kamruzzaman M¹, Hosseini-Marnani E¹, Horowitz M^{1,3}, Marathe C^{1,3}

¹Adelaide University, Adelaide, Australia, ²Flinders Medical Centre, Adelaide, Australia, ³Royal Adelaide Hospital, Adelaide, Adelaide

Aim/s:

Both diabetic foot disease (DFD) and cardiac autonomic neuropathy (CAN) are common, severe complications of diabetes mellitus (DM) associated with an increased risk of major cardiovascular events and mortality. CAN tends to be asymptomatic until advanced and although its prevalence in DFD is high, ranging between 43% -66%, it is, unfortunately, not routinely assessed in clinical practice. A recently developed clinical CAN Risk-Score revealed good diagnostic accuracy for the detection of CAN in asymptomatic type 2 DM population without DFD. We validated the utility of the CAN Risk-Score in identifying CAN in a population with DFD.

Methods:

The CAN Risk Score was calculated amongst 79 patients with DFD. The CAN risk score was calculated/derived from resting heart rate, HbA1c, the presence of retinopathy, nephropathy, cardiovascular disease physical inactivity and insulin prescription. CAN was confirmed using cardiovascular autonomic reflex testing (CARTs).

Results:

The 79 unselected participants (33 -female and mean age 67.64 years) were divided into two groups according to their calculated CAN Risk Scores <4 (n=31) or ≥4 (n=48). The mean CAN Risk Score was 1.39 ± 1.05 , in the <4 group and 5.5 ± 1.25 in the ≥4 group ($P < 0.0001$). The CAN Risk Score was significantly higher in subjects with overall CAN (i.e., early and confirmed) 5.02 ± 1.74 than those without CAN 1.82 ± 1.83 ($P < 0.01$).

The CAN Risk Score demonstrated a good diagnostic accuracy for detection of confirmed CAN with an area under the receiver operating characteristic (ROC) curve (AUC) of 0.82 (0.72-0.91) and at the cut-off of 4 had a sensitivity and specificity of 93.2% and 59.2%, respectively, and negative predictive value of 93.5% for confirmed CAN.

Conclusion:

Our study supports the diagnostic value of the CAN Risk Score in DFD and those with an elevated CAN Risk Score should be referred for definitive testing in the form of CARTs.

A study of the association between glycemic control and hearing loss in patients with diabetes mellitus

Tumendelger A¹, Batbayar D¹, Battur T¹
¹Northern Cancer Center Of Mongolia, Orkhon, Mongolia

Aim

The purpose of this study was to compare auditory outcomes between glycemic groups that were well-controlled and poorly-controlled and to examine the connection between high-frequency hearing loss and glycemic control status among individuals with diabetes mellitus.

Methods

98 diabetic patients underwent preventive health examinations at Erdenet Medical Hospital in 2025 in this cross-sectional study. The participants were grouped into two main groups based on their glycemic control status, with a well-controlled group (n = 46) and a poorly controlled group (n = 52). Data on age, gender, disease duration, and HbA1c levels were collected. Pure-tone audiometry was used to perform hearing assessment, and the worst ear and the most recent measurement were used to analyze hearing thresholds at 4 kHz and 8 kHz. The threshold for high-frequency hearing loss was ≥26 dB at either 4 kHz or 8 kHz.

Results

Age (n46 50.4 ± 9.0) (n52 52.5 ± 8.7), or sex (n46 m33 f13) (n52 m39 f13) distribution did not have any significant differences between the two groups (p > 0.05). However, the poorly controlled group had significantly higher disease duration (n46 1.2 ± 0.6) (n52 10.1 ± 4.4), and HbA1c levels (n46 6.7 ± 0.2) (n52 12.4 ± 3.4) (p < 0.001).

Factors	Controlled group (n = 46)	Poorly controlled group (n = 52)	P value
Age	50.4 ± 9.0	52.5 ± 8.7	0.239
Sex	33 (71.7%) / 13 (28.3%)	39 (75.0%) / 13 (25.0%)	> 0.05
Duration of diabetes (years)	1.2 ± 0.6	10.1 ± 4.4	< 0.001
HbA1c	6.7 ± 0.2	11.1 ± 2.4	< 0.001

Conclusion

Poor glycemic control, reflected by elevated HbA1c is associated with high-frequency hearing impairment in patients with diabetes mellitus. Auditory screening should be considered as part of routine evaluation, especially in patients with long disease duration and inadequate glycemic control, according to these findings.

Keywords: Diabetes mellitus; Glycemic control; HbA1c; High-frequency hearing loss

Mechanistic kidney effects of semaglutide by baseline SGLT2i use in type 2 diabetes: A post-hoc analysis of the REMODEL trial

Cooper M¹, Cherney D², Alicic R^{3,4}, Chacko M⁵, Driscoll L⁶, Olsen E⁷, Priyadarshini P⁸, Sridhar V⁹, Tuttle K¹⁰, Bjornstad P¹¹

¹ Department of Diabetes, School of Translational Medicine, Monash University, , Melbourne, Australia, ²Department of Medicine, Division of Nephrology, University Health Network,, Toronto, Canada , ³Providence Medical Research Center, Providence Inland Northwest Health, , Spokane, USA, ⁴Department of Medicine, University of Washington, , Seattle, USA, ⁵Novo Nordisk GBS India, Biostatistics, , Bangalore, India, ⁶Division of Renal Diseases and Hypertension, Department of Medicine, University of Colorado School of Medicine, , Aurora, USA, ⁷Novo Nordisk A/S, Medical & Science, , Søborg, Denmark, ⁸Novo Nordisk GBS India, Global Medical Affairs,, Bangalore, India, ⁹Division of Nephrology, Department of Medicine, University of British Columbia, Vancouver, Canada, ¹⁰Kidney Research Institute and Institute of Translational Health Sciences, University of Washington, Seattle, USA, ¹¹Division of Metabolism, Endocrinology and Nutrition, Department of Medicine, University of Washington Medicine Diabetes Institute, and Division of Endocrinology, Department of Pediatrics, University of Washington, , Seattle, US , ¹²Division of Renal Diseases and Hypertension, Department of Medicine, and Department of Pediatrics, Section of Endocrinology, University of Colorado Anschutz Medical Campus, Aurora, , , US

Introduction:

Semaglutide, a GLP-1RA, and SGLT2is confer kidney protection in people with T2D and CKD. Although both lower blood glucose levels, their kidney-protective mechanisms appear largely independent and potentially additive. This study evaluated kidney-protective effects of semaglutide 1.0mg stratified by SGLT2i use.

Methods:

Adults with T2D, eGFR 30–75mL/min/1.73m², and UACR 20–<5000mg/g were randomized 2:1 to once-weekly semaglutide 1.0mg (n=71) or placebo (n=35) for 52 weeks and stratified by SGLT2i use. Kidney oxygenation (R2*) was assessed using blood-oxygenation-level-dependent MRI. Phase-contrast MRI measured mean GKP, RARI, and cortical and medullary fibrosis estimates (diffusion-weighted imaging for apparent diffusion coefficient [ADC]).

Results:

Baseline eGFR_{creatinine} was similar between SGLT2i users and non-users, while UACR was higher among SGLT2i users (Table 1). Semaglutide reduced RARI regardless of SGLT2i use ($p_{\text{interaction}}$ [p_{int}]=0.29). SGLT2i use did not impact semaglutide-associated increase in cortical or delta ADC vs placebo (p_{int} =0.73 and p_{int} =0.53, respectively). Cortical and medullary R2* ratio from baseline to Week 52 did not differ significantly between SGLT2i users vs non-users (p_{int} =0.88 and p_{int} =0.84, respectively). Higher GKP was observed with semaglutide vs placebo, with similar effects in SGLT2i users and non-users (p_{int} =0.42).

Conclusion:

Semaglutide reduced RARI and mitigated fibrosis irrespective of background SGLT2i, suggesting combined treatment may confer additional kidney benefits.

Table:

	SGLT2i use			Non-SGLT2i use			
	Semaglutide (n=28)	Placebo (n=14)	Total (n=42)	Semaglutide (n=43)	Placebo (n=21)	Total (n=64)	
Baseline Characteristics, mean (SD)							
Age, years	61.9 (11.1)	68.1 (8.2)	64.0 (10.5)	67.6 (7.0)	63.1 (12.7)	66.2 (9.4)	
Creatinine-based eGFR, mL/min/1.73 m ²	54.2 (10.1)	49.6 (9.6)	52.6 (10.1)	47.9 (9.6)	54.4 (11.5)	50.0 (10.6)	
UACR, median (IQR) mg/g	242.7 (79.0; 478.2)	550.1 (263.1; 2299)	419.0 (105.6; 802.7)	109.1 (48.1; 374.2)	163.5 (68.2; 577.2)	109.9 (50.9; 471.3)	
Body weight, kg	88.1 (19.0)	80.6 (13.3)	85.6 (17.5)	89.8 (16.7)	97.4 (24.3)	92.2 (19.5)	
BMI, kg/m ²	30.2 (5.9)	28.0 (2.9)	29.5 (5.2)	31.3 (5.7)	32.7 (6.4)	31.7 (5.9)	
HbA _{1c} , %	7.0 (0.9)	7.1 (0.8)	7.0 (0.9)	7.1 (0.9)	7.0 (1.0)	7.1 (0.9)	
HbA _{1c} , mmol/mol	53.1 (10.3)	54.3 (9.1)	53.5 (9.8)	53.8 (9.6)	53.5 (10.6)	53.7 (9.9)	
MRI Analyses at Week 52	Semaglutide (n=28)	Placebo (n=14)	ETR ^a or ETD ^b (95% CI)	Semaglutide (n=43)	Placebo (n=21)	ETR ^a or ETD ^b (95% CI)	p _{interaction} value
Oxygenation, s ⁻¹							
Cortex	15.29	15.55	0.98 ^a (0.95; 1.02)	15.22	15.54	0.98 ^a (0.95; 1.01)	0.88
Medulla	22.15	22.32	0.99 ^a (0.93; 1.06)	21.36	21.72	0.98 ^a (0.93; 1.04)	0.84
GKP, mL/100 g/min	473.5	454.7	1.04 ^a (0.88; 1.23)	479.7	418.9	1.15 ^a (0.98; 1.34)	0.42
RARI	0.76	0.81	0.94 ^a (0.90; 0.99)	0.77	0.80	0.97 ^a (0.94; 1.01)	0.29
ADC, μm ² /sec							
Cortex	2419	2321	1.04 ^a (0.99; 1.10)	2417	2291	1.05 ^a (1.01; 1.10)	0.73
Medulla	2182	2194	0.99 ^a (0.93; 1.06)	2219	2169	1.02 ^a (0.97; 1.08)	0.51
Delta	239.1	158.6	80.41 ^b (4.77; 156.0)	189.6	140.9	48.63 ^b (-17.7; 114.9)	0.53

^aEstimated treatment ratio (ETR) at Week 52 for semaglutide 1.0mg/placebo, adjusted for baseline values.

^bEstimated treatment difference (ETD) at Week 52 for semaglutide 1.0mg/placebo, adjusted for baseline values.

Abbreviations: ADC, apparent diffusion coefficient; BMI, body mass index; CI, confidence interval; eGFR, estimated glomerular filtration rate; ETD, estimated treatment difference; ETR, estimated treatment ratio; GKP, global kidney perfusion; HbA_{1c}, glycated hemoglobin; IQR, interquartile range; MRI, magnetic resonance imaging; RARI, renal artery resistive index; SD, standard deviation; SGLT2i, sodium-glucose cotransporter-2 inhibitor; UACR, urine albumin-creatinine ratio.

	SGLT2i use			Non-SGLT2i use			
	Semaglutide (n=28)	Placebo (n=14)	Total (n=42)	Semaglutide (n=43)	Placebo (n=21)	Total (n=64)	
Baseline Characteristics, mean (SD)							
Age, years	61.9 (11.1)	68.1 (8.2)	64.0 (10.5)	67.6 (7.0)	63.1 (12.7)	66.2 (9.4)	
Creatinine-based eGFR, mL/min/1.73 m ²	54.2 (10.1)	49.6 (9.6)	52.6 (10.1)	47.9 (9.6)	54.4 (11.5)	50.0 (10.6)	
UACR, median (IQR) mg/g	242.7 (79.0; 478.2)	550.1 (263.1; 2299)	419.0 (105.6; 802.7)	109.1 (48.1; 374.2)	163.5 (68.2; 577.2)	109.9 (50.9; 471.3)	
Body weight, kg	88.1 (19.0)	80.6 (13.3)	85.6 (17.5)	89.8 (16.7)	97.4 (24.3)	92.2 (19.5)	
BMI, kg/m ²	30.2 (5.9)	28.0 (2.9)	29.5 (5.2)	31.3 (5.7)	32.7 (6.4)	31.7 (5.9)	
HbA _{1c} , %	7.0 (0.9)	7.1 (0.8)	7.0 (0.9)	7.1 (0.9)	7.0 (1.0)	7.1 (0.9)	
HbA _{1c} , mmol/mol	53.1 (10.3)	54.3 (9.1)	53.5 (9.8)	53.8 (9.6)	53.5 (10.6)	53.7 (9.9)	
MRI analyses at week 52	Semaglutide (n=28)	Placebo (n=14)	ETR ^a or ETD ^b (95% CI)	Semaglutide (n=43)	Placebo (n=21)	ETR ^a or ETD ^b (95% CI)	^p _{interaction} value
Oxygenation, s ⁻¹							
Cortex	15.29	15.55	0.98 ^a (0.95; 1.02)	15.22	15.54	0.98 ^a (0.95; 1.01)	0.88
Medulla	22.15	22.32	0.99 ^a (0.93; 1.06)	21.36	21.72	0.98 ^a (0.93; 1.04)	0.84
GKP, mL/100 g/min	473.5	454.7	1.04 ^a (0.88; 1.23)	479.7	418.9	1.15 ^a (0.98; 1.34)	0.42
RARI	0.76	0.81	0.94 ^a (0.90; 0.99)	0.77	0.80	0.97 ^a (0.94; 1.01)	0.29
ADC, μm ² /sec							
Cortex	2419	2321	1.04 ^a (0.99; 1.10)	2417	2291	1.05 ^a (1.01; 1.10)	0.73
Medulla	2182	2194	0.99 ^a (0.93; 1.06)	2219	2169	1.02 ^a (0.97; 1.08)	0.51
Delta	239.1	158.6	80.41 ^b (4.77; 156.0)	189.6	140.9	48.63 ^b (-17.7; 114.9)	0.53

^aEstimated treatment ratio (ETR) at week 52 for semaglutide 1.0 mg/placebo, adjusted for baseline values.

^bEstimated treatment difference (ETD) at week 52 for semaglutide 1.0 mg/placebo, adjusted for baseline values.

Abbreviations: ADC, apparent diffusion coefficient; BMI, body mass index; CI, confidence interval; eGFR, estimated glomerular filtration rate; ETD, estimated treatment difference; ETR, estimated treatment ratio; GKP, global kidney perfusion; HbA_{1c}, glycated hemoglobin; IQR, interquartile range; MRI, magnetic resonance imaging; RARI, renal artery resistive index; SD, standard deviation; SGLT2i, sodium-glucose cotransporter-2 inhibitor; UACR, urine albumin-creatinine ratio

Mechanistic effects of semaglutide on kidney disease in Type 2 Diabetes: The REMODEL trial

Tuttle K^{9,10}, Bjornstad P^{3,4}, Pruijm M⁸, Hodgin J⁶, Cherney D¹, Belmar N², Chacko M⁵, Das V⁸, Idorn T², Schytz P², Kretzler M⁷

¹ Department of Medicine, Division of Nephrology, University Health Network, Toronto, Canada,

²Novo Nordisk A/S, , Søborg, Denmark , ³ Division of Metabolism, Endocrinology and Nutrition, Department of Medicine, and Division of Endocrinology, Department of Pediatrics, University of Washington,, Seattle, USA, ⁴ Division of Renal Diseases and Hypertension, Department of Medicine, Section of Pediatric Endocrinology, Department of Pediatrics, University of Colorado Anschutz Medical Campus,, Aurora, USA, ⁵ Novo Nordisk GBS India, Bangalore, India, ⁶ Department of Pathology and Clinical Laboratories, University of Michigan, Ann Arbor, USA, ⁷Department of Internal Medicine and Bioinformatics, University of Michigan, Ann Arbor, USA, ⁸ Service of Nephrology, University Hospital of Lausanne and University of Lausanne, Lausanne, Switzerland, ⁹Kidney Research Institute and Nephrology Division, University of Washington School of Medicine, Seattle, USA,

¹⁰Providence, Medical Research Center, Providence Inland Northwest Health, Spokane, USA, ¹¹Clinical Omics Science, Data Science, Research & Development, Novo Nordisk A/S, , Denmark, Denmark

Background: Semaglutide reduces the risk of kidney function decline and kidney failure in patients with type 2 diabetes (T2D) with chronic kidney disease (CKD), but the pathways responsible for this benefit are not yet fully understood. The study aimed to discover the basis of this kidney protection using an integrative approach that combined functional magnetic resonance imaging with tissue-based analytics.

Methods: Adults with T2D, estimated glomerular filtration rate (eGFR) of 30-75 mL/min/1.73 m² and urine albumin-creatinine ratio (UACR) 20-<5000 mg/g were randomised 2:1 to once-weekly subcutaneous semaglutide 1.0 mg or placebo for 52 weeks. A subset underwent paired kidney biopsy for histology, single-nuclear transcriptomics, and spatial transcriptomics.

Results: At baseline, participants (N=106) had a mean age of 65±10 years, 24% (n=25) were female, mean eGFR was 51±10 mL/min/1.73m² and median UACR was 187mg/g (interquartile range 60-546mg/g). At 52 weeks, semaglutide was associated with an estimated 40% reduction in UACR and a 12 mL/min increase in creatinine clearance vs placebo (Figure 1A). Perirenal and sinus fat volumes decreased by 25% and 13%, respectively, while the cortical apparent diffusion coefficient increased (ETR 1.05; 95% CI: 1.01-1.09) (Figure 1B). Semaglutide also reduced the renal arterial resistive index (ETR 0.96; CI: 0.93-0.99), while cortical oxygenation (ETR 0.98; CI: 0.96-1.01) and perfusion (ETR 1.10; CI: 0.98-1.24) showed directional increases (Figure 1C). In the biopsy subset (n=33), the arteriolar intimal area of the most diseased vessel decreased by 10%, and glomerular endothelial-cell transcriptomes showed downregulation of genes in metabolic, inflammatory, and fibrotic pathways by semaglutide (figure 1D).

Conclusions: Semaglutide reduced intrarenal fat, improved renal haemodynamics and enhanced glomerular endothelial function through metabolic reprogramming and mitigation of inflammation and fibrosis in participants with T2D and CKD.

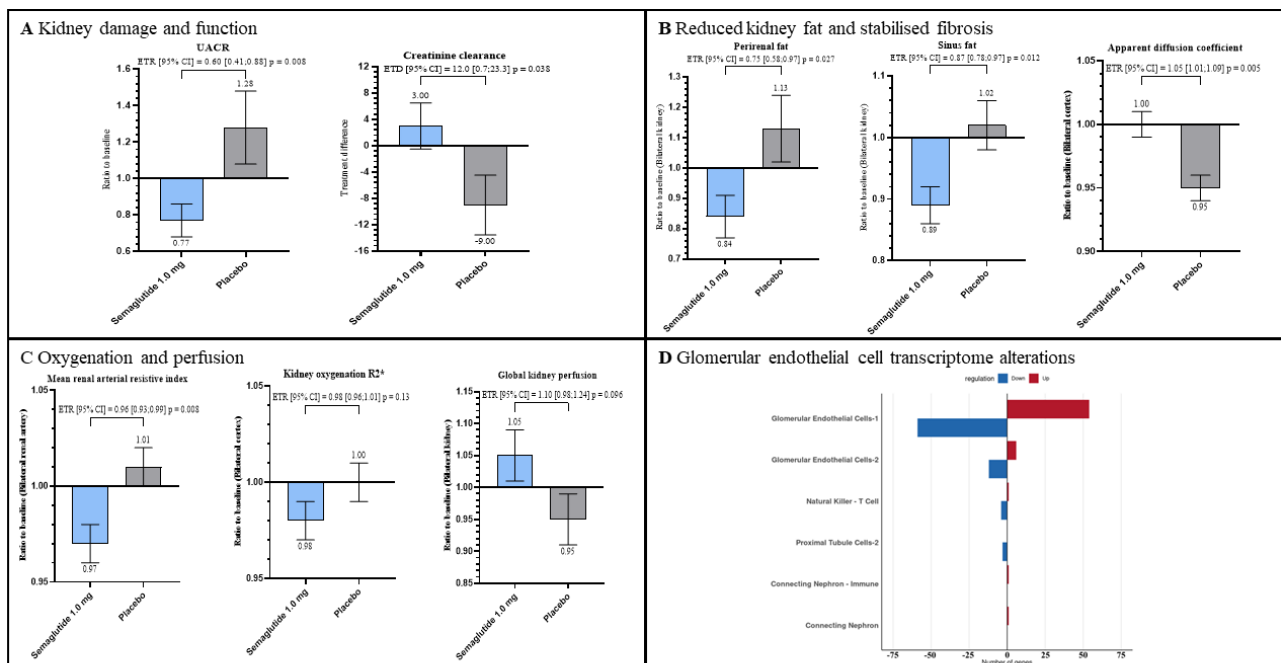


Figure 1. Integrated summary of outcomes in REMODEL. Data presented as change from baseline to week 52. Error bars denote $\pm$ standard error.

Simple fibroblast activation protein (FAP) quantitation for assessing fibrosis in metabolic dysfunction-associated steatotic liver disease (MASLD)

Wang V¹, Boumelhem B¹, Pennell T¹, Bachovchin W², Brewer K¹, Ooi G³, George J⁴, Eslam M⁴, Adam L⁵, Zhang H¹, McCaughan G^{1,6}, Majumdar A^{1,6,7}, Gorrell M¹

¹Centenary Institute, Camperdown, Australia, ²Tufts University, Boston, USA, ³Monash University, Melbourne, Australia, ⁴The Westmead Institute for Medical Research, Westmead, Australia, ⁵The University of Western Australia, Perth, Australia, ⁶Royal Prince Alfred Hospital, Camperdown, Australia, ⁷Austin Hospital, Melbourne, Australia

Aims

Metabolic dysfunction-associated steatotic liver disease (MASLD) diagnostics and management is a significant burden in the clinical management of diabetes and obesity. This study designed and evaluated a novel diagnostic algorithm (FAP-Index) based upon circulating levels of the fibrogenic marker, fibroblast activation protein (FAP) in cohorts of patients with MASLD and/or undergoing bariatric surgery.

Methods

Two retrospective cohorts recruited from tertiary hepatology and obesity clinics were studied as training (n = 160) and external validation cohorts (n = 332), with prevalence of histologic advanced fibrosis (F3–F4) of 20% and 11%, respectively. FAP was measured in sera using our rapid single-step FAP-specific microplate enzyme assay. A predictive model, FAP Index, containing age, type 2 diabetes, alanine transaminase (ALT), and ordinal FAP was developed using logistic regression. Diagnostic accuracy was evaluated.

Results

FAP Index AUROC for advanced fibrosis was 0.875 (95% CI: 0.813–0.938) and 0.841 (95% CI: 0.776–0.906) the training and validation cohorts, respectively. Dual cutoffs of 0.157 (**Low**, sensitivity 84.3%, negative predictive value 95%) and 0.695 (**High**, specificity 99.2%, positive predictive value 92.9%) values excluded and predicted F3–F4, respectively. FAP Index following FIB-4 reduced the frequency of indeterminate results by more than one-third compared to FIB-4 alone. In addition, FAP-Index also obtained an AUROC 0.795 (Youden: 0.166 with sensitivity 70.6%, specificity 77%) in discriminating F2–F3 exclusive of cirrhosis.

Conclusion

FAP-Index was competitive with established serum NITs and applying FAP Index following FIB-4 or NFS increased the accuracy of fibrosis risk stratification of patients by greatly reducing the frequency of indeterminate results, without compromising negative predictive value. Moreover, FAP-Index show promise for discriminating patients with F2–F3. Thus, FAP Index is a novel, fibrogenesis-relevant, rapid, robust diagnostic tool suited to increasing the efficiency of liver fibrosis triage in primary care.

Impacts of COVID-19 on diabetes: Insights from a longitudinal metabolomics study

Wang W^{1,2}, Wist J², Nicholson J³, Kowlessur S⁴, Zimmet P¹, Cooper M¹, Chai Z¹

¹Department of Diabetes, Monash University, Melbourne, Australia, ²Australian National Phenome Centre, Murdoch University, Perth, Australia, ³Department of Metabolism, Digestion and Reproduction, Imperial College London, London, United Kingdom, ⁴Ministry of Health and Wellness, Port Louis, Mauritius

This study investigates the role of COVID-19 in causing new-onset diabetes, affecting glucose management in people with diabetes, and assessing metabolic changes.

Methods

Blood samples with clinical data were collected in 2022 (baseline) from 251 participants for metabolomics profiling using NMR and LC–MS. Participants were stratified into four groups: Control (no prior COVID-19, no diabetes), post-COVID (prior COVID-19), Diabetes, and post-COVID with diabetes. The cohort was reassessed after one year. HbA1c was measured at baseline and follow-up, and diabetes was defined as HbA1c $\geq 6.5\%$. Prior COVID-19 was confirmed from SARS-CoV-2 testing records. Metabolite changes (follow-up minus baseline) were compared using the Wilcoxon rank-sum test. Among those without diabetes at baseline (Control and post-COVID), new-onset diabetes was compared with stable normoglycaemia at follow-up. Among those with baseline diabetes (Diabetes and post-COVID with diabetes), persistent hyperglycaemia was compared with improved glycaemic control (HbA1c $< 6.5\%$) at follow-up.

Results

Longitudinally, HbA1c increased from 5.8% at baseline to 6.5% at follow-up in post-COVID ($p < 0.05$), whereas no change was observed in control (5.8% to 6.2%, $p > 0.05$). Individuals with new-onset diabetes at follow-up in post-COVID, showed greater increases in lipids, specifically triacylglycerides, monoacylglycerides, phosphatidylinositols, and lysophosphatidylglycerides, compared to those with stable normoglycaemia ($p < 0.05$). HbA1c remained high levels in post-COVID with diabetes (8.1% to 7.7%, $p > 0.05$), but decreased at follow-up in diabetes (8.4% to 6.5%, $p < 0.05$). Individuals with improved glycaemic control at follow-up in diabetes exhibited greater reductions in triacylglycerides, monoacylglycerides, phosphatidylethanolamines, and glutamic acid compared to those with persistent hyperglycaemia ($p < 0.05$).

Conclusion

COVID-19 exerts long-term effects on glucose metabolism, causing increased incidence of new-onset diabetes with dysregulation of certain lipids. COVID-19 is also found to compromise glucose management in people with diabetes, leading to less reduction in their HbA1c levels in association with dysregulation of lipid and glutamine-glutamate metabolism.

Worsened atherogenic dyslipidaemia, metabolic dysregulation, and chronic low-grade inflammation in diabetes with prior COVID-19 infection: a metabolomics study

Wang W^{1,2}, Wist J², Nicholson J³, Kowlessur S⁴, Zimmet P¹, Cooper M¹, Chai Z¹

¹Department of Diabetes, Monash University, Melbourne, Australia, ²Australian National Phenome Centre, Murdoch University, Perth, Australia, ³Department of Metabolism, Digestion and Reproduction, Imperial College London, London, United Kingdom, ⁴Ministry of Health and Wellness, Port Louis, Mauritius

Aim

COVID-19 and diabetes exhibit a bidirectional relationship, with metabolic dysregulation potentially exacerbating disease severity. This study aims to investigate metabolic alterations in diabetes with prior COVID-19 infection.

Methods

NMR and LC-MS profiling of blood samples from 251 individuals in 2022 yielded six metabolomics data blocks comprising 1,110 variables, including lipoproteins, lipids, small molecules, inflammatory signals, amino acids, and bile acids, with 34 cytokines quantified by a multiplex immunoassay. A total of 194 individuals with complete data were included and classified into four groups: control (n=11), diabetes (n=27), post-COVID (≥ 30 days since SARS-CoV-2 infection, n=78), and post-COVID with diabetes (n=78). Data were modelled using multiple-block orthogonal projections to latent structures for feature selection and derivation of score vectors, which were subsequently analysed by orthogonal partial least square discriminant analysis (OPLS-DA) to reveal metabolic alterations.

Results

OPLS-DA effectively discriminated between diabetes and control (CV-AUROC = 0.63), identifying 102 significantly altered metabolites, including 94 lipids ($p < 0.05$). Similarly, discrimination between post-COVID with diabetes and post-COVID (without diabetes) (CV-AUROC = 0.83) revealed 614 significantly altered metabolites, including 542 lipids and 54 lipoproteins ($p < 0.05$). Notably, individuals in post-COVID with diabetes, particularly those with persistent symptoms, exhibited increased small dense LDL parameters, decreased HDL cholesterol, and a marked rise in polyunsaturated triacylglycerides. Additionally, distinct alterations in amino acids and small molecules were observed in this population, such as elevated isoleucine, valine, 3-hydroxybutyric acid, and acetone, and reduced citrulline. A subset of this group also displayed pronounced inflammatory signatures, especially among those with persistent symptoms.

Conclusion

In individuals with diabetes, COVID-19 leads to persistent metabolic disturbances, characterised by worsened atherogenic dyslipidaemia, increased branched-chain amino acid catabolism, and enhanced ketogenesis. These alterations are linked to chronic low-grade inflammation and an elevated risk of potentially debilitating and costly long-term organ complications, such as atherosclerotic cardiovascular disease.

Prevalence of subclinical microvascular complications among Thai individuals with prediabetes

Washirasaksiri C¹, Kathananon P¹, Ariyakunaphan P¹, Kositamongkol C¹, Srivanichakorn W¹

¹Faculty of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand

AIM

Prediabetes has increasingly been recognized as a metabolic condition associated with early vascular injury, even prior to the progression to overt diabetes mellitus. However, evidence regarding vascular complications in individuals with prediabetes remains limited. This study aimed to investigate microvascular complications among Thai individuals with prediabetes.

Methods

We conducted a cross-sectional analysis using baseline data from a prediabetes cohort at Siriraj Hospital. Retinopathy was evaluated using fundus photography with artificial intelligence–assisted interpretation, and the findings were subsequently confirmed by an ophthalmologist. Nephropathy was assessed by urine albumin-to-creatinine ratio and estimated glomerular filtration rate. Peripheral neuropathy was evaluated using standard foot examination with a 10-g Semmes–Weinstein monofilament test. Microvascular complications were defined as the presence of either one of retinopathy, nephropathy, or peripheral neuropathy. Microvascular complications were defined as the presence of any of the aforementioned conditions. Clinical characteristics were compared between individuals with and without microvascular complications.

Results

442 individuals with prediabetes (33% male) were recruited; the mean age was 58.8±9.5 years, BMI 25.9±4.6 kg/m², FPG 103.5±8.7 mg/dL, and HbA1c 5.9±0.3%. Hypertension and dyslipidemia were present in 58.6% and 81.0%, respectively. Thirty-five participants had at least one microvascular complication, yielding a prevalence of 7.92%. The prevalence of retinopathy was 1.13% (n=5), nephropathy 5.20% (n=23), and loss of protective sensation 1.81% (n=8). Compared with individuals without microvascular complications, those with complications had a significantly higher prevalence of hypertension (77.1% vs 57.0%, p=0.02), dyslipidemia (94.3% vs 79.9%, p=0.04), and obstructive sleep apnea (17.1% vs 2.2%, p<0.001), as well as a longer duration of prediabetes (median 6 vs 3 years, p=0.04).

Conclusion

These findings suggest that a small proportion of microvascular injury may develop early. Comprehensive risk factor management, including blood pressure, lipid, and obstructive sleep apnea management, may be important in individuals with prediabetes.

Same service, different outcomes: comparing type 1 and type 2 diabetes in a multidisciplinary diabetic foot service

Willis C^{1,2,3}, Baba M^{5,7}, Joseph S⁶, Bravo Ceballos C^{6,7}, Chu E⁸, Lafontaine Bedecarratz N^{1,4}

¹Department of Endocrinology, Sir Charles Gairdner Hospital, Nedlands, Australia, ²School of Medicine, University of Notre Dame, Fremantle, Australia, ³School of Exercise and Nutrition sciences, Deakin University, Burwood, Australia, ⁴School of Medicine, University of Western Australia, Crawley, Australia, ⁵Department of Podiatry, Sir Charles Gairdner Hospital, Nedlands, Australia, ⁶Department of Vascular and Endovascular Surgery, Sir Charles Gairdner Hospital, Nedlands, Australia, ⁷Heart and Vascular Research Institute, Harry Perkins Medical Research Institute, Perth, Western Australia, Australia, Nedlands, Australia, ⁸Department of Infectious Diseases, Sir Charles Gairdner Hospital, Nedlands, Australia

Aim

To compare the characteristics and outcomes of patients with type 1 (T1D) and type 2 diabetes (T2D) attending a metropolitan multidisciplinary diabetic foot unit (DFU).

Background

Diabetes-related foot disease (DFD) is associated with substantial morbidity, hospitalisation, and premature mortality. Despite differences in the pathophysiology and management of T1D and T2D, comparative data within the DFU cohort is lacking.

Methods

We conducted a retrospective cohort study using data from the Australian Diabetes High Risk Foot Service Database of patients attending the Sir Charles Gairdner Hospital multidisciplinary diabetic foot clinic since 2021. Demographic characteristics, ulcer severity, management, and outcomes were compared between T1D and T2D.

Results

592 patients with 1,064 ulcers were included. The cohort was predominantly male (76%), with a mean diabetes duration of 18 years. Previous ulceration was present in 70.0%, prior amputation in 46%, and mean ulcer SINBAD score was 2.38.

Among patients with record of diabetes type, 40 patients (7.4%) with T1D, accounted for 91 (9.4%) ulcers, with a higher ulcer incidence per patient (2.5 vs 1.9). T2D patients had higher rates of macrovascular disease (67 vs 45%).

T1D was associated with a trend towards higher ulcer recurrence (67.5% vs 52%), and lower healing rates (14.1% vs 22.1%) compared to T2D. Although amputation rates per ulcer were lower in T1D (5.5% vs 8.5%), amputation rates per patient were higher (32.5% vs 21.7%).

Mortality was substantial, with 112 deaths among patients with T2D (20.7%), while no deaths were recorded in T1D. Among patients with 4–5 years of follow-up, 38.3% were deceased.

Conclusion

Patients with T1D and DFD demonstrated higher ulcer burden, recurrence, severity, and poorer healing outcomes. T2D was associated with higher per-ulcer amputation rates and mortality, highlighting important differences between these groups.

Effect of oral hygiene status on the incidence of stroke-associated pneumonia in people with acute stroke and diabetes

Yamada H¹, Fujita K², Kawakubo M¹, Nagafuchi M¹, Sogawa R³, Shinada K⁴, Shiraishi T⁵, Mizoguchi Y⁵, Takedomi Y¹

¹Department of Lifelong Developmental Nursing, Faculty of Medicine, Saga University, Saga, Japan,

²Department of Health Sciences, Kyushu University, Fukuoka, Japan, ³Department of Pharmacy, Saga University Hospital, Saga, Japan, ⁴Department of Emergency and Critical Care Medicine, Saga

University Hospital, Saga, Japan, ⁵Department of Psychiatry, Faculty of Medicine, Saga University, Saga, Japan

Aims

Stroke-associated pneumonia (SAP) is a critical complication that influences prognosis, and diabetes may amplify its risk factors. This study determined the incidence of SAP among people with diabetes following acute stroke and evaluated whether oral hygiene status at admission is a risk factor for SAP.

Methods

This retrospective cohort study involved individuals (≥ 20 years) with diabetes admitted to an emergency centre for ≥ 48 hours. The exclusion criteria included recurrent stroke, missing Revised Oral Assessment Guide (OAG) scores, and intubation. Variables included SAP onset before oral intake, oral hygiene, and related factors (NIHSS, HbA1c, and dysphagia). Oral hygiene status was evaluated using the Revised OAG and assessing items such as saliva and teeth/dentures as normal or abnormal. Analyses comprised the chi-square and Fisher's exact tests. Cox proportional hazards models were constructed based on age, sex, NIHSS, HbA1c, and significant oral hygiene variables from the univariate analysis while considering multicollinearity. Additionally, cumulative incidence curves were generated.

Results

Among 78 participants, the incidence of SAP was 16.7% ($n=13$). The mean age was 73.3 ± 12.2 years, the mean NIHSS was 11.9 ± 9.0 , and the mean HbA1c level was $7.3 \pm 1.6\%$. Cox analysis revealed that poor teeth/denture status (plaque/food debris) was a significant independent risk factor for SAP (HR: 3.89; 95% CI: 1.03–14.75; $p=0.04$). The cumulative incidence curves demonstrated a sharp increase in SAP onset around day 3 post-admission in the poor teeth/denture status group, which diverged significantly from the normal group.

Conclusion

Following an acute stroke in people with diabetes, poor teeth/denture status was an independent risk factor for SAP, regardless of stroke severity or glycaemic control. Given the sharp increase in SAP around day three, prompt oral assessment upon admission and early intervention focusing on plaque and debris removal are essential strategies for SAP prevention in this population.

A multicentre analysis on the natural history of MASLD and MASLD with mix aetiologies

Yeo L¹, Nah B¹, Chan T³, Chen V⁴, Lai J^{5,6}, Wijarnpreecha K⁷, Kumar R⁸, Kaewdech A⁹, Ueno M^{10,11}, Pramotedham T², Kulkarni A¹², Zheng M^{13,14}, Gao Y¹⁵, Seko Y¹⁶, Nakamura Y¹⁷, Kimura T¹⁸, Choi W¹⁹, Roy A²⁰, Liu K²¹, Rattananukrom C²², Nouredin M²³, Siddiqui M²⁴, Takahashi H²⁵, Muthiah M^{1,3,24}, Ng C^{1,7,26}

¹Division of Gastroenterology and Hepatology, Department of Medicine, National University Hospital, Singapore, Singapore, ²Department of Gastroenterology and Hepatology, Yokohama City University Graduate School of Medicine, Yokohama, Japan, ³Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, ⁴Division of Gastroenterology and Hepatology, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, United States of America, ⁵Medical Data Analytics Centre, The Chinese University of Hong Kong, Hong Kong, China, ⁶Li Ka Shing Institute of Health Sciences and State Key Laboratory of Digestive Disease, The Chinese University of Hong Kong, Hong Kong, China, ⁷Division of Gastroenterology and Hepatology, University of Arizona College of Medicine Phoenix, Phoenix, United States of America, ⁸Department of Gastroenterology, Changi General Hospital, Singapore, Singapore, ⁹Gastroenterology and Hepatology Unit, Division of Internal Medicine, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand, ¹⁰Department of Gastroenterology and Hepatology, Kurashiki Central Hospital, Kurashiki, Japan, ¹¹Department of Gastroenterology and Hepatology, Graduate School of Medicine, Kyoto University, Kyoto, Japan, ¹²Asian Institute of Gastroenterology, Hyderabad, India, ¹³MAFLD Research Center, Department of Hepatology, the First Affiliated Hospital of Wenzhou Medical University, Wenzhou, China, ¹⁴Key Laboratory of Diagnosis and Treatment for The Development of Chronic Liver Disease in Zhejiang Province, Wenzhou, China, ¹⁵First Affiliated Hospital of Jilin University, Changchun, China, ¹⁶Department of Gastroenterology and Hepatology, Kyoto Prefectural University of Medicine, Kyoto, Japan, ¹⁷Division of Gastroenterology, Department of Medicine, Kurume University School of Medicine, Kurume, Japan, ¹⁸Department of Medicine, Division of Gastroenterology and Hepatology, Shinshu University School of Medicine, Matsumoto, Japan, ¹⁹Department of Gastroenterology, Liver Center, Asan Medical Center, University of Ulsan College of Medicine, Seoul, South Korea, ²⁰Medical University of South Carolina, South Carolina, United States of America, ²¹Central Clinical School, Faculty of Medicine and Health, University of Sydney, Camperdown, Australia, ²²Division of Gastroenterology and Hepatology, Department of Medicine, Faculty of Medicine, Srinagarind Hospital, Khon Kaen University, Khon Kaen, Thailand, ²³Houston Methodist Hospital and Houston Research Institute, Houston, United States of America, ²⁴University of Virginia School of Medicine, Charlottesville, United States of America, ²⁵National University Centre for Organ Transplantation, National University Health System, Singapore, Singapore, ²⁶Division of Metabolism and Endocrinology, Faculty of Medicine, Saga University, Saga, Japan, ²⁷Visiting Assistant Professor of Graduate School of Medicine, Yokohama City University, Kanagawa, Japan

Background

Metabolic dysfunction–associated steatotic liver disease (MASLD) may modify the clinical course of coexisting liver diseases, yet longitudinal comparative data in compensated advanced chronic liver disease (cACLD) remain limited. This study evaluated whether dual-aetiology cACLD (MASLD with chronic viral hepatitis [CVH] or alcohol-related liver disease [ArLD]) was associated with differential risks of hepatic decompensation, hepatocellular carcinoma (HCC), and mortality compared with MASLD alone.

Methods

A retrospective, multicentre cohort study using data from the CORE consortium (23 tertiary centres across eleven countries) was conducted. Only patients with liver stiffness measurement ≥ 10 kPa and no baseline decompensation were included and classified as having MASLD alone, MASLD+ArLD, or MASLD+CVH. Outcomes included incident hepatic

decompensation, HCC, and cause-specific mortality. Time-to-event analyses used competing-risk models with adjustments for significant covariates.

Results

Among 1,852 patients with MASLD-related cACLD, 1,161 (62.7%) had MASLD only, 114 (6.2%) had MASLD+ArLD, and 577 (31.2%) had MASLD+CVH. During the follow-up period, 249 patients developed incident hepatic decompensation, 112 developed HCC, and 85 demised. MASLD+ArLD was associated with an increased risk of incident hepatic decompensation (adjusted sub-distribution hazard ratio [sHR], 2.546; 95% confidence interval [CI], 1.597–4.059, $p < 0.001$), hepatic-related mortality (adjusted sHR, 5.600; 95% CI, 2.083–15.054, $p = 0.001$), and all-cause mortality (adjusted sHR, 3.190; 95% CI, 1.641–6.202, $p = 0.001$) compared to MASLD only. In contrast, MASLD+CVH was associated with an increased risk of HCC risk (adjusted sHR, 1.868; 95% CI, 1.174–2.972, $p = 0.008$), but showed no significant differences in risk of incident hepatic decompensation, hepatic-related mortality or overall mortality compared with MASLD only.

Conclusion

In patients with MASLD-related cACLD, concomitant ArLD was associated with an increased risk of hepatic decompensation and mortality, particularly hepatic-related mortality. These findings highlight alcohol consumption as an important determinant of prognosis in MASLD-related advanced fibrosis and support systematic alcohol assessment and integrated risk factor management in this population.

Estimated glomerular filtration rate and risk of hepatic decompensation and mortality in chronic liver disease: a retrospective multicentre cohort study

Yeo L¹, Chan T³, Chen V⁴, Lai J^{5,6}, Wijarnpreecha K⁷, Kumar R⁸, Kaewdech A⁹, Ueno M^{10,11}, Pramotedham T², Kulkarni A¹², Zheng M^{13,14}, Gao Y¹⁵, Seko Y¹⁶, Nakamura Y¹⁷, Kimura T¹⁸, Choi W¹⁹, Roy A²⁰, Liu K²¹, Rattananukrom C²², Nouredin M²³, Siddiqui M²⁴, Takahashi H²⁵, Muthiah M^{1,3,24}, Ng C^{1,7,26}

¹Division of Gastroenterology and Hepatology, Department of Medicine, National University Hospital, Singapore, Singapore, ²Department of Gastroenterology and Hepatology, Yokohama City University Graduate School of Medicine, Yokohama, Japan, ³Yong Loo Lin School of Medicine, National University of Singapore, Singapore, Singapore, ⁴Division of Gastroenterology and Hepatology, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor, United States of America, ⁵Medical Data Analytics Centre, The Chinese University of Hong Kong, Hong Kong, China, ⁶Li Ka Shing Institute of Health Sciences and State Key Laboratory of Digestive Disease, The Chinese University of Hong Kong, Hong Kong, China, ⁷Division of Gastroenterology and Hepatology, University of Arizona College of Medicine Phoenix, Phoenix, United States of America, ⁸Department of Gastroenterology, Changi General Hospital, Singapore, Singapore, ⁹Gastroenterology and Hepatology Unit, Division of Internal Medicine, Faculty of Medicine, Prince of Songkla University, Songkhla, Thailand, ¹⁰Department of Gastroenterology and Hepatology, Kurashiki Central Hospital, Kurashiki, Japan, ¹¹Department of Gastroenterology and Hepatology, Graduate School of Medicine, Kyoto University, Kyoto, Japan, ¹²Asian Institute of Gastroenterology, Hyderabad, India, ¹³MAFLD Research Center, Department of Hepatology, the First Affiliated Hospital of Wenzhou Medical University, Wenzhou, China, ¹⁴Key Laboratory of Diagnosis and Treatment for The Development of Chronic Liver Disease in Zhejiang Province, Wenzhou, China, ¹⁵First Affiliated Hospital of Jilin University, Changchun, China, ¹⁶Department of Gastroenterology and Hepatology, Kyoto Prefectural University of Medicine, Kyoto, Japan, ¹⁷Division of Gastroenterology, Department of Medicine, Kurume University School of Medicine, Kurume, Japan, ¹⁸Department of Medicine, Division of Gastroenterology and Hepatology, Shinshu University School of Medicine, Matsumoto, Japan, ¹⁹Department of Gastroenterology, Liver Center, Asan Medical Center, University of Ulsan College of Medicine, Seoul, South Korea, ²⁰Medical University of South Carolina, South Carolina, United States of America, ²¹Central Clinical School, Faculty of Medicine and Health, University of Sydney, Camperdown, Australia, ²²Division of Gastroenterology and Hepatology, Department of Medicine, Faculty of Medicine, Srinagarind Hospital, Khon Kaen University, Khon Kaen, Thailand, ²³Houston Methodist Hospital and Houston Research Institute, Houston, United States of America, ²⁴University of Virginia School of Medicine, Charlottesville, United States of America, ²⁵National University Centre for Organ Transplantation, National University Health System, Singapore, Singapore, ²⁶Division of Metabolism and Endocrinology, Faculty of Medicine, Saga University, Saga, Japan, ²⁷Visiting Assistant Professor of Graduate School of Medicine, Yokohama City University, Kanagawa, Japan

Background and Aims

Chronic kidney disease (CKD) is common in patients with chronic liver disease (CLD) and is associated with poorer outcomes. Estimated glomerular filtration rate (eGFR) is widely used to classify CKD severity according to KDIGO classification. However, the relationship between different levels of renal function on hepatic decompensation and mortality in CLD is not well defined. This study aimed to evaluate the association between eGFR categories and the risk of hepatic decompensation and mortality in patients with CLD.

Methods

We performed a multicentre longitudinal cohort study, including 2,915 adults with LSM $\geq$ 10kPa. Patients were stratified by KDIGO eGFR categories: G1 ($\geq$ 90), G2 (60-89), G3 (30-59) and G4/5 ($<$ 30mL/min/1.73m²). First and second hepatic decompensation, all-cause mortality, hepatic-related mortality and cardiovascular disease (CVD)-related mortality were

analysed using Fine-Gray competing-risk regression. Multivariable models were adjusted for age, gender, BMI, presence of diabetes mellitus and liver stiffness.

Results

Among 2,915 patients, 1,945 (66.7%) were G1, 662 (22.7%) G2, 229 (7.9%) G3 and 79 (2.7%) G4/5. G2 (adjusted sHR 2.935, 95%CI 1.313 – 6.557, $p=0.009$) and G3 (adjusted sHR 4.230, 95%CI 1.770 – 10.106, $p=0.001$) patients had higher risk of second hepatic decompensation compared to G1 patients. G4/5 patients had higher risk of all-cause mortality compared to G1 patients (adjusted sHR 4.555, 95%CI 2.356 – 8.806, $p<0.001$). Increased risk of CVD-related mortality increased progressively across renal dysfunction: G2 (adjusted sHR 14.217, 95%CI 1.507 – 134.153, $p=0.020$), G3 (adjusted sHR 26.416, 95%CI 1.406 – 496.406, $p=0.029$) and G4/5 (adjusted sHR 50.089, 95%CI 2.654 – 945.470, $p=0.009$) patients, relative to G1 patients.

Conclusion

In this real-world cohort, lower eGFR was associated with markedly higher risks of second hepatic decompensation and mortality in CLD, highlighting renal dysfunction as an important prognostic marker for adverse outcomes.

Qualitative Evidence of Neuro Protection in Type 2 Diabetes Mellitus Rats Supplemented with Tocotrienol Rich Fraction (TRF)

Yeong Zher L¹, Yap C¹, Beatty D²

¹Monash University Malaysia, Bandar Sunway, Malaysia, ²Aston Clinton Scientific. Ltd UK, Edinburgh , United Kingdom

Tocotrienol is a naturally occurring vitamin E isomer found abundantly in Malaysian palm oil. Compared to tocopherol, tocotrienol exhibits superior antioxidant and anti-inflammatory activities due to its unsaturated phytyl tail. The brain is highly vulnerable to oxidative stress and inflammation caused by T2DM. Current literature on animal and clinical studies reported mixed outcomes.

Aims: This study aimed to investigate the neuroprotective effect of TRF in diabetic rat models.

Methods: 40 male Spargue Dawley rats (N=40) were used in this study. Group A (n=10) represented non-diabetes (fed with a normal diet). T2DM was induced in the remaining 30 rats using a high-fat diet. All rats develop T2DM at week 17. High fat diet induced T2DM rats were randomly divided into three groups: Group B; n=10 (not supplemented with TRF), Group C; n=10 (supplemented with low-dose TRF), and Group D; n=10 (supplemented with high-dose TRF). Daily low and high doses of TRF were gavaged orally in Group C and D respectively. At the end of week 28, all animals were sacrificed and the brains were dissected for histology preparation.

Results: Histological analysis of the brain tissue (CA3) revealed extensive neuronal damage in Group B. Group C showed moderate improvement, with the presence of some healthy neuronal cells, while Group D demonstrated substantial preservation of neuronal architecture, with healthy cells similar to Group A (Figure 1).

Conclusion: In conclusion, TRF exhibits protective effects against diabetes-induced neuronal damage, supporting its potential role as a neuroprotective agent in T2DM.

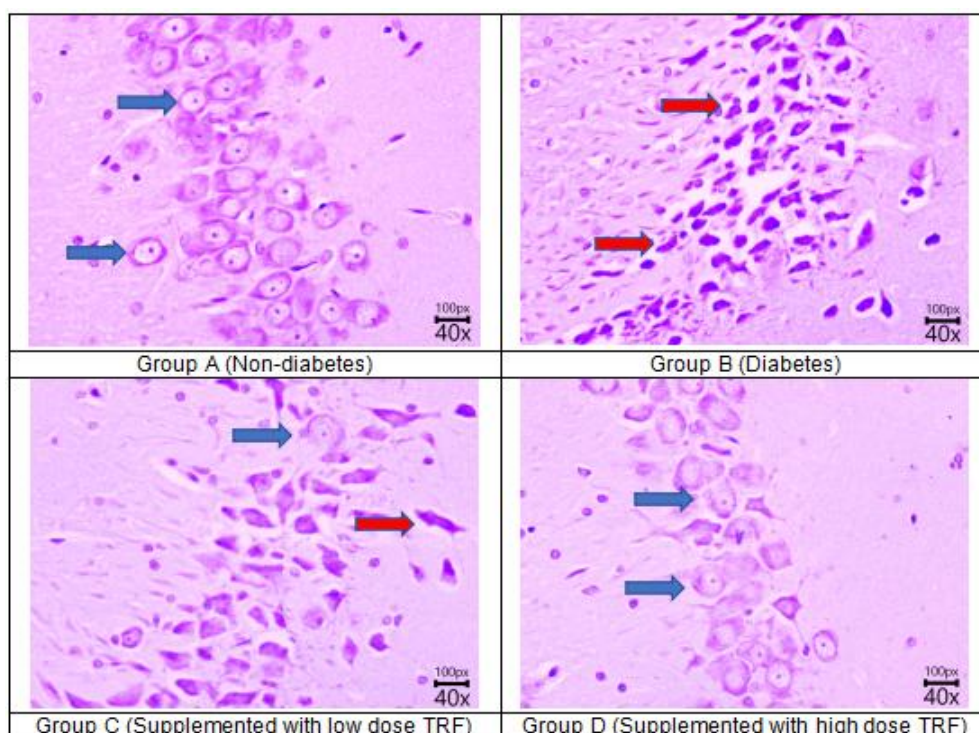


Figure 1: Representative histological images (CA3) of each experimental group. (Red arrow = damaged neuron; blue arrow = healthy neuron)

Gestational diabetes mellitus and the risk of adverse neonatal outcomes: A meta-analysis

Yuen L^{1,2,3}, Immanuel J⁴, Werfalli M⁵, Naumovski V², Chai T, Joshi T³, Venigalla M², Chivese T⁷, Hannah W⁸, Musa E⁵, Egan A⁹, Genitsaridi I¹⁰, Salpea P¹⁰, Magliano D¹¹, Boyko E¹², Yang X¹³, Levitt N⁵, Simmons D²

¹Central Coast Local Health District, Gosford, Australia, ²Western Sydney University, Campbelltown, Australia, ³University of Newcastle, Gosford, Australia, ⁴Texas Woman's University, Denton, United States of America, ⁵University of Cape Town, , South Africa, ⁶University of Sydney, Sydney, Australia, ⁷University of Washington Tacoma, Tacoma, United States of America, ⁸Madras Diabetes Research Foundation, , India, ⁹Mayo Clinic, Rochester, United States of America, ¹⁰International Diabetes Federation, , Belgium, ¹¹Monash University, Clayton, Australia, ¹²Univeristy of Washington, Seattle, United States of America, ¹³University of Tianjin, Tianjin, China

Background/Objective: Adverse neonatal events are common in pregnancies complicated by gestational diabetes mellitus (GDM). This global meta-analysis synthesized the association between GDM and major neonatal complications.

Methods: PubMed and MEDLINE databases were searched from January 2013 to December 2023 to identify cohort studies reporting neonatal complications in GDM and normal pregnancies. Nine major neonatal outcomes taken from the International Association of Diabetes in Pregnancy Study Group proposed definitions¹. Two reviewers independently screened studies and extracted data. Data were pooled using a random effects model, and the effect size was reported as odds ratios (OR) with 95% confidence interval (CI). Heterogeneity was assessed using Q statistic and I^2 . Publication bias was assessed using Egger's test and funnel plot.

Results: Of the 923 studies screened, 43 (involving 3,726,388 participants) were included in the meta-analysis. GDM was positively associated with macrosomia (n=29 studies, OR (95%CI): 1.53 (1.26 –1.86), $I^2=98\%$), large for gestational age infants (n=25 studies, 1.52 (1.30–1.79), $I^2=92.2\%$), neonatal hypoglycemia (n=19 studies, 4.40 (3.22–6.02), $I^2=88.7\%$), respiratory distress syndrome (n=15 studies, 1.36 (1.19–1.56), $I^2=31.6\%$), hyperbilirubinemia (n=13 studies, 1.29 (1.16–1.43), $I^2=45.7\%$), neonatal intensive care unit admission (n=18 studies, 1.59 (1.42–1.79), $I^2=78.1\%$), and congenital malformation (n=10 studies, 1.19 (1.10–1.29) $I^2=0\%$). There was no higher risk of shoulder dystocia (1.24 (0.73–2.09)) or stillbirth (0.75 (0.14–3.95)). The funnel plots suggested possible publication bias across all the outcomes.

Conclusion: This synthesis of global studies confirms associations between GDM and higher odds of neonatal complications.

References:

¹ The International Association of Diabetes in Pregnancy Study Group (IADPSG) Working Group on Outcome Definitions et al., "Diabetes in pregnancy outcomes: A systematic review and proposed codification of definitions" Diabetes/Metabolism Research and Reviews

Fecal microbiota transplantation improves diabetic kidney disease by regulating gut tryptophan metabolism

Zeng Y^{1,2,3}, Long Y^{1,2,3}, Xu Y^{1,2,3}

¹Department of Endocrinology and Metabolism, The Affiliated Hospital of Southwest Medical University, Luzhou, Sichuan, China, Luzhou, China, ²Metabolic Vascular Diseases Key Laboratory of Sichuan Province, The Affiliated Hospital of Southwest Medical University, Luzhou, Sichuan, China, Luzhou, China, ³Sichuan Clinical Research Center for Nephropathy, The Affiliated Hospital of Southwest Medical University, Luzhou, Sichuan, China, Luzhou, China

Aim:

To investigate the role and molecular mechanisms of fecal microbiota transplantation (FMT) in the prevention and treatment of diabetic kidney disease (DKD).

Methods:

This study was conducted at three levels: human, animal, and cellular. First, fecal metagenomics, serum metabolomics, and targeted tryptophan quantification were used to characterize changes in gut microbiota composition and serum metabolic flux in DKD patients and db/db mice. Next, an 18-week FMT intervention was performed, with dynamic assessments of glucose and lipid metabolism, intestinal barrier integrity, renal function, and inflammatory cytokines. Renal transcriptome sequencing and pathological analyses were also conducted. Finally, molecular biological techniques, including Western blotting, co-immunoprecipitation, luciferase reporter assays, and gene overexpression/knockdown, were employed to elucidate the mechanisms underlying the therapeutic effects of FMT on DKD.

Results:

1) FMT improved glucose and lipid metabolism disorders, restored intestinal barrier structure and function, reduced urinary microalbumin levels, delayed renal function decline, and alleviated renal inflammation in db/db mice. 2) FMT reversed gut microbiota dysbiosis in db/db mice, particularly affecting bacteria involved in tryptophan metabolism, and significantly altered serum tryptophan metabolic flux. 3) In DKD, serum indole-3-acetic acid (IAA) levels were significantly elevated and closely correlated with metabolic abnormalities and renal dysfunction. IAA intervention enhanced NEMO SUMOylation, leading to NF- κ B pathway activation and exacerbated renal inflammation. 4) FMT significantly reduced IAA production, suppressed the miR-145a-5p/SEN2 signaling axis, and decreased NEMO SUMOylation, thereby attenuating excessive activation of the NF- κ B inflammatory signaling pathway.

Conclusion:

FMT ameliorates DKD by correcting intestinal tryptophan metabolic disturbances, significantly reducing pathological metabolite IAA, suppressing miR-145a-5p overexpression, restoring SEN2 activity, decreasing NEMO SUMOylation, and ultimately inhibiting NF- κ B-mediated renal inflammation.

Predictive value and optimal threshold of serum retinol binding protein 4 for diabetic nephropathy in Type 1 Diabetes

Huang Z¹, Huang M¹, Dai L¹, Qin Y¹, Zhang M¹

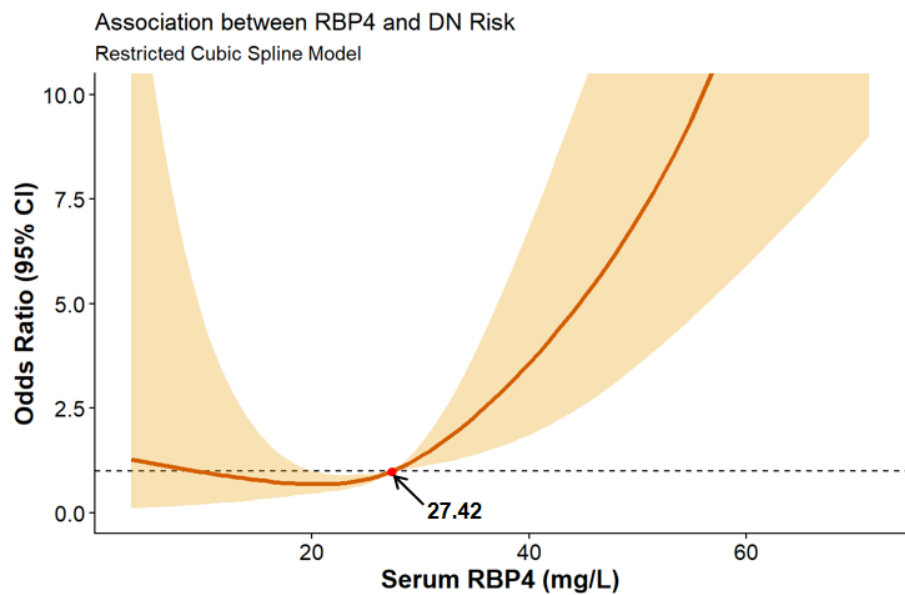
¹Department of Endocrinology, the First Affiliated Hospital Of Nanjing Medical University, Nanjing, China

Aims To explore the association between serum retinol binding protein 4 (RBP4) and type 1 diabetic nephropathy (T1DN), to identify the optimal threshold in patients with T1DM, and to elucidate the molecular mechanisms underlying the observed serum RBP4 elevation.

Methods We retrospectively enrolled 718 patients with T1DM between January 2010 to December 2022 in the First Affiliated Hospital with Nanjing Medical University and included 414 age- and sex-matched patients with T2DM as a control group. Patients were divided into DN and non-DN groups based on the diagnosis of DN. Logistic regression identified independent risk factors for DN. Restricted cubic spline (RCS) model examined non-linear relationship between serum RBP4 and DN risk and identified optimal thresholds. Considering that RBP4 is primarily reabsorbed and catabolized by renal proximal tubules, we analyzed the human DN tubulointerstitial transcriptome dataset GSE30122, with differential expression analysis, feature selection (LASSO and random forest), and pathway exploration via GSEA.

Results In T1DM, the DN prevalence was 8.9% (64/718). Serum RBP4 was significantly higher in the DN group than in the non-DN group (39.7 vs 26.7 mg/L, $P<0.001$). In T2DM, the DN prevalence was 16.6% (69/414), and overall RBP4 levels were higher than those in T1DM (median: 36.8 mg/L vs 27.6 mg/L, $P<0.001$). The RCS analysis showed a "J-shaped" relationship between RBP4 and DN risk in T1DM, with a lower optimal threshold (27.42 mg/L), compared to T2DM (37.01 mg/L). Conversely, transcriptomic analysis revealed a downregulation of RBP4 and its receptor STRA6 in the renal tubular tissues of DN patients.

Conclusion Serum RBP4 is associated with DN in T1DM and exhibits a lower risk threshold than in T2DM. These findings support serum RBP4 as a sensitive biomarker for the early risk stratification, providing a potential impairment of the RBP4–STRA6 mediated renal tubular uptake/signaling axis.



Wound fluid biomarkers alone and combined for healing assessment, prediction, and treatment response in diabetes-related foot ulcers: A systematic review

Zhang Y¹, Liu Y³, Min D^{1,2}, Twigg S^{1,2}

¹University Of Sydney, Sydney, Australia, ²Royal Prince Alfred Hospital, Sydney, Australia, ³Sun Yat-sen University, GuangZhou, China

Aim This systematic review synthesised evidence on wound fluid biomarkers to evaluate their clinical utility in predicting healing, diagnosing infection, and monitoring therapeutic response in people with diabetes-related foot ulcers (DFUs).

Methods Five databases were searched through December 1, 2025. Eligible studies analysed wound exudate biomarkers in participants with DFUs and reported associations with clinical outcomes. Combined algorithms were included. Data were synthesised narratively.

Results Twenty-six studies (n=9 healing prognostic, n=3 infection diagnostic, n=14 treatment response) were included. While sampling methods and quantification varied across studies, elevated MMP-9/TIMP-1 and depletion of chemokines CXCL5 and CXCL6 served as robust predictors of healing outcome. Combined biomarker scores for healing showed some utility (Table 1). Median lactate levels were significantly higher in infected versus non-infected ulcers. The multi-marker 'Likelihood Score' for Infection algorithm achieved 81% specificity, supporting antimicrobial stewardship. Longitudinal data supported effective interventions modulating inflammatory cytokines (IL-6, TNF- α), proteases (MMP-9), and angiogenic factors (VEGF).

Conclusion Wound fluid serves as a non-invasive 'liquid biopsy', providing molecular insights that complements clinical evaluation. There is a need to explore other potential biomarkers or combined models such as miRNA and other proteins. Moreover, standardisation of protocols is a prerequisite to validating these signatures for precision diagnostics.

Table 1: Diagnostic Accuracy of Wound Fluid Biomarkers for Predicting Healing Outcomes

Biomarkers	Key Finding	Healing definition	Cut-off (AUC)
MMP-9	Poor Healing	>50% reduction (Wk 4)	0.38 pg/μg (0.901) [Luanraksa, 2018]
MMP-9/TIMP-1 Ratio	Poor Healing	>50% reduction (Wk 4)	9.06 (0.777) [Luanraksa, 2018]
MMP-1/TIMP-1 Ratio	Good Healing	>82% reduction (Wk 4)	0.39 (0.821) [Muller, 2008]
	Good Healing	>50% reduction (Wk 4)	0.056 (0.802) [Luanraksa, 2018]
ENA-78 (CXCL5)	Good Healing	Healed (6 mos)	1792 pg/ml (0.705) [Li, 2019]
CXCL6	Good Healing	Healed (24 wks)	846.9 pg/ml (0.965) [Wang, 2019]
Pro-MMP-9 + TIMP-1 + TGF-beta1	Good Healing	Healing rate (Wk 4)	TIMP>480 pg/ml;TGF-β1>115 pg/ml Pro-MMP-9=NR (0.94) [Liu, 2009]
MMP-9 combined model	Poor Healing	>50% reduction (Wk 4)	Total score≥2 (0.85) [Luanraksa, 2018]

Independent and joint effects of long-term PM_{2.5} and solar radiation exposure on cardiovascular risk in Type 1 Diabetes: A nationwide multicenter study

Zhao Y¹, Zhang J¹, Wang W¹, Liu X¹, Pan Q¹, Guo L¹

¹Beijing Hospital, Beijing, China

Aims

This study aimed to investigate the independent and combined effects of long-term exposure to PM_{2.5} and shortwave radiation (SWR) on CVD risk among individuals with type 1 diabetes mellitus (T1DM).

Methods

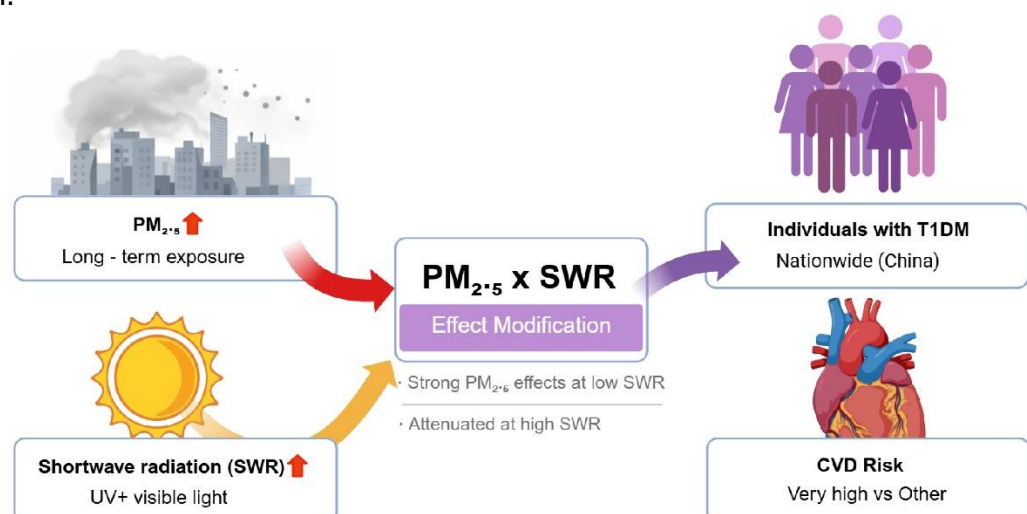
We conducted a nationwide cross-sectional study including 8,317 individuals with T1DM from 30 provinces in China. CVD risk was categorized as “very high” or “other” according to the 2019 ESC/EASD guidelines. Multivariable logistic regression models were used to assess the associations of PM_{2.5} and SWR with very high CVD risk, adjusting for age, sex, body mass index (BMI), diabetes duration, hypertension, dyslipidemia, smoking status, and altitude.

Results

Overall, 4,103 (49.3%) were classified as having very high CVD risk. In fully adjusted models, each 1 µg/m³ increase in PM_{2.5} was associated with higher odds of very high CVD risk (OR = 1.03, 95% CI: 1.02–1.04, *p* < 0.001) and a one-standard deviation increase (7.4 µg/m³) was associated with a 21% increase in odds (OR = 1.21, 95% CI: 1.14–1.29; *p* < 0.001). Conversely, SWR was inversely associated with very high CVD risk, with a 35% reduction per standard deviation increase (32.9 units) (OR = 0.65, 95% CI: 0.59–0.71, *p* < 0.001). A significant interaction between PM_{2.5} and SWR was observed (*p* for interaction < 0.001), with the adverse association of PM_{2.5} strongest at lower SWR levels.

Conclusion

Long-term PM_{2.5} exposure was associated with very high CVD risk among individuals with T1DM, whereas higher SWR levels appeared protective. These findings suggest that combined environmental exposures may jointly influence cardiovascular vulnerability in this high-risk population.



Graphical abstract

Created with BioRender.com

The association between emerging comorbid conditions and cardiorenal complications in people with diabetes

Zomer E¹, Earnest A¹, Pourghaderi A¹, Dawson C^{1,2}, Paul E³, Talic S¹, Gasevic D^{1,4}, Russell A^{1,2}, Zoungas S¹

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia,

²Department of Endocrinology and Diabetes, Bayside Health (The Alfred), Melbourne, Australia,

³Department of General Medicine, Bayside Health (The Alfred), Melbourne, Australia, ⁴Centre for Global Health, Usher Institute, The University of Edinburgh, Edinburgh, United Kingdom

Aim/s: People with diabetes are at increased risk of developing cardiorenal disease. However, little is known about how this risk is influenced by comorbid conditions that are becoming more prevalent in diabetes, including liver disease, dementia, depression, and malignancy. We aimed examine the association between emerging comorbid conditions and the prevalence of cardiorenal complications in adults with diabetes.

Method: Cross-sectional analysis of 24,492 adults with type 1 or type 2 diabetes captured in the Australian National Diabetes Audit (2015-2022), a long-standing national clinical quality audit. Mixed-effects logistic regression was used to evaluate the association between emerging comorbid conditions and cardiorenal complications. Models were adjusted for age, sex, diabetes type and duration, HbA1c, presence of more than one cardiovascular risk factor (hypertension, dyslipidaemia, overweight/obesity, or current smoking), and audit year. A random effect at the site level accounted for clustering of individuals within services. Emerging comorbid conditions considered were liver disease, dementia, depression, and malignancy. Cardiorenal complications were defined as myocardial infarction, stroke, heart failure, peripheral vascular disease, or moderate to severe chronic kidney disease (stage 3–5).

Results: Overall, 19.9% of participants had at least one emerging comorbid condition (17.5% had one, 2.3% had two, and 0.1% had three or more). The prevalence of cardiorenal complications was 37.3%. Compared to those without emerging comorbid conditions, the odds of cardiorenal complications were higher among those with one (OR 1.18, 95% CI 1.09–1.28, $p < 0.001$), two (OR 1.20, 95% CI 0.99–1.46, $p = 0.057$), and three or more emerging comorbid conditions (OR 2.79, 95% CI 1.20–6.48, $p = 0.017$), suggesting a dose-response pattern.

Conclusion: Emerging comorbid conditions are associated with cardiorenal complications in adults with diabetes, with odds increasing in line with the number of conditions present. These findings highlight the need for targeted, multidisciplinary care approaches that address the complexity of multimorbidity in diabetes management.

Severe PRES triggered by diabetic ketosis requiring intubation and hemodialysis: A case report

森田 ヌ¹, Murakami T², Narita A², Sugawa T², Kira Y², Ueda Y², Ikeda K², Yabe D²

¹Integrated Clinical Education Center, Kyoto University Hospital, Kyoto, Japan, ²Department of Diabetes, Endocrinology and Nutrition, Kyoto University Hospital, Kyoto, Japan

Aim: Posterior reversible encephalopathy syndrome (PRES) is characterized by acute neurological symptoms with reversible MRI abnormalities. Although hypertension, renal dysfunction, and infection are established precipitants, severe hyperglycemia (including diabetic ketosis) can also trigger PRES. Because delayed recognition may lead to critical complications, we report a severe case of PRES associated with diabetic ketosis that required intubation and hemodialysis.

Methods: Case report. An 18-year-old man developed polydipsia and polyuria after several months of consuming sugar-containing beverages. One month before admission, he experienced recurrent headaches and scintillating scotomata; initial evaluation included head CT only, without laboratory testing, and no abnormalities were identified. He subsequently presented to another hospital and was admitted with diabetic ketosis. Despite intensive insulin therapy, hyperglycemia persisted.

Results: On hospital day 3, he developed status epilepticus requiring intubation. On day 4, he became oliguric with acute kidney injury and hemodialysis was initiated. With supportive management, seizures did not recur; he was extubated, urine output recovered, and hemodialysis was discontinued, allowing discharge. MRI at symptom onset demonstrated a high-intensity lesion in the right occipital subcortical region on diffusion-weighted imaging that resolved on follow-up MRI, supporting a diagnosis of PRES triggered by diabetic ketosis. AKI was considered multifactorial, potentially related to dehydration from hyperglycemia and seizure-associated complications (e.g., creatine kinase elevation).

Conclusion: Persistent headache or visual symptoms should prompt consideration of PRES in hyperglycemic crises. Early MRI evaluation and timely correction of metabolic derangements may help prevent progression to severe neurological and renal complications.

Stream 6:

Clinical diabetes management and therapeutics

Leveraging Intermittent Continuous Glucose Monitoring to Improve Glycaemic Safety in Complex Type 2 Diabetes: A Primary Care Case Study

Ganasan V¹, Abdul Rahim N¹
¹Ministry Of Health, Ipoh, Malaysia

CASE STUDY

This is a case study of a 58-year-old Malay Malaysian woman with Type 2 Diabetes (baseline HbA1c- 9.2%), Hypertension, Dyslipidaemia and Rheumatoid Arthritis. She had significant glucose variability while on high-dose premixed human insulin analog. We aim to evaluate the utilization of intermittent Continuous Glucose Monitoring (iCGM) in improving glycaemic safety and therapeutic precision in insulin-treated Type 2 Diabetes in a primary care setting.

Here, a Family Medicine Specialist-led primary care multidisciplinary team (MDT), comprising diabetes educator, dietitian and pharmacist, integrated iCGM technology to support Diabetes management of this patient. Therapeutic adjustments such as insulin timing correction, insulin dose de-intensification, SGLT2i optimization and structured meal scheduling were implemented based on ambulatory glucose profile. A structured food diary was also introduced and reviewed alongside iCGM tracings to correlate meal patterns with glycaemic excursions, enabling individualized dietary counselling and behaviour modification. Patient was also seen at frequent intervals, once to twice a month to fine tune her glycaemic control.

Results interpretation:

iCGM	Time-in-range	Time-below-range	Other finding
Nov 2025	76%	8% including seven hypoglycemic episodes and asymptomatic nocturnal hypoglycaemia	Incorrect insulin injection timing
Jan 2026	68%	0%	Reduced glucose variability

The initial iCGM findings were discussed with the patient, following which targeted therapeutic modifications were implemented. A second iCGM assessment was performed to evaluate treatment efficacy. Utilization of iCGM eliminated hypoglycaemic events and resulted in improved glycaemic stability. The patient reported greater confidence in insulin administration, enhanced awareness of meal–glucose relationships, and reduced anxiety regarding nocturnal hypoglycaemia.

CONCLUSION

Based on iCGM data, our management transitioned from traditional gradual correction to data-driven, proactive decision-making. iCGM in primary care can refine therapeutic decisions and aid hypoglycaemia prevention.

AKT inhibitor and Metabolic crisis: Capivasertib associated Diabetic Ketoacidosis

Abeygunasekara A¹, Nguyen M¹, Perampalam S¹

¹Department of Diabetes and Endocrinology, The Canberra Hospital, Canberra, Australia

Background

Capivasertib is increasingly used in Oncology for advanced hormone receptor–positive breast cancer with PI3K/AKT pathway alterations. AKT plays a central role in insulin signaling by promoting GLUT4-mediated glucose uptake and suppressing hepatic gluconeogenesis. Inhibition of AKT impairs insulin signalling, reduces glucose uptake and increases lipolysis, promoting ketogenesis. AKT inhibition can lead to profound insulin resistance and hyperglycaemia, which in susceptible individuals may precipitate diabetic ketoacidosis (DKA) (1).

Aim

To describe a case of Capivasertib-induced DKA highlighting consequences AKT pathway inhibition.

Case

A 78-year-old woman presented with nausea and vomiting one week after commencing Capivasertib for metastatic breast cancer. She had no known history of diabetes. On admission she was noted to be hyperglycaemic with metabolic acidosis. Her glucose was 36mmol/L, ketones 2.2mmol/L, pH 7.17, bicarbonate 8mmol/L, creatinine 310µmol/L, eGFR 12mL/min/1.73 m² and lactate 7mmol/L. Concurrent acute kidney injury and lactic acidosis were noted. Despite fluid hydration for few hours, ketones progressed to 2.7mmol/L, consistent with component of ketoacidosis.

She was treated with intravenous insulin in addition to fluid replacement and broad-spectrum antibiotics; no alternative precipitant was identified. Preserved endogenous insulin secretion with C-peptide 82nmol/L and glucose 36mmol/L was noted. While on insulin–dextrose infusion, C-peptide remained elevated at 52nmol/L with glucose 18mmol/L and insulin 10.7mIU/L. Following drug cessation, three days later C-peptide was 1.2nmol/L with glucose 4.1mmol/L; ketosis resolved, insulin was ceased and glucose remained between 4–8mmol/L. Persistently elevated C-peptide during severe hyperglycaemia is consistent with insulin resistance related to AKT inhibition, compounded by reduced renal clearance.

Conclusion

AKT inhibitor therapy represents an emerging cause of reversible, treatment-related hyperglycaemia and DKA. Baseline diabetes risk assessment, early glucose monitoring following therapy initiation, and collaboration between Oncology and Endocrinology are essential to mitigate metabolic complications.

Reference

1. Turner NC et al. *N Engl J Med*. 2023;389:2051–2062.

Prediction of insulin resistance using wearable device data

Abhishek A¹, Verma R¹, Guria R¹

¹Rajendra Institute Of Medical Science, Ranchi, Hazaribagh, India

Aim: To develop and evaluate a wearable device-based artificial intelligence model for predicting insulin resistance using sleep and physical activity patterns in young adults.

Methods: A retrospective observational study was conducted using a synthetically generated dataset of 536 adults aged 18–35 years reflecting realistic metabolic and lifestyle trends. Wearable-derived parameters included sleep duration, sleep efficiency, daily step count, sedentary time, resting heart rate, and physical activity duration. Clinical variables included BMI, fasting glucose, fasting insulin, and HOMA-IR. Insulin resistance was defined as HOMA-IR >2.5. Machine learning models including Random Forest, XGBoost, Support Vector Machine, and Logistic Regression were evaluated using accuracy, precision, recall, F1-score, and AUC.

Results: Among the simulated cohort, 34.5% demonstrated insulin resistance. Participants with insulin resistance exhibited significantly lower mean sleep duration (5.8 ± 1.1 vs 7.1 ± 0.9 hours/day), reduced sleep efficiency (71.4% vs 85.6%), lower daily step count ($4,920 \pm 1,130$ vs $8,140 \pm 1,420$ steps/day), and higher sedentary duration (9.3 ± 1.8 vs 6.1 ± 1.5 hours/day) compared with metabolically healthy individuals ($p < 0.001$ for all). Sleep efficiency showed a strong negative correlation with HOMA-IR levels ($r = -0.48$, $p < 0.001$), while sedentary duration demonstrated a positive correlation ($r = 0.44$, $p < 0.001$). The XGBoost classifier achieved the best predictive performance with an accuracy of 92.4%, precision of 0.91, recall of 0.90, F1-score of 0.90, and AUC of 0.96. Feature importance analysis identified sleep efficiency, sedentary duration, and resting heart rate as the strongest predictors of insulin resistance.

Conclusion: AI-driven analysis of wearable-derived sleep and activity metrics demonstrated high accuracy for early prediction of insulin resistance. Integration of wearable technologies with machine learning may provide a scalable and non-invasive strategy for early metabolic risk detection and preventive diabetes care.

Prediction of Metabolic Syndrome Risk in Women with Polyoendocrine Metabolic Ovarian Syndrome (PMOS) Using Clinical and Hormonal Biomarkers

Abhishek A¹, Verma R¹, Guria R¹

¹Rajendra Institute Of Medical Science, Ranchi, Hazaribagh, India

Aim: To develop and evaluate an artificial intelligence-based predictive model for identifying metabolic syndrome risk in women with Polyoendocrine Metabolic Ovarian Syndrome (PMOS) using clinical and hormonal parameters.

Methods: A retrospective observational study was conducted using a synthetically generated dataset of 512 women with PMOS aged 18–39 years, designed to reflect clinically realistic endocrine and metabolic profiles. Parameters included BMI, waist circumference, fasting glucose, triglycerides, HDL-C, systolic blood pressure, fasting insulin, HOMA-IR, LH/FSH ratio, total testosterone, and menstrual irregularity. Metabolic syndrome was classified using modified International Diabetes Federation criteria. Machine learning models including Random Forest, XGBoost, Support Vector Machine, and Logistic Regression were evaluated using accuracy, precision, recall, F1-score, and area under the curve (AUC).

Model	Accuracy (%)	Precision	Recall	AUC
Logistic Regression	81.6	0.79	0.77	0.84
Support Vector Machine	84.1	0.82	0.81	0.87
Random Forest	89.3	0.88	0.86	0.93
XGBoost	91.2	0.90	0.89	0.95

Results: Among the simulated cohort, 38.7% met the diagnostic criteria for metabolic syndrome. Elevated HOMA-IR, increased waist circumference, triglyceride levels, and reduced HDL-C emerged as the strongest predictors. The XGBoost classifier demonstrated the best predictive performance with an accuracy of 91.2% and AUC of 0.95, outperforming conventional statistical models. Feature importance analysis revealed insulin resistance related variables contributed most significantly to risk stratification.

Conclusion: AI-driven predictive modeling using routinely available clinical and hormonal parameters demonstrated high accuracy for early identification of metabolic syndrome risk in women with PMOS. These findings highlight the potential of machine learning approaches in improving early metabolic risk assessment and personalized preventive strategies in reproductive endocrinology.

Dysglycaemia is highly prevalent in heart and lung transplant recipients thought to be free from diabetes.

Abrahamson G¹, Chen R¹, Wall E¹, Chong S¹, Muir C¹

¹St Vincent's Hospital, Darlinghurst, Australia

Background & Aim:

Post-transplant diabetes mellitus (PTDM) affects 30-50% of solid organ transplant recipients and is associated with increased morbidity and mortality. In transplant recipients, fasting glucose and HbA1c underestimate abnormalities in glucose metabolism due to factors such as corticosteroid use, anaemia and renal impairment, resulting in under-diagnosis and under-treatment. This study aimed to detect undiagnosed dysglycaemia in stable heart and lung transplant patients using the 75-gram oral glucose tolerance test (OGTT).

Methods:

A single-centre, prospective study of 100 stable heart and lung transplant recipients who were thought to be free from diabetes at least 1-year post-transplant. All participants underwent 'gold standard' 75-gram OGTT to establish the true prevalence of dysglycaemia. Glucose tolerance was determined according to standard diagnostic criteria.

Results:

To date, 19 individuals have consented and 17 have enrolled in the study and completed study investigations. Herein, we report preliminary data from these first 17 participants. Based on OGTT results, 8 participants (47%) were diagnosed with dysglycaemia. Specifically, 1 subject (6%) was diagnosed with PTDM, 2 subjects (12%) were diagnosed with impaired fasting glycaemia (IFG), and 5 subjects (30%) were diagnosed with impaired glucose tolerance (IGT). Subjects with dysglycaemia were not statistically different from normoglycaemic patients based on sex (63 vs. 67% male), median age (64 vs. 60 years), median BMI (25.8 vs. 27.8 kg/m²), or corticosteroid use (63% vs. 67%). Median HbA1c was non-statistically higher in subjects with dysglycaemia (5.8 vs. 5.3%; $p=0.08$), but did not reliably distinguish between groups with significant overlap in recorded values.

Discussion / Conclusion:

More than 40% of heart and lung transplant recipients thought to be free from diabetes had IFG, IGT, or PTDM detected by OGTT. Given that fasting glucose and HbA1c underestimate dysglycaemia in this population, the 75-gram OGTT should be incorporated into routine metabolic screening to facilitate earlier diagnosis and reduce long-term cardiovascular and metabolic risk.

Integrative approaches to managing Type 2 Diabetes mellitus among registered alternative medicine practitioners through medicinal plants, poly-herbal formulations, dietary regimen, healthy lifestyle and yoga-based practices.

Ahammed M¹

¹Assistant Professor, Hamdard University Bangladesh., Munshiganj., Bangladesh

Aims:

The present study aimed to identify a safer and more affordable treatment option for type 2 diabetes mellitus (T2DM) by documenting the poly-herbal formulations, medicinal plants, healthy lifestyles, dietary regimens, and yoga poses practiced by registered Alternative Medicine Practitioners (AMPs) in Bangladesh.

Methods:

A cross-sectional mixed-methods study was conducted in the Dhaka Division of Bangladesh during 2021. Quantitative data were collected from 280 randomly sampled registered AMPs via a structured questionnaire, while qualitative insights were obtained from 10 purposively selected key informants. Data were analyzed using chi-square tests (SPSS v26) and thematic analysis, respectively.

Results:

The study demonstrated a comprehensive integrative approach to managing T2DM. Characterized by the combined use of medicinal plants, poly-herbal formulations, structured physical activity, regulated dietary practices, yoga āsanās, and pranayama practices were employed effectively. The inventory comprised 77 medicinal plant species from 44 families, with fruits, leaves, and roots being the most utilized parts. Among these, *Trigonella foenum graecum*, *Coccinia grandis*, *Syzygium cumini*, *Momordica charantia*, *Gymnema sylvestre*, *Tinospora cordifolia*, *Nigella sativa*, *Mangifera indica*, and *Ficus racemosa* were the most commonly prescribed plants, which were validated by all key informants. Additionally, 24 poly-herbal formulations were recorded, featuring prominent Unani preparations such as Habbe Dolabi, Qurs Ziabeetes, and Qurs Garlic, as well as Ayurvedic formulations like Basanta Kusumakar Rasa, Brihat Somnath Rasa, and Meha Mudgar Rasa. The study also identified healthy dietary practices and pranayama techniques, including Kapalabhati, Anuloma–Viloma, and Bhramari pranayam alongside seven yoga postures: Vajrasana, Maṇḍukasana, Pascimottanasana, Ardha Matsyendrasana, Dhanurasana, Bhujangasana, and Savasana.

Conclusion:

Poly-herbal drugs, medicinal plants, proper dietary regimens, and integrated lifestyle interventions are widely practiced by registered AMPs for T2DM management and are

perceived as safe and cost-effective. These practices may provide an evidence for policymakers and researchers in developing plant-based anti-diabetic therapies and integrative diabetes management approaches.

Keywords: Integrative approaches, type 2 diabetes, management, registered alternative practitioner

Metabolic Dysfunction-Associated Fatty Liver Disease (MAFLD) Phenotype Modulates Body Composition Remodelling and Hepatic Steatosis Improvement One Year After Bariatric Surgery

Ahmad Zamri L¹, Mohkiar F¹, Zainal Abidin N¹, Mansor F¹, Poh Y^{2,3,4}, Lim S^{2,3,4}, Gee T^{2,3,4}

¹Nutrition, Metabolic & Cardiovascular Research Centre, Institute for Medical Research, National Institutes of Health, Ministry of Health Malaysia, Shah Alam, Malaysia, ²Metabolic and Weight Management Centre, iHeal Medical Centre, , Malaysia, ³General and Bariatric Surgery, Sunway Medical Centre, , Malaysia, ⁴General and Bariatric Surgery, Sunway Velocity Medical Centre, , Malaysia

Background:

Metabolic dysfunction–associated fatty liver disease (MAFLD) is highly prevalent in obesity and reflects increased cardiometabolic risk. Although bariatric surgery improves metabolic and adiposity outcomes, whether baseline MAFLD status influences postoperative trajectories remain unclear.

Aim/s:

This study assessed the influence of baseline MAFLD status on one-year postoperative trajectories of anthropometric, body composition, cardiometabolic, and hepatic outcomes.

Methods:

This prospective cohort study included 33 adults with obesity undergoing bariatric surgery at medical centres in Kuala Lumpur, Malaysia. Anthropometric, body composition, biochemical, and liver-related parameters were assessed at baseline and at 6 and 12 months postoperatively. Hepatic steatosis was evaluated using the fatty liver index (FLI) and hepatic steatosis index (HSI). Participants were classified as MAFLD (n=10) or non-MAFLD (n=23) according to established criteria. Longitudinal changes were analysed using generalised estimating equations adjusted for age, sex, type of surgery, baseline body mass index, and baseline outcome values.

Results:

Significant time effects were observed for most anthropometric, body composition, cardiometabolic, and hepatic outcomes (all $p < 0.01$), except total and LDL cholesterol. Significant time-by-group interactions were found for weight, BMI, waist circumference, body composition, FLI, and HSI (all $p < 0.01$). Post hoc analyses showed greater reductions in participants with MAFLD for body weight (−48.1 vs −26.9 kg), BMI (−16.2 vs −10.2), waist circumference (−36.5 vs −26.6 cm), body fat mass (−33.8 vs −20.0 kg) and hepatic steatosis indices (FLI: −70.7 vs −18.2; HSI: −20.6 vs −14.7). Conversely, participants without MAFLD demonstrated larger reductions in visceral fat area (−88.7 vs −69.1 cm²) and percentage body fat (−11.6% vs −8.6%), with better preservation of skeletal muscle mass (−4.7 vs −9.4 kg).

Conclusion:

Bariatric surgery improves metabolic, hepatic, and body composition outcomes in both MAFLD and non-MAFLD individuals. However, distinct patterns of fat and muscle remodelling by MAFLD status highlight the need for phenotype-specific postoperative monitoring and targeted interventions.

Predicting Post-Operative Dysglycaemia with Machine Learning Models in an Australian Adult Surgical Inpatient Context: Investigating the STOIC-D Surgery Cohort

Albanese C^{1,2}, Kyi M^{1,2,3}, Furlanos S^{1,2,3}, Barmanray R^{1,2,3}

¹Department of Diabetes & Endocrinology, The Royal Melbourne Hospital, Parkville, Australia,

²Department of Medicine, The University of Melbourne, Parkville, Australia, ³Australian Centre for Accelerating Diabetes Innovations (ACADI), Parkville, Australia

Aim

Dysglycaemia has been well-established to negatively impact surgical inpatients' outcomes. Proactive management of glycaemia improves post-operative outcomes. This study aimed to explore the risk factors associated with dysglycaemia and other adverse outcomes, among surgical inpatients with diabetes or newly diagnosed hyperglycaemia. Machine learning models were employed to quantify the association between these risks and outcomes to inform risk calculation for clinical management decisions.

Methods

This retrospective cohort study was a sub-study of the Australian Specialist Treatment of Inpatients: Caring for Diabetes (STOIC-D) in Surgery trial. We applied machine learning techniques to characterise the association between various clinical risk factors and postoperative adverse outcomes, including persistent adverse post-operative glycaemia (PAPG; defined as ≥ 2 adverse glycaemic days - days with any glucose ≤ 3.9 or ≥ 15.0 mmol/L), hyperglycaemia, hypoglycaemia, acute kidney injury, and healthcare-associated infection. Data from prior to pre-operation day 2 and days 2 to 5 post-operation were collected. Machine learning prediction models applied included: rpart (RP), elastic net (EN) and xgboost (XBG). Model performance was analysed using the area under the curve (AUC).

Results

516 patients from the STOIC-D Surgery cohort who underwent an inpatient procedure were included. 327 patients had known diabetes, and 187 patients had newly diagnosed hyperglycaemia in hospital. 91 patients (17.6%) experienced PAPG. EN and XGB had similar predictive utility for PAPG (AUC 0.902 and 0.911, respectively) compared to RP (AUC 0.805). 21 predictors were retained using EN, the most useful predictor being pre-admission insulin treatment (OR 2.587).

Conclusion

This study demonstrated that machine learning models could be successfully applied to clinically useful post-operative glucose-related adverse outcomes. Identifying patients at risk of adverse glycaemic outcomes can enable judicious allocation of resources in hospital, improving the ability to optimise glucose and prevent inpatient adverse glucose-related morbidity.

Association between Diabetes self-care practices and glycaemic outcomes among adults with Type 2 Diabetes in Aseer, Saudi Arabia

Alhazmi A¹, Arrab M², Hawash M¹

¹Public Health Department, College of Applied Medical Sciences, King Khalid University, Abha, Saudi Arabia, ²Community and Mental Health Nursing Department, College of Nursing, King Khalid University, Abha, Saudi Arabia

Aims:

To assess diabetes self-care activities, evaluate healthcare professionals' self-care recommendations, and examine associations among self-care practices, sociodemographic characteristics, and glycaemic levels among people with type 2 diabetes mellitus (T2DM) attending a diabetes center in the Aseer region, Saudi Arabia. The study aimed to address the limited regional evidence on the behavioural determinants of diabetes management and to identify priority targets for person-centred clinical and educational interventions.

Methods:

A cross-sectional study was conducted among 387 adults with type 2 diabetes mellitus (T2DM) attending a diabetes center in the Aseer region. Data were collected through face-to-face interviews using the validated Arabic version of the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire. Sociodemographic characteristics and self-care recommendations provided by healthcare professionals were recorded. Glycaemic levels were assessed using glycated haemoglobin (HbA1c) values retrieved from medical records measured within the preceding three months. Data were analysed using SPSS version 26.

Results:

Most participants (84.2%) had HbA1c levels above the recommended target range, with a mean HbA1c of 9.25 ± 2.56 . Lower engagement was observed across several self-care domains, particularly physical activity and dietary practices, indicating gaps between recommended and implemented self-management behaviours. Medication-taking behaviours showed comparatively higher scores. Self-care activities were significantly associated with sex, marital status, education level, and place of residence. Participants with shorter diabetes duration demonstrated HbA1c levels closer to target ranges. Dietary self-care practices were negatively correlated with HbA1c levels, suggesting a measurable association between lifestyle behaviours and glycaemic outcomes.

Conclusion:

This study provides novel regional evidence highlighting that receiving self-care recommendations alone may not translate into sustained self-management behaviours. Findings support the integration of structured, culturally tailored, and person-centred behavioural and educational strategies within routine diabetes care to strengthen self-care engagement and improve glycaemic outcomes among people with T2DM in Saudi Arabia and comparable settings.

Safety and glycaemic outcomes of Ramadan fasting in high- and moderate-risk adults with Type 2 Diabetes who decided to fast: A retrospective observational study

Almutairi A¹, Alqabandi N¹, Abdalla M¹

¹Dasman Diabetes Institute, Kuwait City, Kuwait

Aim:

To evaluate the safety of Ramadan fasting in high-to-moderate-risk adults with type 2 diabetes by assessing hypoglycaemia events and diabetes-related hospital admissions, and to assess changes in HbA1c and CGM-derived glycaemic metrics.

Method:

This retrospective observational study included 70 adults with T2D who decided to fasting during Ramadan 2025. Inclusion required CGM use. All participants received structured pre-Ramadan education by a diabetes care team, underwent IDF-DAR (Diabetes and Ramadan Alliance) risk stratification, and received routine medication adjustments. Repeated-measures ANOVA evaluated changes across three predefined time points; paired t-tests assessed two-point comparisons.

Result:

HE did not differ between pre- and during-RF; 74% of participants showed no change, 15% improved, and 11% worsened (McNemar test, $p=0.81$). Two patients discontinued fasting due to urinary tract infection, including one requiring hospitalization. HbA1c decreased significantly from 7.66% to 7.44% after RF (mean difference -0.22% , 95% CI -0.40 to -0.06), $t(67)=2.74$, $p=0.008$. CGM metrics showed no significant changes during RF, and post-Ramadan values did not differ from baseline (all $p>0.05$).

Conclusion:

In high-to-moderate-risk adults with T2D who fasted Ramadan under structured education and CGM monitoring, hypoglycaemia events and CGM-derived metrics remained stable, while HbA1c improved modestly. These findings provide real-world evidence that RF can be safely undertaken by selected high- and moderate-risk individuals under structured education and clinical monitoring. Prospective studies are needed to further evaluate safety and optimize Ramadan-focused diabetes care.

A 50-Year-old man with brittle diabetes, extrahepatic cholestasis, portal hypertension, and fibrocalculous pancreas : a difficult case management report

Anindita Y¹, Astuti V², Nugroho H¹, Minuljo T¹, Indiarso D³, Fuadi A⁴, Aripriandari A⁵

¹Division of Endocrinology and Metabolism, Department of Internal Medicine, RS Kariadi/FK Undip, Semarang, Indonesia, ²Department of Internal Medicine, RS Ken Saras, Semarang, Indonesia,

³Division of Gastroenterohepatology, Department of Internal Medicine, RS Kariadi/FK Undip, ,

Indonesia, ⁴Division of Digestive Surgery, Department of Surgery, RS Kariadi/FK Undip, , Indonesia,

⁵Department of Radiology, RS Kariadi/FK Undip, , Indonesia

Background:

Fibrocalculous pancreatic diabetes (FCPD) is a secondary form of diabetes caused by chronic pancreatic inflammation leading to fibrosis and calcification. Progressive destruction of both beta and alpha cells results in severe glycemic instability, often presenting as brittle diabetes. Structural changes in the pancreas may obstruct the pancreatic and distal bile ducts, causing obstructive jaundice. Chronic biliary obstruction and longstanding inflammation can further contribute to portal hypertension. The coexistence of FCPD, brittle diabetes, obstructive jaundice, and portal hypertension presents significant diagnostic and therapeutic challenges.

Case Report :

A 50-year-old male was admitted with uncontrolled blood glucose, jaundice, abdominal distension, and severe abdominal pain. Blood glucose levels fluctuated markedly, ranging from 500 mg/dL to below 100 mg/dL despite intensive insulin therapy. Laboratory evaluation showed elevated liver enzymes, marked cholestasis (ALP 2244 U/L; GGT 1290 U/L), total bilirubin 3.71 mg/dL, and HbA1c 12.35%. CA 19-9 was elevated (281.84 U/mL). Imaging revealed chronic pancreatitis with multifocal calcifications, distal common bile duct narrowing with upstream biliary dilatation, splenomegaly, ascites, and features consistent with portal hypertension.

The patient underwent ascitic paracentesis and medical stabilization, followed by referral for advanced management. Endoscopic biliary stenting was performed. Due to persistent severe pain and structural pancreatic disease, a Frey procedure with biliodigestive bypass was carried out. Intraoperative findings confirmed diffuse pancreatic fibrocalcinosis.

Discussion and Conclusion :

Chronic pancreatic inflammation can progress to FCPD, resulting in brittle diabetes due to extensive endocrine cell destruction. Ductal obstruction and fibrosis may lead to extrahepatic cholestasis and increased portal resistance. This case highlights the complex interplay between metabolic instability, biliary obstruction, and portal hypertension. A multidisciplinary approach—including glycemic stabilization, biliary decompression, and surgical intervention—is essential to reduce morbidity and improve quality of life.

Weight change and diabetes status following heart transplantation – a retrospective audit

Barel R¹, Nielssen A¹, Muir C¹, Raven L¹

¹St Vincent's Hospital, Sydney, Sydney, Australia

Background:

Heart transplant (HTx) recipients often experience weight fluctuations perioperatively. Before HTx, cardiac failure, cardiac cachexia, exercise intolerance and concurrent comorbidities contribute. Following HTx, altered energy metabolism and immunosuppression, especially glucocorticoids, are associated with weight gain and metabolic disease. Literature reports HTx recipients gain 3-11kg in the first 12-months post-transplantation, with a 0.83-3.25kg/m² rise in body mass index (BMI). The aim of this study was to assess weight change over 12-months in a local HTx cohort.

Methods:

An ongoing retrospective cohort study of adult HTx recipients at a tertiary centre hospital. Medical records of consecutive HTx recipients from January 2021-January 2022 were screened. Inclusion criteria were 12-month survival, local follow up and weight measurements recorded at 12 months.

Results:

Of the 44 HTx recipients identified, 30 patients met inclusion criteria. Median age 50 years (range 19 – 70 years), 76.7% male. Median baseline weight was 76.0kg (range 49.1 to 115kg), at 12-months post-HTx median weight change -0.425 kg (range -19.35 to +40.3). Median baseline BMI 25.4 kg/m² (range 17.5 to 36.9), at 12-months post-HTx median BMI change -0.1kg/m² (range -7.7 to +11.4). Weight gain occurred in 45.2% at 12-months. Patients with weight gain had similar rates of diabetes and glucocorticoid exposure (Table 1).

Conclusion: In this cohort, there was heterogeneity in weight change after HTx, with a wide range. Further studies on the impact of weight change and diabetes after HTx are required.

Table 1: Comparison of post-heart transplant patients who experienced weight gain and weight loss.

	Weight gain (n=14)	Weight loss/no change (n=16)
Diabetes	6 (42.9)	6 (37.5)
Pre-transplant diabetes	2 (14.3)	4 (25.0)
Post-transplant diabetes	4 (28.6)	2 (12.5)
Prednisolone at 12 months	7 (50.0)	10 (62.5)
Data expressed as number of patients (percentage)		

Feasibility and acceptability of REMODEL: A pilot digital health intervention for Type 2 Diabetes management in rural primary care

Barr N¹, Chua D¹, Bartrim K², Dong T¹, Manuel M³, Pointon K¹, Kangru K⁴, Varnfield M⁵, Ireland D⁵, Russell A^{6,7}, Menon A^{1,8}

¹Queensland Digital Health Centre, Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, Brisbane, Australia, ²School of Human Movement and Nutrition Sciences, The University of Queensland, St Lucia, Australia, ³Clinical Trials Unit, Queensland Regional Cancer Centre (QRCCC), Townsville University Hospital, Townsville, Australia, ⁴Whitsunday Doctors Service, Proserpine, Australia, ⁵The Australian e-Health Research Centre, CSIRO, Brisbane, Australia, ⁶School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, ⁷Department of Endocrinology and Diabetes, Alfred Health, Melbourne, Australia, ⁸Department of Diabetes and Endocrinology, Princess Alexandra Hospital, Metro South Health, Woolloongabba, Australia

Background & Aim

Digital diabetes care enables remote monitoring and rapid clinician feedback to support self-management and improve glycaemic outcomes for people with type 2 diabetes (PwD). Digitally enabled care models may reduce health inequities and strengthen rural Australian primary care by enabling continuous data sharing, timely insulin titration, and enhancing communication between PwD and healthcare professionals. However, evidence evaluating integrated digital models within rural practice remains limited. This study evaluated the feasibility and acceptability of implementing such a model in rural Australian primary care.

Methods

A co-designed digital health-enabled model, REMODEL (Rethinking Model of Outpatient Diabetes Care using eHealth), was implemented in a rural general practice in Proserpine, Queensland, Australia. A mixed-methods design assessed feasibility, acceptability and effectiveness. Ten insulin-treated adults PwD participated in a 12-week program using a Bluetooth-enabled glucometer paired with a smartphone application, enabling remote clinician access to glucose data in partnership with participants. Quantitative measures included glycated haemoglobin, self-reported hypoglycaemia, diabetes self-management, diabetes-related distress, and system usability. Semi-structured interviews with participants and practice staff explored feasibility and acceptability, guided by the Unified Theory of Acceptance and Use of Technology.

Findings

Participants reported satisfaction with REMODEL and perceived it as enhancing routine diabetes care by providing support beyond clinic visits, enabling greater self-management. They valued real-time glucose access, reduced travel, and continuous monitoring. Healthcare professionals noted improved communication and self-management support. Implementation challenges included device compatibility, connectivity limitations, and manual data entry. Non-billable dashboard monitoring constrained feasibility within current Australian general practice funding models. Adaptive strategies, including manual data review, SMS communication, and extended nursing hours, enabled continued delivery.

Conclusion

REMODEL was perceived as acceptable to participants and healthcare professionals. Addressing technology reliability and establishing sustainable funding for remote monitoring are essential to support broader implementation of digital diabetes care in rural Australian primary care.

Glycation Gap: Size, stability over time and correlates in people with Type 1 Diabetes

Begbie T¹, Huang M^{1,2}, Nanayakkara N^{1,2}, Ma R³, Cohen N^{1,2}, Jenkins A^{1,2}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²University of Melbourne Baker Dept. of Cardiometabolic Health, Melbourne, Australia, ³Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Hong Kong,

Background The Glycation Gap (GG) is the difference between lab-measured HbA1c and CGM-estimated HbA1c (Glucose Management Index, GMI). No studies report GG stability. In an ethics-approved Type 1 diabetes (T1D) clinic audit, we aimed to ascertain GG size, stability and correlates.

Methods: GG (GMI% – HbA1c%) size, stability over time and associations with clinical factors were calculated from subjects with ≥90 consecutive days of CGM data.

Results: In n=174 adults, median (IQR) GG for CGM durations of 14-, 28-, 60- and 90-days was 0% (-0.5–0.4%), with $r=0.86$ – 0.98 , all $p<0.0001$. The 90-day GG was used in analyses of 316 adults (57% male, median (IQR) age 52(38–65)yrs, 22(7.3–33.8)yrs T1D, HbA1c 7.3(6.7–8.0)%, (56(50–64)mmol/mol, eGFR 88 (72–90)mL/min/1.73m². Median (IQR) GG was 0.1% (-0.3–0.4%), range -2.8–1.7%. Thirty-six percent had an acceptable GG <0.3%; 42% had a GG ≥0.5%. Additional GGs were available from 231 (73%) subjects, of whom 176 had three 90-day GG measures, with no significant GG difference over time. However, for 231 individuals with two GG measures, the GG differed by ≥0.5% in 23% and ≥0.3% in 51%. In n=176 the first and third GG differed by ≥0.5% in 27% and by ≥0.3% in 53%. GG was higher in n=114 Dexcom-users vs n=132 FreeStyle Libre-users and n=70 Medtronic-users; $p<0.0001$. The GG did not differ by sex nor correlate with diabetes duration. GG correlates: HbA1c $r=-0.71$, age $r=-0.25$, both $p<0.0001$, eGFR $r=0.20$, $p<0.001$, BMI $r=-0.13$, $p=0.03$, Gamma-GT $r=-0.14$, $p=0.038$, Mean Corpuscular Haemoglobin Concentration $r=0.26$, $p<0.001$, and haematocrit $r=-0.16$, $p=0.033$.

Conclusion: Two-thirds of adults with T1D have a GG≥0.3%. GG differed by CGM brand. GG correlated with age, HbA1c, liver and renal function and red blood cell metrics. Whilst group GG is stable over time, the GG can change substantially in some individuals.

Prescription patterns and glycaemic outcomes: a single-centre, retrospective analysis comparing standard and resistant scale supplemental insulin

Bhadbhade M^{1,2}, Toufali H^{1,2}, Katyal A^{1,2}, Haque Y^{1,5}, Malouf N⁴, Lau N^{1,2,3}

¹Diabetes and Endocrine Service, Liverpool Hospital, Liverpool, Sydney, Australia, ²Southwestern Sydney Clinical Campuses, University of New South Wales, Liverpool, Sydney, Australia, ³Liverpool

Diabetes Collaboration, Ingham Institute of Applied Medical Research, Liverpool, Sydney, Australia,

⁴Pharmacy Department, Liverpool Hospital, Liverpool, Sydney, Australia, ⁵Griffith University Medical School, Southport, Australia

Aim: When supplemental insulin is needed, factors including weight, comorbidities and glycaemic needs should be considered to ensure appropriate prescribing. After the introduction of two scales, we analysed prescription patterns & glycaemic outcomes those on resistant scale supplemental insulin (RSI) versus standard scale insulin (SSI).

Method: A retrospective analysis was conducted on demographic, clinical measures and glycaemic outcomes of adult inpatients prescribed RSI and SSI at Liverpool Hospital between 1st August 2025 to 30th September 2025, which immediately followed the change. Those pregnant were excluded.

Results: In the first two months post-implementation, RSI was prescribed to 136 inpatients. Comparison with matched controls on SSI showed no significant differences in age, gender distribution, type of diabetes or body mass index. Both groups had a similar proportion of patients with Type2 diabetes (82.4% vs 81.6%) and obesity (33.6% vs 34.7%). Interestingly, the HbA1c was higher in the RSI group (8.60 vs 7.70, $p = 0.005$), despite no difference in baseline insulin use, incidence of renal or liver disease or co-prescription of steroids. The incidence of glycaemic complications including high range hyperglycaemia (blood sugar levels >14 mmol/L), hypoglycaemia (<4 mmol/L), diabetic ketoacidosis (DKA) and hyperosmolar hyperglycaemic (HHS) state were also similar across groups. However, for RSI, there were significantly more urgent clinical reviews for hypoglycaemia (23 vs 12, $p = 0.044$) and RSI was incorrectly prescribed in 46.3% of patients and frequently supplemental scales were incorrectly prescribed instead of stat insulin doses (13.3% vs 20.6%, $p = 0.112$).

Conclusion: While patients prescribed RSI had higher baseline HbA1c, RSI prescription was also associated with significantly increased number of urgent hypoglycaemia reviews but not for any other glycaemic outcomes. There were also high rates of prescriber error. This demonstrates that despite an extensive education campaign, knowledge gaps in appropriate use of supplemental insulin remain.

Clinical audit on Dyslipidaemia Management in Type 2 Diabetes Mellitus patients attending Health Clinics in Malaysia

Binti Kamaruddin M¹

¹Ministry Of Health Malaysia, Alor Setar, Malaysia

Dyslipidaemia is a major cardiovascular(CV) risk factor among type 2 diabetes mellitus (T2DM) patients. Studies have shown variations in clinical practice despite guideline-directed medical therapy (GDMT) and underachievement of LDL-C targets in high-risk T2DM patients.

Aim :To evaluate the management of dyslipidaemia and determining percentage of patients who achieve LDL as primary target in Malaysia .

Methods : A cross-sectional clinical audit was conducted in multiple health clinics across Malaysia consist of 360 patients. Clinical and laboratories data were collected using standardised dyslipidaemia audit tool which further divided into good, moderate and poor performance.

Results : The overall mean performance score was 71.8%, showing moderate adherence to GDMT. Despite good documentation of lifestyle advice e.g. quit smoking (86.6%), diet (80%) exercise (74.4%) and compliance (94.5%), only 31.9% achieved LDL target. Several important gaps were identified such as poorly calculated CV risk (25.6%), leading clinical inertia and pharmacotherapies that did not match risk profiles (58% were prescribed with appropriate lipid-lowering therapy).

Conclusion : Targeted interventions are needed to improve guideline adherence and cardiovascular(CV) risk management among T2DM patients. This study showed among very/high-risk patients with T2DM patients, treatment target attainment and use of GDMT were suboptimal.

Structure-guided development of potent DYRK1A inhibitors as a regenerative strategy in diabetes

Bis A^{1,2}, Grygier P^{1,2}, Maruf A¹, Pustelny K³, Czarna A¹

¹Malopolska Centre of Biotechnology, Jagiellonian University, Cracow, Poland, ²Jagiellonian University, Doctoral School of Exact and Natural Sciences, Cracow, Poland, ³Faculty of Biochemistry, Biophysics and Biotechnology, Jagiellonian University, Krakow, Poland, Cracow, Poland

Aim:

Progressive loss of functional β -cell mass underlies diabetes pathogenesis, yet current therapies do not directly target this fundamental defect. Extensive evidence identifies DYRK1A as a critical regulator of β -cell function, with pharmacological inhibition enhancing insulin secretion and improving glucose tolerance in diabetic models. This study aim to develop potent DYRK1A inhibitors and evaluate their functional efficacy and kinase selectivity in *in vitro* disease models.

Methods:

Structure-guided virtual screening identified a hit compound with low micromolar inhibition against DYRK1A. Iterative scaffold optimization improved potency into the low nanomolar range. Enzymatic inhibition (IC_{50}) of AC27, M27, and Harmine (gold standard in DYRKs inhibition) was determined using ADP-Glo kinase assay. Target engagement was validated by microscale thermophoresis (MST). Kinome-wide profiling was performed for M27 to assess selectivity across the kinase panel. Functional efficacy was evaluated in MIN6 β -cells by measuring proliferation (Ki67) and glucose-stimulated insulin secretion.

Results:

Optimization of the commercially available parent compound AC27 ($IC_{50} = 532$ nM) led to the development of a stronger DYRK1A inhibitor with nanomolar activity ($IC_{50} = 93$ nM). Biophysical validation confirmed strong target engagement, with M27 demonstrating high-affinity binding ($K_d = 20$ nM), comparable to Harmine ($K_d = 17$ nM).

Functionally, AC27 markedly enhanced insulin secretion (1.91 ± 0.24 vs. control 1.0) and β -cell proliferation (Ki67: 1.52 ± 0.32) in MIN6 cells, exceeding Harmine. M27 also increased insulin secretion (1.75 ± 0.17) with a moderate proliferative effect (1.10 ± 0.10). Kinome-wide profiling demonstrated an improved selectivity profile for M27, supporting its advancement as an optimized DYRK1A inhibitor.

Conclusion:

This study highlights the role of DYRK1A in β -cell proliferation and function. Through high-affinity inhibition and functional validation in β -cell assays, our findings extend the established NFAT-mediated paradigm of DYRK1A targeting and support continued translational development of selective inhibitors as candidates for β -cell–restorative diabetes therapy.

Linking inpatient audit data with glycaemic outcomes: Diabetes management errors and subsequent adverse glycaemia in the pilot AusNADIA cohort

Blomson G^{1,2}, Barmanray R^{1,2,3}, Kyi M^{1,2,3}

¹Department of Diabetes and Endocrinology, The Royal Melbourne Hospital, Melbourne, Australia,

²Department of Medicine, The University of Melbourne, Melbourne, Australia, ³Australian Centre for Accelerating Diabetes Innovations (ACADI), University of Melbourne, Melbourne, Australia

Aim: To determine whether audit-identified diabetes management errors are associated with subsequent adverse glycaemia. To demonstrate the value of linking inpatient audit data with glucometric outcomes to generate actionable clinical insights.

Methods: This retrospective study assessed the cohort of inpatients with known diabetes or new hyperglycaemia identified on the audit date for the Australian National Diabetes Inpatient Audit (AusNADIA) local pilot conducted in November 2025.

Diabetes management errors were defined as failure to act in response to hyperglycaemia (≥ 15.0 mmol/L) or unexplained hypoglycaemia (< 4.0 mmol/L), or inappropriate omission of insulin following hypoglycaemia within the seven days preceding the audit date.

Post-audit capillary glucose measures up to four days following the audit date were analysed among patients with ≥ 2 days of post-audit glucose data. Association between diabetes management errors and adverse glycaemia (AG: any blood glucose < 4.0 or ≥ 15.0 mmol/L) and persistent AG (2 or more patient-days with AG) were assessed using logistic regression.

Results: 114 patients met inclusion criteria; 15% (n=17) had audit-identified diabetes management errors. Patients with management errors had a higher prevalence of any AG than those without errors (59% vs 32%).

On multivariable logistic regression, management errors were not significantly associated with any AG (OR 1.70, 95% CI 0.40–7.34, $p=0.47$) or persistent AG (OR 2.17, 95% CI 0.54–8.76, $p=0.27$).

Higher HbA1c was independently associated with both any AG (OR 1.77, 95% CI 1.21–2.59, $p=0.004$) and persistent AG (OR 1.54, 95% CI 1.12–2.12, $p=0.009$). Exploratory analysis showed that inaction following hyperglycaemia ≥ 15 mmol/L was associated with higher prevalence of any AG (76.9% vs 30.8%; χ^2 $p=0.003$).

Conclusion: Linking inpatient audit data with post-audit glycaemic outcomes provides a scalable methodology for the AusNADIA programme to derive actionable insights and inform targeted improvements in inpatient diabetes care. Findings from this pilot cohort warrant evaluation in larger AusNADIA datasets.

Continuous glucose monitoring is associated with both beneficial and detrimental effects on subcategories of diabetes distress in an Australian Type 1 Diabetes Mellitus cohort

Borg M¹, Huynh L^{1,2}, Borg M¹, Saggs S³, Degreef A⁴, Umapathysivam M^{1,3,5}, Flabouris K^{1,3}, Ephraums L^{1,5}, Marathe C^{1,3}

¹Adelaide University, Adelaide, Australia, ²Lyell McEwin Hospital, Adelaide, Australia, ³Royal Adelaide Hospital, Adelaide, Australia, ⁴Barossa Hills Fleurieu Local Health Network, , Australia, ⁵Flinders Medical Centre, Adelaide, Australia

Aim/s

There are bidirectional associations between diabetes-related distress and glycaemic control in type 1 diabetes (T1DM). Continuous glucose monitoring (CGM) typically benefits glycaemic control but has been variably associated with lower or higher diabetes distress. Cohorts which are adolescent or from the U.S.A. have typically suggested a positive association, while no, or a negative, association between CGM use and diabetes distress has been demonstrated in Northern European cohorts. We compared the burden of diabetes distress, as well as its subcategories, in adults with T1DM managed with or without CGM in an Australian cohort.

Methods.

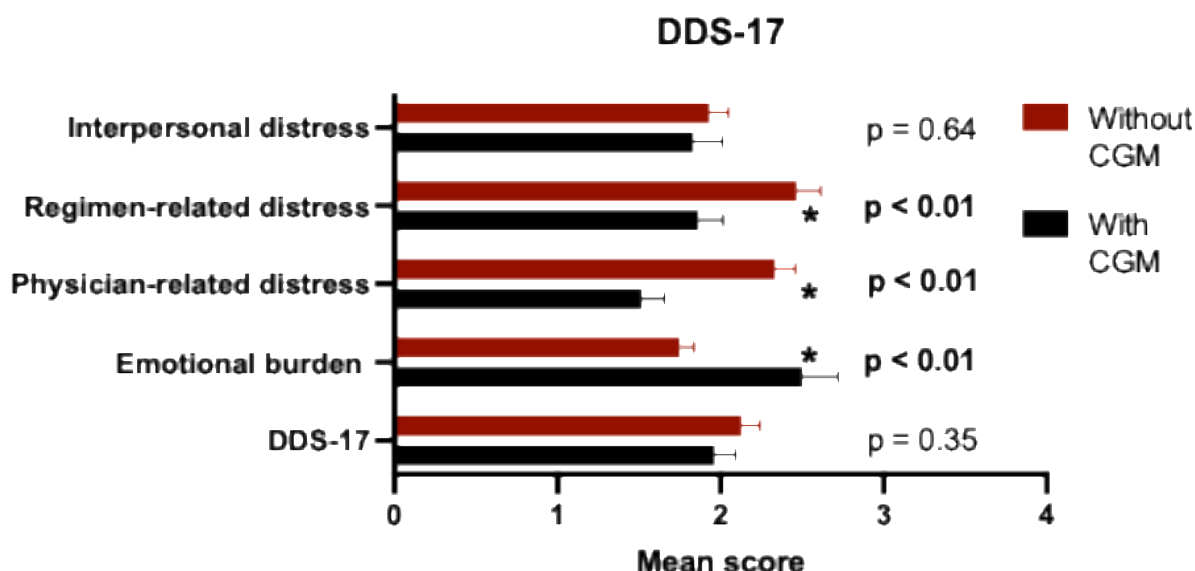
104 unselected adults with T1DM (39 with, and 65 without, CGM), attending metropolitan public hospital outpatient departments, provided demographic information and their diabetes history alongside completion of the 17-item Diabetes Distress Scale (DDS-17). The student's t-test was used to compare the baseline characteristics and DDS-17 scores between the cohorts using, and without, CGM, with $p < 0.05$ denoting statistical significance.

Results

CGM users were older (51 ± 2.5 vs 43 ± 2 years, $p = 0.01$) but other baseline characteristics were similar between the cohorts. CGM users experienced significantly greater emotional burden but less physician and regimen-related distress, with similar mean interpersonal distress and overall DDS-17 scores (Figure), relative to subjects without CGM.

Conclusion

In our interim analysis, CGM use was associated with both beneficial and detrimental effects on subcategories of diabetes distress. Diabetes distress assessment should be considered in the initiation and follow-up of CGM in type 1 diabetes.



Endogenous glucose-dependent insulintropic polypeptide attenuates postprandial cortisol responses in type 2 diabetes.

Borg M¹, Xie C¹, Sun Y¹, Bound M¹, Grivell J, Rayner C^{1,2}, Horowitz M^{1,2}, Wu T¹

¹Adelaide University, Adelaide, Australia, ²Royal Adelaide Hospital, Adelaide, Australia

Aim/s

Dysregulation of cortisol secretion has been implicated in the pathophysiology of type 2 diabetes (T2D). Glucose-dependent insulintropic polypeptide (GIP), released following nutrient ingestion, is known to modulate glucocorticoid output in experimental models and subsets of Cushing's syndrome. Whether endogenous GIP signalling contributes to physiological postprandial cortisol regulation is uncertain. We investigated the impact of endogenous GIP signalling, using the selective GIP receptor antagonist GIP(3-30)NH₂, on cortisol responses during intraduodenal glucose infusion in T2D.

Methods

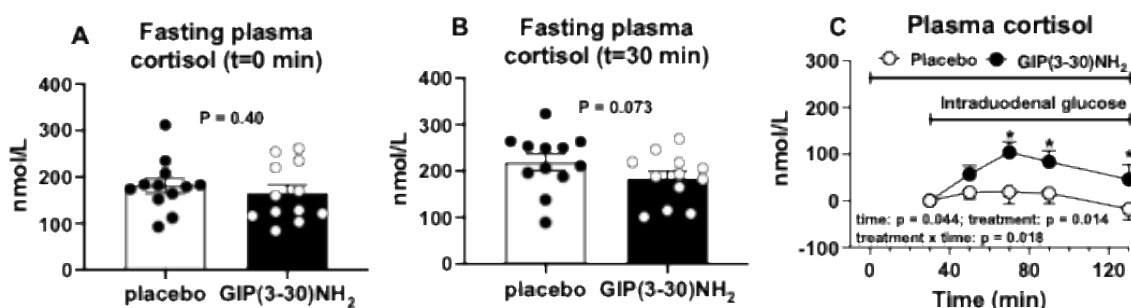
12 participants with T2D (mean HbA1c 7.52 ± 0.11%) on metformin monotherapy received oral sitagliptin 100mg daily over one week, during which they attended the laboratory for two study days after an overnight fast. Hyperglycaemia (15 mmol/L) was established and maintained by variable intravenous infusions of glucose and insulin. Following 30-min stabilisation, participants received intravenous GIP(3-30)NH₂ (800 pmol/kg/min) or 0.9% saline (placebo) in random order from t=0-140min, and intraduodenal glucose via a naso-duodenal catheter (2kcal/min) from t=30-130min. Plasma cortisol was measured by immunoassay.

Results

Fasting plasma cortisol concentrations were comparable at t=0 and 30min on the two days. During intraduodenal glucose infusion, plasma cortisol remained stable with placebo, but increased with GIP(3-30)NH₂ infusion so that peak concentrations (t=70min) were ~100nmol/L above fasting levels (Figure).

Conclusion

Endogenous GIP signalling does not influence circulating cortisol under fasting conditions but attenuates the cortisol response to intraduodenal glucose in T2D. These observations indicate a hitherto unrecognised interaction between GIP and cortisol secretion that has the potential to contribute to postprandial metabolic homeostasis.



Impact of a 'Sit Less and Move More' intervention on daily sitting time and glycaemia in type 2 diabetes: The OPTIMISE Your Health trial

Brakenridge C¹

¹Baker Heart And Diabetes Institute & Swinburne University of Technology, Melbourne, Australia

Aim/s

To evaluate whether an intensive six-month "Sit Less and Move More" intervention improved glycaemia, sedentary behaviour, and physical activity in adults with type 2 diabetes (T2D) compared with usual care.

Methods

This single-centre randomised controlled trial was conducted in Melbourne, Australia. Desk workers (aged 35-65 years) with type 2 diabetes who were eligible (e.g., overweight/obese, physically inactive, sit-stand desk non-users) were randomised to waitlist control or to the multicomponent intervention consisting of health coaching, a height-adjustable sit-stand desk, and an activity tracker. Here, we report the co-primary outcomes (HbA1c and activPAL-measured daily sitting time) at their primary endpoint (6 months), seven secondary glycaemic control outcomes measured by 2-hour glucose and insulin oral glucose tolerance test and nine secondary activPAL-measured activity outcomes indicating sedentary behaviour and physical activity. Constrained longitudinal data analysis was used.

Results

Between June 2019 and September 2024, 1,989 participants were screened, 145 were randomised to the control (n=72, female = 32 [44.4%]) or intervention (n=73, female = 33 [45.8%]). Compared to controls, intervention participants had significant reductions in HbA1c at 6-months (between group difference: -0.5% [-0.87, -0.13]; $p < 0.01$) and daily sitting time (-74.8 [-106.2, -43.5] Δ min/day; $p < 0.01$). Intervention effects on glycemia all favoured the intervention and were significant ($p < 0.05$) for three outcomes: fasting plasma glucose (-0.85 [-1.5, -0.2] Δ mmol/L), HOMA2 β -cell function (9.9 [0.68, 19.2] Δ %), and Glucose iAUC (-163 [-323.9, -2.1] Δ mmol/min/L). Secondary activity outcomes also all favoured intervention, significantly so for eight outcomes (e.g. daily standing (+63.3 [36.8, 89.9] Δ min/day), stepping (+10.8 [2.4, 19.3] Δ min/day), and step counts (+994.3 [228.1, 1760.5] Δ n/day)).

Conclusion

This six-month intervention resulted in improved glycaemic outcomes, sedentary behaviour, and physical activity among workers with T2D, highlighting the relevance of such "Sit Less and Move More" interventions for T2D management.

A personalised, AI-driven, behaviour change Digital Health intervention reduces body weight and improves quality of life and life satisfaction – interim analysis of a large-scale intervention

Brinkworth G¹, Kidd J¹, Simmons D⁴, Meyerowitz-Katz G², Willink A⁴, Ball A⁴, Horobin D³, Summers C³, Panesar A³

¹Diabetes Australia, Milton, Australia, ²Integrated and Community Health, Western Sydney Local Health District, Blacktown, Australia, ³DDM Health, Warwick, United Kingdom, ⁴Diabetes Australia, Glebe, Australia

Aim: ‘Gro Health’ is a co-designed, remotely delivered, structured education and self-management behaviour change digital health and wellbeing platform demonstrated as a feasible, cost-effective health service in multiple international countries for managing obesity, cardiometabolic disease and type 2 diabetes (T2D). This study examines the effectiveness of Gro Health delivered with minimal professional provision to support people living with or at risk of T2D in Australia.

Methods: Participants were recruited prospectively between July 2025 – January 2026 through social media marketing and direct mail to Diabetes Australia members to pilot the Gro Health platform offering free access for 6 months. At baseline, 3 and 6 months users optionally self-reported body weight and completed the EQ5D (Health Related Quality of Life), SWLS (Satisfaction with Life Scale) and the Oxford Happiness (OH) questionnaires. This report represents an interim analysis of data collected as of February 2026.

Results: 765 adults (Age: 56.2±12.4[SD] yrs; 175[23%] males, 460[61%] females and 121[16%] not reported) of whom 80% self-identified as living with T2D enrolled to participate and accessed the program. Ethnicity included Caucasian/White (65%), Indian (5%), Asian (5%), Pakistani (1%), Black (<1%), Bangladeshi (<1%), Multi-ethnic (3%), Other (3%), not stated (18%). The top 4 reasons for joining the program were: to lose weight (44%), improve a health condition (19%), fitness (12%) and dietary choices (12%).

At 3 months, body weight reduced (92.7±21.9 kg to 89.0±21.5 kg [-4.1%]; N=455), with improvements in EQ5D (69.5±14.7 to 81.4±15.1 [20%], N=256), SWLS (19.1±4.7 to 11.9±3.9 [25%], N=214) and OH (3.11±0.80 to 3.57±0.67 [15%], N=136) scores, P<0.001 for all. So far, 6 months weight loss is 4.2% (105.8±20.4kg to 101.4±19.6kg; P<0.001; N=130).

Conclusion: Preliminary results suggest a digitally delivered self-management, behaviour-change program can facilitate weight loss and improve quality of life and mental health wellbeing in free living individuals living with overweight/obesity and/or T2D.

Semaglutide monotherapy for HNF-1A MODY: An unexpected success

Bromley K^{1,2}, Zhu H¹

¹Fiona Stanley Fremantle Hospital Group, Murdoch, Australia, ²Sir Charles Gairdner Hospital, Nedlands, Australia

Aim: We describe a case of successful management of hepatocyte nuclear factor 1-alpha monogenic diabetes of the young (HNF1-a MODY) with a glucagon-like peptide 1 receptor agonist (GLP-1 RA).

Methods: A 34-year-old woman was first diagnosed with gestational diabetes at age 19, with a strong family history of diabetes and no additional features of metabolic syndrome. Genetic testing confirmed a heterozygous mutation in the HNF1-a gene, leading to the diagnosis of HNF1-a MODY. Multiple lines of treatment including a sulfonylurea were trialled, but self-ceased due to personal preference. Semaglutide monotherapy was commenced in 2023 to a maximum dose 0.5mg weekly, with a HbA1c of 7.1% prior.

Results: Semaglutide initiation led to a reduction in HbA1c to 5.5% and an improvement in both fasting and post-prandial blood sugar levels.

Conclusion: MODY accounts for 1-2% of all diabetes.¹ Approximately half of all MODY cases are due to mutations in the HNF-1a, a transcription factor regulating insulin secretion.^{1,2} Sulfonylureas are frequently used in the treatment of HNF1-a MODY as they act on ATP-sensitive potassium channels to increase the secretion of insulin, therefore bypassing deficits caused by the HNF1 mutation.¹ Insulin is another common treatment used. Both insulin and sulfonylureas have common side effects of hypoglycaemia and weight gain.³

GLP-1 RA's such as semaglutide can be considered as alternative therapy, with a reduced risk of hypoglycaemia and potential additional metabolic benefits. A crossover blinded randomised control trial compared six weeks of liraglutide to glimepiride monotherapy for 16 patients with HNF-1a MODY, finding reduced fasting plasma glucose in both groups and reduced hypoglycaemia in the liraglutide group.⁴ A small number of case reports have examined the use of other GLP-1's in HNF-1a MODY.⁵ This case adds to emerging evidence regarding the use of GLP-1 RA in HNF1-a MODY.

References

1. Anik A, Çatlı G, Abacı A, Böber E. Maturity-onset diabetes of the young (MODY): an update. *J Pediatr Endocrinol Metab.* 2015;28(3-4):251-263. doi:10.1515/jpem-2014-0384
2. Fajans SS, Bell GI, Polonsky KS. Molecular mechanisms and clinical pathophysiology of maturity-onset diabetes of the young. *N Engl J Med.* 2001;345(13):971-980. doi:10.1056/NEJMra002168
3. Zhao Q, Ding L, Yang Y, et al. Clinical Characteristics of Patients With HNF1-alpha MODY: A Literature Review and Retrospective Chart Review. *Front Endocrinol (Lausanne).* 2022;13:900489. Published 2022 Jun 20. doi:10.3389/fendo.2022.900489
4. Østoft SH, Bagger JI, Hansen T, et al. Glucose-lowering effects and low risk of hypoglycemia in patients with maturity-onset diabetes of the young when treated with a GLP-1 receptor agonist: a double-blind, randomized, crossover trial. *Diabetes Care.* 2014;37(7):1797-1805. doi:10.2337/dc13-3007
5. Müssig K. Novel Treatment Options in Patients with Maturity-Onset Diabetes of the Young. *Exp Clin Endocrinol Diabetes.* 2025;133(1):51-58. doi:10.1055/a-2436-7723

High affinity T regulatory Cell therapy targeting C-Peptide for Type 1 Diabetes Mellitus

Broury A¹, Ting Y¹, Besnard M¹, Ooi J¹

¹Monash University, Clayton, Australia

Aims: We aim to develop a novel antigen-specific T-regulatory (Treg) cell therapy for Type 1 Diabetes Mellitus (T1DM), by engineering Tregs with high affinity T cell receptors (TCR) specific for C-peptide and evaluating their efficacy in halting disease progression in a humanised T1DM mouse model.

Methods: CD4⁺ T cells from a healthy HLA-DQ2 donor were co-cultured with autologous dendritic cells pulsed with C-peptide. Proliferating T cells were identified by CellTrace labelling and Fluorescence Activated Cell Sorting (FACS) for single-cell RNA sequencing. High affinity TCRs were identified from expanded CD4⁺ T cells with elevated activation marker co-expression and cloned into lentiviral transduction vectors for Treg cell engineering.

Simultaneously, a humanised mouse model of T1DM was generated by reconstituting NSG-MHC I/II DKO mice with HLA-DQ2 human peripheral blood mononuclear cells (PBMCs), followed by low dose streptozotocin. PBMC engraftment was confirmed by FACS analysis of blood samples. Symptoms of T1DM were evaluated by histological examination of pancreatic tissue for β -islet damage and blood glucose monitoring to confirm hyperglycemia.

Results: We have identified seven C-peptide specific TCRs associated with elevated expression of activation markers. These TCRs were successfully cloned and transduced into HLA matched Treg cells. Surface expression of transduced TCRs was confirmed by FACS. We also generated a humanised mouse model of T1DM exhibiting hyperglycaemia and histological evidence of islet destruction, resembling the pathological features observed in people with T1DM. Functional in vitro and in vivo suppression testing are currently in progress to validate the therapeutic potential of these TCR-transduced Tregs against autoreactive T cell responses.

Conclusion: These findings demonstrate successful generation of antigen-specific Tregs and a clinically relevant preclinical model of T1DM. Ongoing in vitro and in vivo studies will establish functional efficacy, paving the way for clinical translation of this targeted Treg therapy.

A process evaluation using TDF to explore continuous glucose monitoring with Aboriginal and Torres Strait Islander peoples: Balancing deductive and inductive approaches

Klaic M^{1,2}, Bui M^{1,2}, Hachem M^{2,3,4}, Hearn T^{3,4,5}, Kelly-Edwards B^{2,4}, Kelly R², Cross C², Sommerville C^{2,4}, Taseska A^{2,4}, Bolitho J^{2,4}, Eer A^{2,4}, Burchill L^{2,6}, Ekinci E^{2,3,4}, Flash Study Collaborators and Sites

¹School of Health Sciences, Faculty of Medicine, Dentistry and Health Sciences, The University of Melbourne, Melbourne, Australia, ²Australian Centre for Accelerating Diabetes Innovations (ACADI), Melbourne Medical School, Faculty of Medicine, Dentistry and Health Sciences, University of Melbourne, Melbourne, Australia, ³Endocrinology, Austin Health, Melbourne, Australia, ⁴Department of Medicine, Austin Health, Faculty of Medicine, Dentistry and Health Sciences, the University of Melbourne, Melbourne, Australia, ⁵Rumbalara Aboriginal Cooperative, Mooroopna, Australia, ⁶Cardiovascular Medicine, Mayo Clinic, Rochester, USA

1. Study aim: to critically examine the application of the Theoretical Domains Framework (TDF) in identifying barriers, enablers, and contextual factors for potential implementation of continuous glucose monitoring for Aboriginal and Torres Strait Islander peoples with type 2 diabetes, while ensuring culturally appropriate knowledge generation.

2. Methods: A hybrid inductive-deductive approach using semi-structured interviews with patients and healthcare providers. We adapted interview schedules and coding frameworks to allow for emergent, culturally specific themes. We also ensured that predetermined TDF categories do not overshadow First Nations peoples' ways of knowing and being.

3. Results: Through this hybrid approach, we co-designed an Aboriginal artwork titled 'Solutions Under the Surface'. The artwork visually represents the connections between four of the fourteen TDF domains, including Knowledge, Social Influences, Environmental Context and Resources, and Beliefs about Capabilities. These connections inform strategies for continuous glucose monitoring implementation to ensure they are culturally appropriate and effective for Aboriginal and Torres Strait Islander peoples, potentially leading to faster adoption of beneficial health technologies and fairer health outcomes for this population.

4. Conclusion: The study highlights the tension between using structured implementation science frameworks and capturing unique cultural perspectives in health research for Aboriginal and Torres Strait Islander peoples. While the TDF provides valuable structure, its deductive application risks constraining knowledge generation and may not adequately reflect enviro-socio-cultural determinants of behaviour in Aboriginal and Torres Strait Islander cultural contexts. A novel hybrid inductive-deductive approach using the TDF was needed to address this tension and contributed to more culturally responsive implementation science methodologies, providing a blueprint for equitable technology scaling in diabetes research with First Nations peoples.

Hospital Hyperglycemia: Prevalence and impact of a real-time Glycemic Alert System

Cao C¹, Liu Z¹, Li C¹, Xiao J¹

¹Beijing Tsinghua Changgung Hospital, School of Clinical Medicine, Tsinghua University, Beijing, China

Aim: To investigate the prevalence of hyperglycemia and evaluate the impact of a Hospital-wide Mobile Phone Alert (HMA) system on inpatient glycemic management.

Methods: We identified inpatients with hyperglycemia hospitalized between January 1, 2017, and December 31, 2018, excluding those under 18 years of age. The HMA system was activated on October 1, 2017, sending real-time alerts to the attending physician's mobile phone for glucose levels >10 mmol/L or <3 mmol/L. Hospital hyperglycemia (HH) was defined as a random blood glucose >7.8 mmol/L, and significant HH (SHH) as >10 mmol/L. Glucose excursions before and after HMA implementation were compared.

Results: The incidence of HH, SHH, and hypoglycemia was 26.1%, 12.8%, and 2.5%, respectively. Following HMA activation, the monthly rate of glycemic-related consultations increased by 65.9%. The HH rate in surgical wards significantly decreased with HMA ($15.8 \pm 4.7\%$ vs. $21.1 \pm 6.1\%$, $p < 0.05$).

Conclusions: Approximately one-third of inpatients experienced hyperglycemia. Real-time mobile alerts to physicians increased consultation rates for glucose excursions and reduced hyperglycemia incidence in surgical wards.

Keywords: Blood glucose monitoring, hyperglycemia, inpatients, alert system, patient care management, health information technology

Bespoke management of Hyperglycaemic Emergencies in dialysis patients is required: lessons from an illustrative case

Chan C¹, Rowe C^{1,2}

¹Department of Diabetes and Endocrinology, John Hunter Hospital, , Australia, ²University of Newcastle, School of Medicine and Public Health, , Australia

Aims: Diabetes is the leading cause of end-stage kidney disease (ESKD) and those commencing on renal replacement therapy. With improving advances in treatment of diabetes, more patients are surviving to haemodialysis, making managing dialysis patients with diabetes-related hyperglycaemic emergencies more common. Managing these situations can be challenging given the altered physiology in ESKD and paucity of evidence in the literature. The objective is to describe a range of extreme glycaemic emergencies in a dialysis patient and illustrate management principles.

Method: We describe a case of a 48-year-old man with Type 1 Diabetes Mellitus on an insulin pump with recurrent admissions for hyperosmolar hyperglycaemic state (HHS) and diabetic ketoacidosis (DKA) precipitated by user error, on a background of ESKD on intermittent haemodialysis. He required customised management based on his fluid status and type of emergency often in an intensive care setting, including needing emergent continuous renal replacement therapy for florid fluid overload with concurrent HHS.

Results:

Patients with DKA and ESKD on haemodialysis have been shown to have worse clinical outcomes compared with patients with preserved kidney function based on observational data. Current management strategies are based on expert consensus tailored to the unique physiological alterations of ESKD. Management should take into consideration total body potassium balance, fluid status (noting low urine output in most cases), timing of dialysis, consideration of adjunctive measures to correct acidosis given underlying bicarbonate deficiency and requires nuanced multidisciplinary care.

Conclusion:

This case highlights an increasingly common, but complex acute clinical issue which may benefit from development of a foundational algorithm based approach to management. There is a need for an increased awareness of the altered physiology in dialysis patients and how this changes management of diabetes-related hyperglycaemic emergencies, in addition to a collaborative approach within a multidisciplinary team.

Real-world use and effectiveness of tirzepatide in Thai patients: A retrospective single-center study in Bangkok

Chatchomchuan W¹, Thewjitcharoen Y¹, Wanothayaroj E¹, Butadej S¹, Nakasatien S¹, Himathongkam T¹

¹THEPTARIN Diabetes, Thyroid and Endocrine Center, Vimut-Theptarin Hospital, Bangkok, Thailand

Aims: Tirzepatide, a once-weekly dual glucose-dependent insulintropic polypeptide (GIP) and glucagon-like peptide-1 (GLP-1) receptor agonist, was approved in Thailand in May 2025 for type 2 diabetes (T2D) and obesity. As clinical trial populations are predominantly Caucasian, real-world evidence in Asian populations is limited. This study evaluated the real-world use and effectiveness of tirzepatide among Thai adults attending a tertiary diabetes center in Bangkok.

Methods: This retrospective cohort study included adults with T2D or obesity who initiated tirzepatide for at least 1 month between June and December 2025. Primary outcomes were changes in glycated hemoglobin (A1C) and body weight from baseline to the last follow-up. Secondary outcomes included achievement of glycemic and weight-loss targets and body composition changes assessed by bioelectrical impedance analysis (BIA).

Results: A total of 102 patients were included (52.9% female; mean age 50.2±16.0 years; baseline weight 87.8±19.2 kg; BMI 31.8±5.7 kg/m²); 58.8% had T2D and 57.8% had prior GLP-1 receptor agonist exposure. Median follow-up was 4 months. Overall mean weight reduction was 8.4%. Among participants with T2D, mean diabetes duration was 14.5 years, baseline A1C was 7.1±1.7%, and 20% used insulin. Weight reduction in this group was 3.6%, while the proportion achieving A1C <7.0% increased from 42.6% to 57.7%. In participants without diabetes, mean weight loss was 9.7 kg (10.6%). GLP-1 naive individuals achieved greater weight loss than prior GLP-1 users (12.3% vs 7.5%). Overall, 51.0% achieved ≥5% weight loss and 21.6% achieved ≥10% weight loss; corresponding rates in the non-diabetes group were 76.2% and 40.5%. Mean skeletal muscle mass decreased by 0.8 kg (9%). No pancreatitis, cancer, or progressive retinopathy was observed.

Conclusions: In routine clinical practice, tirzepatide was associated with significant glycemic improvement and weight loss among Thai adults with or without T2D, with outcomes comparable to randomized clinical trials.

Diabetes Urgent Comprehensive Care Service (DUCCS): A novel multidisciplinary model of care for complex diabetes management in the community.

Chaubey S^{1,2,3}, Manners L³, McLean A^{1,3,4}, Li L^{1,3}, Anderson J³, Lawrence J³

¹Cairns Hospital, Cairns, Qld, Cairns, Australia, ² College of Medicine & Dentistry, James Cook University, Cairns, Australia, ³Cairns Diabetes Centre, Cairns, Qld, Cairns North, Australia, ⁴ Menzies School of Health Research, NT, Tiwi, Australia

Background & Aim: Far North Queensland has been identified as having very high rates of diabetes, with 10% of its residents being of first nations origin. Complex diabetes management in the community can be challenging. In Cairns, traditionally patients requiring urgent care were seen in a weekly Rapid Access endocrinologist clinic. Due to clinical need, the Diabetes Urgent Comprehensive Care Service (DUCCS) was established in 2023. In this daily service all patients are reviewed by an endocrinologist, diabetes educator, dietitian, and as appropriate a First Nations health worker, social worker and psychologist. This study aimed to evaluate the impact of the DUCCS on hospital presentations, patient engagement, access to care for First Nations patients and glycaemic outcomes.

Methods: Data were compared from 2 years prior (Rapid Access clinic 2021-22) and 2 years post inception of DUCCS (DUCCS 2024-25) for diabetes related emergency department (ED) presentations following new clinic appointments, clinic attendance rates and the proportion of patients identifying as First Nations. Change in HbA1c was assessed in patients reviewed between March and August 2025.

Results: Diabetes-related ED presentations following new clinic appointments reduced, occurring in 9.6% of those attending DUCCS 2024-25, vs 15.3% of patients attending Rapid Access clinic 2021-22, $p < 0.05$. Non-attendance rates were lower (19.4% vs 30.7%, $p < 0.01$) and proportion of patients identifying as First Nations were higher (45.3% vs 25.7%, $p < 0.01$) in DUCCS 2024-25 compared with the Rapid Access clinic 2021-22. DUCCS patients demonstrated a mean reduction in HbA1c of 2.3%, with average HbA1c 11.0% down to 8.7% at 3-6 months.

Discussion/Conclusion: The DUCCS model shows promising results in improving engagement of high-risk patients, particularly those of First Nations background. Compared to the traditional specialist OPD model, this novel multidisciplinary approach has the capacity to reduce hospital presentations and significantly improve the health of patients with diabetes.

Comparing the impact of intermittent fasting plus early time-restricted eating vs. calorie restriction on ultra-processed food consumption: exploratory analysis of a randomised controlled trial

Cheng R^{1,2}, Teong X^{1,2}, Liu K^{1,2}, Wittert G^{1,2}, Hutchison A^{1,2}, Heilbronn L^{1,2}

¹School of medicine, Adelaide University, Adelaide, Australia, ²Lifelong Health Theme, South Australian Health and Medical Research Institute, Adelaide, Australia

Background: Ultra-processed food (UPF) is linked to weight gain and chronic disease risk. While intermittent fasting dietary approaches are effective for weight loss, little is known about their impact on UPF intake.

Objective: Compare mean daily absolute UPF intake between intermittent fasting plus early time-restricted eating (iTRE) versus calorie restriction (CR).

Method: The randomised, open-label, three-arm trial comprised a 6-month intervention phase and a 12-month follow-up. Only participants in the active intervention arms who completed diet diaries at 6 months (iTRE, n = 61, CR, n = 51) and 18 months (iTRE, n = 45, CR, n = 43) were included. NOVA classification categorised food into four categories, with NOVA 4 being UPF. UPF was further classified as discretionary and non-discretionary under Australian dietary guidelines. ANCOVA and linear regression were used to evaluate differences in UPF intake and associations with health outcomes, adjusting for age, sex, and baseline values.

Result: At 6 months, iTRE led to greater reduction in fasting glucose than CR (-3.6 mg dl^{-1} [-6.5 , -0.8], $p = 0.013$), but the reduction in body weight, total energy intake, insulin, triglycerides, and total cholesterol did not differ between groups ($p > 0.05$). UPF reduction was also not different between groups (iTRE: -1084.7 kJ [-1277.2 , -892.2]; CR: -1127.1 kJ [-1337.6 , -916.5], $p = 0.089$). However, iTRE consumed more discretionary UPF (382.9 kJ [143.2 , 622.6], $p = 0.002$). At 18 months, the same diet pattern was observed. Neither discretionary nor non-discretionary UPF was linked to weight loss, fasting glucose, triglycerides, or cholesterol at 6 months. But discretionary UPF intake was positively linked to fasting insulin ($\beta = 0.0019$, $p = 0.049$), whereas non-discretionary UPF intake was inversely linked ($\beta = -0.0036$, $p = 0.015$).

Conclusion: Although iTRE consumed more discretionary UPF than daily CR, it did not adversely impact the health outcomes during weight loss.

Association of sodium-glucose cotransporter-2 inhibitors with risk of rheumatoid arthritis in patients with type 2 diabetes

Cheng Y^{1,2,3}, Lee J^{1,2,3}, Sheu M³, Lu C³

¹Taichung Veterans General Hospital, Taichung, Taiwan, ²National Yang Ming Chiao Tung University, Taipei, Taiwan, ³National Chung Hsing University, Taichung, Taiwan

Aim

Sodium-glucose cotransporter-2 (SGLT-2) inhibitors have been shown to reduce proinflammatory cytokines. We aim to investigate the association of SGLT-2 inhibitors with risk of rheumatoid arthritis.

Methods

The data used in this retrospective cohort study were obtained from the National Health Insurance Research Database (NHIRD) in Taiwan for the period January 1, 2013, to December 31, 2023. We enrolled adults with type 2 diabetes who were prescribed metformin and continuously received one of sulfonylureas or one of SGLT-2 inhibitors for 90 or more days between January 1, 2014, and December 31, 2023. Use of interest drugs 180 days before the drugs initiation were excluded to ensure a new-user design. The primary endpoint was rheumatoid arthritis development which was determined as the first diagnosis after the 91st day of the initiation of interest drugs.

Results

A total of 205022 patients were enrolled. Among them, 130300 and 74722 patients were users of sulfonylureas and users of SGLT-2 inhibitors, respectively. Over a median follow-up of 5.59 years, the cumulative incidence rate of rheumatoid arthritis was 2.11 events/1000 person-years in the sulfonylureas group. Over a median follow-up of 2.42 years, the cumulative incidence rate of rheumatoid arthritis was 1.93 events/1000 person-years in the group of SGLT-2 inhibitors. Multivariable Cox regression analyses revealed that users of SGLT2 inhibitors had a lower risk of incident rheumatoid arthritis than users of sulfonylureas (hazard ratio = 0.816, 95% confidence interval: 0.727–0.915, $P = 0.001$).

Conclusion

In patients with type 2 diabetes prescribed with metformin, combined use of SGLT-2 inhibitors had a significantly lower risk of rheumatoid arthritis development as compared with combined use of sulfonylureas.

Management challenges in refractory recurrent hypoglycemia secondary to metastatic insulinoma

Chong S¹, Kim Fong Ng²

¹Hospital Sultan Ismail, Johor Bahru, Malaysia, ²KPJ Kluang Specialist Hospital, Kluang, Malaysia

INTRODUCTION

Insulinoma is a rare functional pancreatic neuroendocrine tumour characterised by autonomous insulin secretion leading to recurrent hypoglycaemia. Surgical resection is typically curative in localised disease; however, metastatic insulinoma presents substantial therapeutic challenges. Persistent hypoglycaemia despite multimodal therapy is associated with significant morbidity and mortality. This case highlights the complexity of managing refractory hypoglycaemia in metastatic disease.

CASE DESCRIPTION

A 69-year-old woman presented with recurrent symptomatic hypoglycaemia in September 2023. A 72-hour fasting test confirmed endogenous hyperinsulinaemic hypoglycaemia (glucose 1.9 mmol/L with elevated insulin level at 106 pmol/L and C-peptide level at 1621 pmol/L). Imaging study revealed metastatic insulinoma involving regional lymph nodes and liver.

Initial treatment with diazoxide, long-acting octreotide and everolimus failed to achieve glycaemic control. She continued to experience frequent fasting hypoglycaemia, necessitating distal pancreatectomy and splenectomy. However, hypoglycaemia recurred within one month post-operatively.

During subsequent hospital admission, her glucose levels persistently ranged between 2 and 4 mmol/L despite repeated Dextrose 50% (D50%) boluses and continuous Dextrose 20% (D20%) infusion. Medical therapy was intensified with diazoxide, short-acting octreotide and high-dose prednisolone. Management was complicated by significant fluid overload and bilateral lower limb oedema (a known side effect of Diazoxide and high-volume dextrose infusion) requiring diuretics. Her hospital course was further complicated by hospital-acquired infections, persistent *Candida glabrata* fungemia, acute kidney injury and delirium. Despite temporary stabilisation, she developed progressive sepsis and ultimately succumbed to her illness.

CASE DISCUSSION

This case illustrates the difficulty of balancing aggressive glycaemic correction with the risk of fluid overload and medication-related adverse effects. Refractory hypoglycaemia in metastatic insulinoma often requires high-concentration dextrose infusion, which may precipitate rebound hyperglycaemia and volume complications. Immunosuppression from malignancy and corticosteroid therapy further increases infection risk, significantly worsening prognosis.

CONCLUSION

Metastatic insulinoma with refractory hypoglycaemia remains a complex clinical challenge. Careful titration of glucose therapy, vigilant monitoring for complications and multidisciplinary management are essential to optimise outcomes in this high-risk population.

Ferritin as a predictor of improved glycaemic control following a novel endoscopic pulsed electric field therapy in Type 2 Diabetes

Choong C^{1,2,3}, Sartoretto A⁴, Storm A⁵, McCollister H⁶, Severson P⁶, Holt B^{2,7}, Cameron G⁷, Vaughan R⁸, Ekinci E^{2,10,11}, Lipham J⁹, Cunningham L¹², Abu Dayyeh B¹³, O'Neal D^{1,2,3}

¹Diabetes Technology Research Group, Fitzroy, Australia, ²Department of Medicine, The University of Melbourne, Parkville, Australia, ³St Vincent's Hospital, Fitzroy, Australia, ⁴BMI Clinic, Double Bay, Australia, ⁵Mayo Clinic School of Medicine, Rochester, The United States of America, ⁶Minnesota Institute for Minimally Invasive Surgery, Cuyuna Regional Medical Centre, Crosby, The United States of America, ⁷Department of Gastroenterology, St Vincent's Hospital, Fitzroy, Australia, ⁸Department of Gastroenterology and Hepatology, Austin Health, Heidelberg, Australia, ⁹The Division of Upper GI and General Surgery, The University of Southern California, Los Angeles, The United States of America, ¹⁰Department of Endocrinology, Austin Health, Heidelberg, Australia, ¹¹Australian Centre for Accelerating Diabetes Innovations, , Australia, ¹²Endogenex Inc., Plymouth, The United States of America, ¹³Cedars-Sinai Medical Centre, Los Angeles, The United States of America

Aim:

Iron may impact Type 2 diabetes (T2D) pathophysiology. Endoscopic non-thermal pulsed electric field (PEF) therapy targets duodenal metabolic regulation with aim to improve T2D glycaemic outcomes. We aimed to evaluate baseline serum ferritin as a predictor of glycaemic response following PEF therapy.

Methods:

We combined data from two prospective, non-randomised multicentre studies designed to evaluate the safety, feasibility and metabolic effects of PEF therapy in T2D adults.

Seventy-one participants (18-70 years old, body mass index 24-40 kg/m², glycated haemoglobin [HbA1c] 7.5-11.0%, on 1-4 non-insulin glucose-lowering medications) received low- or high-energy PEF. The primary endpoint was serious adverse events (SAEs). Secondary endpoints included glycaemic changes at 24 weeks.

Results:

No SAEs occurred. At 24 weeks HbA1c fell more in the high-energy vs. low-energy group ($-1.3 \pm 0.2\%$ vs. $-0.1 \pm 0.2\%$; $p < 0.01$). Across the total cohort, higher baseline ferritin was associated with a greater HbA1c reduction, at Week 4 ($r = -0.35$, $p = 0.007$), Week 12 ($r = -0.32$, $p = 0.012$) and Week 24 ($r = -0.45$, $p = 0.001$) with the greatest reduction (-2.04 [95%CI -3.94 , -0.14]) in the high-energy subgroup with baseline ferritin ≥ 200 and HbA1c $\geq 8\%$.

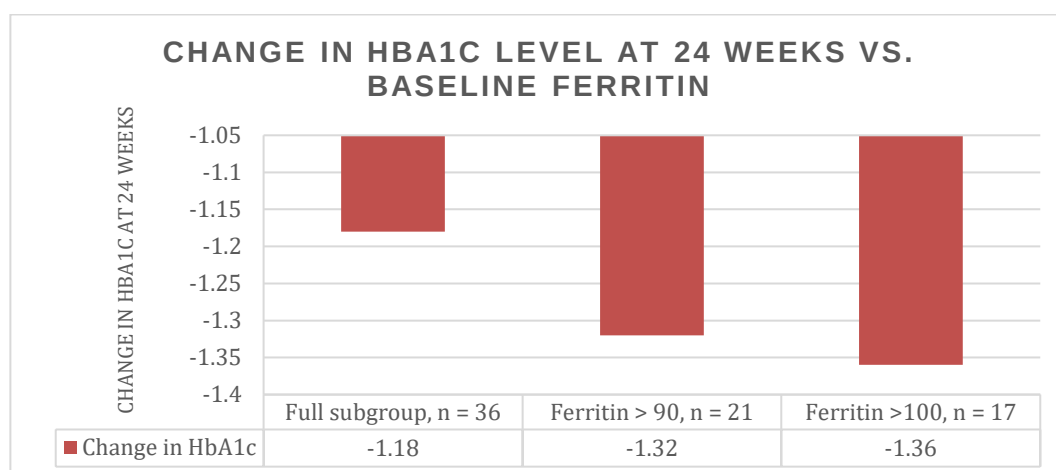


FIGURE 1. Change in HbA1c at 24 weeks across baseline serum ferritin following high-energy PEF.

Conclusion:

Baseline serum ferritin may identify T2D patients who benefit most from PEF. Further studies are warranted.

Revisiting hyperglycaemia in community-acquired pneumonia

Choong C^{1,2,4}, Barmanray R^{2,3,4}

¹St Vincent's Hospital Melbourne, Fitzroy, Australia, ²Western Health, Footscray, Australia, ³The Royal Melbourne Hospital, Parkville, Australia, ⁴The University of Melbourne, Parkville, Australia

Aim:

Though hyperglycaemia in patients hospitalised with community-acquired pneumonia (CAP) is clearly associated with adverse outcomes, glucocorticoid therapy appears to both improve CAP outcomes while causing hyperglycaemia¹. We describe this apparent differential contribution of inflammation-related vs. glucocorticoid-related hyperglycaemia.

Methods:

We reviewed results from studies and meta-analyses quantifying the association between diabetes, hyperglycaemia and outcomes in patients hospitalised for CAP.

Results:

Glucocorticoid therapy in CAP has been reported to reduce mortality compared with standard care, despite increased incident hyperglycaemia, with nearly double the risk of hyperglycaemia in some cases.

These findings may suggest that in CAP, hyperglycaemia related to glucocorticoid therapy ("glucocorticoid-induced hyperglycaemia") is distinct from hyperglycaemia due to inflammatory mediators and in the absence of glucocorticoids ("inflammation-mediated hyperglycaemia"), which has been linked to worse outcomes. Evidence from post-COVID-19 cohorts² support this distinction, with hyperglycaemia largely reflecting glucocorticoid use without being independently associated with mortality³.

Conclusion:

Evidence is building for differential implications of glucocorticoid vs. inflammatory hyperglycaemia in hospitalised patients, particularly those with CAP. There may consequently be value in differentiating the two and less impetus to treat the former. Subgroup analyses by glycaemic status could be informative in detailing differences within hyperglycaemia in CAP cohorts. Proactive glucose control in glucocorticoid-treated patients in future trials could increase separation between groups and clarify these relationships further.

References:

1. Smit, J. M. *et al.* Predicting benefit from adjuvant therapy with corticosteroids in community-acquired pneumonia: a data-driven analysis of randomised trials. *Lancet Respir. Med.* **13**, 221–233 (2025).
2. The RECOVERY Collaborative Group. Dexamethasone in Hospitalized Patients with Covid-19. *N. Engl. J. Med.* **384**, 693–704 (2020).
3. Barmanray, R. D. *et al.* Diabetes IN hospital - Glucose and Outcomes in the COVID-19 pandemic (DINGO COVID-19): the 2020 Melbourne hospital experience prior to novel variants and vaccinations. *Intern. Med. J.* **53**, 27–36 (2023).

Territory-wide trends and patterns in glucose-lowering drug utilization in 1.1 million adults with diabetes in Hong Kong, 2002–2023

Bai X¹, Lau E¹, Shi M^{1,2}, Fan B¹, Kong A^{1,2}, Luk A^{1,2,3}, Ma R^{1,2,3}, Chan J^{1,2,3}, Wu H¹, Chow E, Yang A^{1,2,3}

¹Department of Medicine and Therapeutics, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong SAR, China., Hong Kong, China, ²Hong Kong Institute of Diabetes and Obesity, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong SAR, China., Hong Kong, China, ³Li Ka Shing Institute of Health Sciences, The Chinese University of Hong Kong, Prince of Wales Hospital, Hong Kong SAR, China., Hong Kong, China

Aims: The introduction of newer classes of glucose-lowering drugs (GLDs) has substantially changed diabetes management globally. We previously reported rapid increase in the use of newer GLDs in Hong Kong, accompanied by relatively low overall utilization. The present study aims to provide an updated evaluation of long-term trends and prescribing patterns of GLD among adults with diabetes in Hong Kong over a 22-year period.

Methods: This is a territory-wide serial cross-sectional study using the Hong Kong electronic health records between 2002 and 2023. A total of 1,148,259 adults with diabetes were included. We estimated age- and sex-standardized annual proportions of GLD use by drug class and examined utilization patterns by age group and the presence of atherosclerotic cardiovascular disease (ASCVD).

Results: Between 2002 and 2023, sulfonylurea use declined markedly (55.5% to 26.7%), while metformin use increased steadily from 42.9% to 57.3%. Insulin use remained relatively stable (12.0% to 11.3%). Use of dipeptidyl peptidase-4 inhibitors (DPP-4is) increased continuously from 2007 to 2023, reaching 13.7% in 2023 (average annual percentage change [AAPC]=63.1; 95%CI: 55.2–78.4). Sodium-glucose co-transporter-2 inhibitor (SGLT2i) use increased rapidly during 2015–2023 (0.05% to 13.0%) but remained lower among adults aged ≥75 years (10.1% in 2023). Use of glucagon-like peptide-1 receptor agonists (GLP-1 RAs) increased from 0.01% in 2011 to 1.1% in 2023 (AAPC=38.0; 95%CI: 31.6–53.2). Patterns of newer GLD use varied by ASCVD status: individuals with ASCVD were more likely to use DPP-4is (18.9%-vs-12.7%) and SGLT2is (18.6%-vs-11.8%) in 2023.

Conclusions: Over the 22-year study period, GLD use in Hong Kong shifted toward increased metformin use, decreased sulfonylurea, and a modest increase in the use of newer GLDs, with persistently lower use among older adults with diabetes. Ongoing population-level surveillance is warranted to monitor alignment between prescribing practices and evolving evidence-based guidelines.

Declaration of interests: We declare no competing interests.

Acknowledgments: The work was supported by funding from Area of Excellence Scheme, Research Grants Council, Hong Kong SAR, China (Reference number: AoE/M-401/24-R).

Six-month real-world effectiveness of Tirzepatide for weight management

Choy K^{1,2}, New R³

¹Department of Endocrinology and Diabetes, Barwon Health, Geelong, Australia, ²Adrian Costa Clinical Trials Centre, Barwon Health, Geelong, Australia, ³Department of General Medicine, Eastern Health, Box Hill, Australia

Aim:

Obesity is a chronic metabolic disease associated with significant cardiometabolic morbidity. Tirzepatide, a dual glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptor agonist, has demonstrated substantial weight reduction in randomised clinical trials. This audit aimed to evaluate the real-world effectiveness of tirzepatide for weight management.

Methods:

We conducted a retrospective audit of adults treated with tirzepatide for weight management. Baseline demographic and clinical data were collected prior to treatment initiation and reassessed 6 months after treatment initiation.

Results:

31 adults were included in the analysis. The mean baseline body weight was 108.4 kg and the mean BMI was 36.9 kg/m², with 90.3% of the cohort having a BMI of ≥ 30 kg/m². At baseline, obesity class distribution consisted of 35.5% with class I obesity, 25.8% with class II obesity, and 29.0% with class III obesity, while 9.7% had a BMI below 30 kg/m². 35.5% had type 2 diabetes at baseline. At 6 months, the mean body weight change was -13.7 kg. Clinically meaningful weight loss was observed in the majority of patients, with 96.8% achieving $\geq 5\%$ weight loss, 64.5% achieving $\geq 10\%$ weight loss, 29.0% achieving $\geq 15\%$ weight loss, and 9.7% achieving $\geq 20\%$ weight loss. Among those with obesity at baseline, 75% experienced a reduction in obesity class. The highest tirzepatide dose received was 2.5 mg in 4 patients, 5 mg in 11 patients, 7.5 mg in 4 patients, 10 mg in 9 patients, 12.5 mg in 1 patient, and 15 mg in 2 patients.

Conclusion:

In this real-world cohort audit, tirzepatide treatment was associated with substantial weight reduction at 6 months, with nearly all patients achieving clinically meaningful weight loss and approximately two-thirds achieving at least 10% weight reduction. These findings support the effectiveness of tirzepatide in routine clinical practice and are consistent with results observed in randomised clinical trials.

Inpatient diabetes care at the frontline: A survey of nurses' confidence and knowledge

Choy K^{1,2}, Marlow C³, Drever E⁴

¹Department of Endocrinology and Diabetes, Barwon Health, Geelong, Australia, ²Adrian Costa Clinical Trials Centre, Barwon Health, Geelong, Australia, ³Centre of Education and Training, Barwon Health, Geelong, Australia, ⁴Colac Area Health, Colac, Australia

Aim:

Diabetes mellitus is a common condition among hospitalised patients and requires careful inpatient management to reduce the risk of complications. As diabetes therapies and monitoring technologies continue to evolve, the knowledge required for safe inpatient care has become increasingly complex. This survey aimed to assess nurses' self-reported confidence and perceived knowledge in key aspects of inpatient diabetes management.

Objectives:

An anonymous questionnaire was distributed to nursing staff across multiple specialties. Responses were recorded using Likert-style confidence scales and analysed descriptively. The aim was to identify potential educational needs and inform strategies to strengthen patient safety and quality of inpatient diabetes care.

Results:

A total of 32 nurses across multiple specialty wards completed the survey. More than half of respondents had over 10 years of nursing experience (56.3%), and many reported frequent exposure to people with diabetes in clinical practice, with 40.6% caring for 6–10 such patients per week. Confidence was generally high in routine inpatient diabetes management tasks. Approximately 78.2% of respondents reported being fairly or extremely confident in recognising and managing hypoglycaemia according to hospital protocols, and 75.1% reported similar confidence in administering insulin using inpatient sliding-scale charts. Lower confidence was observed in several more complex areas of diabetes care. The largest confidence and knowledge gaps were identified in insulin pump therapy, recognising nutrition-related or steroid-induced hyperglycaemia, interpreting HbA1c values, recognising diabetic ketoacidosis and following its treatment protocol, and knowledge of glucose-lowering medications.

Conclusion:

While nurses demonstrated strong confidence in several routine aspects of inpatient diabetes management, the findings of this survey highlight the need for targeted educational initiatives focusing on more complex aspects of diabetes management. Structured training programs and continuing professional education can help strengthen nursing competence and support safe and effective inpatient diabetes care.

Thinking beyond diabetes: a case series of atypical causes of ketoacidosis

Choy K^{1,2}, Ramasamy T³

¹Department of Endocrinology and Diabetes, Barwon Health, Geelong, Australia, ²Adrian Costa Clinical Trials Centre, Barwon Health, Geelong, Australia, ³Department of General Medicine, Barwon Health, Geelong, Australia

Aim:

Ketoacidosis is most commonly associated with diabetes mellitus; however, a range of non-classical precipitants may lead to clinically significant ketosis and metabolic acidosis that can mimic diabetic ketoacidosis. Atypical causes of ketoacidosis may be under-recognised, which can contribute to delays in diagnosis and appropriate management. Awareness of these alternative aetiologies is therefore essential when evaluating patients presenting with high anion gap metabolic acidosis (HAGMA). This case series aims to highlight atypical and under-recognised causes of ketoacidosis and emphasise the importance of maintaining a broad differential diagnosis.

Methods:

We describe three cases illustrating distinct non-classical mechanisms of ketoacidosis identified through clinical assessment and biochemical evaluation.

Results:

The first case involved a 20-year-old woman, 12 weeks postpartum, who presented with nausea, vomiting and severe HAGMA with marked ketonaemia in the absence of hyperglycaemia. Further assessment revealed inadequate caloric intake while exclusively breastfeeding, leading to a diagnosis of lactation ketoacidosis. Rapid clinical and biochemical improvement occurred following intravenous dextrose administration and nutritional optimisation. The second case describes a 46-year-old man with type 2 diabetes who presented with severe DKA without an identifiable precipitant initially. Further history subsequently revealed recent cocaine ingestion. The sympathomimetic effects of cocaine likely precipitated ketoacidosis through increased counter-regulatory hormone activity and impaired insulin action. The third case involved a 40-year-old man without diabetes who presented with severe ketoacidosis initially suspected to represent new-onset diabetes. Subsequent evaluation revealed adherence to a very-low-carbohydrate ketogenic diet, resulting in starvation-induced ketoacidosis with transient hyperglycaemia.

Conclusion:

These cases illustrate that ketoacidosis can arise from diverse mechanisms beyond classical diabetes-related pathways. Recognition of atypical precipitants—including dietary practices, substance use, and physiological states such as lactation—is important when evaluating HAGMA. Careful assessment of social, medication, and dietary history can help identify uncommon causes of ketoacidosis, guide appropriate management and avoid misdiagnosis.

Glycaemic Outcomes and Patient Profiles in a Rural Australian Diabetes Outreach Clinic in South West Victoria

Choy K¹, Cukier K^{1,2}

¹Department of Endocrinology and Diabetes, Barwon Health, Geelong, Australia, ²Adrian Costa Clinical Trials Centre, Barwon Health, Geelong, Australia

Aim:

Diabetes outreach clinics help address access-to-care inequalities in rural and regional populations. The Colac Diabetes Outreach Clinic (CDOC) is a specialist outreach service delivered through Barwon Health for rural patients with complex diabetes.

Methods:

This retrospective audit characterised patients referred to the CDOC and evaluated 12-month glycaemic outcomes.

Results:

23 patients attending the CDOC between September and December 2024 were included. The median age was 65 years, with 52.2% female. The median duration of diabetes was 13 years. Most patients had type 2 diabetes (78.3%), followed by type 1 (17.4%) and type 3c diabetes (4.3%). The primary reason for referral was glycaemic optimisation (78.3%), with the remainder referred for continuation of specialist care or newly diagnosed diabetes. At initial review, 60.9% had at least one diabetes-related complication, and 95.7% had at least one additional cardiovascular risk factor beyond diabetes mellitus, predominantly dyslipidaemia. Among type 2 diabetes patients, all were managed with ≥ 2 glucose-lowering therapies at baseline, with 66.7% receiving insulin therapy. Treatment intensification within 12 months occurred in 47.8% of patients. Mean HbA1c at baseline was 9.2%, improving to 8.1% at approximately 12 months. Among patients with paired HbA1c data (baseline and at 12 months), 84.2% demonstrated an HbA1c reduction. In those with HbA1c improvement, the mean reduction was 1.68%. 75.0% achieved a clinically meaningful HbA1c reduction of $\geq 0.5\%$, with a strong reduction of $\geq 1.0\%$ in 68.8%, and a marked reduction of $\geq 2.0\%$ in 31.3%.

Conclusion:

Patients attending the CDOC represent a complex cohort with longstanding diabetes, high comorbidity burden, and substantial cardiovascular risk. Meaningful improvements in glycaemic control were achieved in most patients over 12 months. Ongoing audit involving a larger cohort is warranted to better represent clinic activity and outcomes. Future evaluation incorporating patient-reported satisfaction surveys may further inform the perceived value and impact of this clinic.

Case report: Congenital nystagmus and preaxial polydactyly in 17q12 deletion syndrome (HNF1 β -MODY)

Clay R¹, Laafira A^{2,3}

¹Royal Perth Hospital, Perth, Australia, ²Armadale Health Service, Armadale, Australia, ³Fiona Stanley Hospital, Murdoch, Australia

Background

17q12 deletion syndrome is a contiguous gene deletion that includes HNF1 β and commonly presents with HNF1 β maturity-onset diabetes of the young (MODY 5)¹. Whole gene deletion of HNF1 β typically occurs with a highly variable phenotype^{1,2}. In addition to early-onset diabetes, renal and genitourinary malformations; neurodevelopmental or neuropsychiatric features are frequently reported²⁻⁴. Approximately 75% of 17q12 deletions occur de novo, while 25% are inherited in an autosomal dominant manner¹. Given the rarity of 17q12 deletion syndrome, a high clinical index of suspicion is needed to undertake genetic testing.

Case presentation

We report a 26 year old Thai woman presenting with marked hyperglycaemia without ketoacidosis or ketonaemia. Basal bolus subcutaneous insulin was commenced, achieving good glycaemic control. She was lean (BMI 20.6) and noted to have congenital horizontal nystagmus and history of surgically corrected pre-axial polydactyly.

Biochemistry demonstrated HbA1c 17.6% (168mmol/mol) with detectable fasting c-peptide, negative diabetes autoantibodies and mixed dyslipidaemia. Ultrasonography demonstrated an atrophic pancreas, unilateral renal agenesis. Neuropsychiatric testing (via Thai interpreter) indicated marked impairment in working memory, verbal expression, comprehension and academic attainment. MRI brain demonstrated non-specific frontal white matter hyperintensities. Chromosomal micro-array identified a 1.4Mb heterozygous recurrent deletion at 17q12, confirming 17q12 deletion syndrome with HNF1 β -MODY.

Discussion

This case expands the phenotypic spectrum of 17q12 deletion syndrome by documenting congenital nystagmus and preaxial polydactyly, features rarely attributed to this microdeletion. Establishing the diagnosis with genetic testing has immediate clinical utility by enabling cascade testing, reproductive counselling and surveillance for renal, hepatic, neuropsychiatric and associated complications.

Conclusions

HNF1 β -MODY should be suspected in lean individuals presenting with diabetes who lack typical risk factors for Type 2 Diabetes, particularly when congenital abnormalities are evident. Identification of a whole-gene HNF1 β deletion confirms 17q12 deletion syndrome and broadens management to evaluate for extra-pancreatic manifestations.

References

1. Mitchel MW, Moreno-De-Luca D, Myers SM, Levy RV, Turner S, Ledbetter DH, et al. 17q12 recurrent deletion syndrome. In: Adam MP, Bick S, Mirzaa GM, Pagon RA, Wallace SE, Amemiya A, editors. GeneReviews® [Internet]. Seattle (WA): University of Washington, Seattle; 1993-2026. 2016 Dec 8 [updated 2025 Aug 14; cited 2026 Feb 8]. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK401562/>
2. Clissold RL, Shaw-Smith C, Turnpenny P, et al. Chromosome 17q12 microdeletions but not intragenic HNF1B mutations link developmental kidney disease and psychiatric disorder. *Kidney Int.* 2016;90(1):203-11. doi:10.1016/j.kint.2016.03.027.
3. Rasmussen M, Vestergaard EM, Graakjaer J, Petkov Y, Bache I, Fagerberg C, et al. 17q12 deletion and duplication syndrome in Denmark: a clinical cohort of 38 patients and review of the literature. *Am J Med Genet A.* 2016;170(11):2934-42. doi:10.1002/ajmg.a.37848. Epub 2016 Jul 13. PMID:27409573.
4. Milone R, Tancredi R, Cosenza A, Ferrari AR, Scalise R, Cioni G, et al. 17q12 recurrent deletions and duplications: description of a case series with neuropsychiatric phenotype. *Genes (Basel).* 2021;12(11):1660. doi:10.3390/genes12111660. PMID:34828266. PMCID:PMC8620923.

Stop Diabetes: A multidimensional study of screening, treatment optimization, preventive lifestyle and clinical outcomes in newly diagnosed adult Filipino with Type 2 Diabetes

Costelo E¹, Tolentino M¹, Tiu F¹

¹Diabetes Philippines, City of Mandaluyong, Philippines

Sponsor: Diabetes Philippines

Background: Type 2 diabetes mellitus (T2DM) remains a major public health challenge in the Philippines, with an estimated 8% prevalence and 26% prediabetes among adults. Despite therapeutic advances, national data show persistently poor glycemic control, with only 15% of patients achieving HbA1c <7%. Early complications—including neuropathy, proteinuria, and retinopathy—are frequently observed within the first year of diagnosis. The 2025 Philippine Clinical Practice Guideline (CPG) emphasizes early screening, timely treatment intensification, and structured monitoring, yet real-world adherence and outcomes among newly diagnosed Filipino adults remain insufficiently characterized.

Objective: To evaluate changes in HbA1c from diagnosis to 6, 12, and 24 months among newly diagnosed Filipino adults with T2DM managed according to the Philippine CPG, and to describe screening quality, treatment patterns, safety, and early clinical outcomes.

Methods: The STOP DIABETES study is a prospective, multicenter, observational cohort enrolling adults ≥18 years with newly diagnosed T2DM (≤6 months) across outpatient clinics, hospitals, and primary care centers nationwide. Baseline assessments include demographics, clinical history, physical examination, laboratory tests, and complication screening. Follow-up visits at 3, 6, 12, and 24 months capture glycemic and metabolic parameters, treatment changes, adverse events, and adherence to CPG-recommended screening intervals. The primary endpoint is change in HbA1c from baseline to 6, 12, and 24 months. Secondary endpoints include CPG adherence metrics, treatment intensification patterns, achievement of glycemic, blood pressure, and lipid targets, and incidence of early microvascular and macrovascular complications. Analyses will use paired tests, mixed models for repeated measures, and subgroup analyses by age, sex, region, and facility type.

Expected Results: The study will generate a national profile of newly diagnosed Filipino adults with T2DM, quantify real-world adherence to the Philippine CPG, and describe early treatment outcomes, safety, and care gaps. Findings will inform future updates to the Philippine CPG and guide national diabetes care strategies.

Cardiovascular risk prediction in adults with type 1 diabetes using an equation validated for type 2 diabetes: The Fremantle diabetes study phase II

Davis T¹, Fegan P², Davis W¹

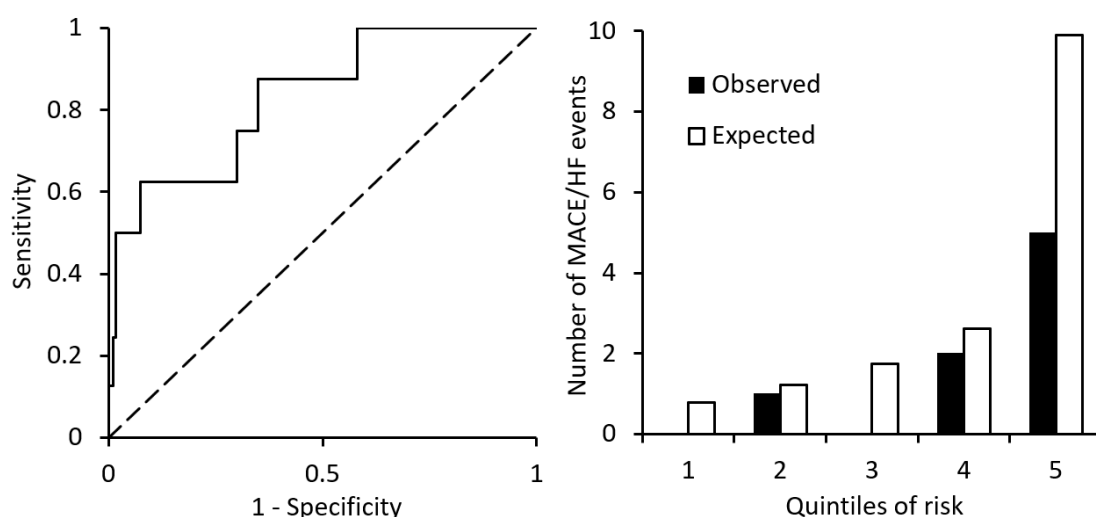
¹University of Western Australia, FREMANTLE, Australia, ²Department of Endocrinology and Diabetes, Fiona Stanley Hospital, Murdoch, Australia

Aim: We have previously published a validated 5-year cardiovascular disease (CVD) risk equation for Australians with type 2 diabetes (T2D) based on longitudinal data from 1551 representative, community-based individuals in the Fremantle Diabetes Study Phase II (FDS2) and allowing for the competing risk of non-CVD death. The aim of this study was to determine whether this equation has clinical utility in type 1 diabetes (T1D).

Methods: We followed a parallel cohort of 128 FDS2 adults with T1D (mean age 47 years, 54% males, median diabetes duration 20 years) recruited 2008-2011 for first occurrence of a major adverse cardiovascular event (MACE; non-fatal myocardial infarction, stroke, cardiovascular death) or heart failure (HF) hospitalisation. Model discrimination was assessed from the area under the receiver operating characteristic curve (ROC AUC). Observed versus predicted events were plotted by quintiles of risk.

Results: There were 8 MACE/HF events in the cohort over the 5 years from baseline (6.3% versus the equivalent percentage of 15.3% in the older contemporaneous FDS2 T2D cohort). The ROC AUC was 0.83 [95% confidence interval 0.69 to 0.98]; see Figure, left panel) which was similar to that in the T2D participants (0.82 [0.79-0.85]). Observed vs predicted events suggested good model calibration (see Figure, right panel).

Conclusions: Despite different phenotypic characteristics, the FDS2 CVD risk equation successfully identified adults with T1D at increased of incident MACE and HF events, and could be used to guide CVD risk reducing strategies in T1D.



The relationship between serum HDL-cholesterol and all-cause mortality in community-based people with type 1 diabetes: The Fremantle diabetes study Phase I

Davis T¹, Fegan P², Davis W¹

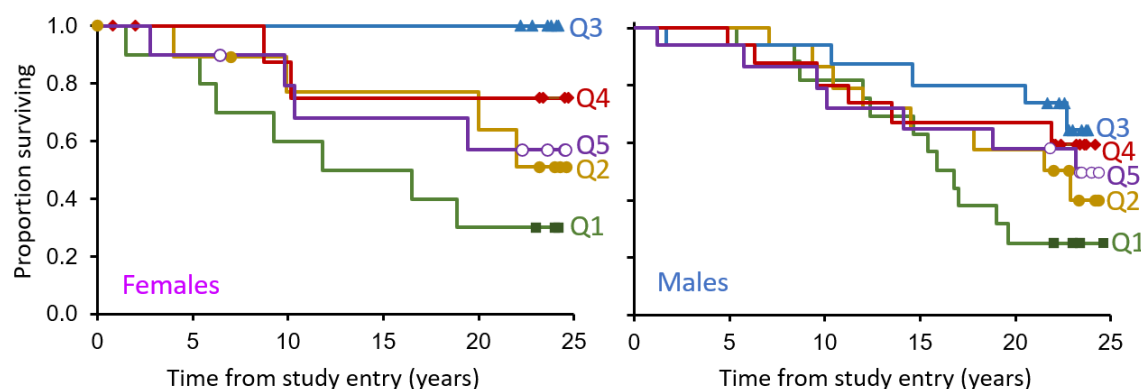
¹University Of Western Australia, Fremantle, Australia, ²Department of Endocrinology and Diabetes, Fiona Stanley Hospital, Murdoch, Australia

Aim: There is a U-shaped relationship between serum HDL-cholesterol and mortality in females but not males with type 2 diabetes (T2D). Our aim was to assess the prognostic significance of serum HDL-cholesterol concentrations by sex in type 1 diabetes (T1D).

Methods: Fremantle Diabetes Study Phase I (recruitment 1993-1996) was utilised due to long duration follow-up. We followed 50 females and 74 males (mean ages 40.3 and 43.3 years, mean follow-up 17.4 and 18.1 years, respectively) with T1D for deaths ascertained from validated databases to end-2017. Kaplan Meier curves by HDL-cholesterol quintile (Q) were compared by log rank test.

Results: There were 17 and 38 deaths in females and males, respectively (34.0% and 51.4%; $P=0.056$). In the females, baseline Q3 (1.26-1.44 mmol/L) had lowest mortality (0%; see Figure; $P=0.017$) with higher mortality in Q1 (70%; <0.95 mmol/L, $P=0.001$), Q2 (40%; 1.00-1.25 mmol/L, $P=0.013$), and Q5 (40%; >1.80 mmol/L, $P=0.021$) in unadjusted pairwise comparisons. In males, there was no between-quintile difference in survival ($P=0.201$).

Conclusions: There is a significant U-shaped relationship between serum HDL-cholesterol and all-cause death in community-based females but not males with T1D, paralleling type 2 data. These findings have implications for assessment of serum lipid profiles in T1D.



Scalable speech-based screening for type 2 diabetes: a large-scale validation study

de Courten B¹, Brann E², Polle R², Cepukaityte G², Georgescu A², Parsons O², Molimpakis E², Gorla S²

¹RMIT University, Melbourne, Australia, ²thymia Limited, London, United Kingdom

Aims: Approximately 50% of type 2 diabetes (T2D) cases remain undiagnosed in the Western Pacific Region, driving high complication rates. Diabetes-related metabolic and neuropathic changes affect aspects of speech production, including vocal fold function and articulation. We aimed to validate a novel scalable speech-based T2D screening tool requiring only a 20-second recording against self-reported diagnosis, HbA1c, and a validated risk assessment benchmark.

Methods: A logistic regression classifier was trained on paralinguistic speech features from 21,129 English-speaking UK and US adults, then prospectively validated in a separate cohort of 7,319 UK adults (Stage 1, self-report) and benchmarked against QDiabetes. A subset of 801 individuals from this cohort also completed home HbA1c blood tests within three months of the speech recording (Stage 2). Performance was assessed using bootstrap cross-validation, reporting area under the curve (AUC; > 0.5 indicates above-chance), with subgroup analyses across demographic and clinical strata.

Results: The model achieved AUC 0.80 (± 0.03) for self-reported T2D, approaching QDiabetes (AUC = 0.86 ± 0.03). Performance was generally robust across demographic subgroups (most AUCs ≥ 0.75), but lower in comorbid subgroups, including hypertension, cardiovascular disease or BMI ≥ 30 (AUCs 0.65–0.73). Against HbA1c, the model achieved AUC 0.75 at diabetes (≥ 48 mmol/mol) and 0.73 at prediabetes (≥ 42 mmol/mol) thresholds. Among undiagnosed participants, the predicted high-risk group had significantly higher mean HbA1c than the low-risk group ($\Delta = 5.3$ mmol/mol, $p < 0.001$), and no low-risk participant had prediabetic or diabetic HbA1c results.

Conclusion: In the largest study of its kind, we have shown that 20-second speech recordings can predict T2D with clinically useful performance. By being quick, non-invasive, remote and scalable, this innovative technology has the potential to increase screening uptake and enable earlier diagnosis, lowering long-term costs of T2D and meaningfully complementing existing detection pathways at population level.

Insulin dose normalised time in range (dTIR): A novel metric quantifying glycaemic benefit per unit insulin in hybrid closed-loop therapy

Konantambigi A¹, Shenoy V², Puri G¹, Deshmukh H¹

¹Gold Coast University Hospital, Mackay, Australia, ²James Cook University, Townsville, Australia,

³Logan Hospital, Meadowbrook QLD 4131, Australia

Objective:

Hybrid closed-loop (HCL) insulin delivery systems improve glycaemic outcomes in type 1 diabetes; however, the mechanisms underlying these improvements remain incompletely understood. We developed and evaluated a novel metric, Insulin dose normalised Time in Range (dTIR), defined as time in range (TIR) achieved per unit of insulin administered, to quantify glycaemic benefit independent of insulin dose.

Research Design and Methods:

We conducted a retrospective multicentre observational study of individuals with diabetes initiating HCL therapy across regional Australia. Insulin dose normalised Time in Range (dTIR) was calculated as TIR (3.9–10 mmol/L) divided by total daily insulin dose (TDD). Efficiency change was assessed using paired comparisons and log-transformed efficiency ratios. Associations with glycaemic outcomes were evaluated using correlation and regression analyses.

Results:

Eighty-six participants (mean age 32.8 years; 60% female) were included. Mean TIR improved from 56.6% to 72.8% (+16.2 percentage points), while mean TDD decreased modestly (−1.6 units). dTIR increased significantly from 1.38 to 1.75 ($p = 2.1 \times 10^{-5}$). Log efficiency change demonstrated a moderate effect size (Cohen's $d = 0.54$). Efficiency improvement strongly correlated with TIR improvement (Spearman $\rho = 0.76$, $p = 1.78 \times 10^{-15}$) and inversely correlated with HbA1c change ($\rho = -0.24$, $p = 0.038$). Efficiency change independently predicted TIR improvement after adjustment for baseline TIR, age, and sex ($\beta = 11.16$, $p = 0.0004$). Both Medtronic and Tandem systems demonstrated significant efficiency improvements, with greater gains observed in Tandem users ($p = 0.022$).

Conclusions:

dTIR represents a novel metric that quantifies glycaemic benefit relative to insulin dose. Hybrid closed-loop therapy improves glycaemic control primarily by enhancing insulin efficiency rather than increasing insulin delivery. This metric may provide a mechanistic framework for evaluating automated insulin delivery systems and optimizing diabetes management.

Developing a digital phenotype to identify diabetes in patients admitted to hospital: Findings in an AusNaDIA point-prevalence pilot study

Dharma M^{1,2,3}, Barmanray R^{1,2,3}, Kyi M^{1,2,3}, Furlanos S^{1,2,3}

¹Department of Diabetes & Endocrinology, The Royal Melbourne Hospital, Parkville, Australia,

²Department of Medicine, The Royal Melbourne Hospital, The University of Melbourne, Parkville, Australia, ³ Australian Centre for Accelerating Diabetes Innovations, The University of Melbourne, Melbourne, Australia

Background: In the inpatient setting, diabetes is frequently not correctly documented or detected, despite its impact on clinical outcomes such as healthcare-associated infection. Discrete electronic medical record (EMR) documentation can assist with discharge coding and is required for use of diabetes specific digital tools such as decision support and risk calculators. Digital phenotyping for diabetes uses health data to identify the presence of diabetes.

Methods: Based on the Royal Melbourne Hospital's pilot Australian National Diabetes Inpatient Audit (AusNaDIA) in November 2025 we investigated which patients had a clinician-made diagnosis of diabetes or hyperglycaemia (gold-standard) or discrete EMR documentation. We developed algorithm-based digital phenotypes to identify diabetes or hyperglycaemia (two random blood glucose measures ≥ 11.1 mmol/L) utilising HbA1c, medications, outpatient encounters, glucose measures, and natural language processing of clinical notes.

Results: Overall, 39.3% (211/537) patients had diabetes or hyperglycaemia, 30.2% (162/537) had diabetes with 8.6% (14/162) newly-detected. Discrete EMR documentation was only evident in 46.9% (76/162) patients and markedly less evident in patients admitted under surgical versus medical specialties [relative risk (RR) 0.56, 95%CI 0.36-0.86, $p=0.004$] and the newly-detected versus previously-detected [RR 0.14, 95%CI 0.02-0.94, $p=0.002$]. Phenotype 1 detected diabetes and hyperglycaemia with a sensitivity of 98.1% and specificity of 88.0%. Phenotype 2 excluded the discharge summary which contributed to a high false positive rate, 12%, and specificity increased to 99.4%. Phenotype 2b, which included discrete fields and excluded natural language processing of text had a sensitivity of 94.3% and specificity of 99.7%.

Conclusion: We developed a digital phenotype to accurately identify diabetes or hyperglycaemia in an AusNaDIA pilot cohort. Further assessment and validation are pending in the planned first Australia-wide AusNaDIA benchmarking study in 2026. Improving digital identification of diabetes is crucial for digital health tools to assist managing the increasing inpatient burden of diabetes and improving the coding of diabetes.

An evaluation of guided self-determination: a co-designed communication intervention for Aboriginal people living with type 2 diabetes

Druce T¹, Rasmussen B¹, Mullan ^{1,2}, Druce T^{1,3}, McNamara C^{1,4}, Kerr D^{1,3}

¹School of Nursing & Midwifery, Centre for Quality & Patient Safety Research, Deakin University, Burwood, Australia, ²School of Nursing, Midwifery and Paramedicine, Australian Catholic University, Brisbane, Australia, ³Western Health Partnership, St Albans, Australia, ⁴Baker Heart and Diabetes Institute, Melbourne, Australia

Background/Aim:

The incidence of and mortality associated with diabetes are substantially increased amongst Aboriginal and Torres Strait Islander people compared with non-Indigenous Australians. The Guided Self-Determination (GSD) approach empowers people living with diabetes by facilitating person-centred, reflective conversations to create sustainable solutions to support diabetes self-management. We aimed to develop, implement and evaluate a co-designed culturally-tailored GSD program to improve diabetes self-management and well-being for Aboriginal people.

Methods:

A pre-post, mixed-methods design was used to test the feasibility, acceptability and usefulness of GSD for Aboriginal and Torres Strait Islander people living with diabetes. Participants complete evaluation surveys before commencing the GSD program, immediately after completion, and six months post-program. The surveys measured autonomous motivation to self-manage diabetes, perceived competence in diabetes, health literacy, quality of life, and diabetes distress. Secondly, we conducted a qualitative evaluation of the implementation of the GSD program. Health care practitioners and Aboriginal participants were interviewed about their perspectives on the GSD program.

Results:

This culturally tailored program is being implemented by healthcare practitioners working with Aboriginal and Torres Strait Islander people living with type 2 diabetes. Experiences of participants and practitioners are being evaluated to assess impact, feasibility, and broader applicability. Exit interviews and 6-month surveys are underway, with preliminary findings to be presented.

Conclusion:

The culturally designed GSD program is expected to reduce the burden of type 2 diabetes and its complications, improve quality of life for Aboriginal and/or Torres Strait Islander people living with T2D, and strengthen prevention and care through meaningful, evidence-driven improvements in practice and research. Program impact will be demonstrated through final evaluation surveys and interviews.

Fasted high-intensity interval exercise does not increase ketosis or hypoglycaemia risk in adults with type 1 diabetes using sodium-glucose cotransporter 2 inhibitors

Du P^{1,2}, Kong Y^{1,2,3}, Kriketos A⁴, Manzoney A⁵, Jenkins A^{1,2,3,6}, Nolan C^{3,7,8}, Hennessy D², Randle D⁹, Ekinci E^{2,3,5}, Gao F^{3,5}, Jones H^{1,2}, Goad J², Ngan J^{1,2}, Fenn J⁹, Agnoletto L², Umapathysivam M⁹, Felder M⁴, Huang M⁶, Nakano M⁵, Taylor P⁹, Lee R⁷, MacIsaac R^{1,2,3}, Vogrin S², Furlanos S^{3,4}, Stranks S⁹, O'Neal D^{1,2,3,6}, Morrison D²

¹Department of Endocrinology and Diabetes, St Vincent's Hospital Melbourne, Fitzroy, Australia,

²Department of Medicine, University of Melbourne, Fitzroy, Australia, ³Australian Centre for Accelerating Diabetes Innovations, School of Medicine, University of Melbourne, Parkville, Australia,

⁴Department of Diabetes and Endocrinology, The Royal Melbourne Hospital, Parkville, Australia,

⁵Department of Endocrinology and Centre for Research in Education in Diabetes and Obesity, Austin Health, Heidelberg, Australia, ⁶Baker Heart and Diabetes Institute, Melbourne, Australia,

⁷Department of Diabetes and Endocrinology, Canberra Health Services, Garran, Australia, ⁸School of Medicine and Psychology, Australian National University, Acton, Australia, ⁹Southern Adelaide Diabetes and Endocrine Services, Oaklands Park, Australia

Aim: Sodium-glucose cotransporter 2 inhibitors (SGLT2i) improve glycaemic control, reduce cardiovascular mortality and are reno-protective in type 2 diabetes. These benefits may extend to people with type 1 diabetes (T1D), however SGLT2i are not recommended due to increased diabetic ketoacidosis risk. Exercise in T1D may promote ketosis via glycogen depletion, dehydration and counter-regulatory hormone secretion. We aimed to assess the effect of high-intensity interval exercise (HIIE) on continuous ketone levels in T1D adults receiving SGLT2i versus placebo.

Methods: The PARTNER study was a randomised cross-over double-blinded trial in T1D adults who were randomised to dapagliflozin 10mg/day or placebo for 12 weeks, followed by the alternative treatment for 12 weeks after a 2-week washout period, in conjunction with wearing a continuous ketone monitor (CKM), continuous glucose monitor (CGM), and education to minimize ketosis. This exercise sub-study involved a subset of participants undergoing morning, fasted HIIE (40min, with five 4min efforts at ~80-90% heart rate max, interspersed with passive rest) after at least 6 weeks on dapagliflozin or placebo. Participants remained fasted for 90min post-exercise at which point they ingested a 20-40g carbohydrate meal.

Results: A total of 13 participants were included in the sub-study analysis. From both exercise commencement to 2 hours post-exercise and 24 hours post-exercise, there was no significant difference in any CKM or CGM outcome between treatments. CGM time below range (<3.9mmol/L) was 0% with both treatments. While no participants on placebo experienced ketones >0.6mmol/L, two participants using dapagliflozin (17%) experienced elevated ketones 2 hours post-exercise (54.5% and 100% time spent >0.6mmol/L; 0% and 46.9% time spent >1.5mmol/L, respectively).

Conclusion: We observed no significant impact of SGLT2i on ketosis or hypoglycaemia risk alongside CKM use with fasted HIIE in T1D adults. Larger studies are required to definitively determine if exercise increases ketosis risk with SGLT2i in T1D.

Effect of extracellular water ratio (ECW/TBW) on physical function in older adults with Type 2 Diabetes: A cross-sectional study

Ekawa H¹, Ono K¹, Sugimoto R¹, Fukuoka M¹, Yamaguchi Y¹, Hirota Y², Yamada T², Yasuda H¹

¹Kobe University Graduate School of Health Sciences, Kobe, suma, tomogaoka, Japan, ²Kobe University Graduate School of Medicine, Division of Diabetes and Endocrinology, Kobe, chu-ou, kusunoki, Japan

Aims: Skeletal muscle mass index (SMI), calculated using bioelectrical impedance analysis (BIA), can be overestimated due to increased extracellular water (ECW) misidentified as muscle tissue. This study evaluated the association between the combined status of SMI and body water distribution (ECW/TBW) and physical performance in older adults with T2DM.

Methods: This cross-sectional study involved 89 older outpatients with T2DM (age 74.5±5.8 years, male/female 59/30). This study received ethical approval from Kobe University Hospital. Participants were classified into four groups based on SMI (male: 7.0, female: 5.7 kg/m²) and ECW/TBW (cutoff 0.400): Group1 (SMI and ECW/TBW within recommended ranges), Group2 (SMI within range, High ECW/TBW), Group3 (Low SMI, ECW/TBW within range), and Group4 (Low SMI and High ECW/TBW). Physical performance was quantified through the Short Physical Performance Battery Score, Five-Times Sit-to-Stand Test (FTSST), 4m-gait speed, and handgrip strength. MANCOVA was employed to compare functional outcomes among groups, adjusting for age, sex, HbA1c, serum albumin, and creatinine. Statistical significance was set at p<0.05.

Results: While traditional metabolic and nutritional markers were not independent predictors, Group categorization was independently associated with all physical performance measures (p < .0001). Post-hoc comparisons demonstrated a significant difference between Group 1 and Group 4 (p =0.0007). Although the comparison between Group 2 and Group 1 did not reach statistical significance (p =0.063), Group 2 (11.20±0.67 sec) was, interestingly, nearly equivalent to Group 3 (11.01±0.85 sec, p = 0.998), with an estimated mean difference of only 0.19 seconds.

Conclusion: SMI alone may overlook functional risks in T2DM, because abnormal fluid distribution causes an overestimation of muscle mass. This study suggests that Integrating ECW/TBW with SMI assessments is essential for identifying "hidden functional impairment". This approach may facilitate early multidisciplinary intervention for those at "hidden" functional risk.

A new clinical consensus statement on obesity and cardiovascular disease from the National Heart Foundation of Australia

Raffoul N¹, Bradburn E¹, Donnelly K², Just J², Jennings G², Ekinci E^{3,4}

¹Heart Foundation, Sydney, Australia, ²Heart Foundation, Melbourne, Australia, ³Australian Centre for Accelerating Diabetes Innovations (ACADI) and Department of Medicine, Melbourne Medical School, The University of Melbourne, Melbourne, Australia, ⁴Centre for Research and Education in Diabetes and Obesity (CREDO) and Department of Endocrinology Austin Health, Melbourne, Australia

Background: Approximately two thirds of Australian adults are living with overweight or obesity,¹ with excess adiposity a major contributor to cardiovascular disease (CVD) and type 2 diabetes.² Despite this, the overlap between obesity and CVD remains under-recognised and undertreated. Healthcare professionals require practical information on this rapidly expanding field, especially as new drug therapies emerge.

Aim: To develop an evidence-based clinical consensus statement offering practical guidance to healthcare professionals on the assessment, diagnosis and management of overweight and obesity in people with or at high risk of CVD.

Methods: An evidence-based clinical consensus statement was developed by the Heart Foundation in collaboration with a multidisciplinary expert taskforce, including endocrinologists/diabetologists, cardiologists, bariatric surgeons, general practitioners and allied healthcare professionals, and consumers with lived experience. Recommendations were informed by an independent evidence review, environmental scan and targeted consultation to ensure clinical relevance across care settings.

Results: The consensus statement promotes a stepped, person-centred approach to obesity management, commencing with behaviour modifications and escalating to incretin-based pharmacotherapies and/or metabolic bariatric surgery to achieve cardiovascular risk reduction. Practical guidance is offered on initiation, dose titration and side effect management of incretin-based therapies, and acknowledges specific considerations for prescribing these medications in people living with type 2 diabetes, atherosclerotic cardiovascular disease and heart failure. The consensus statement also emphasises the importance of comprehensive cardiometabolic risk assessment and recognises the growing clinical importance of cardiovascular-kidney-metabolic syndrome in contemporary practice.

Conclusion: The consensus statement is the first of its kind in Australia to address the complex intersect between obesity and cardiovascular disease, offering practical guidance to improve outcomes for people living with overweight/obesity and CVD or who are at high risk of CVD.

¹ Australian Institute of Health and Welfare. Overweight and obesity. 2024.

<https://www.aihw.gov.au/reports/overweight-obesity/overweight-and-obesity>

² Australian Institute of Health and Welfare. Australian Burden of Disease Study 2024. 2024.

<https://www.aihw.gov.au/reports/burden-of-disease/australian-burden-of-disease-study-2024>

Phase 3 trial of Survodutide once weekly for the treatment of adults with obesity: SYNCHRONIZE™-1

Ekinci E¹

¹Head, Department of Medicine, Melbourne Medical School, The University of Melbourne Director, Australian Centre for Accelerating Diabetes Innovations (ACADI) Director, Centre for Research and Education in Diabetes and Obesity (CREDO), Melbourne, Australia

Background: Obesity is a chronic metabolic disease that warrants novel pharmacotherapeutic approaches. Despite the effectiveness of existing glucagon-like peptide-1 (GLP-1) medications in treating obesity, unmet needs remain, partly because of the heterogeneity among patients in response to current obesity treatment. Survodutide is an investigational glucagon receptor/GLP-1 receptor dual agonist that induced substantial weight reduction in a phase 2 trial in adults with obesity without diabetes.

Methods: In this multinational phase 3 trial (NCT06066515), adult participants (aged ≥18 years) with a body-mass index (BMI) of ≥30 kg/m² or ≥27 kg/m² with ≥1 obesity complication (excluding diabetes), were randomized 1:1:1 to double-blind treatment with once-weekly subcutaneous survodutide up-titrated to 3.6 or 6.0 mg, or placebo. The two primary endpoints were percent change in body weight and a reduction in body weight of ≥5%, each from baseline to Week 76. Safety was evaluated throughout the study.

Results: Enrolment and follow-up in the trial were completed, and the final patient visits occurred in October 2025. Results will be available in June 2026.

Conclusion: The SYNCHRONIZE™-1 trial will provide a robust evaluation of the efficacy and safety of survodutide for the treatment of obesity in a multinational cohort of adults with a BMI of at least 27 kg/m² and at least one obesity related complication, without diabetes.

Tirzepatide use in a patient with cystic fibrosis and low body weight

Ephraums L^{1,2}, Chapman S³, Umapathysivam M^{1,2,3}

¹Sothorn Adelaide Diabetes and Endocrine Service, Flinders Medical Centre, Adelaide, Australia,

²Adelaide University, Adelaide, Australia, ³Department of Thoracic Medicine, Royal Adelaide Hospital, Adelaide, Australia

Case study:

Despite the advent of highly effective modulator therapy, respiratory disease remains the primary driver of morbidity and mortality in cystic fibrosis (CF). Glucagon-like peptide-1 receptor agonist (GLP-1RA) and dual agonist therapy (tirzepatide) are emerging as a potential therapy in cystic fibrosis-related diabetes (CFRD) due to proposed positive respiratory effects and potent glycaemic effects. GLP-1 receptors are highly expressed in the lung with evidence of positive effects on respiratory smooth muscle, mucus secretion, inflammation and surfactant production (1). Two small uncontrolled case series of incretin therapy in cystic fibrosis-related diabetes (CFRD) suggest improvements in pulmonary function and glycaemic control (2, 3). However, a safety concern about weight reduction with GLP-1RA remains. Weight loss is associated with reduction in pulmonary function in individuals with CF. This may offset the proposed benefit of this class in the CFRD.

A 38-year-old female with cystic fibrosis but without diabetes or obesity self-funded tirzepatide through an online provider, with an initial BMI of 23 kg/m² and weight of 66 kg. She had a pre-therapy FEV1 of 2.94 L (87% predicted) and FVC of 3.73 L (91% predicted) which had remained stable on TRIKAFTA for several years. After initiating tirzepatide (2.5 mg) there was weight loss of 13.5 kg to below the normal BMI range of 18.4 kg/m². Notably there was clinically significant improvement in FEV1 to 3.06 L (91% predicted) (+0.12 L) and FVC to 3.83 L (94% predicted) (+0.1 L) at 12 months. Despite absence of obesity and diabetes and in the presence of weight loss below normal thresholds there was an improvement in pulmonary function tests at 12 months with tirzepatide.

Conclusion:

Incretin therapy may have positive pulmonary effects that are independent of improved glycaemia and obesity in CF. Furthermore, incretin therapy may be safe from a pulmonary perspective in patients with normal/low body weight.

References

1. Bullock BP, Heller RS, Habener JF. Tissue distribution of messenger ribonucleic acid encoding the rat glucagon-like peptide-1 receptor. *Endocrinology*. 1996;137(7):2968-78.
2. Park S, Jain R, Mirfakhraee S. Glucagon-like-peptide-1 agonist therapy in adults with cystic fibrosis. *J Cyst Fibros*. 2025;24(1):40-6.
3. Horvit A, Kaput K, Neece A, Abramowitz J, Abreu M, Ratti GA, et al. Impact of glucagon-like-peptide-1 receptor agonist therapy on pulmonary function in people with cystic fibrosis who achieve normal body mass index. *J Cyst Fibros*. 2025.

Twice weekly low dose of semaglutide reduced hypoglycaemia in a patient with Type 1 diabetes on an automated insulin delivery system.

Ephraums L^{1,2}, Umapathysivam M^{1,2,3}

¹Southern Adelaide Diabetes and Endocrine Service, Flinders Medical Centre, Adelaide, Australia,

²Adelaide University, Adelaide, Australia, ³Endocrine and Metabolic Medicine Unit, Royal Adelaide Hospital, Adelaide, Australia

Case study

The emergence of glucagon-like peptide-1 receptor agonists (GLP-1RA) has been transformative for the management of obesity and type 2 diabetes. Their mechanism of action in glucose control is multifactorial, including improved insulin sensitivity and delayed gastric emptying, resulting in significant reductions in insulin requirements. Hypoglycaemia is a common sequela if GLP-1RA therapy is combined with insulin, with rates of up to 20% after initiation. Consequently, insulin doses are often reduced after GLP-1RA initiation.

For patients managed with automated insulin delivery (AID) via continuous subcutaneous insulin infusion (CSII) reducing insulin requirements can be challenging as insulin delivery algorithms adjust automatically and may not adequately adapt to rapid changes in insulin sensitivity.

A case is presented of a 39-year-old male with type 1 diabetes, obesity (weight 118 kg) and insulin resistance. He was managed with a Tandem t:slim X2 CSII system in Control-IQ mode with a total daily insulin requirement of 180 units. After initiation of low-dose semaglutide (0.25 mg weekly), daily insulin requirements decreased to 80 units with continuous glucose monitoring (CGM) time in range improving to 95% (from 75%) without hypoglycaemia.

Following dose escalation to 0.5 mg weekly, there was a rapid increase in hypoglycaemia, occurring at least twice daily for three days after each semaglutide dose. Notably, during the four days prior to the weekly semaglutide dose, hypoglycaemia did not occur and the amount of insulin delivered did not change.

Given this pattern, semaglutide was split at twice weekly dosing of 0.25 mg. With this change hypoglycaemia was reduced from 4% to 0% on CGM.

Conclusion:

This case highlights that hypoglycaemia can occur at peak semaglutide concentration at 2-3 days and improves prior to next dosing. Therefore, twice weekly low dose administration may be a feasible option to mitigate refractory hypoglycaemia in patients managed with GLP-1RA and insulin therapy.

A cross-sectional comparison of three different automated insulin delivery systems in adults with type 1 Diabetes

Ephraums L^{1,2}, Jalleh R^{1,2}, Watson L^{1,2}, Haurat J³, Zimmermann A^{1,2}

¹Diabetes and Endocrine unit, Northern Adelaide Local Health Network, Adelaide, Australia,

²Adelaide University, Adelaide, Australia, ³Biogrid, Royal Melbourne Hospital, Melbourne, Australia

Aim:

Over the last decade there have been significant advances in the management of type 1 diabetes (T1D) with rapid uptake in Australia of continuous subcutaneous insulin infusion (CSII) and more recently, automated insulin delivery (AID) systems which protect users from both low and high glucose levels. AID systems have been shown to have significant benefits over multiple daily injections (1, 2) and has led the American Diabetes Association (ADA) guidelines recommending AID systems as the preferred insulin delivery method over MDI and CSII stand-alone systems for all people with T1D (3).

Currently there are limited comparisons of glucometric outcomes between different AID systems. The primary aim of this study is to compare CGM-derived glycaemic outcomes between users of the Medtronic 780G, Tandem t:slim X2 and YpsoPump AID systems in people with T1D. Secondary outcomes of the study will include comparison of bolus delivery patterns between pumps and comparison of rates of acute metabolic complications.

Methods:

Patients were identified via electronic medical records at the Northern Adelaide Local Health Network. Data was collected between January 2024 and January 2026 from AID system portals. Inclusion criteria were T1D, pump use > 3 months, age ≥18 years, sensor wear >70% and AID mode > 70%. Pregnant patients and Omnipod 5 (due to < 15 patients) users were excluded.

Results and Conclusion:

A total of 442 people with T1D were included. Continuous outcomes were analysed using multivariable regression models adjusted for prespecified covariates. Binary target attainment outcomes were analysed using generalized linear models with a log-binomial link to estimate relative risks. Final results of this analysis will be presented.

References

1. Benkhadra K, Alahdab F, Tamhane SU, McCoy RG, Prokop LJ, Murad MH. Continuous subcutaneous insulin infusion versus multiple daily injections in individuals with type 1 diabetes: a systematic review and meta-analysis. *Endocrine*. 2017;55(1):77-84.
2. Zimmermann AT, Lanzinger S, Kummernes SJ, Lund-Blix NA, Holl RW, Fröhlich-Reiterer E, et al. Treatment regimens and glycaemic outcomes in more than 100 000 children with type 1 diabetes (2013-22): a longitudinal analysis of data from paediatric diabetes registries. *Lancet Diabetes Endocrinol*. 2025;13(1):47-56.
3. Diabetes* ADAPPCf. Summary of Revisions: Standards of Care in Diabetes—2026. *Diabetes Care*. 2025;49(Supplement_1):S6-S12.

Clinician beliefs and behaviours related to prescribing physical activity for people with Type 2 Diabetes

Ferris W¹, Hure A^{2,3}, Cox E^{1,4}, Beacroft S¹, Plotnikoff R¹

¹Global Sport and Movement Collaborative, University of Newcastle, Callaghan, Australia, ²School of Medicine and Public Health, University of Newcastle, Callaghan, Australia, ³Hunter Medical Research Institute, New Lambton Heights, Australia, ⁴School of Biomedical Science and Pharmacy, Callaghan, Australia

Aims

Explore the relationship between (i) clinician physical activity (PA) participation and their PA prescribing behaviours, (ii) clinician PA participation and their beliefs regarding importance, knowledge and time for prescribing PA, and (iii) clinician beliefs and their PA prescribing behaviours. Clinician role and geographic location were tested as moderators in this exploratory analysis.

Methods

A cross-sectional survey was conducted with primary care clinicians in the Hunter New-England Region of NSW Australia who attended T2D education events. The REDcap survey assessed clinician aerobic and resistance training behaviour and beliefs on prescribing PA to their patients (i.e. importance, knowledge and time). Chi-square tests and one-way analysis of variance (with post-hoc) tests were conducted.

Results:

Ninety-two clinicians (medical doctors=29, nurses=32, allied health/other professionals=31) completed the survey. Clinician participation in PA was ~80%, with a prescription rate of 96%. Prescription of aerobic and muscle strengthening PA was most common (39%), followed by recommending PA without specifying the type (35%). Clinicians who participated in aerobic activity, both aerobic and resistance training, or did not participate in PA were more likely to prescribe aerobic activity ($p<.041$), both aerobic and resistance training ($p=.008$) or unspecified PA ($p<0.001$), respectively. There were no significant differences in means for clinician PA beliefs and participation in PA. Mean scores for importance of PA were high across all PA prescription categories. PA knowledge was significantly higher ($p=.002$, for clinicians who prescribed both aerobic and resistance PA. There were no significant differences in PA beliefs between clinician roles or geographical location.

Conclusion

The study reinforces that clinicians are cognisant of the need for PA for managing T2D whether they themselves participate in PA or not. Specificity of prescribing may be affected by self-participation practices, potentially due to better knowledge of the benefits of PA.

Adults with T1D and overweight or obesity display intact GLP-1 and GIP response to a mixed meal

Frampton R^{1,2,3,4}, Hocking S^{5,6,7}, Snaith J^{1,2,3}, Greenfield J^{1,2,3}

¹Garvan Institute Of Medical Research, Darlinghurst, Australia, ²St Vincent's Healthcare Clinical Campus, University of New South Wales, Sydney, Australia, ³Department of Diabetes and Endocrinology, St Vincent's Hospital, Darlinghurst, Australia, ⁴Department of Diabetes and Endocrinology, The Canberra Hospital, Garran, Australia, ⁵Boden Initiative, Charles Perkins Centre, The University of Sydney, Sydney, Australia, ⁶Central Clinical School, Faculty of Medicine and Health, University of Sydney, Sydney, Australia, ⁷Department of Endocrinology, Royal Prince Alfred Hospital, Camperdown, Australia

Aim

Incretin mimetics reduce prandial insulin requirements and improve glycaemia in type 1 diabetes (T1D). Whether endogenous incretin secretion is intact in T1D is unknown. We assessed incretin hormones in people with T1D (PwT1D) and overweight/obesity and matched controls without T1D.

Methods

Following overnight fast, 32 PwT1D and 16 controls underwent a mixed meal tolerance test. PwT1D continued basal but omitted prandial insulin. Plasma samples were collected at baseline and every 15–30 minutes for glucose, GLP-1, GIP and glucagon. Outcomes were peak concentration, change from baseline, early (0–30 min), late (30–120 min), total (0–120 min) and incremental area under the curve (AUC). Groups were compared using two-sample Welch t-tests, and ANCOVA when adjusting for glucose.

Results

PwT1D were similar to controls in age (49.7 ± 13.0 vs 48.1 ± 13.1 years) and BMI (32.1 ± 7.7 vs 30.2 ± 5.4 kg/m²), however HbA1c (7.4 ± 0.8 vs $5.2 \pm 0.2\%$), baseline glucose (8.1 ± 2.7 vs 5.4 ± 0.3 mmol/L, $p < 0.001$) and peak glucose (17.8 ± 3.9 vs 7.8 ± 0.7 mmol/L, $p < 0.001$) were higher in PwT1D. Although baseline glucagon was similar in PwT1D and controls (5.6 ± 3.8 pmol/L vs 5.6 ± 3.4 pmol/L, $p = 0.96$), PwT1D demonstrated larger glucagon increments (6.9 ± 4.1 vs 4.0 ± 2.2 pmol/L, $p = 0.002$) and higher glucagon_{AUC} (1115 ± 566 vs 706 ± 407 pmol/L·min, $p = 0.007$). Fasting GIP (24.9 ± 12.9 vs 14.9 ± 8.5 pmol/L, $p = 0.002$) and total GIP_{AUC} (8387 ± 2199 vs 6426 ± 1776 pmol/L·min, $p = 0.002$) were higher in PwT1D than controls, even after adjustment for glucose ($p = 0.04$), yet GIP increment (58.8 ± 19.1 vs 57.1 ± 20.4 pmol, $p = 0.78$) was similar. Fasting GLP-1 (11.6 ± 7.9 vs 12.5 ± 5.2 pmol/L) and total GLP-1_{AUC} (2394 ± 1131 vs 1948 ± 616 pmol/L·min, $p = 0.09$) were similar in both groups. GLP-1 increment was higher in PwT1D than controls (13.9 ± 10.1 vs 8.7 ± 5.1 pmol/L, $p = 0.02$), however not after adjustment for glucose_{AUC} ($p = 0.36$).

Conclusion

Our study demonstrates exaggerated prandial glucagon and preserved prandial GLP-1 and GIP responses in T1D. This dysregulated alpha-cell response despite intact incretin signalling supports rationale for pharmacologic incretin-level exposure as a therapeutic strategy.

Diabetic Ketoacidosis as first presentation of Cushing's disease

Amanda H¹, Gamage A¹, Katulanda P²

¹Postgraduate Institute Of Medicine, University Of Colombo, Colombo, Sri Lanka, ²National Hospital of Sri Lanka, Colombo, Sri Lanka

Aim

To report a rare and distinctly complicated case of Diabetic Ketoacidosis (DKA) as presenting manifestation of Cushing's Disease (CS) and highlight potentially fatal complications of thrombotic events and opportunistic infections, that pose management challenges.

Case Presentation

54-year-old female presented with a 3-day history of worsening shortness of breath and was found to have DKA at presentation. She also reported progressive weight gain, increased facial hair growth, and proximal muscle weakness over the preceding 4 months. Her past medical history included chronic headache for 8 years, depression, diabetes mellitus, and hypertension for 1 year. On examination, she had central obesity, hirsutism, abdominal striae, tachypnoea, tachycardia, and hypertension. Computed tomography pulmonary angiography revealed pulmonary emboli (PE) involving the right-sided lobar pulmonary arteries with extension to subsegmental branches. Evaluation demonstrated persistent hypokalaemia with hypercortisolism on 9 AM serum cortisol and overnight dexamethasone suppression test. Serum ACTH was elevated. MRI of the brain revealed a right-sided pituitary macroadenoma measuring 18 × 9 × 12 mm without significant mass effect (Figure 1).

Management

Heparin following rivaroxaban given for pulmonary embolism. DKA management done. She underwent transsphenoidal surgery; however, residual tumour remained and radiotherapy was planned. While awaiting radiotherapy, the patient passed away due to hospital acquired pneumonia.

Conclusion

Cushing's disease can rarely present as Diabetic Ketoacidosis and can accompany life-threatening complications.

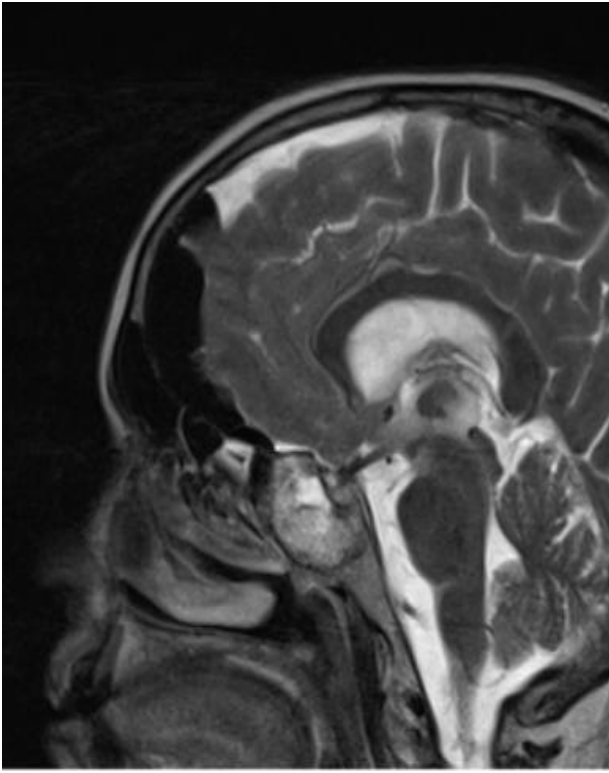


Figure 1- MRI brain revealing pituitary tumour

Effect of preoperative SGLT2 inhibitor use on postoperative acute kidney injury in patients with type 2 diabetes undergoing surgery

Gao F¹, Kishore K², Pandey D², Jahanabadi H², Stevens M², Lecamwasam A³, Churilov L¹, Ekinci E¹

¹University Of Melbourne, Ivanhoe, Australia, ²Austin Health, Heidelberg, Australia, ³Northern Health, Epping, Australia

Aim

To assess whether preoperative sodium-glucose co-transporter 2 inhibitor (SGLT2i) use reduces the odds of postoperative acute kidney injury (AKI) in patients with type 2 diabetes undergoing surgery.

Methods

We conducted a target trial emulation using inverse probability of treatment weighting, utilising routinely collected data from a tertiary centre in Australia. Patients with type 2 diabetes were included. We compared patients undergoing surgery under general anaesthesia who were taking SGLT2i preoperatively, with patients undergoing surgery who were not taking SGLT2i preoperatively. The primary outcome was postoperative AKI within 7 days of surgery. We performed subgroup analyses of emergency surgery and nonemergency surgery. We estimated the average treatment effect on the treated and calculated adjusted odds ratios (aORs). As negative controls, we examined postoperative AKI in patients in patients taking dipeptidyl peptidase-4 inhibitors preoperatively, and postoperative thrombocytosis rates in SGLT2i-users vs nonusers.

Results

We included 2,499 patients (738 taking SGLT2i preoperatively and 1,761 not taking SGLT2i preoperatively). Over half of patients (57.1%) underwent emergency surgery. Postoperative AKI occurred in 18.6% taking SGLT2i preoperatively and 25.8% not taking SGLT2i preoperatively. Odds of postoperative AKI were significantly lower in those who used SGLT2i preoperatively (aOR 0.71, 95% CI 0.56 to 0.91, $p=0.007$). Similar results were seen in emergency surgery (aOR 0.73, 95% CI 0.54 to 0.99, $p=0.045$) and non-emergency surgery (aOR 0.63, 95% CI 0.40 to 0.98, $p=0.040$). No differences were observed in our negative controls.

Conclusions

In patients with type 2 diabetes who used SGLT2i preoperatively, its use reduced the odds of postoperative acute kidney injury. Larger randomised studies investigating this effect are warranted.

Outcomes of the connected care for complex chronic disease (4CD) Diabetes clinic, an integrated primary-specialist model of care.

Gill J¹, Singh R¹, Paul E², Rasalam R^{1,3}, Braithwaite A¹, Woolley K⁴, Sumithran P^{1,5}, Russell A^{1,2}

¹Department of Endocrinology and Diabetes, Alfred Care Group, Bayside Health, Melbourne, Australia, ²School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, ³Department of General Practice and Primary Care, University of Melbourne, Melbourne, Australia, ⁴Caulfield Community Health Service, Alfred Care Group, Bayside Health, Melbourne, Australia, ⁵Department of Surgery, School of Translational Medicine, Monash University, Melbourne, Australia

Aim:

To analyse the clinical outcomes of the Connected Care for Complex Chronic Disease (4CD) Diabetes Clinic, an integrated primary-specialist model of care designed to improve quality and access to specialist care for adults with type 2 diabetes (T2D).

Methods:

This prospective analysis was conducted at Alfred Health, a quaternary referral service in Melbourne, Australia from service initiation in June 2023 to September 2025. Adults (≥ 18 years) with T2D were referred by their general practitioner (GP) or internal hospital pathways. This model was adapted from the Beacon Clinic¹ and utilised upskilled GPs within a multidisciplinary team, overseen by an endocrinologist, to deliver coordinated care. Patients remained in the model for 12 months or until agreed upon clinical targets were achieved. The primary outcome was HbA1c (%) at 12 months, or earlier if discharged. Secondary outcomes included body mass index, lipid profile, blood pressure, pharmacotherapy and patient reported experience measures (Net Promoter Score (NPS)). Analysis used a mixed-effects model with intention to treat.

Results:

306 patients were included (mean age 64.5; 65% male), with a mean duration of diabetes of 12.5 years, and baseline HbA1c of 8.6%. 14.4% of patients were lost to follow-up. Mean HbA1c decreased to 7.6% ($p < 0.0001$) within the first 3 months and improvements were sustained throughout the analysis period. Significant reductions were also observed in total cholesterol, low-density lipoprotein, triglycerides, body weight and diastolic blood pressure. There was an increased use of glucagon-like peptide 1 receptor agonists and sodium-glucose cotransporter 2 inhibitors. NPS was 82.7 (world-class).

Conclusion:

The 4CD-diabetes clinic demonstrates that an integrated primary-specialist model of care for T2D can be successfully translated and implemented into another tertiary health service, achieve excellent clinical outcomes, world-class patient experience and promote guideline directed medical therapy.

¹ Russell, A. W. et al. (2019). *Diabetologia*, 62(1), 41-52.

*Joint first authors

Improving nighttime glucose management by nighttime hypoglycemia prediction

Glatzer T¹, Mitter M², Theodorou D³, Bogaarts G³

¹Roche Diabetes Care GmbH, Mannheim, Germany, ²mySugr GmbH, Vienna, Austria, ³Roche Diagnostics International Ltd., Basel, Switzerland

Background and Aims:

Nighttime hypoglycemia is a major clinical and psychosocial burden for people with diabetes. Despite Continuous Glucose Monitoring (CGM) reducing occurrences, nighttime hypoglycemia persists. Current hypoglycemia alerts are reactive and disrupt sleep. This study examines the Accu-Chek[®] SmartGuide NightLowPredict feature, which predicts nighttime hypoglycemia with 87% accuracy, on nocturnal glucose management in real-world settings. Despite CGM, nighttime hypoglycemia remains a burden.

Methods:

This analysis was conducted on real-world data from 308 users, each having experienced at least one nocturnal hypoglycemic event. Inclusion criteria required a minimum of 15 days of data with CGM coverage exceeding 70% on analysis days. The study employed a within-person comparison of nights where users engaged with the NightLowPredict feature versus nights they did not. To control for potential bias, a propensity score based was incorporated into the analysis. The primary endpoint was the incidence of nocturnal hypoglycemic events between 00:00 and 06:00 am. A Poisson Bayesian mixed-effects model was used to analyze the data.

Results:

The use of the NightLowPredict feature was associated with a statistically significant reduction in the rate of nighttime hypoglycemic events. The model estimated that engaging with the feature reduced the incidence of nocturnal hypoglycemia by 19.2% (95% Credible Interval: [12.8%, 25.1%]). The model also confirmed significant variability among individuals, both in their baseline risk of nocturnal hypoglycemia and in the level of benefit they derived from using the feature.

Conclusions:

The NightLowPredict feature can effectively reduce nighttime low glucose events, easing the burden of nocturnal hypoglycemia and minimizing potential sleep disruptions caused by low glucose alarms.

Optimal carbohydrate dosing for hypoglycemia prevention enabled by predictive glucose monitoring

Glatzer T¹, Breton M², Lustenberger P³, Andorra M⁴, Herrero P⁴
¹Roche Diabetes Care GmbH, Mannheim, Germany, ²Center for Diabetes Technology, Virginia, USA,
³F. Hoffmann-La Roche Ltd., Basel, Switzerland, ⁴Roche Diagnostics SL, St Cugat del Valles, Spain

Background:

Hypoglycemia, a serious diabetes complication, requires immediate treatment, with current guidelines recommending 15g of fast-acting carbohydrates. The Accu-Chek® SmartGuide Predict CGM app's Low Glucose Predict (LGP) feature warns users of low glucose within 30 minutes, necessitating research into new, evidence-based preventive actions.

Methods:

Using the UVa digital twin methodology, 2461 patient-days from 20 representative individuals from the REPLACE-BG dataset were simulated. Preventive actions explored varying carbohydrate interventions (5g, 10g, 15g, or 5-15g random) following LGP notifications. The baseline arm adhered to ADA 15/15 guidelines.

Results:

Table 1 compares baseline and LGP interventions on CGM metrics, time in range [70-180] mg/dL, hypoglycemia alarms (<70 mg/dL), and daily carbohydrate intake for prevention and recovery.

Table 1. Impact of Carbohydrate Dosing on Glycemic Outcomes Following LGP Notifications.

ARM	Mean CGM (mg/dL)	%Time < 70 mg/dL	%Time in [70,180] mg/dL	%Time>180 mg/dL	Avg. Daily Grams of rescue+preven tive carbs
BASELINE	156.8±17.4	4.38±1.2	65.0±9.6	30.6±10.1	24.6±7.8
5g	154.9±17.7***	2.19±0.8***	68.4±10.2***	29.4±10.4***	22.3±7.5***
10g	159.5±16.9***	1.13±0.4***	68.2±10.1***	30.7±10.2	27.4±8.7***
15g	165.3±16.2***	0.89±0.3***	65.6±9.7	33.6±9.8***	34.7±11.1***
5-15g	160.1±17.0***	1.23±0.5***	67.6±10.1***	31.2±10.2*	28.1±8.8***

* (p < 0.05) ** (p < 0.01) *** (p < 0.001)

Conclusion:

Responding to LGP notifications effectively prevents hypoglycemia. A 10g carbohydrate dose optimally prevents hypoglycemia, limits rebound hyperglycemia, and reduces total intake, supporting long-term metabolic health.

Impact Snapshot:

Managing blood sugar often feels like a guessing game of over-treating "lows," leading to a frustrating rollercoaster of high glucose later. Our research uses AI to predict drops early, showing that just 10g of carbs can prevent a low before it starts. This smarter approach stops the rollercoaster, keeping levels stable and reducing the daily burden of diabetes.

Performance of a low glucose and 2-h predictive algorithm in Chinese population

Glatzer T¹, Herrero P², Peak A³, Lustenberger P⁴, Andorra M²

¹Roche Diabetes Care GmbH, Mannheim, Germany, ²Roche Diagnostics SL, St. Cugat del Vallès, Spain,

³Roche Diagnostics International Ltd., Penzberg, Germany, ⁴F. Hoffmann-La-Roche Ltd., Basel, Switzerland

Background and Aims

Accu-Chek® Smartguide Predict app is a predictive companion application for the Accu-Chek® Smartguide Continuous Glucose Monitoring (CGM) sensor. It forecasts CGM readings for 2-hours (GP) and assesses hypoglycemia risk within 30 minutes (LGP). Previous evaluations covered mostly western population; this study extends it to a Chinese population.

Methods

The system was evaluated using ShanghaiT1DM/T2DM datasets. The data contained 16 subjects with Type1 diabetes (T1DM) (58.5[56-67.25] years-old) and 109 subjects with Type 2 diabetes (T2DM) (63[51-68] years-old). Algorithms, designed for 5-min CGM sampling, required minor evaluation adaptations to accommodate the 15-min CGM sampling of the Chinese datasets. Both algorithms were assessed using the same metrics as in the previous evaluation.

Results

For ShanghaiT1DM, GP showed %CEG(A+B) values of 99.8% (30 min), 98.5% (60 min), and 94.2% (120 min). For ShanghaiT2DM, these values were 100%, 99.6%, and 97.9%. RMSE was 15.79 mg/dL, 28.55 mg/dL, 43.29 mg/dL and MARD was 7.7%, 13.9%, 22.6% on the same predicted timepoints for T1DM and 14.07 mg/dL, 24.16 mg/dL, 34.15 mg/dL and 7%, 11.7%, 17.8% for T2DM respectively. LGP achieved an ROC AUC of 0.95 for both datasets. Mean lead time and accuracy for T1DM were 17.7 minutes and 95.4%, and for T2DM, 18.6 minutes and 96.3%.

Conclusions

The performance of LGP and GP of Accu-Chek® SmartGuide Predict app in a Chinese dataset is comparable to prior art, suggesting a similar real-world performance in Chinese population.

Impact Snapshot:

Predictive technology must work for everyone, regardless of where they live. Our study confirms that AI-driven glucose forecasting is highly accurate in the Chinese population. This ensures more people can rely on early warnings to stay safe and manage their diabetes with confidence.

Impact of the Logan Healthy Living 8-week group program for people living with type-2 diabetes: A pragmatic, single-arm evaluation of service delivery

Gomersall S¹, Winkler E¹, Connell S¹, McNaughton S¹, Schain K², Westbrook W², Munro J³, Healy G¹

¹The University Of Queensland, St Lucia, Australia, ²Logan Healthy Living, UQ Health Care, Logan, Australia, ³Health and Wellbeing Queensland, Milton, Australia

Aims: Logan Healthy Living (LHL) by UQ Health Care is a proof-of-concept, interprofessional allied health service supporting people with type 2 diabetes in a region with high levels of health inequity. LHL is supported by the Queensland Government through Health and Wellbeing Queensland and a multisectoral alliance. This study aimed to evaluate the impact of the 8-week, group-based program on participant outcomes following the 4-year pilot of the program. The program comprises one hour of education and one hour of exercise per week.

Methods: Participants who attended groups completing up to 30th June 2025 were included (n=517). Primary (PAID-20 diabetes distress) and secondary outcomes were compared between pre- to post-program (at 8 weeks or at 12 weeks for HbA1c, which was collected in a subset) using Wilcoxon signed ranks test.

Results: Participants (56.7% female) were aged (mean $\pm$ SD) 61.4 $\pm$ 11.8 years, were 9.6 $\pm$ 9.0 years since diagnosis, and attended a median of 7 sessions (1 to all 8+). Significant ($p < 0.05$ two-tailed) improvements were seen in the primary and most secondary outcomes (see Table).

Conclusions: Findings indicate that the LHL program has broad positive impacts for people living with type 2 diabetes in Logan, Australia.

Table: Changes pre- to post- program (8 weeks) in primary and some key secondary outcomes (Wilcoxon signed ranks test – cluster bootstrapped to account for program repeaters)

Outcome	n	Mean $\pm$ SD		50 th (25 th -75 th) percentile		p
		Pre	Post	Pre	Post	
Diabetes distress (0-80)	391	16.4 $\pm$ 15.5	11.1 $\pm$ 12.2	11 (4-26)	7 (2-16)	<0.001
MVPA ^a , min/week	381	231.7 $\pm$ 304.9	339.9 $\pm$ 375.4	120 (24-300)	210 (80-480)	<0.001
Diet Quality score ^b (0-110)	371	73.1 $\pm$ 20.6	79.8 $\pm$ 18.2	74 (60-89)	80 (69-92)	<0.001
HbA1c % (at 0 and 12 weeks)	120	7.5 $\pm$ 1.4	7.2 $\pm$ 1.2	7.2 (6.5-8.1)	7 (6.5-8.0)	0.014
EQoL 5-D-5L Quality of Life (0-100)	336	65.6 $\pm$ 21.0	69.9 $\pm$ 19.5	70 (50-80)	75 (54.5-85)	<0.001
UCLA Loneliness (3-9)	363	4.8 $\pm$ 2.0	4.6 $\pm$ 1.8	4 (3-6)	4 (3-6)	<0.001
Waist circumference, cm	336	117.7 $\pm$ 16.8	115.3 $\pm$ 16.5	116.5 (106-129)	114 (104.6-125.6)	<0.001
Right grip strength, kg	336	31.9 $\pm$ 11.8	32.6 $\pm$ 12.0	30 (24-40)	30 (24.8-40.3)	0.001

^a MVPA =Moderate to Vigorous Physical Activity (walking + moderate + 2x vigorous) measured by the Active Australia Survey

^b Diet score, modified from O'Reilly 2012, with higher values indicating greater consistency with dietary recommendations

Preadmission GLP-1 Receptor agonist use is associated with lower 30-day mortality among inpatients with Type 2 Diabetes

Goshrani A^{1,2,3}, Gao F^{1,2,3}, Baqar S^{1,2,3}, Churilov L^{3,4}, Ekinçi E^{1,2,3,4}

¹Centre for Research and Education in Diabetes and Obesity, Austin Health, Melbourne, Australia,

²Department of Endocrinology, Austin Health, Heidelberg, Australia, ³Department of Medicine, Melbourne Medical School, The University of Melbourne, Parkville, Australia, ⁴Australian Centre for Accelerating Diabetes Innovations (ACADI), The University of Melbourne, Melbourne, Australia

Aim: To examine whether preadmission glucagon-like peptide-1 receptor agonist (GLP-1RA) use is associated with 30-day all-cause mortality following hospitalisation in people with type 2 diabetes.

Methods: We conducted a retrospective cohort study of adults with type 2 diabetes admitted to a tertiary health service, as part of the Diabetes Discovery initiative, comparing 30 day mortality outcomes in patients taking GLP-1RA preadmission to patients not taking GLP-1RA preadmission. The primary outcome was all-cause mortality within 30 days of admission. Secondary outcomes included 30-day hospital readmission, intensive care unit (ICU) admission, length of stay, severe inpatient hyperglycaemia (blood glucose ≥ 20 mmol/L), hypoglycaemia, and hypotension. Inverse probability of treatment weighting based on the propensity score was used to adjust for differences in baseline characteristics including age, sex, Charlson Comorbidity Index, HbA1c, preadmission insulin use, admission diagnosis, and body weight.

Results: Among 13,868 admissions, there were 1,340 (9.7%) people prescribed a GLP-1RA preadmission. Thirty-day mortality occurred in 2.4% of GLP-1RA users and 6.4% of GLP-1RA non-users. After adjustment, preadmission GLP-1RA use was associated with lower 30-day mortality (adjusted odds ratio [aOR] 0.50, 95% CI 0.34 to 0.72; standardised risk difference -0.021, 95% CI -0.031 to -0.012). There was no significant association between GLP-1RA use and 30-day hospital readmission (aOR 0.89, 95% CI 0.75–1.06). No significant differences were observed in ICU admission, inpatient hyperglycaemia, hypoglycaemia, hypotension, or length of stay between groups.

Conclusion: Preadmission GLP-1RA use was associated with substantially lower 30-day all-cause mortality among inpatients with type 2 diabetes, without differences in readmission or inpatient complications. These findings suggest a potential protective effect of GLP-1RAs in hospitalised populations and support further prospective evaluation of peri-hospitalisation GLP-1RA management.

Advancing diabetes eye care: Early insights from the Diabetes Eye Screening Investigation Clinic (DESIC) Pilot program

Hall A¹, Downie L¹, Huhtanen A¹, Metha A¹, Bui B¹, Symons R¹, Kiburg K¹

¹The University Of Melbourne, Department Of Optometry And Vision Sciences, Carlton, Australia

Aim:

To describe the early implementation of, and patient profiles captured in, the Diabetes Eye Screening Investigation Clinic (DESIC) Pilot Program, designed as an integrated clinical, educational and research model for diabetes eye care.

Method:

DESIC is a university-affiliated, optometry-led diabetes eye care clinic that links optometry, ophthalmology, endocrinology, researchers and optometry students. DESIC integrates high-quality clinical care, including advanced retinal imaging, with structured clinical experience in diabetes-related eye care for Doctor of Optometry students. A research database, operating in parallel to best-practice care provision, supports real-world data collection and analysis. Baseline patient demographic and clinical characteristics, including diabetes type and retinopathy severity, were analysed descriptively for patients enrolled in the Pilot Program to date.

Results:

To date, 42 individuals with diabetes have consented to participate to the DESIC Pilot Program, with 62 optometry students engaged with the Program. Among the 42 patients, 35% had type 1 diabetes and 65% had type 2 diabetes. Mean age was 57.2 years (SD 16.7), and mean diabetes duration was 16.9 years. Overall, 56% had no retinopathy, 5% had mild non-proliferative retinopathy (NPDR), 35% had moderate NPDR, 2% had severe NPDR, and 2% had quiescent proliferative retinopathy. Ophthalmology input supported monitoring and collaborative clinical decision-making in more advanced cases of retinopathy or macular oedema. Data collection is ongoing, with continued patient enrolment expected to meaningfully expand the dataset by August 2026.

Conclusion:

These early findings show DESIC as a feasible model for integrating clinical, educational and research data capture to support high-quality diabetes eye care. The Pilot Program is successfully engaging patients, clinicians and students, identifying a clinically meaningful spectrum of diabetic retinopathy, and facilitating collaborative management of sight-threatening eye conditions. These findings support DESIC as a scalable model, which shows promise for advancing healthcare professional training, research, and service design in diabetes care.

Determination of islet autoantibody cut-offs and their performance in discriminating youth-onset diabetes phenotypes in a Bangladeshi cohort

Hasan M¹, Shil K¹, Abdus-Salam S¹, Ratul R¹, Sultana N¹, Hasanat M¹

¹Bangladesh Medical University, Dhaka, Bangladesh

Aims: To estimate the prevalence of obesity and identify socio-demographic, lifestyle, and metabolic risk factors among Bangladeshi adolescents and young adults.

Method: This is a post-hoc analysis of a nationwide study that included 2300 young [adolescents: 10-18 years, n=1118 and young adults: 19-34 years, n=1182] by multistage random sampling during March-August 2024. Obesity among adolescents was defined by BMI percentiles (overweight 85th–94th, obesity ≥95th), while in adults by BMI cut-offs (overweight 23–24.9 kg/m², obesity ≥25 kg/m²). Data on lifestyle, family, and socioeconomic history were collected. Blood pressure (BP), plasma glucose, and lipid profile were measured.

Results: The prevalence of overweight/obesity was 29.2% (overweight 11.6%, obesity 17.6%), higher among young adults (43.8%) vs. adolescents (13.6%), and in urban areas (38.2%) vs. rural areas (21.1%). In both adolescents and young adults, overweight/obesity was associated with higher wealth index (OR 3.3, 95% CI 2.4–4.8 and 1.9, 95% CI 1.5–2.4 respectively), urban residence (OR 2.9, 95% CI 2.1–4.2 and 1.5, 95% CI 1.2–1.9 respectively), and late bedtime (OR 3.0, 95% CI 2.1–4.3 and 1.3, 95% CI 1.0–1.6 respectively). In addition, overweight/obesity was associated with increased screen time (OR 2.1, 95% CI 1.5–2.9) and short sleep duration (OR 2.2, 95% CI 1.5–3.2) in adolescents while frequent meals outside home (OR 1.3, 95% CI 1.0–1.7) and female gender (OR 1.4, 95% CI 1.1–1.8) in young adults. Elevated BP, acanthosis, and dyslipidemia were associated with overweight/obesity in both groups and diabetes in young adults (all p<0.01).

Conclusion: Obesity is highly prevalent among Bangladeshi youth, with distinct risk profiles in adolescents and young adults. Lifestyle factors such as late bedtime, short sleep, poor diet, and inactivity, together with urbanization and metabolic disorders, contribute significantly.

Traditional cardiometabolic risk factor attainment in adults with type 1 diabetes: a large clinic audit

Hemphill M^{1,2,3}, Huang M^{1,3}, Antonius A³, Ryan C^{1,3}, Brazionis L^{1,3}, Cohen N^{1,3}, Jenkins A^{1,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²The University of Notre Dame Australia, Sydney, Australia, ³The University of Melbourne, Melbourne, Australia

Aims: To assess cardiometabolic risk factors levels and target attainment rates in adults with type 1 diabetes (T1D).

Methods:

A cross-sectional audit of adults with T1D attending Baker Heart and Diabetes Institute Diabetes Clinics in the last 10-years. Median risk factor values, percent meeting target, median number of targets met, percent on lipid and blood pressure (BP) drugs and between group differences were analysed. Statistics: Descriptive statistics, Kruskal-Wallis with Dunn's Multiple Comparisons, Mann-Witney non-parametric tests and Chi-Square test, significance at two-tailed $p < 0.05$.

Results:

N=1480 patients: 56% male; median (25th, 75th percentile) age 50 (36, 63) years, 22 years (13, 34) T1D. Smoking data available for n=1035 (70%): 15% smokers. Continuous glucose monitors and insulin pumps were used by 71% and 28% respectively.

Risk factor levels and percentage attainment for all subjects: (n=1480).

Risk factor and target	Median value (25 th , 75 th percentile)	Percent meeting target
HbA1c <53 mmol/mol, n=1475	60 (52, 69)	26%
SBP <130 mmHg, n=1317	129 (118, 140)	52%
DBP <80 mmHg, n=1317	77 (70, 84)	58%
uACR (<3.5 for F, <2.5 for M), n=1396	1 (0.6, 2.3)	79%
eGFR >60 ml/min/1.73m ² , n=1382	90 (78, 90)	89%
BMI <25 kg/m ² , n=1288	26.6 (23.8, 29.9)	34%
LDL-C (<2, <1.7, <1.4) mmol/L, n=1328	2.3 (1.7, 2.9)	35% (<2), 21% (<1.7), 10% (<1.4)
HDL-C >1 mmol/L, n=1382	1.6 (1.3, 2.0)	91%
TG <2 mmol/L, n=1421	1.1 (0.8, 1.5)	86%

Risk factor control and target attainment decreased by age and were lower in males. Technology users and those without chronic complications had better results. Lipid and BP drugs were used by 44% and 36%. The median (IQR) number of targets met was 6 (2).

Conclusions:

Traditional risk factor control was suboptimal in adults with T1D. A better understanding of why and improving care are merited.

When continuous glucose monitoring (CGM) has detrimental impact on self-management behaviours of people with Type 2 Diabetes (PWD).
Demonstrated in 3 case reports.

Hess C¹

¹Western Health, Melbourne, Australia

Background:

Continuous Glucose Monitoring (CGM) technology is largely recognized for its ability to beneficially supplement self-management strategies in people with diabetes. With all of its known potential benefits, it is not well known how CGM may adversely impact the PWD.

Aim:

Highlight clues and behaviours from selected peoples' CGM reports that the CGM was having a negative impact on their self-management practices.

Method:

Develop a case report of 3 different PWD that were trialling CGM and had similar, yet individual, adverse experiences with CGM.

Results:

Scenario 1

Clues:

- Sharp increase in Time in Range (TIR) from 23% to 74%
- Frequent hypos

Behaviours:

- Withholding food

Scenario 2

Clues:

- Checking Sensor Glucose Level (SGL) 19-687 times per day
- Frequent hypos
- Sleep disturbances
- Family c/o hyperfixation
- TIR increased from 61% to 94%
- Person dissatisfied with TIR of 94%

Behaviours:

- Treating hypos 1 jellybean at a time
- Novorapid correction doses overnight
- Withholding food
- Exercising to control glucose levels

Scenario 3

Clues:

- HbA1c of 13.5% prior to CGM trial-->GMI of 7.3% with commencement of CGM
- Checking SGL 32-970 times per day
- Frequent hypos

Behaviours:

- Exercise and breathing exercises to control glucose levels
- Titrating Metformin for glucose control
- Many correction doses of Novorapid

Discussion:

In each case the PWD showed negative behaviours which could be potentially dangerous. Frequent hypoglycaemia places the PWD at significant risk of adverse outcomes. As Health Care Professionals we have a responsibility to recognise and address these behaviours.

Conclusion:

These case reports highlight the importance of always having a follow up after commencement of CGM. It is important to notice signs of hypervigilance or potentially harmful self-management practices related to CGM.

An artificial intelligence algorithm for meal announcement free automated insulin delivery

Price S¹, Hettiarachchi C¹, Nolan C¹, Suominen H¹

¹Australian National University, Belconnen, Australia

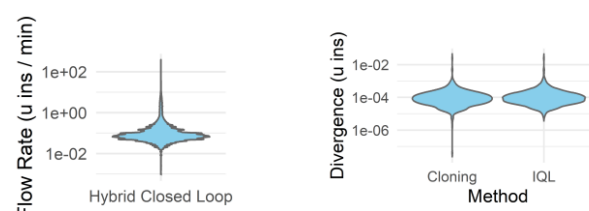
Introduction: Current Automated Insulin Delivery (AID) systems used for the treatment of Type 1 Diabetes (T1D) require human-machine teaming, with user input at least for announcing and estimating meal carbohydrates. This manual intervention is cognitively burdensome for people with T1D and their caregivers.

Aim: Design and develop fully automated personalised treatment strategies using Artificial Intelligence (AI) and demonstrate, both quantitatively and visually, their ability to eliminate the need for manual input for meals without worsening outcomes.

Methods: We implemented the Implicit Q-Learning (IQL) algorithm to produce a fully automated AID-system which analysed glucose measurements/insulin delivery patterns in 1-hour windows to estimate the subsequent insulin dosage required. We then assessed the performance of IQL on clinically-sourced data for 310 adult subjects (18-70-year-olds) with hybrid closed loop pump systems using manual meal adjustments, drawn from the T1-DEXI dataset, provided by the Helmsley Charitable Trust.

Results: Our fully closed loop IQL method was estimated to achieve a significant, though marginal, improvement ($p < 0.001$), as calculated through a paired 2-tailed t-test, in estimated glycaemic control performance over a baseline behavioural cloning method, while not diverging too drastically from the original hybrid closed loop pump system it trained from.

Fig 1. (A) Distribution and (B) Divergence of Insulin Flow Rates by Method. Data shown on a log scale, and divergence calculated by Mean Squared Error (MSE). Values where no insulin is given are excluded from the distribution.



Conclusion: Our systems validate that manual meal announcement and carbohydrate estimation may not be necessary for effective AID-systems. Supporting analytical validations on digital twins of subjects provided further evidence for efficacy, supporting potential further clinical validation studies, with appropriate safety guardrails in place.

A Qualitative Analysis of participants, healthcare professionals and researchers in the Apps and Peer support for a Healthy future and Living with Diabetes (APHLID-M) study

Hicks R¹, Mathews K¹, MacMillan F², Wong V³, Craig M⁴, Greenfield J⁵, Jones T⁶, Poynten A⁷, Wong T⁸, Reyes M⁹, Tannous K¹, Wilson C¹, Hay P¹, Abdo S⁸, Piya M^{1,10}, Lai J³, Thomson R¹¹, Simmons D^{1,10}

¹Western Sydney University, Campbelltown, Australia, ²Office of the Senior Deputy Vice-Chancellor and Vice-President (Research, Enterprise and Global), Western Sydney University, Penrith, Australia,

³Liverpool Hospital, Liverpool, Australia, ⁴Sydney Children's Hospital Westmead, University of NSW, Westmead, Australia, ⁵St Vincent's Hospital, University of NSW, Darlinghurst, Australia, ⁶Goulburn Valley Health, Shepparton, Australia, ⁷Prince of Wales Hospital, Randwick, Australia, ⁸Bankstown Hospital, Bankstown, Australia, ⁹St George Hospital, Kogarah, Australia, ¹⁰Macarthur Diabetes, Endocrinology and Metabolism Service, Campbelltown Hospital, Campbelltown, Australia,

¹¹Analytical Edge Pty Ltd, , Australia

Steam 6 - Clinical Diabetes Management and Therapeutics

Background: The **Apps-and-Peer-Support-for-a-Healthy-future-and-Living-Well-with-Diabetes and Mental health (APHLID-M)** randomised-controlled trial investigated the effects of a bespoke app on distress among young adults (16-20) with diabetes with or without a mental health condition (MHC).

Aims: To examine lived experiences and healthcare professional (HCP) perspectives of the APHLID-M app and its impact.

Methods: APHLID-M participants randomised to an app containing diabetes and MH resources, and HCPs/Research Assistants (RAs), were interviewed about their experiences and perceptions of the app. Discussions were recorded, transcribed verbatim, and coded using reflexive thematic analysis in NVivo, alongside collating frequency of code recurrence.

Results: Fifteen (9 female, 6 male) APHLID participants were interviewed: 1 living with type 2 diabetes and 14 with type 1 diabetes (mean age 22 ± X years, age 17-30). Two-thirds of participants (n=10) lived with a MHC. Eight HCPs across all sites (diabetes educators [n=6] endocrinologists [n=2]), and 2 APHLID RAs were interviewed. Three main themes arose: engagement/implementation (trial and app); app effects; and app content/design. All groups felt rapport, diabetes community altruism, and app features of convenience, monetary rewards, and reminders facilitated engagement. However, busy lifestyles, technical issues, and notification fatigue were barriers. Participant groups found the app useful for diabetes management and goal tracking. MHC participants valued gamification, but cited repetitive tasks, data glitches, and limited game variety as deterrents to long-term engagement. Most MHC participants reported minimal changes to mental health and diabetes management; several No-MHC participants reported benefits. Participants, HCPs and RAs recommended app integration into diabetes services and expanded implementation (as a communication/education tool), provided it remained affordable and accessible for individuals with and without mental health conditions.

Conclusion: The APHLID-M app was found useful and engaging by participants, with implementation successful when participants had existing rapport with clinical teams and willingness to improve their own diabetes and health management

Changes in physical function by degree of improvement in inflammatory biomarkers: a post-hoc analysis of SURMOUNT-2

M. Chao A¹, Sattar N², J. Lee C³, Hunter Gibble T³, Linetzky B³, Cao D³, Griffin R³, Hocking S⁴

¹Johns Hopkins School of Nursing, Baltimore, USA, ²School of Cardiovascular and Metabolic Health, BHF Glasgow Cardiovascular Research Centre, University of Glasgow, Glasgow, UK, ³Eli Lilly and Company, Indianapolis, USA, ⁴Royal Prince Alfred Hospital, NSW, Australia

Aim: This analysis investigated the relationship between improvements in inflammatory markers (hs-CRP and IL-6) and self-reported physical function (PF) in the SURMOUNT (SM)-2 trial. Also examined if these associations were independent of weight loss.

Methods: This post-hoc exploratory analysis of SM-2 trial included adults with BMI ≥ 27 kg/m² and type 2 diabetes randomised to TZP or placebo (PBO). A subset of 292 participants had fasting plasma hs-CRP and 270 had IL-6 measured at baseline. Participants were categorised into biomarker improvement quartiles from least (Q1) to greatest (Q4). Self-reported PF was assessed with 3-domains from the Short Form Survey-36 version 2 (SF-36v2) acute form: Physical Functioning, Role-Physical, and Bodily Pain. Baseline demographics and clinical characteristics and changes from Week 0-72 in PF score were assessed. Covariance analysis assessed changes in physical function, while multivariate regression analysis (MRA) evaluated the impact of weight reduction and improved inflammatory markers.

Results: 20% and 18% of participants in TZP were in the highest quartile for hs-CRP and IL-6 improvements, compared to 4% and 6% in PBO. In TZP group, the quartile of greatest vs least improvement in hs-CRP and IL-6 included more females (67% vs 64% and 55% vs 42%), higher baseline BMI (37.2 vs 36.1 and 37.6 vs 34.8 kg/m²), and shorter diabetes duration (7.5 vs 9.8 and 8.3 vs 9.2 years). With TZP, greater improvements in inflammatory markers were associated with greater improvements in PF scores in unadjusted analyses. Pearson correlation (r) between PF improvement and biomarker reduction ranged from 0.047 to 0.242 (significant between Bodily Pain and IL-6, $r=0.142$, and between Role-Physical and IL-6, $r=0.242$), while r between PF improvement and % weight reduction ranged from 0.148-0.230.

Conclusion: Findings from this post-hoc exploratory analysis of SM-2 suggested that improvement in systemic inflammation may partially explain weight loss impacts on PF outcomes.

Serum bile acid response to an oral glucose load is exaggerated in newly diagnosed, treatment-naïve, Chinese with type 2 diabetes and reduced by insulin-pump therapy

Xiang C¹, Huang W²

¹Zhongda Hospital Southeast University, Nanjing, China, ²Adelaide University, Adelaide, Australia

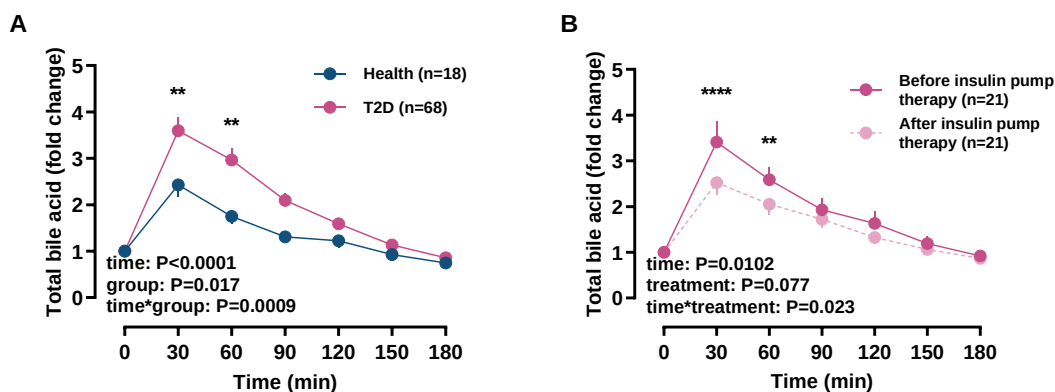
Abstract

Aims: While recognised as pivotal metabolic regulators, circulating bile acid (BA) dynamics following a nutrient load in type 2 diabetes (T2D) remain poorly characterised. This study evaluated serum BA response to a 75g glucose drink in Han Chinese with newly-diagnosed T2D compared to healthy controls, and the effects of 4-week insulin pump therapy.

Methods: Sixty-eight newly-diagnosed, treatment-naïve Han Chinese T2D participants (43 male, age 49.7 ± 1.3 years, BMI $26.0 \pm 0.4 \text{ kg/m}^2$, HbA1c $9.8 \pm 0.2\%$) and 18 healthy controls (9 male, age 46.9 ± 2.7 years, BMI $23.8 \pm 0.6 \text{ kg/m}^2$) underwent a 75g oral glucose tolerance test (OGTT), with plasma glucose and serum insulin, fibroblast growth factor-19 (FGF-19) and total and individual BAs assessed over 180min. A subset of T2D participants ($n=21$) received insulin pump therapy for four weeks when the OGTT was repeated.

Results: Untreated T2D participants had comparable fasting total BA and FGF-19 levels to healthy controls, but exaggerated responses to oral glucose (each $p < 0.05$, **Figure A**). Total BA area under the curve over 180min was related positively to HOMA-IR ($p < 0.05$). Four weeks of insulin pump therapy increased insulin secretion, and reduced HOMA-IR and glycaemia, accompanied by reductions in total BAs, specific species (TCA, TDCA, GCA, GCDCA and DCA), and FGF19 (each $p < 0.05$, **Figure B**).

Conclusion: In newly-diagnosed, treatment-naïve Han Chinese with poorly-controlled T2D, the serum BA response to oral glucose is increased, which is associated with insulin resistance and attenuated by insulin pump therapy. These observations highlight a close link between BAs and glucose metabolism.



Cost-effectiveness of the MiniMed™ 780G advanced hybrid closed-loop (AHCL) system versus multiple daily injections with self-monitoring blood glucose for managing Type 1 Diabetes in Malaysia

Jalaludin M¹, Hill M², Saltik Z², de Portu S²

¹Universiti Malaya, Kuala Lumpur, Malaysia, ²Medtronic, Tolochenaz, Switzerland

Aims: The MiniMed™ 780G AHCL system improves glycaemic outcomes in people with type 1 diabetes (T1D) compared to multiple daily injections (MDI) with self-monitoring blood-glucose (SMBG). This study assessed the cost-effectiveness of AHCL versus MDI+SMBG in Malaysia in people with T1D.

Methods: A cost-effectiveness analysis was conducted using the IQVIA Core Diabetes Model, a Markov model simulating disease progression, treatment effects, and economic outcomes in diabetes management. Baseline HbA1c was 10.1% for those less than 18 years of age and 10.2% for adults^{1,2}. Efficacy inputs were an HbA1c of -2.5% with AHCL and +0.3% with MDI+SMBG in those less than 18 years³, and a time in range improvement of 17.85% with AHCL in adults⁴. Cohort characteristics, cost of complications and utility values were from local published literature. The analysis was from a healthcare payer perspective over a lifetime horizon, with a 3% discount rate to account for reduced present value of future costs and benefits. Willingness-to-pay threshold was considered to be 1.5 times GDP per Capita.

Results: AHCL started at diagnosis in people under 18 years of age (mean age of 8 years⁵), reduced the incidence of diabetes-related complications, with a savings of RM480,110 (USD122,974), partly offsetting higher acquisition costs. Direct costs were RM6,126 (USD1,569) higher with AHCL, with 6.45 more quality adjusted life years (QALYs). The resulting incremental cost-effectiveness ratio (ICER) was RM949 (USD243).

AHCL started in adults at diagnosis (mean age of 18 years¹), resulted in a cost savings of RM254,913 (USD55,049) in reduced diabetes-related complications. Direct costs were RM175,007 (USD44,827) higher with AHCL, with 5.17 incremental QALYs gained, resulting in an ICER of RM33,822 (USD8,664).

Conclusion: The MiniMed™ 780G system is a cost-effective treatment option for both adults and young people with T1D in Malaysia. The cost-effectiveness is substantially improved if started at a younger age.

References:

1. Lim QH, et al. *J ASEAN Fed Endocr Soc.* 2024;39(S1),33.
2. Yeow TP, et al. *PLoS One.* 2019;14(1):e0211210.
3. Boucsein A, et al. *NEJM Evid.* 2024;3(10):EVIDoa2400185.
4. Pease A, et al. *Diabetes Care.* 2020 ;43(8):1967-1975.
5. Mavinkurve M, et al. *J Clin Res Pediatr Endocrinol.* 2024;16(4):411-418.

The Victorian Virtual Emergency Department (VVED) Diabetes service - an innovative model of care for diabetes-related emergencies

Sher L^{1,2,3}, Nash B^{1,4}, James S^{3,4,5,6}, Nehme Z^{7,8}, Schofield Z^{9,10}, O'Neil D^{3,4,11}, Churilov L^{3,4}, Noonan G¹², Scibilia R¹³, Kwok R^{3,4}, Jessop R^{1,2}, Ekinci E^{1,3,4,14}

¹Victorian Virtual Emergency Department, Northern Health, Epping, Australia, ²School of Psychology and Public Health, La Trobe University, Melbourne, Australia, ³Medicine, Melbourne Medical School, University of Melbourne, Parkville, Australia, ⁴Australian Centre for Accelerating Diabetes Innovations (ACADI), Melbourne Medical School, The University of Melbourne, Parkville, Australia, ⁵School of Health, University of the Sunshine Coast, Petrie, Australia, ⁶Medicine, Western Sydney University, Campbelltown, Australia, ⁷Centre for Research and Evaluation, Ambulance Victoria, Blackburn North, Australia, ⁸School of Public Health and Preventive Medicine, Monash University, St. Kilda, Australia, ⁹Royal Flying Doctor Service, Canberra, Australia, ¹⁰The Menzies School of Health Research, Charles Darwin University, Darwin, Australia, ¹¹St Vincent's Hospital Melbourne, Fitzroy, Australia, ¹²Diabetes Victoria, Carlton, Australia, ¹³Breakthrough Type 1, New York, United States of America, ¹⁴Department of Endocrinology, Austin Health, Heidelberg, Australia

BACKGROUND AND AIM

Innovative models of diabetes care are required to enhance the early detection and effective management of diabetes-related emergencies in community settings. In July 2024, we introduced a telehealth-based service designed to address diabetes-related emergencies: the Victorian Virtual Emergency Department (VVED) Diabetes service, an Australian statewide (Victoria) telehealth model that delivers emergency assessment and management—including pre-hospital ketone testing—for patients experiencing non-life-threatening diabetes-related emergencies. Here we aim to describe 12-month findings of this seminal initiative.

METHODS

Data are provided on all individuals with a diabetes-related emergency (based on ICD-10 diagnosis codes) who presented to VVED Diabetes between 1st July 2024 and 30th June 2025; reported as median (IQR) and number (%).

RESULTS

VVED Diabetes managed 1912 diabetes-related emergencies for 1580 people with diabetes; 207 (13.1%) people had >1 presentation. Age at presentation was 69 (46, 83) years, with most presentations occurring in the daytime (08:00–16:59) (38%) or evening (17:00–21:59) (39%). Referrals came from various sources, including Ambulance Victoria (26%) (paramedics), aged care facilities (28%), and self-registrations (22%). Hyper- (39%) and hypo- (22%) glycemia accounted for most presentations. Overall length of stay was 67 (48, 97) minutes. 79% of presentations were treated in the community, avoiding a physical emergency department visit.

CONCLUSION

VVED Diabetes provide timely, and high-quality care for acutely unwell individuals with diabetes while supporting more efficient use of hospital resources. Our vision is for VVED Diabetes to be scaled nationwide.

Socioeconomic status modifies triglyceride-rich lipoprotein response to fenofibrate in the FIELD trial

Januszewski A^{1,2}, O'Connell R², Li L², Quispe R³, Mangani A², Francis H², Sullivan D^{4,5}, Kulkarni K⁶, Toth P⁷, Jones S³, Best J⁸, d'Emden M⁹, Jenkins A¹⁰, Keech A²

¹University of Sydney, Sydney Pharmacy School, Camperdown, Australia, ²University of Sydney, NHMRC Clinical Trials Centre, Camperdown, Australia, ³Johns Hopkins Heart and Vascular Institute, Johns Hopkins University School of Medicine, Baltimore, USA, ⁴Royal Prince Alfred Hospital, Department of Chemical Pathology, Camperdown, Australia, ⁵University of Sydney, Faculty of Medicine and Health, Camperdown, Australia, ⁶VAP Diagnostics R&D, (formerly Atherotech), Birmingham, USA, ⁷Ciccarone Center for the Prevention of Cardiovascular Disease, Johns Hopkins University School of Medicine, Baltimore, USA, ⁸Nanyang Technological University, Lee Kong Chian School of Medicine, Singapore, Singapore, ⁹Royal Brisbane Hospital, Brisbane, Australia, ¹⁰Baker Heart and Diabetes Institute, Melbourne, Australia

Background

Area-level socioeconomic status (SES) is associated with cardiometabolic risk, yet whether lipoprotein phenotype or therapeutic response differs by SES remains unclear. We examined associations between SES, baseline lipoprotein profile, and fenofibrate response.

Methods

We analysed 5,752 Australian participants with type 2 diabetes enrolled in the Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study. Residential addresses were geocoded and linked to Census-derived area-level SES indices: Index of Relative Socioeconomic Disadvantage, Index of Education and Occupation, and Index of Economic Resources, expressed as state-level percentiles (1996 Census; 2001 sensitivity analysis). Classical lipids (TC, TG, HDL-C, LDL-C) and Vertical Auto Profile (VAP)-derived triglyceride-rich fractions (IDL-C, VLDL-C, VLDL3-C) were assessed at baseline and after 6 weeks of fenofibrate treatment. SES was analysed per 10-percentile increase and by FIELD-specific tertiles. Baseline associations were assessed using linear models. Fenofibrate response was evaluated using ANCOVA: $\ln(6\text{-weeks}) \sim \text{SES} + \ln(\text{baseline}) + \text{age, sex, diabetes duration, BMI, HbA1c, SBP and eGFR}$. Effects are presented as percent differences.

Results

Baseline SES showed statistically significant but very small negative associations with TG, VLDL and VLDL3 (max $R^2 < 0.002$; $p < 0.032$). During uniform fenofibrate exposure, lower SES was consistently associated with attenuated response in triglyceride-rich fractions (0.2–0.4% per decile SES; $p < 0.013$). Participants in the lowest SES tertile demonstrated approximately 1.5–2.5% smaller reductions in TG, VLDL-C, VLDL3-C compared with the highest tertile ($p < 0.015$), independent of baseline levels and clinical covariates. These gradients were not observed uniformly across lipid subclasses.

Conclusions

Fine-grained area-level SES captures modest but reproducible variation in triglyceride-rich lipoprotein response to fenofibrate, even within a controlled trial environment with standardised drug exposure and monitoring. These findings suggest that granular SES provides incremental information beyond conventional clinical risk factors and warrants consideration in predictive and risk-stratification frameworks addressing health equity-related variation in cardiometabolic phenotype.

Effects of progressive resistance training on muscle quality, glycemic control, and vascular function in elderly patients with Type 2 Diabetes Mellitus

Jia H¹, Jia Z², Gao M², Niu W², Huang J¹, Liu F¹, Wang X¹, Yang M¹, Gong F¹, Yuan H¹, Li P¹

¹Henan University Of Science And Technology, Luoyang, China, ²The First Affiliated Hospital of Henan University of Science and Technology, Luoyang, China

Aim To evaluate the effects of a 12-week progressive resistance training (PRT) on muscle quality, glycemic control, and vascular function in elderly patients with type 2 diabetes (T2DM).

Methods In this randomized controlled trial, 32 elderly community-dwelling T2DM patients were randomly assigned to a control group (health education only) or an experimental group (PRT plus health education). Muscle quality indicators, glycemic control parameters, and vascular function were assessed before and after the intervention. Both intention-to-treat (ITT) and per-protocol (PP) analyses were performed.

Results After 12 weeks, the intention-to-treat (ITT) analysis revealed that compared to the control group, the PRT group exhibited significant improvements in grip strength, muscle quality index (MQI), one-repetition maximum (1-RM) of multiple muscle groups, Short Physical Performance Battery (SPPB), and postprandial blood glucose levels 2 hours after meal (all P values < 0.05). Relative to the control group, the PRT group demonstrated smaller declines in skeletal muscle mass index (SMI) and limb skeletal muscle mass, greater reductions in fasting blood glucose and glycated hemoglobin (HbA1c), and more pronounced improvements in brachial-ankle pulse wave velocity (baPWV), although these differences did not reach statistical significance ($P > 0.05$). The per-protocol (PP) analysis confirmed these ITT findings. For continuous glucose monitoring, ITT analysis was not applicable, and only PP analysis was conducted. The results indicated that compared to the control group, the PRT group exhibited significant improvements in glucose variability (SDBG, LAGE, MAGE) ($P < 0.05$).

Conclusion A 12-week PRT intervention effectively improves muscle quality (MQI) and muscle strength, enhances physical function and postprandial glucose control, and reduces glycemic variability, while attenuating skeletal muscle loss and slowing arterial stiffness progression in elderly patients with T2DM.

Women's experiences of continuous glucose monitoring (CGM) or self-monitoring of blood glucose (SMBG) during pregnancy with gestational diabetes (GDM): an integrative review

Johnson S

¹Flinders University, Adelaide, Australia

Aim

To synthesise evidence on women's experiences of using CGM or SMBG during pregnancy complicated by GDM.

Method

An integrative review guided by the Whittemore & Knafl framework was conducted. CINAHL, MEDLINE and Scopus were searched in April 2025 for peer reviewed primary research published between 2015 and 2025. Qualitative and mixed methods studies reporting experiential outcomes related to CGM or SMBG in women with GDM were eligible. Records were managed in Covidence with duplicate removal and two stage screening. Study quality was appraised using the Joanna Briggs Institute checklist for qualitative research and the Mixed Methods Appraisal Tool. Data was analysed using Braun & Clarke thematic analysis.

Findings

From 735 identified records, 9 studies met inclusion criteria, including 4 qualitative and 5 mixed methods studies across diverse healthcare and cultural settings. Four key themes were identified:

- Emotional responses to glucose monitoring
- Barriers and challenges to CGM and SMBG use
- Facilitators and positive experiences with CGM and SMBG
- Influence of cultural social and healthcare contexts

SMBG was associated with pain, inconvenience, anxiety, and uncertainty, particularly when education was inconsistent. CGM was generally perceived as more acceptable due to reduced invasiveness, real time feedback, and support for self-discovery, although some women reported sensor discomfort, sleep disturbance, data discrepancies, and fragmented digital platforms. Across both modalities foetal wellbeing was a key motivator. Women emphasised the importance of clear education, consistent clinician support, family involvement, and culturally appropriate resources.

Conclusion

Women's experiences of glucose monitoring in GDM are shaped by emotional, practical, technological, and contextual factors. CGM may reduce monitoring burden and improve acceptability compared with SMBG, but benefits are maximised when integrated with structured clinician support and culturally responsive education. These findings support person centred care models and inform research and policy related to equitable access to glucose monitoring technologies in GDM.

Implementing a multidisciplinary approach to empower an individual to cope with a new diagnosis of Type 1 Diabetes: A case report

Joseph A¹, Gao Y¹, McKay J¹, Deitch J^{1,2,3}, McAuley S^{1,4}

¹Bayside Health, Melbourne , Australia, ²Western Health , Melbourne , Australia, ³Department of Medicine, University of Melbourne, Parkville, Australia , ⁴School of Public Health and Preventive Medicine, Monash University, Melbourne , Australia

Background & Aim:

A new diagnosis of type 1 diabetes mellitus (T1DM) is often accompanied by emotional responses including anxiety, fear, and psychological distress. These responses may adversely affect individual's coping ability to T1DM diagnosis and glycaemic outcomes. This case report presents the lived experience of an individual following T1DM diagnosis and demonstrates the multidisciplinary approach to empower his coping abilities.

Methods:

A 25-year-old male university student was diagnosed with T1DM in September 2024, during a routine health assessment prior to his overseas travel. Since his diagnosis, he experienced significant anxiety, shown by restricting carbohydrate intake, voicing concerns about diabetes progression, and withdrawal from sports training. He also reported fear of needles and alarm fatigue from his continuous glucose monitoring (CGM). Consequently, he developed diabetes distress soon after T1DM diagnosis as confirmed with a Problem Areas in Diabetes (PAID-5) score of 12/20 which was completed in November 2024.

He was managed by a multidisciplinary team under T1DM clinic service. Medical consultations focused on making a person-centred management plan. Psychology sessions addressed his injection-related fear, anxiety, and coping strategies. Structured and tailored diabetes education improves self-management skills. Dietetic counselling emphasised balanced and flexible dietary choices.

Results:

At recent follow-up, in April 2025, his PAID-5 score improved to 5/20. He subsequently travelled overseas safely and confidently. Moreover, he successfully integrated diabetes management into his preferred lifestyle and remained participation in intensive sports trainings.

Discussion / Conclusion:

This case demonstrates that a new T1DM diagnosis can cause significant emotional responses, causing diabetes distress. A multidisciplinary approach including individualized management plan, psychological support, tailored diabetes education, and dietetic counselling can effectively reduce diabetes distress, improve coping, and support lifestyle integration. Early multidisciplinary intervention is essential to empower individuals to cope with new T1DM diagnosis and lifestyle adoption.

Integrating diabetes medibus into the rural week program improving access and diabetes care in rural and remote communities in the Hunter New England

Joseph M¹, Southwell A¹, Parsons M¹, Acharya S¹, Hure A¹, Ross S¹

¹HNE Health, Newcastle, Australia

Background and Aim Diabetes affects over 100,000 people across the Hunter New England Local Health District (HNELHD), a region spanning 130, 000 km². The Diabetes Alliance Program Plus (DAP+) was established to enhance diabetes care in General Practice and Aboriginal Medical Services (AMS) through an integrated capacity building model.

In June 2025, a DAP+ Medibus was incorporated to address persistent access challenges. The Medibus provides Endocrinologists, Diabetes Educators, Aboriginal Health Worker, Dietitian, and Podiatrist, comprehensive assessments, medication optimisation, and culturally responsive diabetes education on Country to ensure patients receive timely, high-quality care close to home.

Methods

DAP+ MEDIBUS MODEL OF CARE



The DAP+ Medibus and multidisciplinary team travel to rural and remote regions to deliver a structured, tailored one-week program incorporating in-practice case conferencing, on-site allied health clinics, culturally informed yarning sessions, and clinician education.

A community needs assessment informs program design and is followed by an initial visit. The team returns six months later to repeat core activities, consolidate learning, evaluate clinical progress, and strengthen continuity of shared care across services.

Results The Medibus has travelled over 5000km, consulting to 90 patients, engaged six communities. Delivery of community events included cooking classes, NAIDOC activities and clinician education sessions.

Patients' report positive experiences, *"It's so important to have people come out to us... to have the Doctor Luu (endocrinologist) and the educator there on the bus... it's been such an important and vital thing for small country towns, having a mobile service."* Annette *

*pseudonym

Discussion and Conclusion The DAP+ Medibus supports open dialogue about diabetes within community, reducing stigma, providing a culturally safe space on Country for education. Clinicians feel supported by program continuity and scheduled visits.

Patients value care with their usual primary care provider without the burden of travel, strengthening shared care. This model delivers culturally responsive, holistic diabetes care and strengthens limited local infrastructure, supporting future refinement and expansion.

Severity-stratified impact of follow up adherence on glycaemic outcomes in adults with T2DM: A real world longitudinal study

Samant P¹, Joshi A¹, Gattani ¹, Essat A¹, Nerker P¹, Chakrabarty S¹, Talbot-Lachance ¹

¹Droobismit Pte Ltd, Doha, Qatar

Aim:

The study aimed to evaluate changes in HbA1c and transitions between glycaemic severity categories, and to examine the association between follow-up adherence and clinically meaningful improvement across severity strata, and assessed the influence of baseline clinical characteristics (age, medication usage and disease duration) on glycaemic outcomes.

Method:

A longitudinal analysis was conducted among adults enrolled in Lillia 120-day Diabetes Care Program, with baseline and post program HbA1c data. Participants were classified as: Controlled (<7.0%), Uncontrolled (7.0–9.0%), and Severely Uncontrolled (>9.0%). Primary outcomes include HbA1c change and transitions between severity categories. Clinically meaningful improvement was defined as $\geq 0.5\%$ HbA1c reduction. Follow up adherence was quantified as the proportion of scheduled consultations attended. Associations were assessed using non-parametric tests, chi square analyses, multivariable logistic regression and non-linear modelling.

Results:

Overall HbA1c improvement was statistically extremely significant, 64.7% of participants achieving clinically meaningful reduction (median Δ HbA1c 0.9%, IQR 0.2–2.0). Glycaemic control was maintained in 85.4% of controlled participants (n=513). Among uncontrolled participants (N = 1117), 38% (median Δ HbA1c 1.3%) shifted to controlled status, particularly younger individuals with higher baseline HbA1c and no diabetes medication use. Severely uncontrolled participants (N=1035) experienced the largest reductions, from severely uncontrolled to controlled group (median Δ HbA1c 4.5%), and severely uncontrolled to uncontrolled (median Δ HbA1c 2.45%). High follow-up adherence in this group was associated with larger HbA1c reduction (2.4% vs. 1.7%, $p < 0.001$) and higher likelihood of severity improvement (67.8% vs. 51.4%), with non-linear benefits observed beyond ~80% adherence. Non-response was uncommon (9.1%) and was associated with longer diabetes duration.

Conclusion

Structured diabetes care outcomes vary by baseline glycaemic severity. Individuals with severely uncontrolled diabetes derive substantial, non linear benefit from high follow-up adherence, supporting severity-stratified, adherence-focused care models to optimise real world diabetes outcome.

Continuous glucose monitoring and pregnancy outcomes in Type 1 Diabetes: Real-world findings from clinical practice

Kang R¹, Oze V¹, Joshi T^{1,2}, Chalak S¹, Kim A¹, Kaplan A¹, Randall H¹, Snape L³, Wijesinghe S², Park J², Nanayakkara A², Nadeem S², Vithanage S², Yuen L^{1,2}

¹Department of Endocrinology, Gosford Hospital, Central Coast Local Health District, NSW, Gosford, Australia, ²University of Newcastle, Newcastle, NSW, Gosford, Australia, ³Diabetes Service, Gosford Hospital, Central Coast Local Health District, NSW, Newcastle, Australia

Background

Notable studies^{1,2} such as the CONCEPTT trial³ have demonstrated that continuous glucose monitoring (CGM) improves glycaemic control and reduces adverse pregnancy outcomes. Real-world data is needed to assess how these findings are translated into clinical practice.

Aim

To compare maternal and neonatal outcomes between CGM and self-monitoring of blood glucose (SMBG) in type 1 diabetes (T1D) pregnancies in the Central Coast Local Health District (CCLHD).

Method

A retrospective cohort study of 100 T1D singleton pregnancies (CGM n=57; SMBG n=43) reaching ≥ 20 weeks gestation in the CCLHD between 2014 and 2024. Maternal and neonatal outcomes were assessed and compared to determine where there were statistically significant differences between groups ($p < 0.05$).

Results

CGM and SMBG groups were similar in age (~29years), parity (~1), diabetes duration (~14years), BMI (~27kg/m²), and pre-pregnancy HbA1c (~8.5%). However, SMBG users had higher rates of mental health disorders (28%vs.7%, $p=0.005$), smoking (14%vs.2%, $p=0.03$), and previous birth complications (emergency caesarean (16%vs.0%, $p=0.002$), gestational hypertension (12%vs.0%, $p=0.008$), macrosomia (7%vs.0%, $p=0.04$)), indicating a higher-risk baseline profile.

Pregnancy Outcome	CGM	SMBG	P value, OR (95% confidence interval)
Mean (mmol/mol) +/-SD HbA1c % in the first trimester	7.55 (59) +/- 1.51	7.76 (61) +/- 1.46	0.5 (-0.45 to 0.87)
Mean (mmol/mol) +/-SD HbA1c % in the third trimester	6.44 (47) +/- 0.86	6.80 (51) +/- 0.97	0.2 (-0.14 to 0.91)
Mean +/-SD total endocrine contacts over the pregnancy per person	33 +/- 4.5	21 +/- 15.6	<0.001 (-18.2 to -6.17)
Neonatal resuscitation due to respiratory distress %	82.4	50	0.04, OR 4.67 (1.02 to 21.4)
Neonatal resuscitation due to hypoglycemia %	41.2	10	0.03, OR 6.30 (1.09 to 36.3)

All other outcomes such as mean difference in HbA1c between the first and third trimester and composite neonatal morbidity outcome* were not statistically significant.

Conclusion

In this real-world T1D cohort, CGM use increased clinical engagement but did not improve HbA1c or neonatal outcomes. Higher neonatal resuscitation and hypoglycaemia rates in CGM users highlight challenges translating trial efficacy into routine practice, underscoring the need for targeted implementation strategies and further investigation into CGM utilisation.

*foetal death in utero, large for gestational age, neonatal intensive care unit admission, shoulder dystocia, and hypoxic ischemic encephalopathy

References

1. Murphy HR, Rayman G, Lewis K, Kelly S, Johal B, Duffield K, et al. Effectiveness of continuous glucose monitoring in pregnant women with diabetes: randomised clinical trial. *BMJ*. 2008;337:a1680.

2. Burk J, Ross GP, Hernandez TL, Colagiuri S, Sweeting A. Evidence for improved glucose metrics and perinatal outcomes with continuous glucose monitoring compared to self-monitoring in diabetes during pregnancy. *Am J Obstet Gynecol.* 2025;233(3):162-75.
3. Feig DS, Donovan LE, Corcoy R, Murphy KE, Amiel SA, Hunt KF, et al. Continuous glucose monitoring in pregnant women with type 1 diabetes (CONCEPTT): a multicentre international randomised controlled trial. *Lancet.* 2017;390(10110):2347-59.

A retrospective audit of inpatient glycaemic management and outcomes in type 3c diabetes mellitus at a quaternary CALD Centre.

Kaur J¹, Karahasan A¹, Wong V^{1,2}, Lau N^{1,2}

¹South West Sydney Local Health District, Liverpool, Australia, ²Liverpool Diabetes Collaboration Ingham Institute of Applied Medical Research, Sydney, Australia

Background: Type 3c Diabetes Mellitus (T3cDM) remains an under-researched clinical entity characterized by extreme glycaemic volatility. Managing T3cDM in a quaternary setting is complicated by high-acuity presentations, increasing sub-specialisation, and significant cultural and linguistic diversity (CALD).

Aims: To characterize the demographics, glycaemic excursions, and multidisciplinary management of T3cDM inpatients admitted to the state's largest quaternary hospital serving a population with twice the national average rate of CALD.

Methods: A six-month retrospective audit was conducted across medical and surgical wards during the first 72 hours of admission. Data on T3cDM aetiology, HbA1c, inpatient blood glucose levels (BGL), and clinical management were analysed.

Results: Analysis of 20 encounters (mean age 61.5 years) revealed that 55% were admitted for pancreatic malignancy/surgery and 30% for pancreatitis. Notably, 40% required English-language linguistic support. At presentation, 10% were not known to have DM. Glycaemic control was poor; mean HbA1c was 8.4% (68 mmol/mol), with 20% exceeding 10.0% (86 mmol/mol). Hyperglycaemia (>11 mmol/L) was experienced in 85% and severe hyperglycaemia (>20mmol/L) occurred in 45% of patients, while 40% experienced at least one hypoglycaemic event (<4.0 mmol/L). Despite this, primary teams initiated active treatment changes in only 20% of cases, relying heavily on Endocrinology reviews (85%). Multidisciplinary engagement was suboptimal; only 45% received Diabetes Nurse Educator (DNE) and 55% Dietetic reviews. The 30-day readmission rate was 35%, primarily driven by recurrent biliary sepsis or pancreatitis.

Conclusion: T3cDM inpatients face significant glycaemic instability with marked hyperglycaemia, low primary team engagement in glucose management, and suboptimal utilization of DNE/Dietetic services. Findings highlight a need for specialised T3cDM inpatient pathways, with a focus on CALD people, so to improve safety and glucose control and potentially impact length of stay and readmissions.

Physical activity and HbA1c for Indigenous peoples diagnosed with type 2 diabetes: an International systematic review

Kelly R¹, Macniven R², Gaca M³, Morris M⁴, Churilov L¹, O'Neal D¹, Ekinici E¹

¹Australian Centre for Accelerating Diabetes Innovation (ACADI), Melbourne Medical School, University of Melbourne, Melbourne, Australia, ²School of Population Health, Faculty of Medicine & Health, Sydney, Australia, ³CREDO (Centre for Research and Education in Diabetes and Obesity) Department of Medicine, Melbourne Medical School, The University of Melbourne, Melbourne, Australia, ⁴School of Biomedical Sciences, Faculty of Medicine & Health, University of NSW, Sydney, Australia

Aim

To synthesize evidence to determine the effect of physical activity on the management of type 2 diabetes among Indigenous peoples worldwide.

Methods

A systematic search of nine databases (MEDLINE, Embase, Emcare, PsycINFO, PEDro, SPORTDiscus, Global Health, Cochrane CENTRAL and Web of Science) was conducted from inception to 30 November 2024, with a bridging search on 25 November 2025. Studies evaluating physical activity interventions for Indigenous adults with type 2 diabetes were included, prioritising randomised controlled trials and longitudinal cohort studies. Primary outcomes were changes in HbA1c or blood glucose. Methodological quality was assessed using Joanna Briggs Institute critical appraisal tools and the CREATE Aboriginal and Torres Strait Islander quality appraisal tool.

Results

The database searches identified 2013 records, twelve meeting the inclusion criteria: three studies were randomised, eight were cohort studies, and one was quasi-experimental. Ten studies reported HbA1c; of these five demonstrated statistically significant effects. Three reported within group decreases, one with between group decrease, and one with between group increase. Five reported changes that did not reach statistical significance. Six studies reported changes in fasting plasma glucose, with two demonstrating statistically significant reductions within groups, and one between groups.

Conclusion

Despite evidence supporting the role of physical activity in improving health outcomes for non-Indigenous people, there is still a lack of evidence for Indigenous peoples living with T2DM. In this review, the most promising outcomes were observed in studies that integrated local Indigenous communities into the design and support of participants. Sustained failure to strengthen both the quantity and quality of this research will entrench existing inequities in diabetes care and outcomes for Indigenous peoples living with type 2 diabetes.

Aboriginal experiences of health service interactions when halting the usual progression of Type 2 Diabetes

Kelly R¹, Power T², Morris M³, O'Neal D¹, Ekinci E¹

¹Australian Centre for Accelerating Diabetes Innovation (ACADI), Melbourne Medical School, University of Melbourne, Melbourne, Australia, ²Sydney Nursing School, Faculty of Medicine and Health, Sydney, Australia, ³School of Biomedical Sciences, Faculty of Medicine & Health, University of NSW, Sydney, Australia

Aim

To examine the experiences of Aboriginal people living with type 2 diabetes mellitus (T2DM) and their interaction with the health system whilst addressing the progression of T2DM.

Methods

A qualitative study informed by an interpretivist paradigm and a narrative approach grounded in Indigenous Standpoint Theory was conducted. Ten Aboriginal adults (five men and five women, aged 39-76 years) with type 2 diabetes who had achieved remission or substantially reduced diabetes medication through lifestyle change were recruited via social media. Semi-structured telephone interviews were conducted between November 2023 and March 2025. Interviews explored participants' experiences of health system interactions and their perceived influence on halting the usual progression of type 2 diabetes.

Results

Ten Aboriginal individuals living with T2DM were interviewed about their experiences with the health sector and their experiences with diabetes. Opportunistic screening was highly successful, with several participants receiving a diagnosis through this process. Information provided by health professionals was often generic printed material that the participants struggled to put into practice. A lack of hope for the future, support for the management of T2DM and a focus on pharmacological solutions over personalised lifestyle advice were consistently described as barriers. Most participants reported overt or subtle racism as an additional barrier to receiving health and engaging with the health sector. Cultural safety and individualised information were central enablers of success. Ongoing support that was timely, flexible, and responsive to each person's needs, preferences and context was also critical.

Conclusion

In order to improve health outcomes for T2DM, Aboriginal and Torres Strait Islander people need access to culturally safe programs that provide personalised information and sustained support. However, racism remains an ongoing barrier within the health system and must be addressed if the health gap for Aboriginal and Torres Strait Islander peoples is to be narrowed.

Effects of a workplace stress-reduction intervention on cardiometabolic and mental health outcomes: A randomised controlled trial in Australia

Khanal M¹, Karimi L^{1,2}, Saunders P¹, Nguyen K¹, Hallam K¹, de Courten B^{1,3,4}

¹School of Health and Biomedical Sciences, RMIT University, Melbourne, Australia, Melbourne, Australia, ²School of Medicine and Healthcare Management, Caucasus University, Tbilisi, Georgia, Tbilisi, Georgia, ³Department of Medicine, School of Clinical Sciences at Monash Health, Monash University, Melbourne, VIC 3168, Australia, Melbourne, Australia, ⁴Department of Diabetes and Vascular Medicine, Monash Health, Clayton VIC 3186, Melbourne, Australia

Aims

Psychological distress is increasingly recognised as a contributor to cardiometabolic risk, and stress-reduction interventions have been proposed as potential strategies. This study determined the effect of a workplace-based Transcendental Meditation (TM) intervention on cardiometabolic and mental health outcomes, and stress-related physiological markers in working adults.

Methods

A two-arm open randomised controlled trial (RCT) was conducted among staff of an Australian university, comparing TM (n = 65) with a control (usual wellbeing resources, n = 64). The primary outcome of the study was the change in perceived stress at six months. Secondary outcomes included blood pressure (BP), glucose metabolism (fasting blood sugar, insulin resistance), lipid profile, cardiometabolic composite score, C-reactive protein and cortisol, autonomic regulation, workplace burnout, sleep, anxiety and depression symptoms, wellbeing, and quality of life (QoL). Exploratory analyses examined heart rate variability (HRV), diurnal cortisol slope, and insulin resistance for potential effect modification by burnout, gender, and metabolic risk, respectively. Primary analyses followed intention-to-treat; exploratory analyses used complete cases.

Results

TM improved diastolic BP, cardiometabolic composite score, perceived stress, burnout, sleep quality, anxiety and depression symptoms, well-being and QoL (all $p < 0.05$). TM did not improve other cardiometabolic outcomes and stress-related physiology (all $p > 0.05$). Exploratory subgroup analyses showed a significant intervention x burnout interaction ($p = 0.032$), with greater improvement in HRV among participants with higher burnout. TM has a trend for a steeper diurnal cortisol slope among men ($p = 0.023$) and improved insulin resistance among participants with higher metabolic risk ($p = 0.029$).

Conclusion

TM may improve cardiometabolic and mental health of working adults without short-term effects on glycaemic measures. The intervention may alter autonomic and neuroendocrine markers of stress regulation, with greater responsiveness among individuals with higher psychological or metabolic risk. These findings suggest that stress-reduction interventions may represent an adjunct upstream approach for cardiometabolic and diabetes risk prevention.

Keywords: Meditation, Sympathetic Arousal, Homeostatic Model Assessment (HOMA), Cardiometabolic Health (CMH)

Clinical benefits of adding Ezetimibe to Statin mono therapy for optimal LDL-C Control

Kim Y¹, SHIN D¹

¹Bundang Jesaeng Hospital, Seongnam, South Korea

Background & Aim: Following the publication of a 2010 meta-analysis reporting an approximately 9% increased risk of diabetes mellitus associated with statin therapy, concerns have been raised regarding the use of high-dose statins. Although statins remain the cornerstone of dyslipidemia management by inhibiting hepatic cholesterol synthesis, ezetimibe provides an additional therapeutic approach by reducing intestinal cholesterol absorption.

Methods: A total of 130 patients receiving statin therapy were evaluated after switching to ezetimibe–statin combination therapy. Patients were classified into three groups: (1) 79 patients who maintained their existing statin dose with the addition of ezetimibe 10 mg; (2) 38 patients who achieved target LDL-C levels on statin monotherapy and were switched to ezetimibe 10 mg combination therapy with a 50% statin dose reduction; and (3) In 13 patients with prediabetes, the statin dose was maintained, and the ezetimibe combination drug was prescribed at a half-tablet dose. Changes in lipid profiles were analyzed.

Results: In group 1, mean LDL-C levels decreased from 114.2 mg/dL to 71.4 mg/dL (–42.8 mg/dL), while HDL-C decreased by 3.2 mg/dL and triglycerides decreased by 7 mg/dL.

In group 2, mean LDL-C levels decreased from 84.9 mg/dL to 67.1 mg/dL (–17.8 mg/dL), with reductions of 3.4 mg/dL in HDL-C and 4.5 mg/dL in triglycerides.

In group 3, mean LDL-C levels decreased from 88.5 mg/dL to 63.2 mg/dL (–25.4 mg/dL), accompanied by decreases of 2.0 mg/dL in HDL-C and 5.3 mg/dL in triglycerides.

Discussion/Conclusion: Ezetimibe–statin combination therapy demonstrated superior lipid-lowering efficacy compared with high-dose statin monotherapy. This strategy may allow for effective LDL-C control while reducing statin dosage and potentially lowering the risk of statin-associated elevation of glucose in patients with diabetes or prediabetes.

Determinants of baseline glucose variability in individuals with type 1 diabetes initiating automated insulin delivery - a multi-site analysis

Konantambigi A¹, Puri G², Shenoy V³, Deshmukh H^{1,3}

¹James Cook University, Mackay, Australia, ²Logan Endocrine and Diabetes Service, Logan, Australia,

³Townsville Hospital and Health Service, Townsville, Australia

Aim/Background:

Glucose variability, commonly measured using the coefficient of variation (CV), is an important marker of glycaemic stability and hypoglycaemia risk in people with type 1 diabetes (T1DM). We aimed to identify clinical predictors of baseline CV in a real-world cohort initiating AID therapy.

Methods:

We conducted a retrospective observational study of 158 individuals with predominantly T1DM transitioning to AID systems at three Australian centres (Mackay, Townsville, and Logan). Baseline continuous glucose monitoring metrics and clinical variables were extracted prior to AID initiation. Multivariable linear regression was used to examine factors associated with baseline CV, including age, sex, baseline time in range (TIR), HbA1c, total daily insulin dose (TDD), body weight, diabetes duration, and comorbidities.

Results:

Mean baseline CV was 34.7%. In multivariable analysis, male sex was associated with higher glucose variability ($\beta = 2.94$, $p = 0.026$). Higher baseline insulin requirements were also independently associated with increased CV ($\beta = 0.088$ per unit increase in TDD, $p = 0.025$). Conversely, higher body weight was associated with lower glucose variability ($\beta = -0.12$ per kg, $p = 0.033$). Longer diabetes duration showed a trend toward higher CV ($\beta = 0.16$ per year, $p = 0.052$). Baseline HbA1c, TIR, age, and cardiometabolic comorbidities were not significantly associated with CV.

Conclusion:

In individuals initiating AID therapy, higher insulin requirements and male sex were associated with greater baseline glucose variability, while higher body weight was associated with lower variability. These findings highlight potential clinical variables which may identify patients at higher risk of glycaemic instability prior to AID initiation, allowing for a targeted education and monitoring regimen in order to improve treatment outcomes.

Clinical insights into sodium-glucose cotransporter 2 inhibitor therapy and continuous ketone monitors in Type 1 diabetes from the PARTNER trial

Kong Y^{1,2,3}, Ngan J^{1,2}, Jones H^{1,2}, Goad J², Felder M⁴, Fenn J⁵, Furlanos S^{3,4,6}, Gao F^{3,7}, Jenkins A^{1,2,3,8}, Kriketos A⁴, Lee R⁹, Manzoney A⁷, Nakano M⁷, MacIsaac R^{1,2,3}, Nolan C^{3,9,10}, Randle D⁵, Umapathysivam M⁵, Ekinci E^{2,3,7}, O'Neal D^{1,2,3}

¹Department of Endocrinology and Diabetes, St Vincent's Hospital Melbourne, Fitzroy, Australia,

²Department of Medicine, Melbourne Medical School, University of Melbourne, Fitzroy, Australia,

³Australian Centre for Accelerating Diabetes Innovations, Melbourne Medical School, University of Melbourne, Parkville, Australia, ⁴Department of Diabetes and Endocrinology, The Royal Melbourne Hospital, Parkville, Australia, ⁵Southern Adelaide Diabetes and Endocrine Services, Oaklands Park, Australia, ⁶Department of Medicine, The Royal Melbourne Hospital. University of Melbourne, Parkville, Australia, ⁷Department of Endocrinology and Centre for Research in Education in Diabetes and Obesity, Austin Health, Heidelberg, Australia, ⁸Baker Heart and Diabetes Institute, Melbourne, Australia, ⁹Department of Diabetes and Endocrinology, Canberra Health Services, Garran, Australia, ¹⁰School of Medicine and Psychology, Australian National University, Acton, A

Aim: To illustrate safe use of sodium-glucose cotransporter-2 inhibitors (SGLT2i) and utility of continuous ketone monitors (CKM) in Type 1 diabetes (T1D) through a case series of five PARTNER study participants.

Methods: The PARTNER study (ACTRN12624000448549) is a randomised placebo-controlled trial involving dapagliflozin 10mg/day (SGLT2i) in T1D adults using CKM (Abbott) with ketonaemia management education. CKM devices were worn on the upper posterior arm for 15 days with a ketone range of 0-3.1 mmol/L and provided alarm notifications for ketone levels ≥ 1.0 mmol/L. All participants were educated on a ketonemia management algorithm at this threshold.

Results: No PARTNER study participants developed DKA. Cases 1, 2 and 3 experienced asymptomatic elevated ketones (1.2, 1.8 and >3.1 mmol/L respectively) with SGLT2i. CKMs facilitated early identification of this, enabling successful management to mitigate progression to DKA. Case 1 successfully treated SGLT2-related ketonaemia using the provided management algorithm. Case 2 experienced frequent ketonaemia due to significant insulin dose reduction by his automated insulin delivery system on SGLT2i, which resolved by redistributing total daily carbohydrates across the day. Case 3 had a low carbohydrate diet (~ 80 g/day) which exacerbated the frequency and severity of ketonaemia whilst on SGLT2i, which was alleviated by increasing carbohydrate intake to ≥ 100 g/day. Case 1, 4 and 5 highlighted additional situations where ketonaemia occurred and CKMs were beneficial. Case 1 had asymptomatic ketonemia >3.1 mmol/L related to insulin pump delivery failure on placebo, Case 4 had ketone levels of 2.6 mmol/L during an acute illness while on SGLT2i, and Case 5 experienced ketone levels of 0.8 mmol/L on placebo during a non-fasted minor dental procedure.

Conclusion: The case series suggest that access to real-time continuous ketone data with CKMs may assist with DKA risk management while on SGLT2i in T1D. Furthermore, CKMs may identify ketonaemia during other high-risk situations and facilitate early treatment to prevent progression to DKA in T1D.

Dapagliflozin 10mg daily improves glycaemia without increasing risk of diabetic ketoacidosis in adults with Type 1 diabetes using continuous ketone monitoring and ketonemia management education

Kong Y^{1,2,3}, Ngan J^{1,2}, Jones H^{1,2}, Goad J², Felder M⁴, Fenn J⁵, Fournalos S^{3,4,6}, Gao F^{3,7}, Huang M⁸, Jenkins A^{1,2,3,8}, Kriketos A⁴, Lee R⁹, Manzoney A⁷, Morrison D^{2,3}, Nakano M⁷, MacIsaac R^{1,2,3}, Nolan C^{3,9,10}, Randle D⁵, Trawley S^{2,11}, Umapathysivam M⁵, Vogrin S², Ekinici E^{2,3,7}, O'Neal D^{1,2,3}

¹Department of Endocrinology and Diabetes, St Vincent's Hospital Melbourne, Fitzroy, Australia,

²Department of Medicine, Melbourne Medical School, University of Melbourne, Fitzroy, Australia,

³Australian Centre for Accelerating Diabetes Innovations, School of Medicine, University of

Melbourne, Fitzroy, Australia, ⁴Department of Diabetes and Endocrinology, The Royal Melbourne

Hospital, Parkville, Australia, ⁵Southern Adelaide Diabetes and Endocrine Services, Oaklands Park,

Australia, ⁶Department of Medicine, The Royal Melbourne Hospital. University of Melbourne,

Parkville, Australia, ⁷Department of Endocrinology and Centre for Research in Education in Diabetes

and Obesity, Austin Health, Heidelberg, Australia, ⁸Baker Heart and Diabetes Institute, Geelong,

Australia, ⁹Department of Diabetes and Endocrinology, Canberra Health Services, Garran, Australia,

¹⁰School of Medicine and Psychology, Australian National University, Acton, Australia, ¹¹Cairnmillar Institute, Hawthorn, Australia

Aim: To assess glycaemia and diabetic ketoacidosis (DKA) incidence in Type 1 diabetes (T1D) adults taking dapagliflozin 10mg/day vs. placebo with continuous ketone monitoring (CKM) use and ketonaemia management education.

Methods: Sixty-five T1D adults were randomised 1:1 in a double-masked crossover design to receive 12-weeks each of dapagliflozin 10mg/day or placebo, separated by a 2-week wash-out. They received ketonaemia management education and used CKM devices (Abbott) throughout the trial. Primary outcomes were time-in-range (TIR, 3.9-10mmol/L) on continuous glucose monitoring (CGM) and DKA incidence.

Results: Baseline characteristics are mean(SD): age 51.0(14.2)years; T1D duration 26.2(14.4)years; 41(63%) males; HbA1c 7.3(0.9)% [58.4(9.5)mmol/mol]; TIR 69.5(16.5)%. Mean TIR was 8.90% greater with dapagliflozin vs. placebo (Table 1). No DKA occurred. Dapagliflozin was also associated with lower HbA1c, total daily insulin dose and weight (Table 1). Time-below-range (TBR, <3.9mmol/L) was not significantly different [median difference -0.3(-1.0, 0.1), p=0.11]. Ketones >0.6 mmol/L occurred more frequently with dapagliflozin vs. placebo, but the %time with elevated ketones >0.6mmol/L was small [7(0 – 29)minutes/day]. Of those with elevated ketones >0.6mmol/L on dapagliflozin, median %time in this range was 1.2(IQR 0.4, 3.3)%.

Conclusion: Dapagliflozin improved glycaemia, reduced insulin doses and weight without increasing hypoglycaemia or DKA in T1D adults using CKM with ketonemia management education.

	Dapagliflozin	Placebo	Mean/Median difference (95% CI)	P-value
Time in range on CGM (3.9 – 10 mmol/L), %	75.6 (15.4)	65.4 (18.1)	8.90 (6.12, 11.68)	<0.001
HbA1c, %	7.1 (0.9)	7.3 (0.9)	-0.3 (-0.4, -0.2)	<0.001
Number of participants with ketone levels >0.6 mmol/L, n (%)	40 (70)	19 (33)	-	<0.001
Number of participants with ketone levels >1.5 mmol/L, n (%)	6 (11)	0 (0)	-	0.014
Number of participants with ketone levels >3.0 mmol/L, n (%)	2 (4)	0 (0)	-	0.157
%Time with ketones >0.6 mmol/L on CKM	0.5 [0.0, 2.0]	0.0 [0.0, 0.2]	0.4 [0.1, 0.9]	<0.001
%Time with ketones >1.5 mmol/L on CKM	0.0 [0.0, 0.0]	0.0 [0.0, 0.0]	0.0 [0.0, 0.0]	0.12
Total daily insulin dose, U/kg	0.6 [0.5, 0.8]	0.7 [0.5, 0.9]	-0.1 (-0.1, -0.0)	<0.001
Weight, kg	89.2 (18.2)	91.7 (18.7)	-2.4 (-3.1, -1.7)	<0.001

Table 1: Glycaemic, ketone anthropometric and clinical outcomes

Categorical variables were reported as number (%). Continuous variables were reported as mean (standard deviation, SD) and median [interquartile range, IQR]. Differences were reported with 95% confidence interval (CI).

Randomised cross-over study evaluating continuous glucose monitoring on diabetes-related quality of life parameters in adults with Cystic Fibrosis Related Diabetes

Kumar S^{1,2}, Wood M¹, Loel F¹, Matson A¹

¹Adult Cystic Fibrosis Centre, The Prince Charles Hospital, Metro North Queensland Health, Chermside, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, St Lucia, Australia

Introduction

Incidence and prevalence of adults living with cystic fibrosis (CF)-related diabetes is anticipated to increase. Beyond glycaemic outcomes, diabetes-related distress and treatment burden significantly influence engagement and quality of life. The aim of this study was to evaluate impact of continuous glucose monitoring (CGM) on diabetes-related quality of life outcomes in adults with confirmed CF-related diabetes.

Methods

We conducted a prospective investigator-initiated study conducted at Adult Cystic Fibrosis Centre at Prince Charles Hospital, Queensland, Australia ((HREC/2023/MNHB/104428). Adults >21 years with confirmed CF-diabetes on multiple daily injections (MDI) and HbA1c >7.0% without subsidised access to CGM were eligible. Participants were recruited from outpatient clinics and randomised to either standard care (one-week blinded CGM) or intervention (unblinded CGM for 12 weeks). Patient-reported outcomes were assessed at baseline and 3 months.

Results

Interim analyses (December 2025) included 11 participants (median age was 37.6 years, 63.6% male, mean diabetes duration 11.3 years). Over a third had diabetes-related complications. CGM use was associated with reductions in emotional, regimen-related and physician related diabetes distress. Over one-third of participants reported a significant reduction in fear of hypoglycaemia. Improvements in glycaemia were also noted.

Conclusion

CGM use in adults with CF-related diabetes was associated with improved diabetes-related quality of life and reduced treatment burden. providing a strong rationale for broader equitable access to CGM in this population

Change in diabetes related distress domains			
	Pre-CGM n=9	Post-CGM n=6	Percentage change
Emotional related distress	4/9 (44%)	1/6 (17%)	27% reduction
Physician-related distress	1/9 (11%)	0/6 (0%)	11% reduction
Regimen-related	2/9 (22%)	0/6 (0%)	22% reduction
Interpersonal distress	1/9 (11%)	1/6 (17%)*	6% increase
Reduction in hypoglycaemia fear & worry	37.5% (3/8) reported a significant reduction with use of CGM		

Continuous glucose monitoring improve glycaemia in adults with Type 2 Diabetes and active diabetes-related foot disease when supported through a virtual Diabetes Model-of-Care

Kumar S^{1,2}, Muhammad Yunus A¹, Cawte A¹, The Central Foot Hub and Partners
¹Queensland Health, Brisbane, Australia, ²The University of Queensland, St Lucia, Australia

Introduction

Adults with Type 2 diabetes (T2D) and active diabetes-related foot disease (DFD) often require complex and intensive diabetes management. The Central Foot Hub Diabetes Model-of-Care (MOC) jointly delivered by Endocrinology and Diabetes Education leveraged continuous glucose monitoring (CGM) to provide virtual, multi-disciplinary diabetes care for people living in Central Queensland. This study evaluated changes in CGM-derived metrics at MOC entry and exit.

Methods

We conducted a retrospective analysis (HREC/2025/MNH/123069) of time-stamped CGM data extracted from cloud-based software corroborated with electronic medical records for all adults with T2D on insulin and DFD who engaged with our MOC between February 2024 and November 2025. Participants received complimentary CGM for up to 3 months. Glycaemic metrics from the first and last 7-day periods of CGM wear were compared within individuals.

Results

Total of 44 adults (including 2 re-ulcerations) were included. Median age was 64.5 years and 77.2% were male. Median entry plasma HbA1c was 9.4% (IQR 8-11%) which reduced to CGM-derived estimated A1c of 8.1% after 1-week and further to 7.8% after 12-weeks. Sensor wear exceeded 95% at MOC entry and exit demonstrating strong uptake and engagement with virtual CGM-supported care.

Conclusion

We found adults living with T2D on insulin with active DFD who engaged with our virtual MOC that leveraged CGM demonstrated clinically significant improvements in glycaemic management.

	MOC entry median (IQR)	MOC exit median (IQR)	Difference
Glycaemic Management Indicator	8.1% (IR 7.1 – 9.2)	7.8% (IQR 6.7 – 8.7)	-0.3%
Glycaemic Variability	27.9% (21.8 – 33.9)	26.2% (24.1 – 33.8)	-1.7%
Time-in-Range	38.5% (19.6 – 70.3)	48.9% (30.0 – 77.8)	+10.4%
Time-below-Range	0% (0 – 0.5)	0.2% (0 – 0.8)	+0.2%
Time-above-Range	62.5% (28.1 – 81.3)	48.4% (18.1 – 69.7)	-14.1%

Randomised cross-over study evaluating continuous glucose monitoring on glycaemic parameters in adults with Cystic Fibrosis Related Diabetes

Kumar S^{1,2}, Loel F¹, Wood M¹, Matson A¹

¹Adult Cystic Fibrosis Centre, The Prince Charles Hospital, Metro North, Queensland Health, Chermside, Australia, ²Faculty of Health, Medicine and Behavioural Sciences, The University of Queensland, St Lucia, Australia

Introduction

Incidence and prevalence of adults with cystic fibrosis (CF)-related diabetes is anticipated to increase. Aim of this study was to evaluate glycaemic outcomes associated with use of continuous glucose monitoring (CGM) in adults with confirmed CF-related diabetes.

Methods

Prospective investigator-initiated study conducted at Adult Cystic Fibrosis Centre at Prince Charles Hospital, Queensland, Australia ((HREC/2023/MNHB/104428). Adults >21 years with confirmed CF-diabetes on multiple daily injections (MDI) and HbA1c >7.0% without subsidised access to CGM were eligible. Participants were recruited from outpatient clinics and randomised to either standard care (one-week blinded CGM) or intervention (unblinded CGM for 12 weeks). Parameters were collected at baseline and 3 months.

Results

Interim analyses in December 2025 with 11 enrolled participants. Median age was 37.6 years, 63.6% male, 90.1% on CF modulator therapy. Average diabetes duration was 11.3 years. Two male participants experienced pulmonary exacerbations were excluded. **Table 1** shows glucometric changes pre and post-CGM use. 60% demonstrated fasting c-peptide <0.3nmol/L consistent with insulin deficiency.

Conclusion

We found a statistically and clinically significant improvement in glycaemia with CGM use in adults living with CF-related diabetes on MDI. Findings have been shared with policy-makers to advocate for subsidised access to CGM for this population.

Table 1: Change in glucometrics pre-implementation and post-implentation of CGM for management of Cystic Fibrosis Related Diabetes

Outcomes	Pre-CGM n=8	Post-CGM n=8	p-value
Primary outcome			
Mean plasma HbA1c (%)	7.8% (62 mmol/mol)	7.0% (53 mmol/mol)	0.03
Secondary CGM metric outcomes			
Mean sensor usage	85.6%	86.1%	0.95
Average glucose	9.96 mmol/L	8.63 mmol/L	0.18
Time-in-range (3.9 – 10mmol/L)	59.1%	71.0%	0.03
Time-above-range (10.1– 15mmol/L)	18.6%	17.5%	0.68
Time-below-range (<3.8)	2.9%	1.4%	0.18
Glycaemic variability	36.0%	36.3%	0.87

Glycaemia management in adults living with Type 2 diabetes and active diabetes-related foot disease in Central Queensland: a cross-sectional audit

Kumar S^{1,2}, Muhammad Yunus A¹, Cawte A¹, The Central Foot Hub and Partners¹
¹Queensland Health, Brisbane, Australia, ²The University of Queensland, St Lucia, Australia

Introduction

Adults with Type 2 diabetes (T2D) and active diabetes-related foot disease (DFD) represent a complex and vulnerable population for whom therapy intensification and glycaemic optimisation are required to meet targets. Real-world data describing treatment-related changes in this high-risk cohort remains limited. We conducted a cross-sectional analyses of adults with T2D on insulin with active DFD who engaged with Central Foot Hub (CFH) Diabetes model-of-care and were provided continuous access to continuous glucose monitoring (CGM) for up to three months.

Methods

This retrospective cross-sectional study (HREC/2025/MNH/123069) collected demographic, clinical, laboratory, medication and CGM-use data using electronic medical records. Outcomes included baseline/most recent plasma HbA1c, duration of CGM use, pharmacotherapy utilisation and diabetes and lipid management.

Results

Forty-six adults with T2D on insulin were included (mean age 66.7±9.9 years, 76% male). Baseline plasma HbA1c was 9.3%±2.2%, improving to 8.9±1.8% (mean paired change - 0.45%, p=0.13). Mean CGM duration was 123 days, 48% demonstrating >3 months use. In addition to CGM-informed insulin titration, diabetes regimens were often complex (see Table 1). Introduction of non-insulin pharmacotherapy occurred in 34% and was associated with a non-significant trend toward lower plasma HbA1c (8.4% vs 9.1%, p=0.22). Lipids targets were met in 39% of individuals.

Conclusion

Among adults with T2D on insulin and active DFD, CGM uptake and sustained use was high. While baseline HbA1c was significantly elevated, changes to glucose-lowering regimens occurred only in a third of individuals, reflecting the clinical complexity and competing priorities in this population. Despite high use of statins, lipids targets were not met.

Pharmacotherapy	n %
Insulin	41 (89.1%)
Metformin	35 (76.1%)
SGLT2i	20 (43.5%)
GLPRA	18 (39.1%)
Statin	38 (82.6%)
Ezetimibe	10 (21.7%)

Variation in incretin levels in gestational diabetes - A systematic review

Kumaradoss F^{1,2}, Miura D³, Price S¹, Gaca M¹, White B¹, Grills N¹, Thomas N³, Ekinci E¹

¹University of Melbourne, Melbourne, Australia, ²Christian Medical College Vellore, Vellore, India,

³Monash University, Melbourne, Australia

BACKGROUND: Our understanding of incretin profiles in pregnant women with Gestational Diabetes (GD) is limited. Evaluating the relationship between incretin levels and gestational diabetes is crucial, as it helps develop new therapeutic agents.

AIM: To systematically review the available literature to identify incretin levels among women with gestational diabetes when compared to normoglycemia.

METHODS: Two independent authors systematically searched the MEDLINE, Embase, Emcare Clinical Trials, and Cochrane Library databases via Ovid, as well as government databases.

SELECTION: All studies that analysed incretin profiles in gestational diabetes compared to normoglycemia were included in the systematic review.

DATA EXTRACTION: This study was registered with Prospero under registration number CRD42024580542. Two authors screened the articles and extracted data, analysing the timing/trimester of incretin administration, types of incretins, sample storage, incretin levels, and biochemical methods used for analysis. The authors were contacted via email regarding the missing data and the included data.

DATA SYNTHESIS: We reviewed 16 studies (gestational diabetes vs. normoglycemia, n = 1522 vs. 1101) for the final analysis. These studies focused solely on GLP-1, GIP, GLP-2, and Glicentin as incretins. However, there was no consistency in the timing or trimester of the incretin analysis. Discrepancies were observed in the timing or trimester of the incretin analysis, the preservatives used, storage methods, and the assay techniques employed. Additionally, notable variation was observed in the response to incretin after oral glucose administration, with the amount of oral glucose administered differing across studies.

LIMITATIONS: A meta-analysis could not be conducted due to the abovementioned variability

CONCLUSIONS: The published literature does not provide definitive evidence about the incretin profile of pregnant women with gestational diabetes compared to those with normoglycemia. Conducting trimester-specific evaluations of the incretin axes using appropriate preservatives for sample collection and storage, along with suitable assays, is crucial for accurate incretin profiling.

Integrating Muscle Health into Diabetes Care: Validation of the Indonesian Sarcopenia Geriatric Scale toward Glycemic Control and Fatigue

Kurniawan R¹, Chiu H^{2,3}, Bakhsh A^{4,5,6}, Baqi S⁷, Romadlon D⁸

¹Diabetes Connection Care, Eka Hospital BSD, South Tangerang, Indonesia, ²Department of Nursing, Taipei Medical University Hospital, Taipei, Taiwan, ³School of Nursing, College of Nursing, Taipei Medical University, Taipei, Taiwan, ⁴Lunenfeld-Tanenbaum Research Institute, Mount Sinai Hospital, Toronto, Canada, ⁵Division of Endocrinology, Department of Medicine, University of Toronto, Toronto, Canada, ⁶Kidney and Pancreas Health Centre, Organ Transplant Centre of Excellence, King Faisal Specialist Hospital and Research Centre, Alfaisal University, Riyadh, Saudi Arabia, ⁷Faculty of Education and Teaching Sciences, State Islamic University of Kiai Ageng Muhammad Besari Ponorogo, Ponorogo, Indonesia, ⁸Faculty of Nursing, Chulalongkorn University, Bangkok, Thailand

Aim:

To culturally adapt and validate the Indonesian version of the Sarcopenia Geriatric Scale (SARCO-GS-ID) and examine its association with fatigue and glycemic control in adults with type 2 diabetes (T2D).

Methods:

A cross-sectional study was conducted among 125 adults with T2D attending two clinics in Indonesia. The SARCO-GS underwent forward–backward translation and cultural adaptation. Psychometric evaluation included content validity (S-CVI), exploratory factor analysis (EFA), internal consistency (Cronbach's α), and test–retest reliability (ICC). Convergent and criterion validity were assessed. Multivariable linear regression analyses adjusted for BMI, comorbidities, and physical activity.

Results:

The SARCO-GS-ID demonstrated strong content validity (S-CVI = 0.91), good internal consistency (α = 0.82), and excellent test–retest reliability (ICC = 0.89). EFA supported a two-factor structure (subjective and objective domains), explaining 66.7% of total variance. Probable sarcopenia was identified in 20.8% of participants. Individuals with sarcopenia had higher fatigue levels and poorer glycemic control (mean HbA1c 8.7% vs 7.6%). Associations were attenuated after adjustment for BMI, comorbidities, and physical activity.

Conclusion:

The SARCO-GS-ID is a valid and reliable screening tool for probable sarcopenia in Indonesian adults with T2D. Integrating sarcopenia screening into routine diabetes care may support early risk stratification and multidisciplinary intervention. In low- and middle-income settings, SARCO-GS-ID can strengthen comprehensive diabetes management frameworks aligned with healthy aging and non-communicable disease policies.

Australian National Diabetes Inpatient Audit (AusNaDIA) local pilots in preparation for the inaugural nation-wide audit of diabetes care in hospital

Kyi M¹, Wang W², Cheung N³, Puri G², Barmanray R¹, Gong J¹, Donovan P⁴, Russell A⁵, Furlanos S¹

¹Royal Melbourne Hospital, Parkville, Australia, ²Logan Endocrine and Diabetes Services (LEADS), Meadowbrook, Australia, ³Westmead Hospital, Westmead, Australia, ⁴Royal Brisbane and Women's Hospital, Brisbane, Australia, ⁵Alfred Hospital, Melbourne, Australia

Background & Aim

In people with diabetes admitted to hospital, dysglycaemia is associated with adverse outcomes. Despite recommendations to optimise care, there are variations in available health professional resources leading to variations in clinical care. In the United Kingdom, the annual National Diabetes Inpatient Audit (NaDIA) program (2010-2019) was instrumental in benchmarking inpatient management and patient outcomes, which led to improved resourcing, standardisation of care, and reduced inpatient complications. There has not been an Australia-wide audit of diabetes in hospital, although Queensland and South Australia have performed state-wide audits. Following a national Delphi process, the Inpatient Diabetes Management Subcommittee of the Australian Diabetes Society developed an electronic survey for Australia's National Diabetes Inpatient Audit (AusNaDIA).

Methods:

Three hospitals (one in each state of Victoria, Queensland and New South Wales) performed a pilot of AusNaDIA to inform feasibility and optimal workflow. On the designated audit day (November 2025–February 2026), teams of clinicians reviewed the medical records of inpatients and collected relevant data using the REDCap database platform.

Results:

On the audit day 970 patient files were reviewed across three hospitals. The prevalence of diabetes varied between 27% and 30%. A combined total of 298 inpatients with known diabetes (94% with type 2 diabetes, 51% insulin-treated in hospital) were audited. Forty-two percent of these inpatients had consultation by a diabetes clinician. Of a total 1990 patient-days of glycaemic data obtained, hypoglycaemia (≤ 3.9 mmol/L) and hyperglycaemia (≥ 15 mmol/L) occurred in 3.5% and 20.7% of patient-days respectively. Four individuals developed diabetic ketoacidosis, and 5 individuals developed a foot lesion during their hospital stay.

Conclusions:

We describe the first local pilots of the AusNaDIA across different Australian states. We gained insights to improve workflow, and we confirm the feasibility of the upcoming inaugural Australia-wide AusNaDIA planned for execution in May 2026.

Diabetes distress longitudinal changes and association with psychological intervention among adults attending a tertiary multidisciplinary type 1 diabetes clinic

Lamb J¹, Trawley S^{2,3}, McKay J¹, Vu J¹, Deitch J¹, Russell A^{1,3}, McAuley S^{1,2,3}

¹Department of Endocrinology and Diabetes, Bayside Health, Alfred Care Group, Melbourne, Australia, ²Department of Psychology, The Cairnmillar Institute, Melbourne, Australia, ³School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia

Aim: Diabetes-related distress (DD) is common in type 1 diabetes, and can impact glycaemic and psychosocial outcomes. This study examined longitudinal DD trajectories using the five-item Problem Areas in Diabetes Scale (PAID-5; scores ≥ 8 indicate possible DD) and psychology referral patterns among adults attending a tertiary type 1 diabetes clinic.

Methods: This retrospective study included adults with type 1 diabetes attending a multidisciplinary clinic (October 2023–February 2026) who completed PAID-5 at initial visit plus ≥ 1 follow-up. A linear mixed-effects model tested change over visits. Individual-level change was assessed by crossing below the clinical cutoff (PAID-5 < 8). The psychology referral pathway was mapped for patients with DD positive screening.

Results: Participants were 214 adults (94 women [44%]; mean $\pm$ SD age 42 ± 17 years; type 1 diabetes duration 16 ± 13 years; HbA_{1c} $8.7 \pm 2.5\%$; median visits 3 [IQR 2–5]). At initial visit, $n=102$ (48%) screened positive for DD. The mixed-effects model estimated a PAID-5 score change of -0.23 points per visit (95% CI: -0.38 to -0.08 , $p=0.003$). Among DD-screen positive individuals, $n=48$ (47%) dropped below the clinical cutoff during follow-up and $n=35$ (34%) remained below at last visit. Of $n=50$ DD-screen positive individuals with available referral data, 36 (72%) were offered psychology review, 29 accepted, and 24 attended; 14 (28%) had pre-existing mental health support. Screening cutoff-crossing rates did not differ by referral outcome, albeit small cell sizes limited power.

Conclusion: DD is prevalent and dynamic in type 1 diabetes. PAID-5 scores decline modestly over visits, and nearly half of DD screen-positive individuals crossed below the clinical cutoff during follow-up. These findings highlight the importance of systematic integration of psychological support and ongoing DD monitoring beyond initial screening in tertiary diabetes care.

Clinical and biochemical characteristics of SGLT2 inhibitor-associated diabetic ketoacidosis: a multi-year case series

Lan A¹, Nhan S¹, Lau N^{1,2,3}

¹Diabetes & Endocrinology, Liverpool Hospital, , , ²Liverpool Diabetes Collaboration, Ingham Institute of Applied Medical Research, , , ³South West Sydney Clinical School, Faculty of Medicine, UNSW Sydney, ,

Background:

SGLT2 inhibitors are an effective class of antihyperglycaemic medications for diabetes mellitus and with increasing prescriptions, SGLT2i-associated diabetic ketoacidosis is more common.

Aim:

To outline in patients admitted to one of NSW's leading quaternary referral health facilities, located in an area of greater cultural diversity and younger than state average, the clinical and demographic characteristics of those developing SGLT2i-associated DKA.

Methods:

Since 2022, a pragmatic clinically driven audit of Liverpool Hospital inpatients referred to InPatient Diabetes with SGLT2i-associated DKA has been conducted. Hospital demographics, biochemical and clinical characteristics of the SGLT2i-DKA event, and treatments and outcomes were recorded.

Results:

From January to December 2025, 27 patients were referred (females 13/48.2%; mean age 69.7 (± 11.2) years). T2DM: 93%, T1DM: 1, LADA 1. By DKA event 17 (63%) patients were hyperglycaemic and 10 (37%) were euglycaemic. Empagliflozin (67%) and dapagliflozin made up the prescribed SGLT2is. Reduced oral intake was the most common precipitant (89%), followed by acute infection (52%); SGLT2i-DKA event occurred close to admission (time to detect 0.7 days). Initial SGLT2i-DKA measures [pH (7.3), BGL (14.4mmol/L) & bicarbonate (15.8mmol/L)] were consistent with mild–moderate severity. Overall, 26% required ICU/HDU for their DKA management; there was no DKA-associated mortality.

Comparing 2024 to 2025, across all measures, only duration of SGLT2i-DKA event (36.6 ± 36 hrs) was significantly different (longer) (2025: 36.6 ± 36 vs 2024: 19.8 ± 12.1 hrs, $p=0.03$), though interestingly initial pH was less severe (2025: 7.3 vs 7.2 $p=0.5$).

Conclusion:

Our findings consistently show SGLT2i-DKA presents early during hospitalisations predominately admitted via ED, are associated with reduced oral intake & infection, can be severe in presentation and take over 24 hours of active management to resolve. With widespread use of SGLT2is, clinicians need greater awareness of associated DKA risk while health facilities should consider point of entry pathways to mitigate risk.

Health economic evaluation of a resistant starch dietary strategy in gestational diabetes

Latino C^{1,2}, Gianatti E¹, Makate M³, Lo J², Devine A², Christophersen C²

¹Fiona Stanley Hospital, Murdoch, Australia, ²Edith Cowan University, Joondalup, Australia, ³Curtin University, Bentley, Australia

Background: Gestational diabetes mellitus (GDM) increases health service costs through additional education, monitoring, and pharmacotherapy. Mothers and infants face higher risks of adverse outcomes, including neonatal intensive care unit (NICU) admission, a major driver of cost.

Aim: To evaluate the health economic impact and potential cost-benefit of a high-resistant starch (RS) dietary intervention for women with GDM.

Methods: Sixty-nine women with GDM were randomised from diagnosis until delivery to one of three dietary groups (n=23/group): standard care (Control), high-RS diet (RS Diet), high-RS diet plus 16 g/day RS supplement (RS Supp). Direct hospital costs were obtained from Activity-Based Funding records, including antenatal outpatient visits, maternal inpatient care (tests, medications, procedures), and all NICU-related costs for admitted infants. Insulin costs were sourced from the Pharmaceutical Benefits Scheme, and diabetes consumables from Diabetes WA.

Results: NICU admissions were less frequent in RS Diet and RS Supp groups (n=2 each) compared with Controls (n=8) (OR=0.19, $p=0.034$). Absolute risk reduction was 26.1% (95%CI 1.9 to 46.4, $p=0.071$). As a result, total NICU costs were highest in the Control group (AUD 50,317), compared with RS Diet (AUD 10,084) and RS Supp (AUD 25,451). The mean cost per NICU admission was AUD 7,805, yielding net monetary benefits of AUD 46,326 (RS Diet) and AUD 45,586 (RS Supp), with break-even intervention costs of AUD 101 and AUD 249, respectively. Antenatal and maternal inpatient costs did not differ between groups ($p=0.343$ and $p=0.432$). Women requiring insulin therapy incurred substantially higher mean costs than those managed with diet alone (AUD 17,635 and AUD 24,943, respectively, $p<0.001$).

Conclusion: Increasing dietary RS intake in women with GDM appears to be a simple, low-cost strategy with potential to reduce NICU admissions and associated healthcare costs. Although the study was not powered to detect differences in NICU outcomes, the economic signal observed supports further investigation of RS-based dietary interventions in larger trials.

Higher dietary intakes of resistant starch in gestational diabetes are associated with fewer admissions to neonatal intensive care

Latino C^{1,2}, Gianatti E¹, Lo J², Devine A², Christophersen C²

¹Fiona Stanley Hospital, Perth, Australia, ²Edith Cowan University, Joondalup, Australia

Background: Fermentable dietary fibres such as resistant starch (RS) modulate gut microbiota and influence glycaemic control through mechanisms including enhanced short-chain fatty acid production and improved insulin sensitivity. Despite this, the effects of RS on glycaemia and maternal–fetal outcomes in gestational diabetes mellitus (GDM) remain largely unexplored.

Aim: To determine whether higher RS intake improves glycaemia and maternal–fetal outcomes in women with GDM.

Methods: Women newly diagnosed with GDM were recruited during routine education sessions and block-randomised by pre-pregnancy BMI to one of three diets until delivery: standard care (Control), a diet higher in RS (RS Diet), or high RS diet plus 40 g/day high-amylose maize starch (RS Supp). Fasting blood glucose (FBG), 3-day food diaries, gastrointestinal symptoms, and maternal–fetal outcomes were collected. Analyses included mixed modelling, ANOVA, and regression.

Results: Sixty-nine women were enrolled (n=23 per group). Baseline characteristics were comparable except for weight already gained. Compliance with the RS supplement exceeded 80% in 74% of the RS Supp group. RS, fibre, and carbohydrate intakes increased significantly in both intervention groups ($p<0.001$) without worsening gastrointestinal symptoms. Mixed modelling demonstrated a trend toward an inverse association between RS intake and FBG ($r = -0.175$, $p=0.051$), although no between-group differences in FBG were observed after one week ($p=0.475$). Neonatal intensive care unit (NICU) admissions were significantly lower in the combined intervention groups compared with Control (OR=0.19, $p=0.034$). Length of NICU stay ($p=0.079$) and neonatal anthropometry were similar across groups. Maternal insulin use did not predict NICU admission ($p=0.466$).

Conclusion: Higher RS intake in GDM is feasible, well-tolerated, and associated with substantially fewer NICU admissions, with emerging evidence suggesting potential attenuation of FBG. Ongoing analyses of maternal and neonatal microbiota, metabolomics, and maternal lipid profiles, alongside health economic evaluation, will allow us to present further clarification of mechanisms and clinical relevance.

Fermentable dietary fibres and glycaemic outcomes in dietary approaches to manage Gestational Diabetes Mellitus: A scoping review

Latino C^{1,2}, Lo J², Yan R², Devine A², Christophersen C²

¹Fiona Stanley Hospital, Murdoch, Australia, ²Edith Cowan University, Joondalup, Australia

Background: Many women with gestational diabetes mellitus (GDM) do not achieve optimal glycaemic control through current dietary strategies, and a substantial proportion require pharmacotherapy. Recommended dietary patterns for GDM emphasise wholegrains, legumes, vegetables, and fruits—foods naturally rich in fermentable fibres. These fibres reduce dietary energy density, slow nutrient absorption, and support gut microbiota function. Their fermentation metabolites, particularly short-chain fatty acids such as butyrate, may improve glycaemia by reducing inflammation, enhancing cellular glucose uptake, and stimulating incretin release. Given GDM-associated reductions in fibre-fermenting microbes, fermentable fibres may represent an underutilised therapeutic target.

Aim: To examine the role of fermentable fibres in dietary interventions for GDM and their potential to improve glycaemic outcomes.

Methods: Following Joanna Briggs Institute and PRISMA-ScR guidance, Medline, Embase, Emcare, and Web of Science were searched using terms related to GDM, diet, carbohydrates, starch, and fibre. Two reviewers screened 12,105 records using Research Screener, with 180 undergoing full-text review. Extracted data included study design, gestation, intervention characteristics, fibre intake, and glycaemic outcomes.

Results: Twenty-eight studies met inclusion criteria (21 randomised controlled trials, four observational studies, three crossover trials). Of 20 interventions reporting improved glycaemia, 18 involved higher fibre intakes than comparator diets, and fermentable fibre sources were identifiable in 12. Effective dietary patterns (low GI, CHOICE, DASH, Nordic) consistently featured wholegrains, legumes, vegetables, and fruits—foods known to promote microbial short-chain fatty acid production. Six of eight fibre supplement trials improved glycaemic control, five of which used fermentable fibres. Only two studies assessed gut microbiota, highlighting a major evidence gap.

Conclusion: Fermentable fibres appear to enhance the efficacy of GDM dietary interventions, likely through beneficial effects on the maternal gut microbiota. Future research should quantify fermentable fibre intake and investigate microbiome-mediated mechanisms to inform strategies that may reduce reliance on pharmacotherapy and improve maternal–fetal outcomes.

From pregnancy care to preventative care: Early findings from a Telehealth Diabetes Prevention Service after gestational diabetes

Lawty L¹, Dennis K¹, Holden S¹

¹Western Health, Malmsbury, Australia

Aim

Women with a history of gestational diabetes (GDM) have an increased risk of developing type 2 diabetes (T2DM) compared with women without prior GDM. Engagement with diabetes prevention programs in the post-partum period can be low. This project aimed to describe the early implementation and participant characteristics of a dietitian-led T2DM prevention service for women at a tertiary hospital in Melbourne's west.

Methods

Women who birthed at Joan Kirner Hospital were offered a 9-month program. Inclusion criteria included insulin-requiring GDM (>8 units), body mass index (BMI) between 23–40 kg/m², and either a high-risk ethnicity or previous GDM pregnancy. The service comprised of telephone consultations with maternity dietitians, focusing on personalised nutrition, exercise, and behaviour change strategies.

Results

At the time of analysis, the program had been running for 10 months, and 88 women had enrolled in the service. Most were aged between 31–35 years, and all were <16 weeks post-partum at their first consultation. Participants represented diverse cultural backgrounds, with 90% born outside Australia. At the beginning of their recent pregnancy, 80% had a BMI in the overweight or obese range. Engagement with the phone-based model was high, with 82% completing at least two dietitian consultations at the time of analysis. Completion of the post-partum OGTT was high at 65%, compared to the typically reported rate of approximately 40%. Preliminary lifestyle data indicated 68% continued to consume low glycaemic index rice and breads.

Conclusion

Early findings indicate that a dietitian-led, telehealth diabetes prevention service is feasible and acceptable for women with a history of GDM. This model which integrates pregnancy care with preventative care shows promise in engaging a diverse, high-risk population during a life stage when traditional prevention programs may be difficult to access. Ongoing evaluation will assess lifestyle outcomes and longer-term impacts on T2DM prevention.

Outcomes and satisfaction following the development of a nurse practitioner led Gestational Diabetes Clinic at North Canberra Hospital.

Le Cornu N¹

¹North Canberra Hospital, Bruce, Australia

Background: Gestational diabetes (GDM) is a common condition with risks of adverse health outcomes to mother and neonate. Prior to September 2023, mothers diagnosed with GDM requiring insulin routinely had their care transferred to another hospital.

Aim: To investigate maternal and neonatal outcomes in addition to satisfaction levels after the implementation of a Nurse Practitioner led Gestational Diabetes Clinic (NP led GDM Clinic) at our hospital.

Method: A model of care for a NP led GDM Clinic was developed providing women who were diagnosed with GDM continuity of care and for their care to remain at the hospital where they had chosen to give birth. The service is located and managed within the women's and children's service. Our team includes a Nurse Practitioner, Credentialed Diabetes Educator, Dietitian, Registered Midwife, Endocrinologist and Obstetrician was formed. The service provides women-centred non-judgemental care, which respects and acknowledges diversity, and is culturally appropriate to First Nations families.

An audit was conducted looking at the number of women who were managed by the NP led GDM Clinic, the maternal and neonatal outcomes of these women, and satisfaction experienced by the women cared for in the clinic and maternity unit staff.

Results: In the first 2 years of operation, 330 women with insulin requiring GDM were managed at the NP led GDM Clinic. 25% of all pregnant women at our hospital were diagnosed with GDM and had their initial education provided by our service. 38% required insulin to manage their diabetes and were cared for in the clinic. Increasing the number of births at our hospital.

Overall satisfaction with the service by both mothers and maternity staff was high. The physical location and structure of the clinic improved the education and skills of staff involved in care and has led to greater collaboration between the different clinicians caring for these women.

Real-world performance of the Omnipod® 5 automated insulin delivery system in children, adolescents, and adults with Type 1 diabetes in Australia

Lee M^{1,2}, Do D³, Ly T³

¹Department of Medicine, St. Vincent's Hospital Melbourne, Fitzroy, Australia, ²University of Melbourne, Fitzroy, Australia, ³Insulet Corporation, Acton, United States of America

Aim

The Omnipod® 5 Automated Insulin Delivery (AID) System, which allows for personalized therapy through customizable glucose targets from 6.1-8.3mmol/L in 0.55mmol/L increments, is CE marked for use in individuals aged 2 years and older with type 1 diabetes (T1D) and recently became commercially available in Australia. This study aimed to evaluate the early real-world performance of the system in children, adolescents, and adults in this region.

Methods

A retrospective analysis of continuous glucose monitoring (CGM) and insulin data from Omnipod 5 users with T1D aged ≥ 2 years in Australia who provided consent (guardian provided consent for those aged < 18 years) was conducted for those with sufficient CGM data (≥ 90 days of data and $\geq 75\%$ of days with ≥ 220 readings) as of July 31, 2025.

Results

Data from 4,979 users in Australia meeting the inclusion criteria were included in the analysis (25.6% aged 2 to < 18 y; 74.4% aged ≥ 18 y). In the overall cohort, pediatric and adult users achieved a median time in range (TIR; 3.9-10.0 mmol/L) of 65% and 68%, respectively, and time < 70 mg/dL (< 3.9 mmol/L) was low (median 1.3% and 1.0% in pediatric and adult users, respectively). Use of the 6.1mmol/L glucose target, used by 64% of users, was associated with a higher TIR (median 66% in pediatric and 71% in adult users). Among those ($n=632$) utilizing optimized system settings (glucose target: 6.1 mmol/L; correction factor ≤ 83 /total daily insulin; Insulin:carb ratio ≤ 350 /total daily insulin; Time in Automated Mode: $\geq 90\%$; boluses/day: ≥ 3), users achieved a higher TIR (median 75% and 76% in pediatric and adult users, respectively), with minimal impact on hypoglycemia (median time < 3.9 mmol/L of 1.4% and 1.1% in pediatric and adult users, respectively).

Conclusion

Collectively, these real-world results in $> 4,900$ pediatric and adult Omnipod 5 users with T1D in Australia demonstrate the substantial glycemic benefits of AID use.

A case of Von Hippel–Lindau Syndrome with multisystem tumor manifestations over two decades, including pancreatic islet failure

Lee S¹

¹Soonchunhyang University Cheonan Hospital, Cheonan, South Korea

Aim

Von Hippel–Lindau (VHL) syndrome is a rare hereditary tumor syndrome characterized by the development of multiple benign and malignant tumors across various organs. Although pancreatic involvement is common in VHL syndrome, the clinical impact of pancreatic endocrine failure has been relatively underappreciated in the long-term course of the disease.

Methods

We retrospectively reviewed the clinical course, laboratory findings, and serial imaging studies of a patient with VHL syndrome who was followed for approximately 20 years. Clinical data included medical history, biochemical evaluation of glucose metabolism and catecholamine excess, radiological surveillance such as serial abdominal CT, MRI, and brain MRI.

Results

We report a 37-year-old man with a 20-year history of sequential multisystem tumor development consistent with VHL syndrome. The patient initially presented with a neuroblastic tumor of the central nervous system and later developed left renal cell carcinoma requiring nephrectomy. During subsequent health surveillance, elevated blood glucose levels were incidentally detected. Despite medical treatment, glycemic control remained poor, and proteinuria was noted, prompting further evaluation. Abdominal computed tomography revealed right renal cell carcinoma, right adrenal pheochromocytoma, and multiple pancreatic cystic lesions. Serial imaging demonstrated progressive pancreatic cystic involvement with interval increase over approximately 10 years, which temporally correlated with worsening glycemic control. Endocrine evaluation demonstrated markedly reduced C-peptide levels without evidence of autoimmune diabetes, indicating pancreatic islet failure secondary to progressive structural pancreatic involvement.

Conclusion

This case illustrates the near-complete phenotypic expression and long-term natural history of VHL syndrome over two decades, in which insulin-deficient diabetes due to pancreatic islet failure served as an important clinical clue leading to the identification of advanced multisystem involvement. It highlights that unexplained or refractory diabetes may represent a key diagnostic entry point to underlying systemic genetic disorders such as VHL syndrome.

Optimized carbohydrate diet: Establishing a new paradigm in metabolic health

Li H¹, Long X¹, Wu Q¹, Li H¹, Jia W¹

¹Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

Aim:

Dietary intervention is a cornerstone of metabolic disease management. As a key nutrient in energy metabolism, carbohydrate management has long focused on restricting the quantity consumed, whereas the mechanisms for optimizing carbohydrate quality remain unclear. Resistant starch (RS)—a carbohydrate that resists small-intestinal digestion and is fermented by colonic microbes—may provide a promising approach to optimize carbohydrate composition and improve metabolic health.

Methods:

Randomized, double-blind, controlled clinical trials were conducted in individuals with overweight/obesity and those with metabolic dysfunction-associated steatotic liver disease (MASLD). Participants in the intervention group received RS, while the control group received isocaloric corn starch. Clinical phenotypes were assessed before and after intervention. Fecal and serum samples were collected for multi-omics analyses. Potential mechanisms were investigated using fecal microbiota transplantation, monocolonization, and *in vitro* cell experiments. In the MASLD cohort, efficacy was assessed by changes in intrahepatic triglyceride content (IHTC). Participants were stratified into high and low responders, and multi-omics data were used to explore the potential mechanisms of heterogeneous responses.

Results:

Compared with the control group, RS intervention significantly reduced body weight and IHTC, while improving insulin sensitivity. Integrated multi-omics and experimental validation demonstrated that RS reshaped the gut microbiota, including increasing the abundance of *Bifidobacterium adolescentis*, thereby enhancing FGF21 sensitivity in adipose tissue and upregulating intestinal ANGPTL4 expression to inhibit lipid absorption. RS also reduced *Bacteroides stercoris* and microbially derived branched-chain amino acids, thereby attenuating hepatic fat accumulation. Post-hoc analyses further indicated that differences in baseline gut microbiota mediated the efficacy heterogeneity.

Conclusion:

This study shows that RS can improve metabolic health by targeting the gut microbiome. Increasing RS intake to optimize dietary carbohydrate composition may represent an effective, affordable, and sustainable intervention strategy. Moreover, elucidating response heterogeneity provides a new theoretical basis for personalized dietary interventions in metabolic diseases.

Multidimensional effects of personalized exercise intervention in type 2 diabetes: a randomized controlled trial

Liu D¹, Cheng D¹, Wang Q¹, Wu L¹, Zhao Y², Zhao Y³, Chen J⁴, Jia W¹, Li H¹

¹Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Nanjing Normal University, Nanjing, China, ³Nanjing Sport Institute, Nanjing, China, ⁴Shanghai Mental Health Center, Shanghai, China

Aim

Individuals with type 2 diabetes (T2D) commonly experience progressive fat accumulation and muscle loss, highlighting the need for interventions that concurrently target both. We investigated whether a personalized exercise training improved body composition and related metabolic and cognitive outcomes in adults with T2D and abdominal obesity.

Methods

In this 16-week randomized controlled trial, 103 participants with T2D and abdominal obesity were randomly assigned (1:1) to a control group (n = 51) or an exercise group (n = 52). Participants in the control group maintained habitual lifestyle, while those in the exercise group received combined aerobic and resistance training tailored to individual aerobic capacity and muscle strength. The primary outcome was change in fat mass.

Results

Compared with the control group, the exercise group showed a greater reduction in fat mass, with a between-group difference of -1.20 kg (95% CI -1.90 to -0.50), along with an increase in skeletal muscle percentage. Magnetic resonance imaging further demonstrated more pronounced reductions in abdominal fat and increases in lower limb muscle after exercise. The exercise group also showed improvements in glycemic regulation and physical fitness. Additionally, the exercise group showed greater cognitive performance, with higher Montreal Cognitive Assessment scores and faster responses across perceptual speed, working memory, and executive function. Task-based functional magnetic resonance imaging revealed more efficient patterns of network engagement after the intervention. Moreover, improvements in body composition were associated with metabolic and cognitive benefits, alongside exercise-related proteomic changes.

Conclusion

These findings suggest that personalized exercise training effectively promotes fat loss and muscle gain, conferring metabolic and cognitive improvements in adults with T2D and abdominal obesity.

Effects of high-intensity interval training on glycemic management and sleep quality in adults with Type 1 Diabetes Mellitus

Liu F¹, Jia Z¹, Gao M¹

¹The First Affiliated Hospital of Henan University of Science and Technology, Luoyang, China

Objective To evaluate the effects of high-intensity interval training (HIIT) on glycemic control and sleep quality in adults with type 1 diabetes mellitus (T1DM).

Methods From February to May 2025, 60 adults with T1DM attending a tertiary hospital in Luoyang were recruited by convenience sampling and randomly assigned to an intervention group (n=30) or a control group (n=30). The control group received routine care. The intervention group received routine care plus a 12-week smart jump-rope HIIT program (three sessions/week, 30 min/session: 5-min warm-up, 20-min HIIT, 5-min cool-down). HIIT alternated 1 min of high-intensity exercise (75%–95% HRmax) with 1 min of recovery (40%–60% HRmax). Participants used continuous glucose monitoring throughout and wore a real-time heart-rate smartwatch during exercise. Glycemic outcomes included HbA1c and ambulatory glucose profile metrics: mean glucose (AG), glucose management indicator (GMI), glucose standard deviation (SDBG), time in range (TIR), time above range level 1 (TAR1), time above range level 2 (TAR2), time below range level 1 (TBR1), time below range level 2 (TBR2), and coefficient of variation (CV). Sleep quality was assessed by the Pittsburgh Sleep Quality Index (PSQI) and polysomnography (PSG) before and after the intervention.

Results Baseline measures were comparable between groups. After 12 weeks, the intervention group showed significant reductions in HbA1c, AG, GMI, SDBG, TAR1, and TAR2 and a significant increase in TIR versus baseline and versus controls (all $P < 0.05$). CV and TBR1 showed no significant within- or between-group differences ($P > 0.05$). PSQI scores improved in the intervention group and were lower than in controls ($P < 0.05$), whereas PSG parameters did not differ significantly within or between groups ($P > 0.05$).

Conclusion A 12-week smart jump-rope HIIT program improved glycemic control and subjective sleep quality in adults with T1DM but did not significantly change objective PSG outcomes. HIIT may be a feasible adjunct non-pharmacological strategy; longer follow-up is needed to clarify effects on objective sleep.

Effects of digital health-supported exercise snacks on glucose and lipid metabolism in diabetes: A systematic review

Liu F¹, Dong Y¹

¹Peking Union Medical College Hospital, Beijing, China

Aim

This systematic review evaluated the efficacy of digital health-supported exercise snacks—brief, structured physical activity bouts (1-5 minutes) integrated into daily routines—on glucose and lipid metabolism in individuals with diabetes. We aimed to synthesize evidence on metabolic outcomes and assess the role of digital technologies in enhancing adherence.

Methods

Following PRISMA 2020 guidelines, we comprehensively searched MEDLINE, Embase, Web of Science, and CENTRAL databases. Inclusion criteria: adults (≥ 18 years) with diabetes/prediabetes; exercise snacks (< 10 minutes/session, < 30 minutes daily) delivered via digital health technologies (wearables, apps, CGM); comparator: no exercise/usual care/traditional exercise (≥ 30 minutes/session); outcomes: glucose metabolism (HbA1c, fasting glucose, postprandial glucose) or lipid metabolism (TC, TG, HDL-C, LDL-C); RCTs with ≥ 2 weeks duration. Quality assessment used Cochrane RoB 2.0 and Newcastle-Ottawa Scale.

Results

Ten studies ($n=1,892$) were included. Digital health-supported exercise snacks demonstrated superior glycemic control compared to traditional moderate-intensity continuous training (HbA1c reduction: 0.4% vs 0.3%). In type 2 diabetes, 12-24 week interventions reduced fasting glucose by 0.8-1.2 mmol/L; type 1 diabetes showed 15-20% reduction in postprandial glucose excursions. Lipid profile significantly improved: LDL-C decreased (SMD -0.30, $P=0.02$), HDL-C increased (SMD 0.26, $P=0.01$), triglycerides reduced 12-18%. Digital technologies enhanced adherence by 30-40% (12-month retention 82% vs 55% in traditional interventions). CGM integration enabled personalized timing, reducing hyperglycemic time by 15%. MOTIVATE-T2D trial demonstrated 7-fold higher 6-month adherence with wearable technology.

Conclusion

Digital health-supported exercise snacks offer a promising, time-efficient intervention for improving glucose and lipid metabolism in diabetes. The integration of wearable devices, continuous glucose monitoring, and digital coaching platforms significantly enhances adherence compared to traditional exercise regimens. Cost-effectiveness analysis confirmed 18% improvement in cost-effectiveness ratio. This technology-empowered approach provides a scalable solution for diabetes management, particularly addressing time barriers and poor adherence to conventional exercise prescriptions. Future large-scale RCTs are warranted to validate long-term efficacy across diverse diabetic populations.

Early glycaemic outcomes of GLP-1 receptor agonist therapy in diabetes associated with MELAS Syndrome: Two case reports

Lodhia S¹, Lau V¹, Lee S¹, Curak E¹, Fu K¹

¹Wollongong Hospital, Wollongong , Australia

Background:

Mitochondrial diabetes (MD) is an under-recognised form of diabetes caused by mitochondrial defects that impair pancreatic β -cell function and alter peripheral glucose metabolism. Evidence-based guidelines are lacking. Metformin is avoided due to lactic acidosis risk, and many patients require insulin. Pre-clinical studies suggest glucagon-like peptide-1 receptor agonists (GLP-1RA) may improve mitochondrial function, and four existing case reports have described favourable metabolic outcomes. We report early glycaemic responses to GLP-1RA therapy in two patients with mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes (MELAS) syndrome and MD.

Case 1:

A 40-year-old male with MELAS (m.3243A>G mutation; 47% heteroplasmy in blood) had a 10-year history of diabetes and, despite basal–bolus insulin (~80 units/day), HbA1c was 7.3% with problematic major hypoglycaemia. C-peptide was preserved (1.5 nmol/L, paired glucose 14.7 mmol/L).

Semaglutide 0.25 mg weekly was initiated with continuous glucose monitoring. Moderate gastrointestinal symptoms and malaise required dose reduction to 0.17 mg weekly. Basal insulin decreased from 48 to 12 units/day and bolus insulin was discontinued. Glycaemia improved with 77% time-in-range, mean glucose 7.8 mmol/L, and glucose management indicator (GMI) 6.7%.

Case 2:

A 52-year-old female with MELAS and a 17-year history of diabetes had longstanding insulin therapy (87–107 units/day) and suboptimal glycaemic control (GMI 8.6%, mean glucose 12.4 mmol/L). C-peptide was low (0.35 nmol/L, paired glucose 14.9 mmol/L).

Semaglutide 0.1 mg weekly was commenced. After three weeks, mean glucose improved to 9.3 mmol/L with GMI 7.3%. Basal insulin was reduced from 47 to 40 units and bolus insulin from 20 to 14 units. Side effects were mild gastrointestinal symptoms and occasional exercise-related hypoglycaemia requiring insulin adjustment.

Conclusion:

Low-dose semaglutide produced glycaemic improvement and enabled insulin reduction in two patients with MELAS-associated MD, representing insulin-resistant and insulin-deficient phenotypes. GLP-1RA therapy represents a promising treatment option for MD, although longer-term studies are needed.

Tirzepatide for the treatment of concurrent Type 1 Diabetes and overweight or obesity (TZP-T1D): An interim analysis.

Longfield M^{1,2}, Bilal M^{1,2}, Purcell A², Rodrigo N^{1,2,3}, Cheruvu P¹, Glastras S^{1,2}

¹Department of diabetes, metabolism and endocrinology, Royal North Shore Hospital, St Leonards, Australia, ²Kolling Institute, University of Sydney, St Leonards, Australia, ³Department of Endocrinology, Nepean Hospital, Kingswood, Australia

Background: In patients with type 1 diabetes (T1D), the co-occurrence of overweight/obesity increases insulin requirements, complicates glycaemic management, and perpetuates weight-gain. Tirzepatide (TZP), a potent GLP-1/GIP co-agonist, has proven efficacy in patients with type 2 diabetes and obesity, though a paucity of evidence remains for individuals with T1D.

Aims: To explore the efficacy of TZP in adults with concurrent T1D and overweight/obesity to lower body weight and improve metabolic health.

Methods: Patients received TZP for a total of 7 months to a maximum dose of 10mg, up-titrated monthly (Phase A of TZP-T1D 2.0: A randomised open-label crossover trial). All patients received glucose review and dietary support throughout the study. Screening criterium included age 18-70years, ≥ 1 year T1D diagnosis, HbA1c <10%, BMI >27kg/m², and willingness to abstain from other GLP-1 use. Serum markers and body composition (DXA) were measured at baseline with repeat measurement post-treatment. Anthropometrics, total-daily-insulin dose (TDD), and %time-in-range (%TIR) were measured at visits corresponding with dose escalation.

Results: Recruitment commenced in November 2025 and is ongoing. Of the 14 participants recruited 42.9% are female and 78.6% use insulin pumps, with a mean diabetes-duration of 25.6 $\pm$ 4.5yrs and HbA1c of 7.6 $\pm$ 0.3%. At baseline, participants had a mean BMI of 32.1 $\pm$ 0.7kg/m², and body composition of 40.2 $\pm$ 2.3% fat-mass and 57.4 $\pm$ 2.3% lean-mass. %Body-weight reduction was higher in TZP treated participants at 4, 8 and 12-weeks (mean difference: 3.57 $\pm$ 1.16%, P=0.046, n=9; 4.85 $\pm$ 1.37, P=0.027, n=6; 7.59 $\pm$ 1.96, P=0.022, n=6). A higher reduction in TDD was observed in those treated with TZP at 4-weeks (mean difference: 28.46 $\pm$ 8.312%, P=0.012, n=9), with no differences observed in changes to basal insulin or %TIR and no severe adverse events.

Conclusion: Tirzepatide is effective in patients with T1D and concurrent overweight/obesity for reducing body weight and TDD. Future work will ascertain if the cardio-metabolic benefits, observed in those with T2D and/or obesity, occur in T1D.

Managing Insulin Antibody Syndrome in Type 1 Diabetes Using Automated Insulin Delivery Following B-Cell Depletion: An Edifying Single-Case Study

Luo C¹, McGill MJ^{1,2}, Garsia RJ^{2,3}, Parry SN^{1,2}, Twigg SM^{1,2}

¹Diabetes Centre, Department of Endocrinology, Royal Prince Alfred Hospital, Sydney, Camperdown, Australia, ²Sydney Medical School, Faculty of Medicine and Health, University of Sydney, Australia, ³Department of Immunology, Royal Prince Alfred Hospital, Sydney, Camperdown, Australia

Background

Insulin antibody syndrome (IAS) is a rare and difficult to manage cause of glycaemic instability that can exist in type 1 diabetes (T1D), driven by insulin binding and unpredictable insulin action. To our knowledge, no published data exists on use of automated insulin delivery (AID) systems in this setting.

Aim

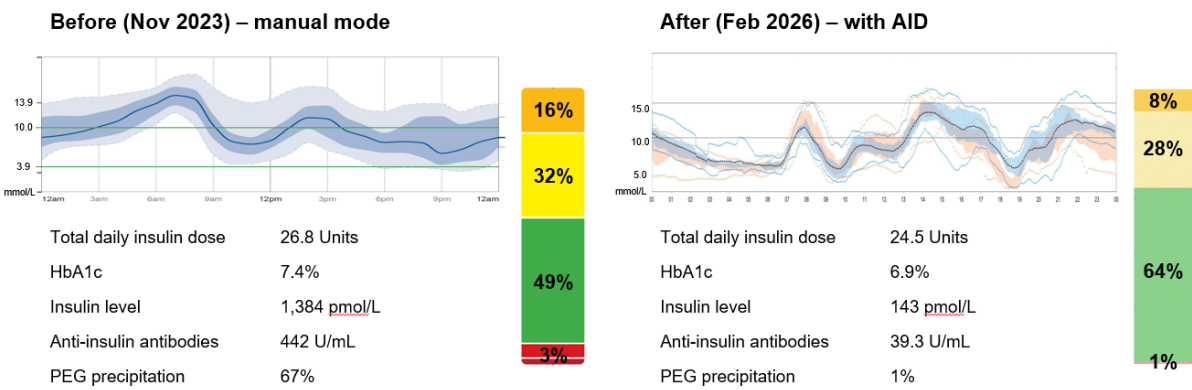
To describe the multidisciplinary management of severe IAS in T1D using B-cell depletion therapy with AID.

Methods

Retrospective single-case review.

Results

A 46-year-old female with 8 years of T1D using MiniMed 780G pump (manual mode) was referred in December 2023 for unstable glycaemia with an unusual pattern of hypoglycaemia. She had a history of childhood limbic encephalitis. Daytime hypoglycaemia prevented AID use; manual mode basal rates totalled 1unit/24h. Investigations demonstrated elevated anti-insulin antibodies (442U/mL; NR:0.0-0.4), high anti-GAD antibodies (90.9-110.7U/L), undetectable C-peptide and highly variable circulating insulin levels (58-1384nmol/L). Insulin antibody PEG precipitation testing showed very low free insulin (9.2u/mL), representing 2.1% of total insulin, with ~67% (NR:<1.0%) of insulin bound in high-molecular-weight complexes. She was referred for immunosuppression and received immune depletion therapy targeting B-cells with rituximab (4 doses totalling 3g/19 months) commencing July 2024. Hypoglycaemia resolved in parallel with reduction in anti-insulin antibody levels and resolution of insulin binding (<1.0%). SmartGuard was initiated 6-months post-rituximab commencement. Pre- and post-outcomes are below.



Acute dip in eGFR in patients treated with tirzepatide. A post-hoc analysis of long-term clinical trials of tirzepatide treatment

Linetzky B¹, Stefanski A¹, Jouravskaya I¹, Cao D¹, J. Wiese R¹, Griffin R¹, Pavo I¹, J. L. Heerspink H², MacIsaac R³

¹Eli Lilly and Company, Indianapolis, USA, ²University of Groningen, Groningen, Netherlands, ³St Vincent's Hospital Melbourne, Victoria, Australia

Aim: Nephroprotective therapies generally reduce glomerular hyperfiltration by reducing glomerular pressure, which manifests clinically as an acute and reversible dip in eGFR. This post-hoc analysis evaluated the presence of a dip in eGFR in two long-term trials of tirzepatide (TZP) and subsequent changes in eGFR for participants with and without a dip by 12 weeks of treatment.

Methods: SURPASS-4 recruited adults with type 2 diabetes (T2D) randomized 1:1:1:3 to TZP 5:10:15mg or insulin glargine [iGlar] 100U/mL once-weekly for up to 104 weeks. The SURMOUNT-1 3-year study recruited adults with obesity or overweight and prediabetes randomized 1:1:1:1 to TZP 5:10:15mg or placebo (PBO) for 176 weeks. Participant groups were classified as having no decrease, a decrease of 0-10%, or a decrease of $\geq 10\%$ from baseline to week-12 in creatinine-based eGFR (Cr-eGFR). A Chi-square test was used to compare the incidence of week-12 eGFR dip between treatment groups. Changes in Cr-eGFR over time (Cr-eGFR slope) were assessed from randomization to end of treatment using random effect mixed model with TZP doses pooled.

Results: The analyses included 1924 SURPASS-4 (TZP=960; iGlar=964) and 942 SURMOUNT-1 (TZP=700; PBO=242) participants. In SURPASS-4, a significantly greater proportion of participants in the TZP vs iGlar group exhibited a week-12 Cr-eGFR decrease (0-10% or $\geq 10\%$); $p < 0.001$. The Cr-eGFR slope was smaller for TZP vs iGlar regardless of the presence or magnitude of the Cr-eGFR dip. In SURMOUNT-1 there were no significant differences in either the incidence of Cr-eGFR dip or Cr-eGFR slope per year among treatment groups.

Conclusion: These post-hoc analyses indicated a more frequent incidence of a dip in Cr-eGFR in TZP-treated (compared to iGlar-treated) participants with T2D. Furthermore, the presence of an acute dip in Cr-eGFR with TZP treatment was not associated with a more pronounced decline in kidney function.

Ethnicity-specific patterns in insulin response and body composition after pregnancy: A cross-sectional study from Western Sydney.

Manoharan M^{1,2}, Sigmond A², Mclean M², Gunton J²

¹Liverpool and Fairfield Hospitals, Sydney, Australia, ²University of Sydney, Sydney, Australia

Background and Aim:

Postpartum glucose intolerance is a key predictor of future type 2 diabetes, yet the influence of body fat composition and ethnic variation remains poorly understood. We examined whether postpartum body fat distribution is associated with OGTT-derived glycaemic responses across diverse ethnic groups.

Methods:

This cross-sectional study included 205 post-partum women. OGTT glucose values, insulin levels, HbA1c, percent fat mass, and central fat mass were compared across ethnicities using ANOVA with Dunnett T3 post-hoc tests.

Results:

South Asian women had lower HbA1c (-0.23 , $p = 0.027$), lower fasting insulin (-4.26 mU/L, $p = 0.009$), markedly lower 2-hour insulin (-34.9 mU/L, $p < 0.001$), lower 2-hour glucose versus Caucasian women (-1.10 mmol/L, $p = 0.021$). South-East Asian women had substantially lower fat mass (-12.6 kg, $p < 0.001$), percent fat mass (-5.85% , $p = 0.003$), central fat mass (-516 g, $p = 0.001$), and lean mass (-6.21 kg, $p < 0.001$). South Asian women had significantly lower lean mass (-6.17 kg, $p < 0.001$).

Conclusion:

Postpartum glycaemic status appears to be shaped more by metabolic and insulin-secretory patterns than by body fat composition alone, highlighting the importance of ethnicity-informed metabolic assessment.

Variable	Reference group	Ethnicity	Mean difference	Std Error	P value	95% confidence interval	
HbA1c(%)	Caucasian	SA	-0.2259*	0.0656	0.027	-0.439	-0.012
GTT Fasting(mmol/L)	SEA	SA	-0.3202	0.0985	0.053	-0.643	0.002
GTT 2 hour(mmol/L)	Caucasian	SA	-1.0988*	0.3109	0.021	-2.112	-0.085
Fasting Insulin(mU/L)	SEA	SA	-4.262*	1.122	0.009	-7.93	-0.59
2 Hour Insulin(mU/L)	Caucasian	SA	-34.881*	6.671	0.000	-56.66	-13.10
Fat mass(gms)	Caucasian	SEA	12617.214*	2173.522	0.000	5503.26	19731.17
Percent fat mass (%)	Caucasian	SEA	5.8524*	1.4158	0.003	1.205	10.500
Central fat mass (gms)	Caucasian	SEA	515.976190*	118.583639	0.001	127.37929	904.57310
		SA	320.420635	99.267030	0.057	-4.08677	644.92804
Lean fat mass (gms)	Caucasian	SEA	6213.929*	1044.184	0.000	2796.33	9631.52
		SA	6167.935*	908.407	0.000	3188.14	9147.73

Recurrent In-Hospital hypoglycaemia: An indicator of complex care needs and increased resource utilization. A Retrospective Cohort Study from Australia

Manoharan M^{1,2,3,4}, Bhandari S¹, Garcia E¹, Bui T⁴

¹Liverpool/Fairfield Hospital, Sydney, Australia, ²Western Sydney University, Sydney, Australia,

³University of New South Wales, Sydney, Australia, ⁴Ingham Institute, Sydney, Australia

Background and Aim:

In-hospital hypoglycaemia is associated with adverse clinical outcomes, prolonged length of stay (LOS), and increased healthcare utilisation. This study aimed to identify clinical factors associated with single versus multiple hypoglycaemic events in hospitalized patients and to compare differences in LOS and hospital resource utilisation.

Methods:

A retrospective cohort study of 99 hospitalized adults who experienced at least one hypoglycaemic event. Patients were categorised into single (n=51) and multiple (n=41) hypoglycaemic events. Multivariable logistic regression was used to identify factors associated with recurrent hypoglycaemia.

Results:

Patients with multiple hypoglycaemic events were older (median 82 vs 77 years, p=0.02) and had significantly longer LOS (median 13 vs 9 days, p=0.02). Inadequate carbohydrate intake was the most frequent cause of hypoglycaemia (single: 53%; multiple: 68%) and showed a trend toward predicting recurrence (adjusted OR 2.32, 95% CI 0.95–5.91, p=0.07). Endocrinologist and diabetes educator consultations were more common in the multiple-event group (39% vs 24%, p=0.10; 39% vs 22%, p=0.06).

Impact and Learnings:

Given the significant longer LOS in the recurrent group, timely endocrinologist involvement and improved nutritional oversight with standardised nutrition protocols may help reduce preventable episodes and mitigate the substantial healthcare burden of recurrent hypoglycaemia.

Clinical characteristics and predictors of multiple in-hospital hypoglycemic events (n = 99)

Variable	Single event (n=51)	Multiple events (n=41)	Adjusted OR (95% CI)	p-value
Age, median [IQR]	77 [72–81]	82 [78–85]	1.03 (0.99–1.07)	0.12
Severity of hypoglycemia	Mild–Severe	Mild–Severe	1.32 (0.83–2.14)	0.24
Inadequate carbohydrate intake, n(%)	27 (53%)	28 (68%)	2.32 (0.95–5.91)	0.07
Length of stay, median [IQR]	9 [6–11]	13 [10–18]	–	0.02
Clinical review by junior doctor (%)	45(88%)	38(93%)	–	0.47
Endocrinologists consult n (%)	12 (24%)	16 (39%)	–	0.10
Diabetes educators consult n (%)	11 (22%)	16 (39%)	–	0.06

Models of care for gestational diabetes mellitus: Pregnancy outcomes in diabetes team follow-up versus midwifery-led stepped-down care.

Malaty M¹, Bhadbhade M^{1,4}, Manoharan V^{2,3,4}, Wong V^{1,4}

¹Diabetes and Endocrine Service, Liverpool Hospital, Liverpool, Australia, ²Department of Endocrinology, Nepean Hospital, Kingswood, Australia, ³Nepean Clinical School, Faculty of Medicine and Health, The University of Sydney, Penrith, Australia, ⁴South Western Sydney Clinical Campuses, University of New South Wales, Liverpool, Australia

Aim: Gestational diabetes mellitus (GDM) is associated with adverse maternal and neonatal outcomes. Its rising prevalence has increased demand on specialist diabetes services, prompting interest in alternative models of care, including midwife led follow up for lower risk women.¹ However, evidence regarding the safety and effectiveness of such approaches remains limited.

Method: This retrospective study compared demographic and clinical outcomes in women with singleton GDM pregnancies managed at Liverpool Hospital between 2020 and 2025, in which follow up was allocated to diabetes team (DT) or midwife led clinic (MWC) according to glycaemic control assessed two weeks after structured diabetes education and medical nutritional therapy. Any requirement for diabetes team input in the MWC prompted transfer to the DT clinic.

Results and Discussion: In our study, 1839 women were followed up in the DT clinic, and 400 women were reviewed in the MWC. Women managed in the MWC demonstrated a lower risk cardiometabolic profile, characterised by younger age, lower rates of obesity, PCOS and family history of diabetes, and lower mean glucose levels at all three 75 g OGTT time points. These women experienced significantly lower rates of maternal complications, including less gestational weight gain, lower risks of hypertensive disorders of pregnancy and emergency caesarean section. Rates of neonatal complications—including preterm birth, neonatal hypoglycaemia, neonatal jaundice, macrosomia, congenital anomalies, respiratory distress, admission to neonatal intensive care, and neonatal death—were also significantly lower among women managed in the MWC. Our findings are in keeping with the literature.^{2,3}

Conclusion: A risk based, midwife led model of care is safe and effective for selected women with GDM; however, prospective validation is required to optimise risk stratification and outcomes.

References

1. Sina M, Cade TJ, Flack J, Nolan C, Rajagopal R, Wong V, **et al**. Antenatal models of care for women with gestational diabetes mellitus: vignettes from an international meeting. *Aust N Z J Obstet Gynaecol*. 2020;60. doi:10.1111/ajo.13144.
2. Shenton E, Carter A, Gabriel L, Slavin V. Improving maternal and neonatal outcomes for women with gestational diabetes through continuity of midwifery care: a cross-sectional study. *Women Birth*. 2024;37(Suppl 1):101741. doi:10.1016/j.wombi.2024.101741.
3. Morelli A, Smith L, Karia A, Marshall A, Plachcinski R, Tyler W, et al. Outcomes for women with diabetes admitted for labour care to midwifery units in the UK: a national prospective cohort study and survey of practice using the UK Midwifery Study System (UKMidSS). *BMJ Open*. 2024;14(12):e087161. doi:10.1136/bmjopen-2024-087161. [bmjopen.bmj.com]

Teplizumab for Stage 2 Type 1 Diabetes: Feasibility, Patient Experience and Early Implementation in the Australian Healthcare Setting

Manos G^{1,2}, Wentworth J^{1,2,3}

¹Royal Melbourne Hospital, Parkville, Australia, ²University of Melbourne, Melbourne, Australia, ³St Vincent's Institute of Medical Research, Fitzroy, Australia

Aim:

Teplizumab has recently been approved in the United States and Europe to delay progression from stage 2 (pre-clinical) to stage 3 (clinical) type 1 diabetes (T1D). Implementation is challenging due to the requirement for intravenous administration over 14 consecutive days. We describe the feasibility, patient experience, and early clinical and immunological outcomes of the first Australian adults treated with teplizumab.

Methods:

Two adults with stage 2 T1D received teplizumab via a compassionate access scheme. Treatment was delivered in January 2026 through a hospital day infusion unit (weekdays and Saturdays) and a Hospital in the Home assessment unit (Sundays and public holidays). Both patients underwent peripheral central line insertion and baseline assessment including oral glucose tolerance testing (OGTT), viral serology and renal and liver function testing. Pre-medication with anti-emetic, paracetamol, and antihistamine was administered during dose escalation (days 1–5). Full blood count and renal and liver function were monitored daily.

Results:

Both patients completed the full 14-day course. Lymphopenia occurred in both patients, with nadirs of $0.2 \times 10^9/L$ and $0.4 \times 10^9/L$ on day 6; counts recovered by day 14 in the first patient, while the second had persistent mild lymphopenia (>0.5 – $<1.0 \times 10^9/L$). Mild transaminitis ($<3 \times ULN$) and alkaline phosphatase elevation occurred in one patient. One patient developed a rash and significant nausea requiring multiple anti-emetics; the second tolerated treatment well. No cytokine release syndrome occurred. Daily admissions lasted approximately 90–180 minutes, with frequent observations during and post-infusion. Both patients reported positive overall experiences and willingness to consider future immunotherapy. The cost of infusion delivery was AUD \$23,306 per treatment course, excluding drug acquisition costs.

Ongoing follow-up will assess short-term metabolic (OGTT, CGM, HbA1c) and immunological outcomes, which will be presented.

Conclusion:

Teplizumab administration is feasible with appropriate resource planning and associated with positive patient experience.

The product was provided free of charge via Sanofi's Managed Access Program. Sanofi was not involved in the design, collection, analysis, interpretation, or reporting of the data, but was provided the opportunity to review the publication prior to submission. The decision to submit for publication was made independently by the authors

Culturally safe clinical guidance for people living with diabetes and eating challenges in Aotearoa New Zealand

McClintock J¹, Hoyle L¹

¹New Zealand Society For The Study of Diabetes, Hamilton, New Zealand

Aims:

To produce guidance for all clinicians working with people living with diabetes and difficulties with body satisfaction or eating behaviours, founded in culturally safe practice, lived experience needs and for all types of diabetes in Aotearoa New Zealand.

Method:

Project and consultation groups were established through the New Zealand Society for the Study of Diabetes (NZSSD) Psychology-Hinengaro Special Interest Group. This included expertise in Kaupapa Māori (indigenous population) practice, working with Pacific Peoples, lived experience of diabetes as well as subject matter experts. The project group met in person and online to develop the guidance, which then underwent significant consultation to ensure best practice from multiple lenses.

Results:

Guidance on engagement and clinician positionality, particularly with regards to talking about weight in healthcare were developed, followed by screening and identification of those in need of help with diabetes and disordered eating. The Meihana Model, a holistic Māori model of health was then used as the framework for assessment and intervention guidance. This includes consideration of historical and current societal factors, whānau (family), tinana (physical health), hinengaro (psychological and emotional wellbeing), ratonga hauora (wider support), wairua (connectedness, spirituality and values), and taiao (environment). This has culminated in the 2025 “Diabetes, Body Satisfaction and Eating Behaviours Guidance” as well as a range of resources produced by the NZSSD project group, and is widely available for all peoples.

Conclusion:

Guidance that is based on culturally safe practice and lived experience is essential for improving the care for those living with diabetes. This world-first guidance has met a significant need in for those living with all types of diabetes who experience difficulties with body satisfaction and eating behaviours.

Whānau perspectives on culturally safe pharmacist-led medicine reviews for Māori living with Type 2 Diabetes: A Kaupapa Māori qualitative study

McIntosh B¹, Hikaka J¹, Anderson A¹, Kremer L²

¹Waipapa Taumata Rau, University Of Auckland, Auckland, New Zealand, ²Ōtakau Whakaihu Waka, University of Otago, Dunedin, New Zealand

Aim:

Type 2 diabetes disproportionately affects Māori in Aotearoa New Zealand, yet many health services remain designed around Western models of care that may not align with Māori values and lived experiences. Pharmacist-led medicine reviews have potential to improve medicines understanding, safety, and self-management, but little research has explored how these services should be designed to work well for whānau Māori. The aim of this study is to explore the experiences and perspectives of Māori living with, or supporting someone with, type 2 diabetes to inform the development of culturally safe pharmacist led medicines review services

Methods:

This qualitative study is guided by Kaupapa Māori research principles. Māori living with type 2 diabetes, or supporting a whānau member with the condition, are invited to participate in semi structured interviews or wānaka (focus groups). Conversations are audio recorded with consent and transcribed. Participants are able to review interview transcripts prior to analysis. Transcripts are de-identified and analysed to identify themes relating to medicines use, pharmacy care experiences, and whānau-centred approaches to medicine reviews

Results:

Analysis is ongoing. The study is expected to identify key themes relating to trust, cultural safety, communication, and whānau involvement in medicines management. Findings are anticipated to highlight elements of pharmacist care that feel respectful, mana-enhancing, and supportive of whānau aspirations for health and wellbeing.

Conclusion:

Understanding whānau perspectives is essential for designing diabetes services that support equitable outcomes. Insights from this study may inform the development of culturally safe pharmacist led medicine review models that strengthen relationships, support diabetes self-management, and improve the quality and equity of diabetes care for Māori.

The digital health care needs for people with type 2 diabetes and primary care clinicians in Australia.

Chua D^{1,2}, Vasconcelos Silva C^{1,2}, Russell A³, Menon A^{1,2}

¹Department of Diabetes and Endocrinology, Metro South Health, Woolloongabba, Australia, ²Centre for Health Services Research, University of Queensland, Woolloongabba, Australia, ³Department of Endocrinology and Diabetes, Alfred Health, Melbourne, Australia

Background

Smartphone-based digital health (mHealth) can support people with diabetes (PwD) by improving self-management and access to their healthcare team. It reduces barriers such as travel distance, limited feedback mechanisms, and gaps in clinical data sharing or communication within multidisciplinary teams. Successful mHealth implementations requires effective integration into existing diabetes care models, alignment with the needs of PwD and clinicians, compatibility with existing workflows, and sustainable funding. However, current evidence is broad and lacks specific Australian insights, especially for primary care and for culturally diverse or socioeconomically marginalised communities.

Aims

Our aims were to explore the mHealth needs and desires of PwD and their clinicians in an Australian community-based diabetes clinic setting, the challenges they might face and the influencing factors of mHealth uptake for diabetes management in Australian general practice.

Methods

We performed a qualitative interview study using semi-structured interviews and underpinned by a constructivist ontology and interpretivist epistemology. An inductive/deductive reflective thematic analysis approach was used. Coding was guided by the eHealth-enhanced Chronic Care Model. Participants included PwD, general practitioners and general practice nurses from Inala, Brisbane, Australia; a culturally diverse region with a high proportion of people experiencing socioeconomic marginalisation.

Results

The study involved fourteen PwD, 43% speaking a language other than English at home, and eleven clinicians. PwD and clinicians saw mHealth's potential to improve healthcare engagement through increased contact, and access to relevant data, feedback and reminders. mHealth-facilitated clinician communications would reduce the need for PwD to convey medical information reducing clinical uncertainty and burden. Implementation of mHealth needs to consider the needs of online communities, family and friends as they facilitate education, uptake and continued utilisation. Clinicians wanted mHealth to eliminate low value tasks but expressed medicolegal concerns with always-connected technologies.

Conclusion

These findings will inform future mHealth implementations in diabetes primary care.

A nonagenarian living with newly diagnosed type 1 diabetes mellitus

Min Myat S¹, William J¹

¹Cairns Hospital And Health Service, Cairns, Australia

Although the onset of type 1 diabetes mellitus (T1DM) is typically seen in children and young adults, this autoimmune condition can impact and change a person's life at any point of lifetime. To date, there are few case reports of newly diagnosed T1DM in nonagenarians. This case represents the approach of diagnosis and management challenges including modern technology in a nonagenarian living in Far North Queensland.

Case Presentation

A 92-year-old gentleman presented to emergency department due to significant fatigue and chronic progressive weight loss. He has background history of pernicious anaemia and was newly diagnosed with diabetes mellitus (HbA1c -8.6 %) 12 months ago and was treated with metformin monotherapy in community. He was found to have hyperglycaemia with ketosis with HbA1c 13.5 % in emergency department presentation and later found to have low C peptide at time of hyperglycaemia and positive insulin antibodies (GAD and ZnT8). No alternate diagnosis was found to explain unintentional weight loss after malignancy, infection and other autoimmune disease screening investigations. With aim to avoid hypoglycaemia at advanced age with personalised HbA1c target 8%, insulin therapy was gradually titrated from basal insulin monotherapy to mixed regimen with assist from continuous glucose monitoring device. He regularly attends Cairns Diabetic Centre multidisciplinary team appointments to achieve clinically meaningful glycaemic control whilst adapting reasonably well to new lifestyle. His body weight has been stable, and his energy level has been improving since commencement of insulin therapy.

Discussion

Onset of T1DM in advanced age is rare and, therefore, the diagnosis is challenging and often late in context of the nature of autoimmune process. It is also important to have clinically meaningful approach in managing this chronic autoimmune condition with multidisciplinary team involvement, allowing the person with diabetes to balance the new lifestyle at advanced age.

Conclusion

This case highlights the rare T1DM diagnosis in a nonagenarian requiring personalised management approach to achieve clinically meaningful outcomes.

Investigating the role of extracellular vesicles for type 1 diabetes therapy

Nachanekar A¹, El-Azzi I¹, Pereira G¹, Kocoski A¹, Donohoe E², Tores Arce E³, Hosseini-Beheshti E⁴, Schjenken J³, Coles M¹, Wong W¹, Hardikar A¹, Joglekar M¹

¹Western Sydney University, Sydney, Australia, ²Asbestos and Dust Diseases Research Institute, Sydney, Australia, ³University of Newcastle, Sydney, Australia, ⁴University of Sydney, Sydney, Australia

Background & Aim

Immune therapies are demonstrated to be successful in delaying the progression of type 1 diabetes (T1D). We observe that human islet-derived progenitor cells (hIPCs) have immunomodulatory properties and now we aim to understand if their signalling molecules, including extracellular vesicles (EVs), can be used as potential immune-regulatory therapies for T1D.

Methods

Co-culture experiments of hIPCs and phytohemagglutinin (PHA) stimulated human peripheral blood mononuclear cells (PBMCs) were performed. PBMC proliferation was measured using flow cytometry. EVs were isolated from culture supernatants and assessed for size, concentration and tetraspanin marker CD63 with Fluorescent-Nano-tracking analysis. Further characterisation with transmission electron microscopy and western blotting for CD9, CD81 and flotillin1 were performed. Cytokines and proteins within the supernatants and EVs (cargo) were measured on O-link system. Co-culture experiments were performed with isolated EVs and a known EV-inhibitor (GW4869).

Results

hIPCs significantly inhibited *in vitro* proliferation of various immune cell subsets, including CD4+ T, CD8+ T, and CD19+ B, in a direct co-culture as well as transwell systems, confirming their immunomodulatory potential. EVs isolated from culture supernatants were mostly exosomes, ranging 50-150nm in size, demonstrating typical markers such as CD63, CD9, flotillin, and CD81. Pro-inflammatory markers (IFN- γ , CCL19, IL-6, GZMA, and TNF- α) were reduced in the supernatants of co-cultures. Interestingly, stimulated PBMCs demonstrated reduced proliferation in the presence of EVs, while this effect was lost when exosome inhibitors were used. Ongoing experiments include EVs injection in NOD mice to understand the change in the incidence of diabetes.

Discussion/Conclusion

Human islet-derived cells and their secretome (specifically extracellular vesicles) exhibit immunomodulatory properties, potentially through cytokine signalling and the transfer of bioactive molecules via exosomes. Detailed characterisation of culture supernatants and EVs could lead to the identification of cell-free therapeutics, presenting potential new treatment targets for T1D.

Comparative effectiveness, feasibility, and psychosocial impact of automated insulin delivery in pregnant women with Type 1 diabetes: a systematic review and meta-analysis

Sheklabadi E¹, Li J¹, Teede H¹, Goldstein R¹, Ng A¹, Naderpoor N¹

¹Monash Centre for Health Research and Implementation, Faculty of Medicine, Nursing and Health Sciences, Monash University, Melbourne, Australia, Melbourne, Australia

Aim/s: Automated Insulin Delivery (AID) systems improve outcomes in type 1 diabetes (T1D). However, pregnancy-specific evidence remains limited. This systematic review and meta-analysis compared AID systems with sensor-augmented pumps and multiple daily injections (MDIs) supported with continuous glucose monitoring in pregnant women with T1D, assessing glycaemic, pregnancy, and psychosocial outcomes.

Methods: A systematic search (April 2010 to December 2025) identified seven randomised controlled trials and 15 observational studies, comprising 745 participants. Thirteen mixed-methods and 10 case reports/series contributed to the qualitative synthesis. Primary outcomes included percentage of time in range (TIR) (3.5–7.8 mmol/L), time below range (TBR) (<3.5 mmol/L) and time above range (TAR) (>7.8 mmol/L), overall and overnight. Secondary outcomes included adverse events, maternal, neonatal, and patient- and clinician-reported outcomes.

Results: Compared with MDIs, AID increased TIR overall (mean difference (MD) 10.40%, 95% CI 9.20–11.59) and overnight (MD 14.55%, 95% CI 9.20–19.90). TAR decreased overall (MD –7.64%, 95% CI –12.80 to –2.48) and overnight (MD –11.95%, 95% CI –17.77 to –6.13). Overnight TBR fell (MD –1.10%, 95% CI –1.50 to –0.70), while overall TBR was not significantly different (MD –0.40%, 95% CI –1.29 to 0.50). Glycaemic variability decreased by 2.24% and HbA1c was modestly reduced by 0.21%. No significant differences were observed in maternal or neonatal outcomes or serious adverse events. Psychosocial findings showed improvements in quality of life, sleep, pregnancy enjoyment and flexibility, with reduced mental burden and fear of hypoglycaemia. Reported challenges included alarm fatigue, device burden and technical issues requiring support.

Conclusion: AID systems improve glycaemic and psychosocial outcomes in pregnancies complicated by T1D. Available evidence indicates AID is safe when used under expert clinical supervision with frequent adjustments to address changing insulin requirements. As AID remains off-label in pregnancy, implementation requires adequate healthcare resourcing, specialist oversight, multidisciplinary team, workforce training, patient education, technical support, and close follow-up.

The rate of decline in blood glucose affects the acceleration of gastric emptying induced by hypoglycaemia in type 1 diabetes

Nadkarni A^{1,2,3}, Emerson P², Asser I^{1,2}, Idris M^{1,2}, Smith H^{1,2}, Tafari S^{1,2}, Bischoff C², Grivell J¹, Hatzinikolas S¹, Lange K¹, Jalleh R^{1,2}, Jones K¹, Horowitz M^{1,2}, Plummer M^{1,2}, Umapathysivam M^{1,2,4}
¹Adelaide University, Fulham, Australia, ²Royal Adelaide Hospital, Adelaide, Australia, ³Austin Health, Heidelberg, Australia, ⁴Flinders Medical Centre, Bedford Park, Australia

Background

Acute insulin-induced hypoglycaemia markedly accelerates gastric emptying (GE) in individuals with type 1 diabetes (T1D). Whether the rate of decline in blood glucose to hypoglycaemia influences the magnitude of this effect is unknown.

Aims

To determine, whether a slow, compared to rapid, onset of hypoglycaemia differentially affects gastric emptying in T1D.

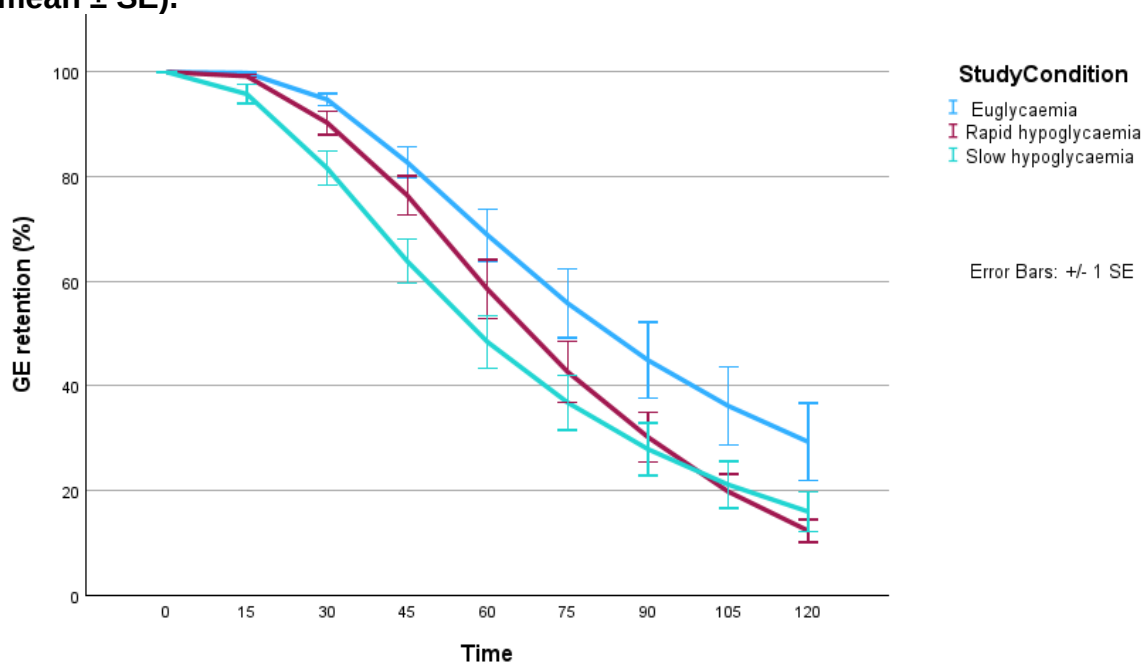
Methods

Twelve adults with T1D (5 females, age 41(19) years, HbA1c 6.8 (1.0)%), were randomised in a crossover design to euglycaemia (blood glucose clamped at 6.0mmol), 'rapid' hypoglycaemia (blood glucose reduced from 6.0mmol/L to 2.8mmol/L over 15 minutes), and 'slow' hypoglycaemia (blood glucose reduced from 6.0mmol/L to 2.8mmol/L over 2 hours). The target blood glucose of 2.8mmol/L was maintained for 60 minutes during hypoglycaemic study visits. Glycaemia was controlled with intravenous insulin (Actrapid) and 25% glucose infusions. Gastric emptying of a 100g minced beef meal labelled with 20 MBq ^{99m}technetium-sulfur colloid was measured using scintigraphy. The primary outcome was area under the gastric emptying curve at 60 minutes (AUC0-60) expressed as % retention and analysed using a linear mixed-effects model.

Results

Mean (SE) gastric retention at 60 minutes was 91.3(1.8)% during euglycaemia, 85.1(1.9)% in rapid hypoglycaemia and 78.8(1.8)% in slow hypoglycaemia. GE was faster during slow-onset, compared to rapid-onset hypoglycaemia ($P < 0.05$).

Figure 1 Gastric emptying during rapid and slow hypoglycaemia and euglycaemia (mean $\pm$ SE).



Raw gastric emptying data presented as %retention across all measured time-points, and SE bars. Study conditions are in blue (euglycaemia) red (rapid hypoglycaemia) and green (slow hypoglycaemia).

Conclusion

Insulin-induced hypoglycaemia markedly accelerates gastric emptying in T1D, with a greater effect when hypoglycaemia develops slowly rather than rapidly.

GLP-1 Is not superior to insulin for glycaemic control during stress hyperglycaemia

Nadkarni A^{1,2,3}, Chapple L^{1,2}, Asser I², Idris M², Tenikoff H², Doherty S², Glasby K², Brown N², Arce-arango P², Christie C², Hulst A⁴, Sundararajan K^{1,2}, Nauck M⁶, Finnis M¹, Deane A^{5,7}, Horowitz M^{1,2}, Plummer M^{1,2}

¹Adelaide University, Adelaide, Australia, ²Royal Adelaide Hospital, Adelaide, Australia, ³Austin Health, Heidelberg, Australia, ⁴UMC Amsterdam, Amsterdam, Netherlands, ⁵Melbourne Health, Melbourne, Australia, ⁶St Josef Hospital, Bochum, Germany, ⁷Melbourne University, Melbourne, Australia

Aims: Glucagon-like-peptide-1 (GLP-1) is an incretin hormone with potent glucose-lowering effects that are glucose-dependent. The reduced risk of iatrogenic hypoglycaemia is a key potential advantage over insulin for managing stress hyperglycaemia. We aimed to compare glycaemic control between exogenous intravenous GLP-1 and insulin infusions for the management of stress hyperglycaemia.

Methods: In a single-centre trial, mechanically ventilated, non-diabetic, critically ill patients with stress hyperglycaemia (blood glucose ≥ 11.1 mmol/L), were randomised 1:1 to receive intravenous infusions of either A) GLP-1 (1.2pmol/kg/min - 3.6pmol/kg/min) and a placebo-insulin infusion or B) insulin and a placebo-GLP-1 infusion, over a 48-hour period to target a blood glucose level (BGL) between 4.0 – 9.9mmol/L. Infusions were titrated hourly using glucometer BGL and continuous glucose monitoring collected glucose data for analysis. The primary outcome was time outside target glucose range, and secondary outcomes included proportion of time and incident rates of hyperglycaemia and hypoglycaemia.

Results: Forty participants were included, with well-matched baseline characteristics between the GLP-1 group (n = 21) and insulin group (n = 19). The mean (95%CI) proportion of time outside of target range for GLP-1 and insulin was 17.0 (5.1 -29.0)% and 11.4 (2.0 – 20.9)% respectively, (p=0.461). There was no difference in the mean proportion of time in the hyperglycaemic or hypoglycaemic range for GLP-1 compared to insulin, 16.9(-8.5 – 22.2)% Vs 10.1(0.5 – 19.6)%; (p=0.373) and 0.2(-3.2 – 0.7)% Vs 1.4(-0.5 – 3.3)% (p=0.203), respectively. Hypoglycaemia (BGL<4.0mmol/L) occurred less frequently during GLP-1 infusion (0.2% Vs 0.5% of BGL values) but was rarely observed (0.35% of all BGLs).

Conclusion(s): We found no difference in efficacy between GLP-1 and insulin to achieve time-in-target-range in a critically ill population with stress hyperglycaemia.

Lack of concordance between subcutaneous continuous glucose monitoring and venous blood glucose during hypoglycaemia in type 1 diabetes

Nadkarni A¹, Emerson P^{1,2}, Asser I^{1,2}, Idris M^{1,2}, Smith H^{1,2}, Bischoff C², Lange K², Jones K¹, Horowitz M^{1,2}, Plummer M^{1,2}, Umapathysivam M^{1,2,4}

¹Adelaide University, Fulham, Australia, ²Royal Adelaide Hospital, Essendon, Australia, ³Austin Health, Heidelberg, Australia, ⁴Flinders Medical Centre, Bedford Park, Australia

Background

Continuous glucose monitoring (CGM) is standard of care in type 1 diabetes (T1D). However, data pertaining to the precision of CGM during hypoglycaemia are limited.

Aims

To compare CGM values with plasma glucose during mild and severe hypoglycaemia in individuals with T1D.

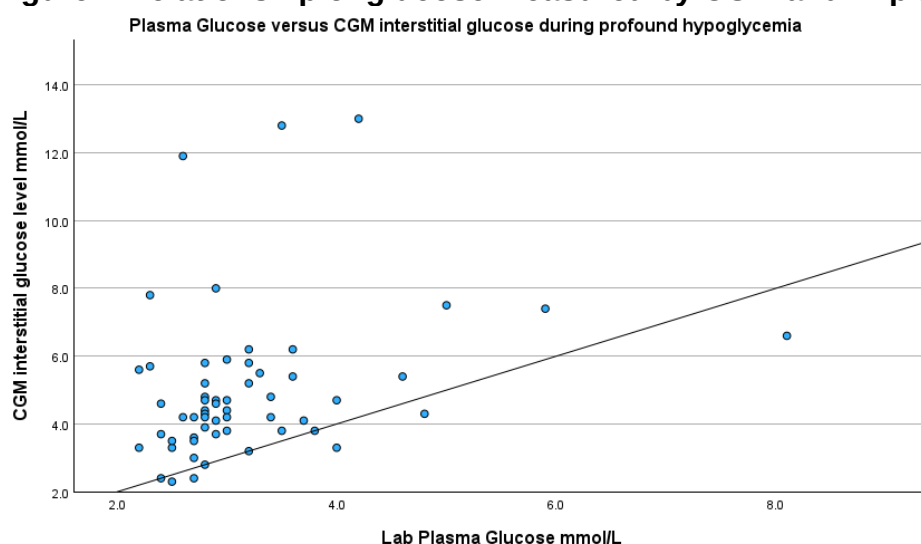
Methods

On separate days, participants with T1D underwent a 'rapid' (15 min) or 'slow' (120 min) hyperinsulinaemic-hypoglycaemic clamp to 2.8mmol/L maintained for one hour, or a euglycaemic clamp (6 mmol/L), in randomised order. Plasma glucose (hexokinase method) measurements were paired with concurrent CGM readings. Mild and severe hypoglycaemia were defined as blood glucose levels ≤ 3.9 mmol/L and ≤ 2.9 mmol/L, respectively. Agreement between methods was assessed using the mean(SD) difference, CGM true hypoglycaemia rate (≤ 0.83 mmol/L error), and mean bias with limits of agreement (LoA).

Results

Ten participants were studied with Dexcom G6 (n=7), Dexcom G7 (n=2), or Medtronic Guardian 4 (n=1) monitors. CGM correctly identified mild hypoglycaemia in 29% of instances and severe hypoglycaemia in 25%. During mild and severe hypoglycaemia, CGM overestimated plasma glucose by a mean (SD) of 1.66 (1.68) mmol/L and 1.75 (1.82) mmol/L respectively. Across the measured glucose range CGM values were consistently higher than plasma glucose with a bias (LoA) of 2.06 (0.75, 4.87)mmol/L during rapid hypoglycaemia and 1.57 (0.32, 2.82)mmol/L during slow hypoglycaemia.

Figure.1 Relationship of glucose measured by CGM and in plasma



Conclusion

CGM overestimates glucose in the hypoglycaemic range and frequently fails to detect clinically significant hypoglycaemia. These findings have important implications for the management of hypoglycaemia in T1D.

Sex differences in diabetes therapy–related quality of life after switching to once-weekly subcutaneous semaglutide

Nagai Y¹, Hata Y¹, Kigawa I¹, Kurasaki K¹, Hamano K¹

¹Kanto Rosai Hospital, Kawasaki, Japan

Aim

To examine changes in diabetes therapy–related quality of life (DTR-QOL) after switching from other GLP-1 receptor agonists to semaglutide in insulin-treated adults with type 2 diabetes, and to explore sex-specific associations with metabolic outcomes.

Methods

This single-center prospective observational study enrolled adults with type 2 diabetes receiving insulin and a non-semaglutide GLP-1 receptor agonist for at least 3 months, with HbA1c $\geq 7.0\%$ or BMI ≥ 25.0 . After informed consent, participants selected either once-weekly subcutaneous or once-daily oral semaglutide based on their preferences. Changes in HbA1c, body weight, and DTR-QOL scores from baseline to 6 months were evaluated. Sex-stratified correlation analyses were conducted to assess relationships between metabolic changes and QOL outcomes.

Results

Among participants, 85% (N=55) chose once-weekly subcutaneous semaglutide. After 6 months, HbA1c decreased by 0.8% (95% CI 0.5–1.1; $p < 0.001$), and body weight decreased by 2.9 kg (95% CI 2.2–3.6; $p < 0.001$). The total DTR-QOL score improved significantly (59.0 ± 15.5 to 66.9 ± 16.1 ; $p < 0.001$). Baseline DTR-QOL scores and overall changes in HbA1c, body weight, and QOL were similar between women and men. However, sex-specific patterns were observed: improvements in QOL were more strongly associated with reductions in HbA1c among women ($r = -0.461$; $p = 0.041$), whereas among men, QOL improvements were more strongly associated with reductions in BMI ($r = -0.566$; $p = 0.004$).

Conclusion

Most insulin-treated patients switching from other GLP-1 receptor agonists preferred once-weekly subcutaneous semaglutide, which led to significant improvements in glycemic control, body weight, and therapy-related QOL. QOL improvement appears to be more strongly linked to glycemic improvement in women and weight reduction in men, suggesting sex-specific drivers of patient-perceived benefit.

CLOSE IT EXTENDED: Long-term real-world follow-up demonstrates sustained stable glycaemia with fully closed-loop management in Type 1 diabetes

Nanayakkara N¹, Wilkinson T³, Williman J⁵, de Bock M^{3,4}, Jenkins A¹, Cohen N¹

¹Baker Heart And Diabetes Institute, MELBOURNE, Australia, ²University of Melbourne, MELBOURNE, Australia, ³Department of Paediatrics, University of Otago, Christchurch, New Zealand, ⁴Department of Paediatrics, Health New Zealand Canterbury, New Zealand Christchurch Hospital, Christchurch, New Zealand, ⁵Department of Population Health, University of Otago, Christchurch, New Zealand

Font: Arial 11 pt - alpha/numeric characters only

Aims

The CLOSE-IT study demonstrated that a fully closed-loop (FCL) system using the open-source oref1 algorithm, with no meal announcements, achieved comparable control to HCL with meal announcements. This extension investigated if these glucose metrics were sustained with real-world use.

Methods

All CLOSE-IT study participants (HCL and FCL trial arms) were invited to extend FCL use for a further 12 months. The primary outcome was time in range (TIR, 70–180 mg/dL/ 3.9–10.0 mmol/L). Secondary outcomes included postprandial glucose, glucose variability, time below range (TBR; <3.9mmol/l) and time above range (TAR; >10mmol/l).

Results

Of 73 CLOSE-IT participants, 49 consented to the extension study (51% male, age 40±12 years, T1D duration 21 [13–33] years). Within 30 days of exiting the RCT phase, TIR declined by 5.6% (3.7–7.5%), but remained stable thereafter (Table 1). TIR was 68±9% at the end of the RCT phase and 63±10% at 12 months (p=0.2). HbA1c increased from 52±7 mmol/mol at the start of the extended period to 57±6 mmol/mol by study end (p=0.002), with no further change beyond 90 days (p=0.4). 8 participants did not complete the extension study (4 assigned FCL and 4 HCL in CLOSE-IT).

Conclusion

Participants who continued to use the oref1 system as FCL had stable glucose metrics over 12-months, with a low risk of hypoglycaemia and good TIR. Optimal control was not achieved in all participants; further analyses will provide insights into those who achieved and maintained adequate control in FCL.

Table 1

Time (months)	-1 (end of RCT) N = 49 ¹	0 N = 49 ¹	3 N = 44 ¹	6 N = 44 ¹	9 N = 42 ¹	11 N = 41 ¹
Time in range	68 (9)	63 (12)	62 (11)	60 (10)	61 (11)	63 (10)
Time below range (<3.0 mmol/l)	0.26 (0.39)	0.26 (0.51)	0.20 (0.26)	0.21 (0.26)	0.21 (0.31)	0.23 (0.26)
Time above range (>10.0 mmol/l)	31 (9)	36 (12)	37 (11)	39 (11)	38 (12)	36 (10)
CV	36.7 (4.1)	34.6 (4.4)	33.9 (4.3)	33.9 (4.0)	32.8 (3.9)	33.5 (3.8)
¹ Mean (SD); n (%)						

Glycaemic stability maintained during and after unannounced extended exercise in adults with T1D using anoref1-based FCL AID system: The CLOSE IT exercise trial

Nanayakkara N^{1,2}, Huang M^{1,2}, Burren D¹, Howden E¹, Jenkins A¹, Cohen N^{1,3}

¹Baker Heart And Diabetes Institute, Melbourne, Australia, ²University of Melbourne, Melbourne, Australia, ³School of Public Health and Preventive Medicine, Faculty of Medicine, Nursing and Health Sciences, Monash University, Australia, Melbourne, Australia

Aim/s

Management of exercise in Type 1 diabetes remains challenging. The CLOSE-IT trial demonstrated that a fully-closed-loop (FCL) system achieved comparable glycaemia to hybrid closed loop (HCL) use. This exercise sub-study examined system performance during prolonged, unannounced exercise.

Methods

Theoref1-based FCL AID system was used without exercise announcement. Participants had a standardised (26g carbohydrate) meal 4-hours pre-exercise and undertook a supervised 90-minute mixed-modality exercise session (20-min. aerobic warm-up and steady-state activity, 45-min. resistance exercises at 60–70% 3 RM (repetition maximum), and 25-min. aerobic segment). CGM and insulin delivery were analysed during and 24-hours after exercise. The primary outcome was time-in-range (TIR 3.9–10.0mmol/L). Secondary outcomes included time below range (TBR<3.9 mmol/L), time above range (TAR >13.9mmol/L), and safety indicators.

Results

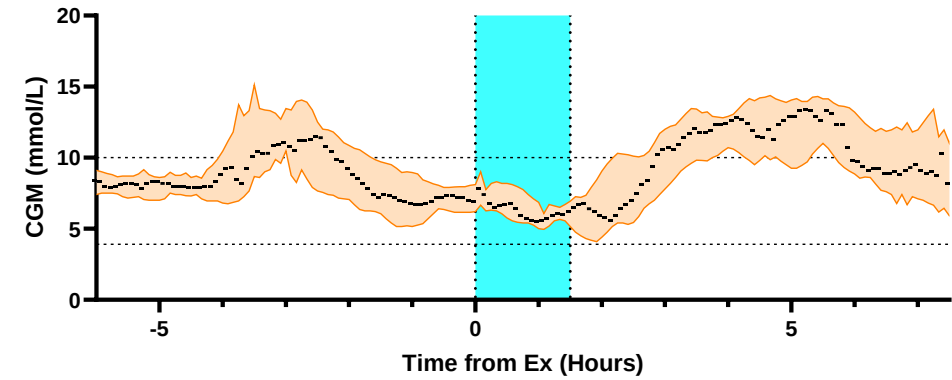
Nine participants (40.1±4.3y.o, 22.2±11.1y T1D, 56% male) completed the exercise study. Glucose levels were stable during and after exercise. Insulin on board was stable during exercise (figure 1). During exercise: TIR was 99.4 (1.8)%; TBR was 0.6 (1.8)%, and TAR was 0.0 (0.0)%. For 24-hours post-exercise: TIR was 61.4 (16.8)%, TBR was 3.3 (6.3)%, and TAR was 29.6 (13.7)%. No carbohydrate supplements were required during exercise.

Conclusion

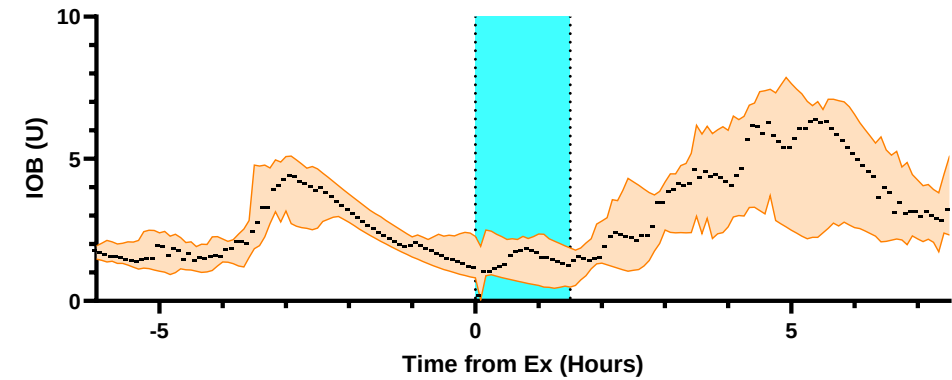
Theoref1-based FCL AID maintained stable glycaemia during prolonged, unannounced exercise and for the subsequent 24-hours. Larger confirmatory studies with a wider ranges of exercise conditions are merited to better understand the system's performance. Outcomes may enable more people with T1D to benefit from exercise.

Figure 1: CGM Glucose (a) and insulin on board (IOB) (b) during and after exercise (exercise period in cyan)

a)



b)



Efficacy of GLP-1 receptor agonists in Asian patients with Type 2 Diabetes Mellitus: A systematic review

Nasarudin J¹, Magfira N¹, Widyastuti A¹, Mokoagow M¹, Epriliawati M¹

¹Division Of Endocrinology, Metabolism And Diabetes Department Of Internal Medicine, Fatmawati General Hospital, South Jakarta, Indonesia

Aim: To systematically review the glycemic and weight-related effects of glucagon-like peptide-1 receptor agonists (GLP-1RAs) in Asian patients with type 2 diabetes mellitus (T2DM).

Methods: A systematic review was conducted according to PRISMA recommendations. Electronic databases were searched for studies published within the last five years evaluating GLP-1RAs in Asian adults with T2DM. Eligible studies included randomized controlled trials, subgroup analyses, and systematic reviews/meta-analyses reporting glycated hemoglobin (HbA1c), body weight, cardiovascular, or renal outcomes. Studies without extractable Asian subgroup data or relevant outcomes were excluded. Data were synthesized narratively.

Results: Eight studies involving predominantly East Asian populations from China and Japan were included. GLP-1RA-based therapies consistently improved glycemic control compared with placebo or active comparators. Oral and subcutaneous semaglutide, exenatide, IDegLira, iGlarLixi, and ecnoglutide demonstrated clinically meaningful HbA1c reductions across multiple patient subgroups. Several studies also reported significant body weight reduction, particularly with semaglutide and ecnoglutide, with greater effects observed at higher doses. Treatment efficacy was generally maintained across varying baseline HbA1c levels, BMI categories, and β -cell function profiles. Gastrointestinal adverse events were the most common safety outcomes, with no unexpected safety concerns identified.

Conclusion: GLP-1RAs appear effective for improving glycemic control in Asian patients with T2DM, with additional benefits on body weight reduction. Further studies evaluating long-term cardiovascular and renal outcomes in Asian populations are needed.

Keywords: Type 2 diabetes mellitus; GLP-1 receptor agonist; Asian population; semaglutide; glycemic control.

Tabel 1. Summary of Glycemic and Weight Effects of GLP-1 Receptor Agonists in Asian Patients With T2DM

Study	Population	Intervention	Follow-up	HbA1c Outcome	Weight Outcome	Key Findings
Davis et al., 2022 ¹	1,444 Asians with T2DM	Exenatide QW vs placebo	6 mo	No ethnic difference in HbA1c reduction (p=0.10)	-0.63 kg	Comparable glycemic efficacy across ethnicities
Wang et al., 2021 ²	720 Chinese T2DM	IDegLira vs degludec/liraglutide	26 wks	Greater HbA1c reduction with IDegLira (p<0.0001)	Superior weight reduction vs degludec	IDegLira showed superior metabolic control
Liu et al., 2024 ³	582 Chinese insulin-naïve T2DM	iGlarLixi vs IDegAsp	24 wks	Superior HbA1c reduction with iGlarLixi	-0.3 kg vs +1.2 kg	Greater efficacy in low β -cell function subgroup
Wang et al., 2024 ⁴	390 Chinese T2DM	Oral semaglutide vs placebo	26 wks	Significant dose-dependent HbA1c reduction	-1.1 to -3.0 kg	Higher doses produced greater benefit

He et al., 2026⁵	623 Chinese T2DM	Ecnoglutide vs dulaglutide	32 wks	Superior HbA1c reduction	Greater weight loss with ecnoglutide	Ecnoglutide outperformed dulaglutide
Ji et al., 2023⁶	7,633 Chinese T2DM	SC semaglutide vs comparators	30–56 wks	HbA1c <7% achieved in 67.8–79.2%	NR	Semaglutide improved target attainment
Yabe et al., 2022⁷	701 Japanese T2DM	Oral semaglutide vs comparators	52 wks	Dose-dependent HbA1c reduction	Greater weight reduction at higher doses	Consistent efficacy across subgroups

Reference

1. Davis TME, Giczewska A, Lokhnygina Y, Mentz RJ, Sattar N, Holman RR. Effect of race on cardiometabolic responses to once-weekly exenatide: insights from the Exenatide Study of Cardiovascular Event Lowering (EXSCEL). *Cardiovascular Diabetology*. 2022;21(1).
2. Wang W, Agner BFR, Luo B, et al. DUAL I China: Improved glycemic control with IDegLira versus its individual components in a randomized trial with Chinese participants with type 2 diabetes uncontrolled on oral antidiabetic drugs. *J Diabetes*. 2022;14(6):401-413.
3. Liu M, Gu W, Chen L, et al. The efficacy and safety of iGlarLixi versus IDegAsp in Chinese people with type 2 diabetes suboptimally controlled with oral antidiabetic drugs: The Soli-D randomized controlled trial. *Diabetes Obes Metab*. 2024;26(9):3791-3800.
4. Wang W, Bain SC, Bian F, et al. Efficacy and safety of oral semaglutide monotherapy vs placebo in a predominantly Chinese population with type 2 diabetes (PIONEER 11): a double-blind, Phase IIIa, randomised trial. *Diabetologia*. 2024;67(9):1783-1799.
5. He Y, Mi N, Cheng Z, et al. Efficacy and safety of cAMP-biased GLP-1 receptor agonist ecnoglutide versus dulaglutide in patients with type 2 diabetes and elevated glucose concentrations on metformin monotherapy (EECOH-2): a 52-week, multicentre, open-label, non-inferiority, randomised, phase 3 trial. *Lancet Diabetes Endocrinol*. 2025;13(10):863-873.
6. Ji L, Agesen RM, Bain SC, et al. Efficacy and safety of oral semaglutide vs sitagliptin in a predominantly Chinese population with type 2 diabetes uncontrolled with metformin: PIONEER 12, a double-blind, Phase IIIa, randomised trial. *Diabetologia*. 2024;67(9):1800-1816.
7. Yabe D, Deenadayalan S, Horio H, et al. Efficacy and safety of oral semaglutide in Japanese patients with type 2 diabetes: A subgroup analysis by baseline variables in the PIONEER 9 and PIONEER 10 trials. *Journal of Diabetes Investigation*. 2022;13(6):975-985.

Tirzepatide as adjunctive therapy in lean type 1 diabetes mellitus: a case report

Nayak D¹, Snaith J^{1,2}

¹Department of Diabetes and Endocrinology, St Vincent's Hospital, Sydney, New South Wales, Australia, Darlinghurst, Australia, ²School of Clinical Medicine, St Vincent's Healthcare Clinical Campus, Faculty of Medicine and Health, UNSW, Sydney, Australia, Darlinghurst, Australia

Background: Tirzepatide, a dual glucose-dependent insulintropic polypeptide (GIP)/glucagon-like peptide-1 (GLP-1) receptor agonist, improves weight and glycaemic outcomes in overweight and obese adults with type 1 diabetes mellitus (T1DM)¹. Its use in lean individuals with T1DM has not been reported.

Case: A 44-year-old man with long-standing T1DM (diagnosed age 8) reported diabetes distress despite insulin pump therapy (t:slim with control IQ) and expressed interest in adjunctive tirzepatide. Baseline weight was 85.3 kg (BMI 23.8 kg/m²), HbA1c 6.0%, total daily insulin (TDI) 50.2 U (0.6 U/kg/day), time-in-range (TIR) 74%, time-below-range (TBR) 2.8%, and coefficient of variation (CV) 37%. Tirzepatide was commenced at 1.25 mg weekly for 1 week, increased to 1.25 mg twice weekly for 6 weeks, and then 5 mg weekly (11 weeks total).

Methods: Data were collected prospectively. Quantitative (weight, total, basal and bolus insulin, TIR, CV) and qualitative (tolerability, adverse effects) data were recorded at baseline and at each pre-escalation visit.

Results: TDI decreased in a dose-dependent manner following tirzepatide initiation. From baseline, TDI declined by 25.5% (-12.7 units) with 1.25 mg, 27.5% (-13.8 units) with 2.5 mg, and 31.2% (-15.6 units) with 5 mg of tirzepatide. Reductions were predominantly in bolus insulin (-46% bolus vs -15% basal at 11 weeks), necessitating a 100% increase in insulin-to-carbohydrate ratio. At 11 weeks, TIR increased by 5%, and there were reductions in TBR (-1.0%), glycaemic variability (CV -4%), and weight (-4.6 kg, BMI 22.4 kg/m²) compared to baseline. Transient nausea occurred during initiation and escalation. There was no severe hypoglycaemia or ketoacidosis. Improved day-to-day management with greater flexibility in insulin dose timing was reported.

Conclusion: In a lean adult with long-standing T1DM, adjunctive tirzepatide was associated with substantially reduced insulin requirements with sustained at-target glycaemia, and reduced diabetes management burdens, supporting rationale for clinical trials assessing tirzepatide in lean T1DM.

References

1. Snaith JR, Frampton R, Samocha-Bonet D, Greenfield JR. Tirzepatide in adults with type 1 diabetes: a phase 2 randomized placebo-controlled clinical trial. *Diabetes Care*. 2026;49(1):161–170. doi:10.2337/dc25-2379. PMID: 41264593; PMCID: PMC12719702.

Use of 'assisted carbohydrates' to optimise hybrid closed-loop therapy (MiniMed780G) in pregnancy

Ngan J¹, Corbould A^{1,2}, Nguyen H¹

¹John Morris Diabetes Centre, Dept of Medicine, Launceston General Hospital, Launceston, Australia,

²School of Medicine, University of Tasmania, Launceston, Australia

Aim

Hybrid closed-loop (HCL) therapy has become the standard of care for type 1 diabetes (T1D) in pregnancy. The MiniMed780G can struggle with meal management from mid-pregnancy: for insulin-to-carbohydrate ratios (ICR) stronger than the 250 rule, the meal bolus algorithm withholds insulin. The CRISTAL study (Lancet Diabetes Endocrinol 2024) used 'assisted carbohydrates' (addition of carbohydrates not actually consumed) at meals +/- corrections – initially additional 25% with meals, increasing to mean 123% at 33-36 weeks gestation. We applied this strategy in our clinic.

Methods

Two women (30, 34 years, both with T1D for >20 years) on HCL therapy with MiniMed780G remained on their pump throughout pregnancy. Pre-pregnancy both had time-in-range [3.9-10.0 mmol/L] >70%, HbA1c 7.0%, 6.1%, respectively.

Results

ICR was strengthened through first and second trimester achieving time-in-range [3.5-7.8 mmol/L] 72-84%. From mid-second trimester, assisted carbohydrates with meals and corrections (up to 100%) achieved time-in-range [3.5-7.8 mmol/L] 80-99% without significant hypoglycaemia (Fig 1). Delivery occurred at 34 weeks due to pre-eclampsia for one pregnancy (twin), and the other at 37 weeks (singleton). All neonates were healthy apart from prematurity and hypoglycaemia did not occur.

Conclusion

The use of assisted carbohydrates is an effective strategy in women using MiniMed780G in pregnancy.

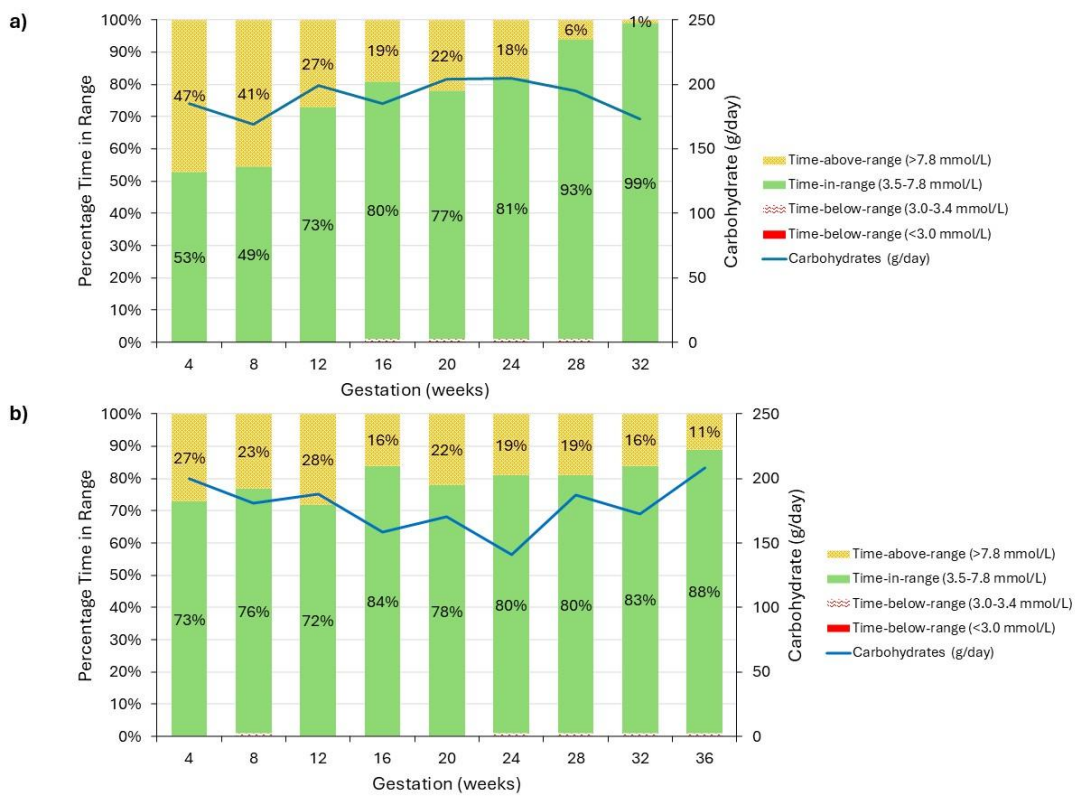


Fig 1. CGM percentage time-in-range and total carbohydrates entered in MiniMed780G pump over pregnancy for woman **a)** and **b)**.

Comparison between use of a smartphone-based blood glucose management system and standard of care for management of culturally and linguistically diverse women with gestational diabetes

Nguyen H¹, Radhakutty A¹

¹Lyell McEwin Hospital, Elizabeth Vale, Australia

Aims: To assess maternal and neonatal outcomes, and impact on resource utilisation in culturally and linguistically diverse (CALD) women with gestational diabetes using the Net-Health Data (NHD) smartphone-based software application for glycaemic management, compared to the standard model of care.

Methods: A single centre, prospective cohort study was conducted. CALD women diagnosed with gestational diabetes managed at the Northern Adelaide Diabetes Service from March 2023 to February 2024 were included. Women who agreed to use NHD with compatible smartphones were assisted with application set-up, including setting the appropriate language. Women who elected not to use NHD or did not have a compatible smartphone were managed per standard of care. Electronic medical records for all participants were reviewed.

Results: 45 women were included in the NHD group. 50 women were managed per standard of care. There were no statistically significant differences in maternal outcomes, including complications or mode of delivery. Neonatal outcomes were also comparable (table 1). Women managed using NHD required less in-person visits. Average review time/woman was significantly lower in the NHD group compared to standard of care (85.7 minutes vs 115.3 minutes, p 0.0171). The average cost/woman for interpreter services was significantly lower in the NHD group compared to standard of care (\$269.11 vs \$396.2, p 0.0055).

Conclusion: Use of a smartphone-based blood glucose management system in CALD women with gestational diabetes resulted in similar maternal and neonatal outcomes, but reduced resource utilisation, compared to standard of care.

Table 1

	Net-Health Data	Standard Model of Care	P value
Birthweight, median (IQR)	3155 (693)	3300 (577)	0.59
Preterm delivery, n (%)	1 (2.2)	5 (9.6)	0.21
Large for gestational age, n (%)	7 (15.6)	5 (7.7)	0.34
Neonatal hypoglycaemia, n (%)	17 (37.8)	25 (48)	0.41
Respiratory distress, n (%)	5 (11.1)	8 (15.4)	0.57

What comes after metformin? Shifts in patterns and predictors of diabetes drug utilisation in Australian adults living with type 2 diabetes, 2014–2024

Nguyen T¹, Pradhan R¹, Ritchie R^{2,3}, Ilomaki J¹

¹Centre For Medicine Use And Safety, Monash Institute Of Pharmaceutical Sciences, Monash University, Parkville, Australia, ²Drug Discovery Biology, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville, Australia, ³Heart Failure Pharmacology, Monash Institute of Pharmaceutical Sciences, Monash University, Parkville, Australia

Aims

To describe post-metformin glucose-lowering drugs (GLDs) use, examine temporal changes in therapy, and identify predictors influencing treatment selection in Australia.

Methods

Using a 10% sample of the Pharmaceutical Benefits Scheme, this population-based cohort study identified 69,857 people with T2D who initiated second GLDs following metformin in 2014–2024. Treatment transitions before and from 2020 are visualised with Sankey diagrams. Risk ratios (RRs) for second GLDs were calculated stratified by age, sex, concessional status, and comedication use.

Results

Among 176,463 metformin users, 31,537 and 38,320 initiated second GLDs before and from 2020, respectively. Mean age was 60 years, 40% were female, less than half held concessional status, and 30% used lipid-lowering, gastrointestinal, antihypertensive and antidepressant therapies in both periods. Treatment shifted markedly: DPP-4 inhibitor use declined from 53% to 18% and SUs from 34% to 11%, while SGLT-2i (48% in 2024) and GLP-1 RAs (22% in 2024) became the predominant GLD therapies post-metformin, with declining insulin use. Age ≥ 40 years were more likely to initiate DPP-4 inhibitor and SUs, whereas younger people more commonly initiated GLP-1 RAs and insulin. Females had higher GLP-1 RA initiation (RR=1.77, [95%CI 1.52 - 2.06] before 2020 and RR=1.63, [95%CI 1.56 - 1.69] from 2020). From 2020, predictors of SGLT2i included age ≥ 40 years (RR=1.18, [95%CI 1.11 - 1.25] for ages 40–59 vs 18–39 years), male sex (RR=0.79, [95%CI 0.77 – 0.81] for female vs male), and congestive heart failure (RR=1.19, [95%CI 1.13 -1.25]). Sensitivity analyses confirmed these findings.

Conclusions

Type 2 diabetes treatment post-metformin in Australia has shifted toward SGLT2i- and GLP-1 RAs - based therapies. However, suboptimal use of these agents persists in older adults and individuals with cardiovascular risk.

Rationale and design of a phase II clinical trial investigating the acute metabolic effects of Tirzepatide in Type 1 Diabetes: The TIRTLE2 trial

Ni H^{1,2}, Samocha-Bonet D^{2,5,6}, Jones K⁴, Horowitz M⁴, Wu T⁴, Greenfield J^{1,2,3}, Snaith J^{1,2,3}

¹Victor Chang Cardiac Research Institute, Darlinghurst, Australia, ²St Vincent's Healthcare Campus, Faculty of Medicine and Health, University of New South Wales, Sydney, Australia, ³Department of Diabetes and Endocrinology, St Vincent's Hospital, Sydney, Australia, ⁴The University of Adelaide, Adelaide, Australia, ⁵School of Health Sciences, University of New South Wales, Sydney, Australia, ⁶Garvan Institute of Medical Research, Darlinghurst, Australia

Aims

Cardiovascular disease is a prominent issue in type 1 diabetes (T1D). Therapies that can address glycaemia, weight, insulin resistance, and other cardiometabolic risk factors in T1D are needed. Tirzepatide (TZP) is a combined glucagon-like peptide 1 (GLP1) and gastric inhibitory peptide (GIP) receptor agonist that has demonstrated multisystem benefits in type 2 diabetes. Our previous clinical trial (TIRTLE1) demonstrated that TZP has profound effects on weight, insulin dose requirements and other metabolic indices in T1D (1). However, the effect of TZP on insulin resistance, and the mechanisms driving its efficacy in T1D, are unknown.

Methods

TIRTLE2 (NCT06820281) is a randomised, placebo-controlled, double-blind phase II trial in 44 adults with T1D for at least 2 years, using an automated insulin delivery system, aged 18-65, with BMI ≥ 27 kg/m² and HbA1c $\leq 9.0\%$. Participants will be randomised 1:1 to TZP 2.5 mg weekly or a volume-matched placebo for 6 weeks.

Results

The primary outcome is change in insulin sensitivity at 6 weeks defined as the M-value measured using the gold standard hyperinsulinaemic-euglycaemic clamp (insulin dose 60 mU/m²/min, target glucose 5.5 mmol/L). Secondary outcomes include glucagon response during a hypoglycaemic clamp, fasting and prandial glucagon and incretin hormone levels, gastric emptying assessed via the mixed meal tolerance test (radiolabelled isotope and breath sampling), overnight growth hormone and lipolysis profiles, energy expenditure, body composition (BodPod), and metabolic (insulin requirements, continuous glucose monitoring metrics) and cardiovascular (including arterial stiffness) indices at 6 weeks.

Conclusions

This study is the first comprehensive assessment of the acute biological effects of dual GIP/GLP receptor agonists in T1D and will define how TZP may uniquely provide clinical benefits across multiple physiological states, including fasting, postprandial, and during hypoglycaemia in T1D.

Reference

1. Snaith JR, Frampton R, Samocha-Bonet D, Greenfield JR. Tirzepatide in Adults With Type 1 Diabetes: A Phase 2 Randomized Placebo-Controlled Clinical Trial. *Diabetes Care* 2026;49:161-170

The relationship between glycated albumin and time in tight range in type 2 diabetes

Ni J¹, Han W¹, Wang Y¹, Yu J¹, Lu W¹, Wang Y¹, Ma X¹, Lu J¹, Zhou J¹

¹Shanghai Sixth People's Hospital, Shanghai, China

Aims: Among the new glucose metrics derived from continuous glucose monitoring, the concept of time in tight range (TITR), defined as the percentage of time glucose remains between 3.9 and 7.8 mmol/L, has gained increasing attention. We aimed to assess the association between TITR and traditional glycemic indicators, such as glycated albumin (GA).

Methods: A total of 310 patients with type 2 diabetes on a stable glucose-lowering regimen over the previous 3 months were enrolled. TITR and time in range (TIR) were calculated using continuous glucose monitoring data collected over a minimum of five days. Spearman correlation analysis was performed to assess the relationships between traditional glycemic indicators, including GA and glycated hemoglobin A1c (HbA1c), with TITR and TIR. Receiver operating characteristic curves were used to evaluate the predictive value of GA for TITR > 50% and TIR > 70%.

Results: The median levels of GA and HbA1c were 15.6% (14.0%, 17.3%) and 6.5% (6.1%, 7.1%), respectively. Median TITR and TIR were 70.0% (56.0%, 81.0%) and 91.0% (84.0%, 96.8%), respectively. Spearman correlation analysis showed a moderate negative relationship between GA and both TITR and TIR. The optimal GA cutoff for identifying either TITR > 50% or TIR > 70% was 17.4%, yielding an area under the curve of 0.687. Moreover, combining GA with fasting plasma glucose or 2-hour postprandial glucose significantly enhanced the ability to identify TITR > 50%, increasing the area under the curve to approximately 0.792 and achieving performance comparable to the combination of HbA1c and plasma glucose.

Conclusions: In patients with type 2 diabetes, a GA cutoff of 17.4% effectively identifies TITR > 50%. GA serves as a practical surrogate for evaluating strict glycemic targets when CGM is unavailable.

Time in tight range provides added value for predicting incident diabetic retinopathy in Type 2 Diabetes with well-controlled time in range

Wang Y¹, Lu J¹, Yu J¹, Ni J¹, Wang M¹, Lu W¹, Guo J¹, Zhou J¹

¹Shanghai Sixth People's Hospital, Shanghai, China

Aim/s: Time spent in the glucose range of 70-180mg/dL (TIR) has become entrenched as a key measure of glycemic control, which was linked to diabetes-related outcomes in previous studies. However, there has been a recent debate about whether to instead emphasize time in target range of 70-140 mg/dL (time in tight range, TITR). We aimed to assess the association between TITR and incident diabetic retinopathy in adults with type 2 diabetes.

Methods: This is a dynamic cohort study conducted in a tertiary hospital. A total of 2,518 adults with type 2 diabetes without diabetic retinopathy at baseline were included. TITR was obtained from continuous glucose monitoring data at baseline. Cox proportion hazard regression analysis was performed to assess the relationships of TITR, TIR with the risk of incident diabetic retinopathy.

Results: During a mean follow-up of 5.43 years, 646 patients developed retinopathy. The multivariable-adjusted hazard ratios (HRs) for incident retinopathy across descending TITR quartiles (Q4: >58% [reference], Q3: 38~57%, Q2: 19~37% and Q1: <19%) were 1.00, 1.47 (95%CI 1.16, 1.86), 1.53 (95%CI 1.21, 1.94) and 1.96 (95%CI 1.55, 2.47), respectively. For per 10% decrease in TITR, the risk of diabetic retinopathy was increased by 9% (HR=1.09, 95%CI 1.06, 1.13) after full adjustment for covariates. In the TIR>70% subgroup, the significant association between TIR, as a continuous variable, and the risk of incident retinopathy disappeared, whereas TITR remains significantly associated with the outcome. Similar results were observed in the TIR>80% and TIR> 90% subgroups.

Conclusion: TITR is inversely associated with the incidence of diabetic retinopathy in people with type 2 diabetes. Among people with well-controlled TIR (70% or higher), TITR may provide added value regarding glucose control.

The effect of tirzepatide vs. dulaglutide on major adverse cardiovascular events (MACE-4 and MACE-5) in patients with type 2 diabetes and established atherosclerotic cardiovascular disease

K McGuire D¹, D'Alessio D², Miller D³, Weerakkody G³, Nicholls S⁴

¹University of Texas Southwestern Medical Center and Parkland Health, Dallas, USA, ²Division of Endocrinology, Metabolism, and Nutrition, Department of Medicine, Duke University, Durham, USA, ³Eli Lilly and Company, Indianapolis, USA, ⁴Victorian Heart Institute, Monash University, Melbourne, Australia

Aim: In SURPASS-CVOT, tirzepatide (TZP) was non-inferior to DULA in reducing the risk of major adverse cardiovascular events (MACE-3: CV death, MI, or stroke) in type 2 diabetes (T2D) and established atherosclerotic cardiovascular disease (ASCVD) patients. This analysis evaluated differences in extended CV outcomes.

Methodology: In these prespecified analyses, we assess the effect of TZP (≤ 15 mg) vs dulaglutide (DULA) (1.5mg) on MACE-4 (CV death, MI, stroke, or coronary revascularisation) and MACE-5 (MACE-4 or hospitalisation due to unstable angina [UA]).

Results: MACE-4 occurred in 1089 (16.5%) receiving TZP vs 1217 (18.5%) receiving DULA (HR 0.88; 95%CI 0.81-0.96). With prior coronary artery disease (CAD), MACE-4 occurred in 875 (18.6%) receiving TZP, and 967 (20.5%) receiving DULA (HR 0.89; 95%CI 0.81-0.97). Without prior CAD, MACE-4 occurred in 214 (11.3%) receiving TZP, and 250 (13.3%) receiving DULA (HR 0.84; 95%CI 0.70-1.01). MACE-5 occurred in 1112 (16.9%) receiving TZP and 1240 (18.8%) receiving DULA (HR 0.88; 95% CI 0.81-0.96). Coronary revascularisation occurred in 527 (8.0%) vs 617 (9.4%) (HR 0.84; 95%CI 0.75-0.95). Hospitalisation due to UA occurred in 110 (1.7%) vs 148 (2.2%) (HR 0.74; 95%CI 0.57-0.94).

Conclusions: Among T2D and ASCVD patients, TZP was associated with a lower risk of MACE-4, MACE-5, coronary revascularisation, and UA hospitalisation vs DULA.

Delayed recognition of autoimmunity with incongruent management: A focused review of 46 latent autoimmune diabetes cases in a RCT cohort of young-onset 'non-type 1' diabetes

O C¹, Fan Y^{1,2}, Fan B^{1,2}, Chow E^{1,2,3}, Lui J^{1,2}, Chow E^{1,2,3}, Ozaki R¹, Kong A^{1,2,3}, Ma R^{1,2,3}, Luk A^{1,2,3}, Chan J^{1,2,3}

¹Department of Medicine and Therapeutics, Faculty of Medicine, the Chinese University Of Hong Kong, Hong Kong SAR, People's Republic of China, ²Li Ka Shing Institute of Health Sciences, the Chinese University of Hong Kong, Hong Kong SAR, People's Republic of China, ³Hong Kong Institute of Diabetes and Obesity, the Chinese University of Hong Kong, Hong Kong SAR, People's Republic of China

Aims: We evaluated drug management before and after autoimmunity confirmation in young patients with physician-diagnosed 'non-type 1 diabetes (T1D)'.

Methods: In 2020-2021, 884 patients diagnosed with non-T1D at <40 and aged <50 joined the PRISM-RCT (NCT04049149) to evaluate the effects of a 3-year algorithm-driven care model guided by biogenetic markers including anti-GAD and C-peptide on metabolic control and incident complications. The intervention group (n=441) received biogenetic information at baseline and the control group (n=443) at study end (2023-2024).

Results: During the PRISM study (2020-2024), 46(5%) had positive anti-GAD with variable C peptide. One had concomitant monogenic diabetes (HNF1B-MODY). The median (IQR) age-at-diagnosis was 31(26-35) years and 50% were diagnosed before 2012(2008-2017). By 2025, 72% had follow-up for >10 years since diagnosis, with a lag of 11(5-15) years between diagnosis and confirmed anti-GAD positivity first known to physician. At diagnosis, 49% had obesity(BMI≥25kg/m²) and 70% had experienced obesity during follow-up. By 2025, 80%(37/46) were on continuous insulin. Amongst them, 31 patients had continuous insulin treatment before confirmed autoimmunity with a lag of 12(6-18) years; 15 within 1 year, 23 within 3 years, and 26 within 5 years of diagnosis.

83% had ever exposure to sulphonylurea (among whom 42% had >3 years of exposure and 53% had glimepiride≥4mg daily or its equivalent); 54% to SGLT2i (among whom 52% had exposure without concomitant insulin and 2 patients had DKA); 78% to DPP4i (among whom 47% initiated at >3 years and 33% at >5 years after diagnosis).

Within one year of confirmed autoimmunity, 55% had treatment changes including insulin initiation(11%), switch from intermediate to basal insulin analogue with low C-peptide(11%), initiation/intensification of incretin-based therapy with residual beta-cell function(27%) and tapering of sulphonylurea(14%) or SGLT2i(25%).

Conclusion: Lack of anti-GAD and C-peptide information had led to incongruent treatment in young patients with non-classical T1D.

Impact of timely expert advice on diabetes management in primary care: The Diabetes WA Connect Service

Ong G^{1,2}, Savage T¹, Lawler N¹, McGough S¹, Denny G¹, Gan S^{1,3,4}

¹Diabetes WA, Subiaco, Australia, ²Fiona Stanley Hospital, Murdoch, Australia, ³Royal Perth Hospital, Perth, Australia, ⁴University of Western Australia, Nedlands, Australia

Background & Aim:

General practice (GP) plays a central role in coordinating and delivering healthcare in Australia. However, growing complexity of diabetes care—driven by an expanding evidence base, rising multimorbidity, and limited access to specialist services —creates challenges which contribute to delayed or suboptimal management. The “Diabetes WA Connect” service was established to provide GPs with timely access to an endocrinologist and diabetes educator for case discussion or multidisciplinary team (MDT) conferences. This offers an alternative pathway to referral for patient-facing specialist care, particularly for those living in rural areas.

Methods:

The service was launched in November 2024 as a pilot across non-metropolitan WA primary health regions. GPs can initiate ad-hoc or scheduled sessions. After each interaction, consenting clinicians receive an electronic survey assessing perceived clinical value and professional impact.

Results:

Between November 2024 and December 2025, 308 interactions occurred: 164 GP case discussions (53%) and 144 MDT conferences (47%). Use was documented across all eligible WA regions, with greatest uptake in the Southwest region (52%). Most enquiries involved Type 2 diabetes (70%). Fifty-five evaluation surveys were completed (18% response rate). Regarding clinical decision-making, 38% of interactions validated the GP's initial plan, 46% resulted in a management change, 15% highlighted the need for further enquiry or more information, and 2% redirected care to alternative services. Reported professional development benefits (multiple responses allowed) included increased confidence (71%), improved diabetes knowledge and skills (65%), enhanced appreciation of team-based care (67%), and fundamental change in practice (7%). The net promoter score was 94.55. At least 43 potential outpatient referrals were avoided or withdrawn.

Discussion / Conclusion:

GPs value timely specialist input and MDT collaboration for improving confidence, skills, and decision-making in complex diabetes care. In regions with limited specialist access, such services may strengthen local chronic disease management, reduce clinical inertia, and ease demand on outpatient clinics.

Intensive diabetes education targeting escalation of chronic kidney disease (IDETECKD): Preliminary outcomes from a pilot nurse practitioner and dietitian-diabetes educator led model of care

Owers E¹, Cotugno J¹, Sharp S¹, Newton J¹, Berkman K¹, Tan K¹, Palmer M¹

¹Queensland Health, Meadowbrook, Australia

Aim:

IDETECKD is a nurse practitioner (NP) and dietitian diabetes educator (DDE) led care model that removes category 2 and 3 patients with type 2 diabetes mellitus (T2DM) and early chronic kidney disease (CKD) (UACR <30 mg/mmol and ≤stage 3A) from endocrinology waitlists. Support is provided by endocrinologists and nephrologists through case-conferencing as required and patients are also offered multidisciplinary input if needed. We assessed model feasibility and preliminary clinical outcomes of the IDETECKD model.

Methods:

Eligible patients were those triaged from the diabetes waitlist between October 2024-February 2026. Dietitian trainees offered eligible patients the IDETECKD pathway, completed pre-service assessments and initiated goal setting. Demographic, medical and appointment data was collected from electronic medical records throughout their care. Descriptive statistics, paired t-tests and Wilcoxon-signed rank were conducted using Excel and SPSS.

Results:

Of 401 referrals screened, 100 were eligible, 57 agreed to the IDETECKD pathway and 34 (60%) consented to research (65±9yrs; 41% female, 3% Indigenous, 68% Australian-born, 30% T2DM duration 6–10 years, 62% stage 2 CKD, median diabetes distress score 31 (24-40), EQ-5D pain/discomfort score 3(2-4)).

HbA1c decreased by 0.7% (95%CI -0.1, -1.3, p=0.02, n=18) from baseline 8.3±1.2% with no increases in hypoglycaemia rates. Triglycerides decreased by a median of 0.4mmol/L (95%CI 0.2, 0.5, p=0.04, n=14) from 1.9mmol/L (1.5-2.3).

The waiting period for care was shorter with median 88(IQR 67-104) days for IDETECKD vs 159(44-285) days for endocrine-led care. Patients were seen 2(1-11) and 1(1-3) times by DDE and NP respectively and attendance rates were 89% and 83% compared with 70% for endocrinology. Two patients required escalation back to endocrinology care.

Conclusion:

Early results suggest that the IDETECKD care model is feasible and safe, although ongoing research is needed for longer-term outcomes.

A scoping review of the literature investigating suicidality in youth living with Type 1 Diabetes.

Paciente R^{1,2}, Boggiss A^{1,3}, Woolard A^{1,2}, Milroy H^{1,2}, Bebbington K^{1,3}

¹The Kids Research Institute Australia, Nedlands, Australia, ²The University of Western Australia, Medical School, Nedlands, Australia, ³The University of Western Australia, School of Psychological Science, Nedlands, Australia

Aims: Despite increased vulnerability to suicidality, there are currently no appropriate suicide prevention frameworks which address risk and accessible means for suicidal behaviour for young people living with T1D. We conducted a scoping review to understand the scope of the literature exploring suicidality and self-injury in young people living with T1D.

Methods: Eligible studies reported findings on suicidal and self-injurious thoughts and behaviours in young people living with T1D aged less than 25 years. Original articles, existing reviews, and dissertations/theses were included regardless of methodology. We searched Medline, PsycInfo, Embase, CINAHL Plus, and ProQuest Theses and Dissertations using terms combining suicide OR self-injury AND young OR child OR adolescents AND type 1 diabetes. Subset screening was employed for title/abstract and full-text phases. Two researchers extracted data, which was analysed using inductive content analysis.

Results: Eighty-six studies met inclusion criteria. Quantitative studies predominated (k=65), with most identifying prevalence and relative risk (k=43). Detection methods varied, namely medical record audits (k=29) and use of the Patient Health Questionnaire-9 (k=26). Very few studies used qualitative methods (k=3), in which nuanced exploration of suicidality was limited. Case studies (k=7) and case series (k=5) were the primary methods used to explore lived experiences. Most studies mentioned determinants to suicidal thoughts and behaviours (k=53) and means for suicidal behaviours (k=21); both determinants and means were closely related to diabetes management. Overwhelmingly, most citations (k=51) call for improved screening for suicidal ideation in T1D clinics and embedding mental health support as part of the clinical model of care.

Conclusions: Studies centring lived experiences of suicidal ideation and self-injurious behaviours in young people living with T1D are scarce. Future research should address this gap through community involvement in research and the use of qualitative methods to explore pathways to suicidal thoughts and behaviours, help-seeking behaviours, and protective factors.

From medical trauma to diabetes resilience: The results of a double-armed, randomised, repeated measures pilot trial of a co-designed, trauma-informed, psychosocial intervention - Wellbeing-T1D.

Paciente R^{1,2}, Freeman A¹, Coombs S¹, Lombardi K^{1,3,4}, Bebbington K^{1,5}, Roby H¹, Taplin C^{1,6,7}, Hanna N¹, Rose S⁷, Ohan J^{1,5}, Milroy H^{1,2}, Woolard A^{1,2}

¹The Kids Research Institute Australia, Perth, Australia, ²The University of Western Australia, Medical School, Crawley, Australia, ³The University of Western Australia, School of Population and Global Health, Crawley, Australia, ⁴Edith Cowan University, School of Medical and Health Sciences, Joondalup, Australia, ⁵The University of Western Australia, School of Psychological Science, Crawley, Australia, ⁶The University of Western Australia, Centre for Child Health Research, Crawley, Australia, ⁷Perth Children's Hospital, Endocrinology and Diabetes, Nedlands, Australia

Aims: This study aimed to determine the efficacy of a co-designed, trauma-informed, psychosocial intervention (Wellbeing-T1D) in reducing diabetes-related distress and boosting resilience to encourage post-traumatic growth in young people living with type 1 diabetes (YPWT). This trial was registered under the Australia and New Zealand Clinical Trials Registry (ACTRN12625000155493).

Methods: We implemented a mixed-method, double-armed, randomised approach with repeated measures. Participants (N=27) were aged between 13 to 17 years, at least 6 months post-diagnosis, with no serious comorbid mental health concerns, proficient in English, and had access to the internet and a video calling device. The Wellbeing-T1D intervention is non-clinical and psychoeducational, drawings upon elements of cognitive behavioural and narrative approaches. A 2:1 non-blinded randomisation ratio was used to allocate YPWT into intervention and control groups. Measures were taken upon consent (T1), immediately post-intervention (T2), and 4 to 6 weeks post-intervention (T3). Primary outcomes were diabetes-related distress and resilience. We performed exit interviews to explore intervention acceptability; these were transcribed and analysed using inductive content analysis.

Results: Results indicate that there was a non-significant reduction in diabetes-related distress ($f=-7.82$, std., $p>0.05$, std. $B=-0.54$) and non-significant increase in total diabetes-related resilience ($f=3.69$, $p>0.05$, std. $B=0.62$) in the intervention group compared to the control group. However, the help-seeking behaviour aspect of diabetes-related resilience significantly increased in the intervention group compared to control at T3 ($f=3.51$, $p<0.01$, std. $B=0.84$). Qualitative results suggest the intervention content and mode of delivery were acceptable, though more intervention sessions may be beneficial.

Conclusion: The pilot trial of Wellbeing-T1D showed promise in reducing diabetes-related distress and increasing diabetes resilience in YPWD. We recommend a larger trial to ascertain the efficacy of Wellbeing-T1D and its potential to be offered as routine psychosocial care in adolescent T1D clinical settings. Future iterations may consider extending to younger children and emerging adults.

Clinical determinants of CGM derived glycemic variability in patients with Type 2 Diabetes

Park S¹, Jang S¹, Kwon S¹, Kim C¹, Kim K¹

¹Yongin Severance Hospital, Yongin-si, South Korea

Aim: Glycemic variability (GV) is associated with poor glycemic control and complications in patients with T2DM. The coefficient of variation derived from CGM has been widely used as a reliable measure of GV. Aim of the study was to identify clinical factors associated with GV derived from CGM in patients with T2DM.

Methods: A total of 773 patients with T2DM were included. A multivariate linear regression model was used to assess independent associations between GV and clinical factors, including age, sex, BMI, diabetes duration, HbA1c, use of antidiabetic medications, and estimated glomerular filtration rate (eGFR). A subgroup analysis of 396 patients with HbA1c < 7.5% was also performed.

Results: The mean age was 53.37±11.74 years, and 60.4% were male. Higher age was significantly associated with increased GV ($\beta=0.08$, $p<0.001$). Lower BMI (<18.5 kg/m²) was significantly associated with higher GV compared to normal BMI (18.5–25 kg/m²) ($\beta=4.40$, $p=0.006$), while BMI 25–30 kg/m² was associated with lower GV ($\beta=-0.94$, $p=0.046$). Longer diabetes duration (≥ 10 years vs. <5 years) ($\beta=3.24$, $p<0.001$) and higher HbA1c ($\geq 9.0\%$ vs. <7.5%) ($\beta = 1.44$, $p=0.010$) were associated with increased GV. Use of triple oral antidiabetic agents ($\beta=2.31$, $p=0.010$), GLP-1 RAs ($\beta=2.14$, $p=0.005$), and insulin ($\beta=4.63$, $p<0.001$) were also associated with higher GV. Additionally, in the subgroup analysis of patients with HbA1c < 7.5%, similar patterns of association were observed; higher age, lower BMI (<18.5 kg/m²), use of triple oral agents, GLP-1 RAs, and insulin were significantly associated with higher GV.

Conclusion: Higher age, lower BMI, longer diabetes duration, higher HbA1c, and use of triple oral agents, GLP-1 RAs, and insulin were associated with higher GV in patients with T2DM. Our study suggests that GV management strategies should consider these clinical factors to improve glycemic stability.

MRI-PDFF $\geq$ 70% reduction was associated with fibrosis improvement with tirzepatide: post-hoc analysis of the SYNERGY-NASH phase 2b trial

Loomba R¹, L. Hartman M², Tang Y², Brouwers B², J. Sanyal A³, Parry S⁴

¹MASLD Research Center, Division of Gastroenterology and Hepatology, University of California San Diego, San Diego, United States, ²Eli Lilly And Company, Indianapolis, United States, ³Virginia Commonwealth University School of Medicine, , United States, ⁴Royal Prince Alfred Hospital, NSW, Australia

Aim: Tirzepatide improved MASH resolution and fibrosis in the SYNERGY-NASH phase 2B trial . The aim of this post-hoc analysis was to examine the association between 30%, 50% and 70% relative reduction in magnetic resonance imaging-proton density fat fraction (MRI-PDFF) and fibrosis improvement in this trial.

Methods: Among randomized 190 participants, 116 had evaluable liver-biopsy and MRI-PDFF results at week-52. The outcome of interest was ≥ 1 stage improvement in fibrosis without worsening of MASH. The proportion of participants achieving this endpoint (fibrosis responders) was evaluated and compared using the Chi-square test. All treatment groups were pooled for this analysis.

Results: The mean percent reduction from baseline at week-52 in MRI-PDFF ranged from 49.7% to 63.8% across the three tirzepatide dose arms (5mg, 10mg and 15mg) compared with 2.6% in the placebo group ($p < 0.001$ for all tirzepatide doses versus placebo). Among 80 participants achieving a $\geq 30\%$ reduction in MRI-PDFF, the proportion of fibrosis responders did not differ significantly from that observed in the 36 participants not meeting the 30% threshold for MRI-PDFF reduction (53.8 vs 41.7%, $p = 0.23$). Similarly, the proportion of fibrosis responders did not differ significantly among those meeting ($n = 66$) versus those not meeting ($n = 50$) the $\geq 50\%$ MRI-PDFF reduction threshold (57.6 vs 40.0%, $p = 0.06$). However, among participants achieving a $\geq 70\%$ reduction in MRI-PDFF ($n = 40$), 65.0% met the endpoint of fibrosis improvement without worsening of MASH; a significantly lower ($p = 0.02$) proportion of fibrosis responders was observed (42.1%) if the $\geq 70\%$ reduction in MRI-PDFF was not achieved ($n = 76$). None of the participants in the placebo group achieved 70% reduction in MRI-PDFF.

Conclusion: In this post-hoc analysis of the SYNERGY-NASH trial, a super response rate of 70% relative reduction in liver fat assessed by MRI-PDFF was associated with a higher rate of fibrosis improvement with tirzepatide treatment.

Hybrid closed loop insulin delivery in pregnant women with Type 1 Diabetes: A feasibility study embedded in routine clinical care

Pattison C¹, Naderpoor N^{1,2}, Wanigaratne A¹, Roy C³, Teede H^{1,2}, Wong J¹, Goldstein R^{1,2}, Soldatos G¹, Ng A², Li J⁴, Sheklabadi E¹

¹Monash Health, Diabetes Unit, Clayton, Australia, ²Monash Centre for Health Research and Implementation - Monash University, Melbourne, Australia, ³Monash University School of Clinical Sciences at Monash Health, Clayton, Australia, ⁴Monash University, Clayton, Australia

Aim:

The primary aim of this study is to assess the acceptability and feasibility of supervised automated insulin delivery via hybrid closed-loop (HCL) systems during pregnancy in women with Type 1 diabetes (T1D). Secondary aims are to identify barriers and enablers to HCL use, compare glycaemic control between women using HCL, sensor-augmented continuous subcutaneous insulin infusion (CSII), and continuous glucose monitoring (CGM) with multiple daily injections (MDIs), and to compare maternal and neonatal pregnancy outcomes across these groups.

Methods:

Conducted at the largest maternity provider in Victoria, Australia, this observational study includes pregnant women with T1D, who are managed at the Diabetes in Pregnancy Services at Monash Health from January 2023 to December 2025. Participants are divided into those using HCL systems, those using sensor-augmented CSII, and those using CGM with MDIs. Exclusion criteria include non-CGM use, twin pregnancies, T1D duration less than 12 months, use of assisted reproductive technology, and significant diabetes-related complications.

Results:

Data collection is ongoing and expected to be completed by April 2026. Preliminary data extraction has occurred for 50 patients, with expected numbers around 150. The following variables will be compared between the three groups of participants at four different time points during pregnancy: glycaemic control, maternal outcomes, neonatal outcomes and patient satisfaction and diabetes-related stress.

Conclusion:

This project addresses the urgent need for improved glycaemic control in pregnant women with T1D by evaluating the acceptability and feasibility of HCL insulin delivery. It will generate preliminary evidence on the safety and potential efficacy of supervised off-label HCL use during pregnancy, informing future randomised controlled trials. The findings will enhance understanding of the benefits, risks, and practical considerations of HCL systems in pregnancy, supporting evidence-based decision-making and guiding implementation strategies for integrating this technology into routine clinical care to improve maternal glycaemic outcomes while maintaining safety.

Beyond GLP-1 Monotherapy: Evidence of therapeutic divergence among dual incretin agonists — A network meta-analysis

Paulus I¹, Dwipayana I², Semadi I², Nugraha I², Saraswati M², Gotera w²

¹ Internal Medicine Resident, Faculty of Medicine Udayana University/ Sanglah Hospital, Bali, Indonesia, ²Endocrinology and Metabolism Division Department of Internal Medicine, Faculty of Medicine Udayana University/ Sanglah Hospital, , Indonesia

Background: Obesity pharmacotherapy is rapidly transitioning beyond GLP-1 monotherapy toward dual receptor agonism. However, whether dual incretin agents represent incremental potency within a shared class—or fundamentally divergent metabolic platforms—remains unclear. We conducted a network meta-analysis to examine whether emerging dual agonists signal mechanistic equivalence or therapeutic separation.

Methods: A systematic review and random-effects network meta-analysis were performed to evaluate weight reduction across randomized trials of dual incretin agonists. Indirect comparison between pemvidutide 1.8 mg and tirzepatide 15 mg was conducted using placebo as a common comparator under REML modelling with GRADE-informed certainty assessment.

Results: Across 12–48 weeks, pemvidutide significantly reduced body weight versus placebo [MD = -4.28% (95% CI: -5.53 to -3.02); $P < 0.001$]. In contrast, tirzepatide 15 mg demonstrated a substantially greater magnitude of weight reduction [MD = -17.80% (95% CI: -19.30 to -16.30)]. Network comparison revealed a pronounced efficacy gradient, with non-overlapping confidence intervals indicating clinically meaningful superiority of tirzepatide. Notably, pemvidutide consistently improved hepatic biomarkers and liver fat indices, whereas glycaemic effects remained modest in predominantly non-diabetic populations.

Conclusions: Dual agonism does not appear to represent a homogeneous class effect. Tirzepatide demonstrates weight-dominant potency, while pemvidutide exhibits a hepatometabolic profile suggestive of phenotype-specific therapeutic positioning. These findings challenge assumptions of class equivalence and underscore the need for head-to-head trials to define precision metabolic targeting strategies.

Keyword : Pemvidutide, Incretin, GLP-1; Tirzepatide

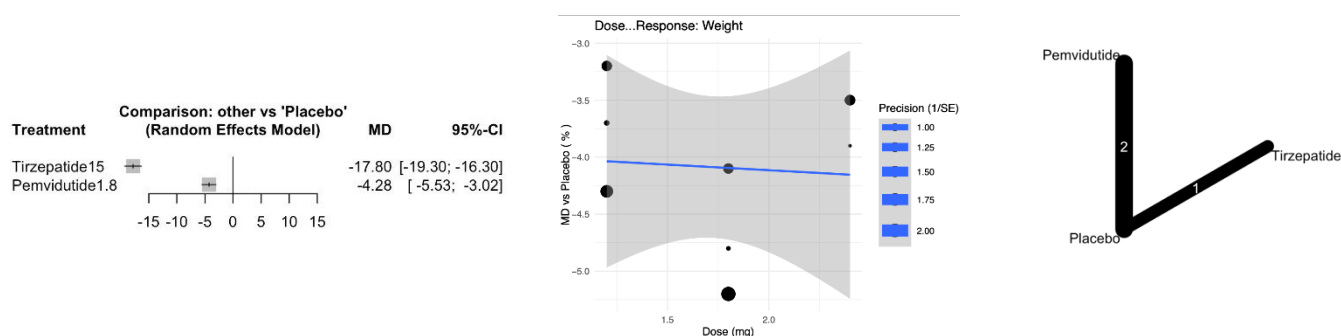


Figure 1. Comparative efficacy and dose–response study of dual incretin agonists on body weight reduction. A) Network-Meta analysis B) Dose response of Pemvidutide C) Network geometry Plot

Assessment of ketone thresholds for stepdown from intravenous insulin therapy in the management of patients with diabetic ketoacidosis

Pham P¹, Puri G¹, Ryder S¹

¹Logan Endocrine and Diabetes Service (LEADS), Logan, Australia

Aim: Management of diabetic ketoacidosis (DKA) varies widely in clinical practice, particularly regarding the ketone threshold for transitioning from a fixed rate intravenous insulin infusion (FRII) to a variable rate intravenous insulin infusion (VRII). The optimal timing of this transition remains unclear, and premature stepdown may risk incomplete DKA resolution. This study aimed to evaluate the association between ketone levels at the time of FRII-to-VRII transition and subsequent clinical outcomes.

Methods: A single-centre retrospective quantitative study was conducted at a metropolitan Australian hospital, examining adult admissions for DKA between January 2024 and October 2025. Inclusion criteria were age ≥ 18 years, glucose >11.0 mmol/L, capillary or blood ketones >3.0 mmol/L, and bicarbonate <15 mmol/L and/or venous pH <7.3 . The primary outcome was incidence of rebound ketosis (ketones >3.0 mmol/L) or hyperglycaemia (glucose >20 mmol/L) within 12 hours of transition to VRII. The secondary outcomes were total admission length and total time on intravenous insulin.

Results: One hundred and six DKA admissions met inclusion criteria. Patients were stratified by ketone level at transition: <0.6 mmol/L ($n=53$), $0.6-1.0$ mmol/L ($n=20$), and >1.0 mmol/L ($n=33$). Overall, rebound ketosis occurred in 6.6% of cases and differed significantly between groups (0% vs 20% vs 9.1%, $p=0.004$). Notably, no episodes of rebound ketosis occurred when transition to VRII was undertaken at ketone levels <0.6 mmol/L. There was no difference in rebound hyperglycaemia, total admission length, and total time on intravenous insulin.

Conclusion: Higher ketone levels at the time of transition from FRII to VRII are associated with an increased risk of rebound ketosis. A transition threshold of <0.6 mmol/L avoids rebound ketosis.

Accordingly, ketone suppression should be prioritised when determining readiness for intravenous insulin stepdown. Incorporating standardised, ketone-based transition thresholds into hospital DKA protocols may reduce relapse and support metabolic recovery.

Stingless bee honey combined with structured exercise improves glycaemic control and lipid profile in people with type 2 diabetes

Pitriani P¹, Rahmah D¹, Nahar Azmi M²

¹Universitas Pendidikan Indonesia, Bandung, Indonesia, ²Universiti Malaya, Kuala Lumpur, Malaysia

Aims: Despite significant treatment advances, 40–50% of people with type 2 diabetes mellitus (T2DM) fail to achieve target HbA1c. This trial evaluated the effects of stingless bee honey (*Trigona* spp.) combined with structured exercise on glycaemic control, and lipid profile, in adults with T2DM.

Methods: A 12-week experiment was conducted at a primary care clinic in Subang, Indonesia (July–November 2025). Seventeen adults with T2DM (aged 30–65 years; HbA1c 7–10%; BMI 23–35 kg/m²) received stingless bee honey (20–25 g/day in divided doses) combined with structured exercise (150 min/week moderate-intensity aerobic exercise; resistance training 2–3×/week). Primary outcomes were HbA1c, fasting plasma glucose (FPG), 2-hour post-prandial glucose (PPG), and lipid panel. Bioactive compounds in the honey were characterised using liquid chromatography–mass spectrometry (LC-MS).

Results: LC-MS identified 10 bioactive compounds: six flavonoids (chrysin, apigenin, kaempferol, rutin, pinocembrin, naringenin) and four phenolic acids (gallic acid, caffeic acid, p-coumaric acid, sinapic acid). After 12 weeks, mean HbA1c decreased from 8.19±2.06% to 6.92±1.91% (–1.27 percentage points; –15.5%). PPG declined from 224.00±88.39 to 191.71±102.17 mg/dL. Lipid profile improved, with reductions in total cholesterol, LDL, and triglycerides and an increase in HDL.

Conclusion: Combined stingless bee honey and structured exercise shows promise as a safe, accessible adjuvant strategy for improving glycaemic control, and lipid metabolism in people with T2DM. Larger, adequately powered trials are warranted to confirm these findings and elucidate the underlying mechanisms of action.

Consistency and applicability of dietary guidance for Diabetes in pregnancy: A Global Review of Clinical Practice Guidelines

Pound F^{1,3}, Lou E², Luo A², Carey S^{1,3}

¹Nutrition and Dietetics Department, Royal Prince Alfred Hospital, Sydney, Australia, ²The University of Sydney, Sydney, Australia, ³Faculty of Medicine & Health, Central Clinical School, The University of Sydney, Sydney, Australia

Aim:

Hyperglycaemia in pregnancy is associated with increased maternal and foetal morbidity. While medical nutrition therapy is considered first line management for diabetes in pregnancy, the consistency and applicability of dietary guidance across clinical practice guidelines remain unclear. This review evaluated the quality and alignment of dietary recommendations across international guidelines to identify gaps in practice and priorities for future research.

Methods:

A systematic review of national and international guidelines published between January 2015 to March 2025 was conducted. Guidelines providing dietary recommendations for gestational diabetes mellitus (GDM) and/or pre-existing diabetes in pregnancy were identified and appraised using the AGREE-II instrument. Dietary recommendations were synthesised and agreement across guidelines was assessed separately for GDM and pre-existing diabetes.

Results:

Twenty-two guidelines from 15 countries were included. Medical nutrition therapy was universally recognised as first-line management for hyperglycaemia in pregnancy, however substantial variation existed in guideline quality and content. Most guidelines focused on GDM, with fewer than two-thirds providing specific dietary guidance for pre-existing diabetes. Less than half included trimester-specific recommendations. Broad agreement was observed for general principles such as individualised dietary counselling, carbohydrate quality, and meal distribution. However, recommendations diverged for energy requirements, macronutrient targets, and micronutrient supplementation. Methodological appraisal revealed strong clarity of presentation but consistently low scores for rigour of development and applicability, limiting the usability of many guidelines in routine clinical practice.

Conclusion:

Current dietary guidance for diabetes in pregnancy provides consistent high-level principles but lacks the specificity required to support uniform, evidence-based nutrition care, particularly for women with pre-existing diabetes. Gaps in trimester-specific advice, micronutrient guidance, and implementation tools contribute to practice variability. Future guideline development should prioritise methodological rigour, stakeholder engagement, and practical dietetic resources to improve applicability and support consistent multidisciplinary care across diverse healthcare settings.

Beyond new onset diabetes: Unmasking Ectopic Cushing Syndrome

Maclean J¹, Haran H¹, Sengwaketse I¹, Jayarante C¹, Hunter L¹, Ross E², Schuch Y², McLean A¹

¹Department of Endocrinology, Cairns Base Hospital, Cairns, Australia, ²James Cook University College of Medicine and Dentistry, Cairns, Australia

Background

Cushings Syndrome is a rare cause of new onset type 2 diabetes¹. However, it should be considered as a potential cause in patients presenting with acutely worsening hyperglycaemia, unusually high insulin requirements and clinical signs of hypercortisolism. Delayed diagnosis puts patients at risk of significant complications from both diabetes and hypercortisolaemia.

Case Study

A 68-year-old woman presented with polyuria and polydipsia in the setting of profound hyperglycaemia (blood glucose 30 mmol/L) and HbA1c 8.5%, accompanied by hypokalaemia and metabolic alkalosis.

Her past medical history included treated primary hyperparathyroidism, diffuse large B-cell lymphoma in remission and pre-diabetes, maclewith an HbA1c 6.0% six months prior.

Clinical examination revealed hypertension, easy bruising, supraclavicular fat pads and proximal myopathy.

Concurrently, she presented to her general practitioner with abdominal pain. CT and MRI revealed hepatomegaly with multiple liver lesions, prompting referral to an oncologist and gastroenterologist. FDG-PET identified coeliac axis lymphadenopathy.

Endoscopic biopsy of a duodenal lymph node showed a Grade 2 neuroendocrine tumour (AE1/AE3+, chromogranin+, CDX2 diffuse; CD20/CD3–; ACTH negative), favouring a midgut or small intestinal origin.

Further laboratory evaluation demonstrated:

- ACTH: 140 ng/L (reference range 10-50 ng/L)
- Morning Serum cortisol: 1190 nmol/L (rr 140-640 nmol/L)
- Urinary free cortisol: 2910 nmol/24hr (rr 10-120 nmol/24hr)
- 1mg dexamethasone suppression test positive
- Glucagon level normal

A ⁶⁸Ga-DOTATATE PET/CT demonstrated a somatostatin receptor–avid duodenal neuroendocrine tumour with widespread hepatic metastases, consistent with ectopic ACTH secretion.

Management included basal–bolus insulin, osilodrostat, lanreotide, clexane, bactrim, spironolactone, perindopril. She was referred for peptide receptor radionuclide therapy.

Conclusion

This case highlights ectopic Cushings syndrome as a rare but important cause of new-onset type 2 diabetes. Early recognition and treatment are key to prevent serious complications including hyperosmolar hyperglycaemic state, sepsis, thromboembolism and cardiovascular events^{3,4}.

References

1. Catargi B, Rigalleau V, Poussin A, Ronci-Chaix N, Bex V, Vergnot V, et al. Occult Cushing's syndrome in type-2 diabetes. *J Clin Endocrinol Metab*. 2003 Dec;88(12):5808-5813. doi:10.1210/jc.2003-030254.
2. DeFronzo RA, Auchus RJ. Cushing syndrome, hypercortisolism, and glucose homeostasis: a review. *Diabetes*. 2025 Dec 1;74(12):2168-78.
3. Ragnarsson O, Juhlin CC, Torpy DJ, Falhammar H. A clinical perspective on ectopic Cushing's syndrome. *Trends in Endocrinology & Metabolism*. 2024 Apr 1;35(4):347-60.
4. Elenius H, Nieman LK. Recognition and management of ectopic ACTH secreting tumors. *Journal of the Endocrine Society*. 2025 Feb;9(2):bvae194.

Moving past BMI: A holistic, multi-marker approach to assessing obesity and metabolic risk.

Raghavan A¹, Ashok A¹, Venkataramanan A²

¹Revivo Metabolic Health, chennai, India, ²Independent researcher, chennai, India

Objective: To compare the utility of BMI with a broader set of body-composition parameters in detecting individuals with elevated metabolic risk.

Methods: A cross-sectional evaluation was conducted in 100 adults (58 men, 42 women) with BMI <27 kg/m² who underwent detailed body-composition testing. Measurements included BMI, body fat percentage (BF%), visceral fat area (VFA), waist-to-hip ratio (WHR), and skeletal muscle mass (SMM). Correlation analyses and between-group comparisons were performed.

Results: BMI showed virtually no relationship with BF% ($r = -0.038$, $R^2 = 0.001$). Despite having BMI <27 kg/m², 82% ($n = 82$) of participants had excess body fat, and 58% ($n = 58$) met criteria for normal-weight obesity. VFA correlated strongly with BF% ($r = 0.879$) but only weakly with BMI ($r = 0.287$). WHR identified 88% of individuals at metabolic risk, whereas BMI ≥ 27 alone identified none. Sex-specific analysis revealed that women exhibited significantly higher BF% than men despite similar BMI values ($p = 0.031$).

Conclusion: BMI by itself fails to accurately classify adiposity or determine eligibility for obesity-related interventions. Incorporating BF%, VFA, WHR, and SMM substantially enhances risk detection, capturing an additional 82–88% of individuals who would be missed by BMI-based criteria alone.

Evaluation of GLP 1 RA use on time in range outcomes.

Raghavan A¹, Ashok A¹, Venkataramanan A¹

¹Revivo Metabolic Health, chennai, India

Background: Continuous glucose monitoring (CGM) metrics such as Time-in-Range (TIR), Time-Below-Range (TBR), and Time-Above-Range (TAR) are valuable indicators of glycemic control in individuals with diabetes. This analysis evaluated (1) whether the use of any GLP-1 receptor agonist (GLP-1 RA) is associated with improved TIR, and (2) whether CGM metrics differ between individuals on basal-only versus premix-only insulin regimens.

Methods: CGM data from 50 individuals were analyzed. Participants were categorized based on GLP-1 RA use (GLP-1 vs non-GLP-1). The participants were on OHA and some of them on Insulins. Group comparisons were conducted using appropriate parametric and non-parametric tests. Effect sizes and confidence intervals were calculated to assess the magnitude and precision of observed differences.

Results: Twenty participants were using a GLP-1 RA. Mean TIR was higher among GLP-1 users (80.3%) compared with non-users (66.4%), reflecting a +13.9% absolute increase. The effect size (Hedges' $g \approx 0.68$) suggested a moderate-to-large clinical effect. No influence in TIR seen between any insulin regimen users and non-users.

Conclusion: Use of a GLP-1 RA showed a clinically meaningful trend toward improved TIR. Comparisons between basal-only and premix-only insulin regimens did not demonstrate clear differences in TIR or TAR.

Oral semaglutide vs orforglipron in obesity – an indirect comparison

Rasalam R¹, Michalak W², Laugesen C³, Rathor N³, Cowley P⁴, Chowdhury R⁴, Bøg M³

¹The Alfred Hospital, Melbourne, Australia, ²Novo Nordisk Inc, Plainsboro, USA, ³Novo Nordisk A/S, Søborg, Denmark, ⁴Petauri Evidence, Bicester, UK

Aims: To compare the weight-loss efficacy and tolerability of oral semaglutide 25 mg and orforglipron 36 mg in individuals with overweight or obesity by conducting an indirect treatment comparison (ITC), addressing the absence of head-to-head data. Evidence was drawn from the OASIS-4 and ATTAIn-1 phase 3 trials.

Methods: OASIS-4 and ATTAIn-1 were comparable in key inclusion criteria (BMI ≥ 30 kg/m² or BMI ≥ 27 kg/m² with ≥ 1 obesity-related complication), estimands, trial design, and 52-week maintenance dosing. Due to between-trial differences in sex and glycemic status, a simulated treatment comparison was used to assess percentage change from baseline (BL) in body weight (BW). A two-stage matching-adjusted indirect comparison was used for tolerability outcomes: discontinuations due to adverse events (AEs) and gastrointestinal (GI) AEs. Analyses were adjusted for BL BW, glycemic status and sex. Treatment effects in the ATTAIn-1 population were compared.

Results: Across both treatment policy and hypothetical estimands, oral semaglutide 25 mg showed significantly greater reductions in percentage change from BL in BW vs orforglipron 36 mg: mean differences (95% CIs) of 3.16%-points (-5.94, -0.38) and -3.04%-points (-5.76, -0.31), respectively. Orforglipron 36 mg was associated with significantly higher odds of discontinuation due to any AEs (odds ratio [OR] [95% CI]: 4.11 [1.30, 13.03]) and due to GI AEs (OR [95% CI]: 13.86 [2.00, 96.01]) vs semaglutide 25 mg.

Conclusion: In this ITC in individuals with overweight or obesity, oral semaglutide 25 mg showed significantly greater weight loss vs orforglipron 36 mg. Orforglipron 36 mg was associated with significantly higher risk of discontinuation due to AEs, including GI AEs, although these findings should be interpreted with care due to small event numbers. These results provide insight into the relative efficacy and tolerability of these treatments in the absence of a direct comparison. Further research is warranted to evaluate comparative effects on cardiometabolic risk factors.

HbA1c and fructosamine in heart transplant recipients: baseline characteristics from the EMPA-HTx trial, a randomised placebo-controlled study of empagliflozin following heart transplant

Raven L^{1,2,3}, Muir C^{1,2}, Greenfield J^{1,2,3}

¹St Vincent's Hospital Sydney, Darlinghurst, Australia, ²School of Clinical Medicine, St Vincent's Campus, Faculty of Medicine and Health, University of New South Wales, Darlinghurst, Australia,

³Garvan Institute of Medical Research, Darlinghurst, Australia

Diabetes is common in heart transplant (HTx) recipients. Whether empagliflozin is beneficial and safe post-HTx is unknown. In the randomised EMPAgliflozin in HTx (EMPA-HTx) trial, the effect of empagliflozin on glycaemic, cardiac and renal outcomes is being studied. Baseline assessment at 6-10 weeks post-HTx includes HbA1c and fructosamine. HbA1c is accepted as a diagnostic and monitoring test for diabetes; however, in HTx recipients HbA1c accuracy is potentially limited by anaemia, renal impairment and other confounders. Fructosamine is a validated biomarker of hyperglycaemia and is used when an alternative to HbA1c is required.

Aims:

This exploratory analysis assesses the correlation of HbA1c and fructosamine in early HTx recipients.

Methods:

EMPA-HTx is an investigator-initiated double-blind placebo controlled study of 10 mg empagliflozin initiated at 6-10 weeks post-HTx. The primary endpoint of the EMPA-HTx trial is change in HbA1c and/or fructosamine at 12 months post-HTx. To assess the relationship between HbA1c and fructosamine, baseline measurements were analysed using Pearson correlation.

Results:

Of the first 49 enrolled trial participants, 48 were included in the analysis; one outlier (HbA1c 12.2% and fructosamine 630 $\mu\text{mol/L}$) was excluded. Median age was 57 (IQR 50-63) years and 40 (83%) were male. The prevalence of pre-transplant diabetes was 29% (n=14). At median 56 (IQR 46-64) days post-HTx, 26 (54%) participants were prescribed insulin. There was a positive correlation between baseline HbA1c and fructosamine ($r=0.54$, $p<0.001$) (Figure). Anaemia (Hb below the reference range) was present in 33 (69%) of participants. Sensitivity analysis were conducted with Hb above and below the reference range, and the positive correlation persisted.

Conclusion:

This is the first study to simultaneously assess the utility of HbA1c and fructosamine in HTx recipients, and showed correlation between these measures. Further research is required to validate the correlation of fructosamine with HbA1c and other glucose measures in HTx recipients.

District-wide urgent diabetes and endocrine advice line: Strengthening specialist access through the Diabetes Alliance Program Plus

Ross-Evans S¹, Acharya S¹, Parsons M¹, Southwell A¹, Joseph M¹, Hure A²

¹Hunter New England Local Health District, Newcastle, Australia, ²University of Newcastle, Newcastle, Australia

Background and Aim

Patients and clinicians across the Hunter New England Local Health District experience limited access to timely specialist diabetes and endocrine advice, particularly in regional and rural communities. Delayed specialist input can contribute to care escalation, varied clinical management, and increased demand on acute services. The Diabetes Alliance Program Plus (DAP+) established a district-wide Urgent Diabetes and Endocrine Advice Line to provide rapid specialist guidance and support clinician capability. This study describes the implementation and early outcomes of the service and its role in informing district-wide education.

Methods

The DAP+ Urgent Diabetes and Endocrine Advice Line was developed in 2023, supporting across a geographically large health district. It is accessible to general practitioners, Aboriginal Medical Services, inpatient teams, and community clinicians across metropolitan, regional, and remote areas. Calls are managed by endocrinology advanced trainees during normal business hours, with endocrinologist oversight and escalation pathways.

Encounters are prospectively recorded using the REDCap platform. Data collected include caller type, presenting condition, and advice provided. Analysis identifies emerging clinical trends and knowledge gaps, informing targeted DAP+ education delivered district-wide through multidisciplinary models including face-to-face sessions, rural outreach, and virtual learning.

Results

Since commencement, the Advice Line has received over 1,600 calls from across the district. Inpatient clinicians generated the largest proportion of calls (47%), followed by general practitioners (39%) and outpatient or specialty services (14%). Diabetes-related queries accounted for 42% of calls, thyroid conditions 24%, with other conditions presentations comprising the remainder. Findings demonstrate strong cross-sector engagement and highlight common clinical challenges requiring specialist support.

Discussion/Conclusion

A district-wide urgent specialist advice line provides a practical and scalable model to strengthen access to endocrine expertise across geographically dispersed health systems. By combining real-time clinical support with data-informed education, the model improves clinician capability and supports safer diabetes and endocrine care delivery, particularly in regional and rural communities

The direct effect of gestational metformin on offspring long-term development, metabolism and pancreas.

Ruwan Pathirana^{T1}, Mwendolwa A¹, Dat Ly D¹, McNeill B¹, R Rivera L¹, Aston-Mourney K¹

¹Deakin University, Waurin Ponds, Australia

Introduction- Metformin has been prescribed for the treatment of diabetes during pregnancy since the 1970s due to its well-established short-term benefits for both mother and fetus. However, the long-term consequences of direct fetal exposure to metformin remain insufficiently understood. Given the limitations of long-term human studies, animal models are essential to delineate these effects.

Aims- This study aimed to assess the long-term effects of gestational metformin exposure on offspring using a healthy mouse model, thereby eliminating confounding influences associated with altered maternal metabolism and glycaemia.

Methods- Pregnant C57BL/6 mice received metformin (5 mg/mL) in drinking water or plain water from embryonic day 0.5 until delivery. Offspring were placed on either a low-fat diet (LFD) or high-fat diet (HFD) from 8 weeks of age. Metabolic assessments, including oral glucose tolerance tests (OGTT) and indirect calorimetry, were performed at 28 weeks, followed by tissue collection for liver triglyceride analysis and immunohistochemical analysis of β -cell mass.

Results- HFD significantly increased body weight in both sexes and increased adipose tissue mass particularly in female offspring, irrespective of maternal metformin exposure. HFD increased liver weight and triglyceride content in control offspring, whereas gestational metformin exposure significantly attenuated it. During the OGTT, metformin-exposed HFD fed offspring exhibited significantly reduced insulin secretion compared with controls, despite comparable blood glucose levels. Pancreatic immunohistochemistry revealed reduced HFD-induced islet expansion and total β -cell mass in metformin-exposed offspring. Moreover, maternal metformin exposure did not affect offspring whole-body energy metabolism.

Conclusion- In conclusion, gestational metformin exposure did not increase susceptibility to obesity or metabolic dysfunction in offspring, even under HFD challenge, but metformin attenuated liver triglyceride accumulation. Although metformin-exposed offspring displayed reduced insulin secretion and β -cell mass, glucose homeostasis was preserved. These findings suggest that in utero metformin exposure may reduce HFD-induced adaptive islet expansion, potentially lowering the risk of long-term β -cell dysfunction without increasing obesity risk.

Algorithm-based insulin titration in diabetes in pregnancy: Real-world performance of a clinical decision support tool

Shahid I¹, Cheung N^{1,2}, Padmanabhan S^{1,2}, Zhang W¹, Song L¹, Hartley E¹, Rhou Y^{1,2}

¹Westmead Hospital, Sydney, Australia, ²University of Sydney, Sydney, Australia

Background & Aim:

Management of gestational diabetes mellitus (GDM) and type 2 diabetes (T2DM) in pregnancy requires frequent insulin adjustment to achieve glycaemic targets. Increasing clinic volumes and complexity make timely and consistent titration challenging. Algorithm-based decision support tools (DST) may assist clinicians by standardising initiation and escalation. Our service utilises the Health2Sync app-dashboard auto-capturing detailed glucose and insulin data. We aimed to design and evaluate the accuracy and clinical utility of an algorithmic DST to guide basal and prandial insulin titration in diabetes in pregnancy.

Methods:

A retrospective cohort study analysing GDM and T2DM clinical encounters in a tertiary endocrinology pregnancy service was conducted. An iterative algorithmic DST was developed to recommend insulin titration based on glucose patterns. DST recommendations were compared with clinician decisions. Accuracy was defined as predicted insulin dose within ± 2 units of clinician-prescribed dose. Encounters where clinician decisions differed from the algorithm were further analysed to determine whether DST recommendations aligned with adjustments at subsequent visits. Patient characteristics including pre-existing T2DM/prediabetes, obesity and completeness of glucose data were evaluated as predictors of performance.

Results:

There were 501 encounters for 69 patients. DST demonstrated high predictive accuracy. Correct dose predictions occurred in 450 visits (89.82%) of glargine and 423 visits (84.43%) of aspart. Where clinicians initially deviated from DST, the tool's prediction was later validated in 34(50%) of aspart and 17(33%) of glargine mismatches. Accuracy declined in patients with hypoglycaemia (n=38[7.5%], declined to 76.3% for glargine and 84.2% for aspart), missing readings (n=82[16.4%], declined to 80.5% for glargine and 85.4% for aspart) and T2DM/prediabetes and/or obesity (n=123[24.5%]), declined to 83.74% for glargine and 82.11% for aspart).

Conclusion:

The algorithmic DST demonstrated high agreement with clinician decisions and frequently anticipated future dose adjustments. DSTs may enhance efficiency and standardisation of diabetes in pregnancy care, though further optimisation is required for patients with T2DM/prediabetes and obesity.

Participant characteristics in a Cluster Randomised Trial assessing a digital health intervention in Western Sydney

Shahidi M¹, Brinkworth G², de Courten B³, Dick H¹, Jayaballa R¹, de la Fosse M⁴, Summers C⁴, Maberly G¹, Meyerowitz G¹

¹Western Sydney Diabetes, Western Sydney Local Health District, Blacktown, Australia, ²Diabetes Australia, Sydney, Australia, ³School of Health and Biomedical Sciences, RMIT University, , Australia,

⁴DDM Health Limited, Coventry, United Kingdom

Background: Western Sydney has a high prevalence of type 2 diabetes (T2D), particularly among culturally and linguistically diverse populations. The Gro-AUS is a cluster randomised trial evaluating a scalable digital behaviour-change intervention delivered through primary care to improve cardiometabolic outcomes in patients with T2D.

Aim: To describe baseline characteristics of the participants enrolled into the trial.

Methods: Adults with T2D were recruited from general practices across Western Sydney. Eligibility criteria included age ≥ 18 years, smartphone access, and HbA1c > 7.5 . Demographic, clinical and comorbidity data were collected at screening, with baseline clinical measures recorded at enrolment.

Results: A total of 140 individuals were screened, of whom 135 were enrolled in the study. Those screened (58.6% male, 40.7% female) had a mean age of 56.7 ± 11.7 years and HbA1c of $9.1 \pm 1.8\%$. Screened participants were culturally diverse: 28% Australian, 25% Indian, 18% Sri Lankan and 8% Middle Eastern. Multiple languages were spoken at home, most commonly English (55.7%) and Tamil (19.3%).

At baseline among enrolled participants ($n = 135$), the cohort demonstrated a high cardiometabolic risk profile. Mean BMI: 30.7 ± 6.4 kg/m², systolic blood pressure 130.9 ± 15.6 mmHg, waist circumference 106.7 ± 19.8 cm (males) and 102.7 ± 16.2 cm (females), HbA1c $9.2 \pm 1.9\%$, total cholesterol 4.5 ± 1.4 mmol/L, triglycerides 2.0 ± 1.5 mmol/L, HDL cholesterol 1.2 ± 0.3 mmol/L, and LDL cholesterol 2.4 ± 1.1 mmol/L. Comorbidities were common, particularly hypertension (62%) and dyslipidaemia (57%) with additional conditions including fatty liver disease, mental health conditions and chronic kidney disease.

Conclusion: The Gro-AUS trial enrolled a diverse primary care population with poorly controlled T2D and high cardiometabolic comorbidity, highlighting necessity for scalable, culturally appropriate digital interventions in high-risk communities.

Late Islet Autoantibody Seroconversion in Long-standing adult-onset diabetes: Diagnostic reclassification and implications for clinical management

Shamshad A¹, Furlanos S¹

¹The Royal Melbourne Hospital Department of Diabetes and Endocrinology, Parkville, Australia

Aim

Latent autoimmune diabetes in adults (LADA) is identified through the presence of islet autoantibodies near the time of diagnosis. While rarely reported, late seroconversion can delay recognition of autoimmune diabetes. We describe a case of long-standing diabetes with initially negative autoantibodies that later developed glutamic acid decarboxylase (GAD) antibody positivity, with clinical features suggesting progressive insulin deficiency.

Methods

We reviewed the clinical course of a patient with presumed type 2 diabetes who underwent repeat autoimmune testing following worsening glycaemic instability and recurrent hypoglycaemia. Clinical history, biochemistry, ambulatory glucose profile monitoring, treatment changes, and outcomes were examined.

Results

A 53-year-old man with an 11-year history of presumed type 2 diabetes had negative autoimmune screening (GAD, IA-2, ZnT8 antibodies) in 2015. Despite intensified non-insulin pharmacotherapy and progressively escalating insulin therapy, glycaemic control remained unstable. Total daily insulin requirements increased from 34 units to 112 units, with HbA1c fluctuating between 7.1% and 9.6%. Recurrent daytime hypoglycaemia later culminated in a severe symptomatic episode in 2024 requiring paramedic assistance. Repeat autoimmune screening in 2025 demonstrated strong GAD antibody positivity (>2000 units, RR <10) with low C-peptide (0.11nmol/L), consistent with progressive latent autoimmune diabetes in adulthood (LADA). Notably, application of the 2006 clinical LADA risk score demonstrated only one risk feature at diagnosis, a profile associated with a 99% negative predictive value for LADA. Insulin pump therapy was subsequently initiated, resulting in improved glycaemic stability with favourable ambulatory glucose profile trends (CGM time in range 77%) and HbA1c of 6.3%.

Conclusion

This case highlights the possibility of late islet autoantibody seroconversion in long-standing diabetes. Given the limitations of single time-point antibody testing, repeat autoimmune and C-peptide testing should be considered when glycaemic patterns or insulin requirements remain unexpected. Earlier recognition of autoimmune diabetes has important implications for diabetes treatment.

Non-invasive continuous glucose monitoring in hospital: future perspectives

Sharma A¹, Barmanray R¹, Le M¹, Wang R^{1,2}, Pandian T¹

¹Royal Melbourne Hospital, Parkville, Australia, ²University Of Melbourne, Department of Medicine, Parkville, Australia

Aim: To examine the role of continuous glucose monitoring (CGM) in improving glycaemic monitoring for hospitalised patients, in the context of rising diabetes prevalence and inpatient hyperglycaemia.

Methods: This perspective reviews current glucose monitoring practices and emerging continuous glucose monitoring (CGM) technologies including minimally invasive (MI-CGM) and non-invasive (NI-CGM) systems highlighting their advantages, limitations, and potential clinical applications in inpatient care

Results: Point-of-care (POC) capillary fingerpick testing remains the current standard for inpatient glucose monitoring. However, CGM technologies have demonstrated potential advantages, including continuous data capture and improved detection of glycaemic variability. MI-CGM is increasingly supported by evidence but is limited by factors such as cost, infection risk, skin complications, medication interference, and interruptions during radiological procedures. NI-CGM offers a promising alternative that may overcome several of these limitations, though technical challenges currently restrict its widespread clinical implementation.

Conclusion: CGM represents a promising advancement in inpatient glycaemic monitoring, with potential to become routine practice for patients requiring insulin therapy. While MI-CGM is closer to clinical integration, further technological development and validation of NI-CGM are needed before broad adoption in hospital settings.

A unique case of Latent Autoimmune Diabetes in youth and adults (LADY & LADA) in a family

Sharma A¹, Furlanos S¹

¹Royal Melbourne Hospital, Parkville, Australia

Background: Latent autoimmune diabetes (LAD) involves gradual autoimmune destruction of the pancreatic beta cells, leading to reduced insulin production.

Case report: We present the case of two generations of latent autoimmune diabetes (LADY and LADA) in one family. In 2015, a 13-year-old female was initially diagnosed with type 1 diabetes when she presented to the emergency department with symptomatic hyperglycaemia without ketoacidosis. Her HbA1c at the time was 13.5 % and she was commenced on basal-bolus insulin regimen. Her past medical history was significant for asthma with a family history of type 2 diabetes mellitus in her aunty and grandparents. Her autoimmune antibody screen was positive for GAD but IA2 and ZnT8 were negative. C-peptide was not checked at time of diagnosis. Over the years, she had an atypical course with reducing insulin requirements and a prolonged honeymoon phase (> 3 years) prompting investigation into monogenic diabetes which was negative. Her C-peptide was checked in 2019 and found to be preserved at 0.67. Given frequent hypoglycaemic episodes on insulin in 2020 she was weaned off insulin by the age of 18 and has maintained excellent glycaemic control with a HbA1c of 5.1% in 2021. Her diagnosis was modified to latent autoimmune diabetes of the youth. She has sustained this for 6 years. Interestingly, her mother, was later diagnosed with LADA at the age of 48, with a positive GAD antibody (>2000) after a background of morbid obesity and gestational diabetes. She was initially managed with oral hypoglycaemic agents but required insulin shortly after her diagnosis, which she has maintained on.

Conclusion: This is the first case report of latent autoimmune diabetes of youth and adulthood affecting two generations within the same family with very different outcomes.

Phase 3 trial of survodutide in adults with obesity and MASLD

Sinclair M¹

¹Victorian Liver Transplant Unit, Austin Health, Melbourne, Australia

Background: Obesity is the leading cause of metabolic dysfunction–associated steatotic liver disease (MASLD). The high global prevalence and burden of obesity and MASLD, including its inflammatory phenotype, metabolic dysfunction–associated steatohepatitis (MASH), has created an urgent need for effective treatments for these diseases. Early treatment for MASLD is needed to reduce inflammation and alleviate the risk of cardiometabolic conditions. In previous phase 2 trials, survodutide, an investigational glucagon receptor/glucagon-like peptide-1 receptor dual agonist, induced substantial weight reduction in adults with obesity without type 2 diabetes (NCT04667377), and reduced liver fat content and improved liver histology in adults with biopsy-confirmed MASH and stage 1–3 liver fibrosis (NCT04771273; N=293).

Methods: This phase 3 trial (SYNCHRONIZE™-MASLD; NCT06309992) included 218 adults aged ≥18 years with a body mass index of ≥30 kg/m² or ≥27 kg/m² with ≥1 metabolic obesity complication and presumed or confirmed MASH, defined using imaging-based and non-invasive test criteria, or histology from a recent liver biopsy. Participants (N=216) were randomized 2:1 to receive once-weekly, subcutaneous survodutide at a dose of 6.0 mg or placebo. The two co-primary endpoints were achievement of a ≥30% reduction in liver fat content (assessed by magnetic resonance imaging proton density fat fraction) and relative change in body weight (%) from baseline to Week 48. Safety was evaluated throughout the study.

Results: Enrollment and follow-up of all participants in the trial have been completed. The final patient visit occurred in December 2025. Results will be available in June 2026.

Conclusion: SYNCHRONIZE™-MASLD will provide a robust evaluation of the efficacy, safety and tolerability of survodutide in adults with obesity and MASLD.

Preparing primary care for precision diabetes: Stakeholder perspectives

Sleaby R¹, Sanci L¹, Ekinçi E^{1,2}

¹University Of Melbourne, Parkville, Australia, ²Austin Health, Heidelberg, Australia

Background:

Approximately 1.34M Australians living with type 2 diabetes are registered with the National Diabetes Service Scheme in 2026, and this number is expected to increase. The Australian Inquiry into Diabetes in 2024 highlighted the importance of advancing precision diabetes, by integrating multi-dimensional scientific and clinical data and applying it to individual health status. A growing body of evidence supports the idea that variation exists in type 2 diabetes presentation and progression, and in individual responses to therapy. This suggests a one-size-fits-all approach to diabetes management may be inappropriate and have an adverse impact on provision of health services and outcomes as the population with diabetes increases. Precision diabetes medicine evolves the existing one-size-fits-all approach, into one in which data enhances clinical decisions at the subgroup, if not at the individual level.

Aim:

The aim of this qualitative research is to explore stakeholder perspectives on precision diabetes and its implementation.

Methods:

University of Melbourne Human Research Ethics Committee approval was received in March 2026. Inclusion criteria for recruitment are people with type 2 diabetes and/or health care professionals (general practitioners, endocrinologists, diabetes educators) seeing people with type 2 diabetes in Australia; aged 18 years or older; and willing to voluntarily contribute to the research project. Semi-structured interviews are being conducted either in-person or via Zoom. Qualitative data are being de-identified and analysed with NVivo software. Thematic analysis is being conducted using the NASSS (non-adoption, abandonment, scale-up, spread, sustainability) of health care technologies framework.

Results:

Stakeholder perspectives on barriers, enablers and recommendations for implementation of precision diabetes will be presented. Results will clarify if there is a perceived need for precision diabetes, and what precision diagnostics and treatments would be relevant and equitable.

Conclusion:

Stakeholder perspectives and recommendations for precision diabetes will guide impactful and sustainable translation from research to practice.

Exercise as soon as possible after a meal: a systematic review and meta-analysis.

Smith L¹, Oetsch K¹, Wakefeild B¹, Sabag A², Francois M¹

¹University Of Wollongong, Wollongong, Australia, ²University of Sydney, Camperdown, Australia

Aims

Postprandial hyperglycaemia following a high-carbohydrate meal can impair endothelial function and contribute to vascular dysfunction. No comprehensive synthesis has identified the optimal timing of exercise to attenuate postprandial glucose and preserve endothelial function. This meta-analysis systematically reviews and synthesises evidence on the effects of exercise timing around meals on postprandial hyperglycaemia and endothelial function.

Methods

A systematic search of databases from 01/011992 to 26/08/2024 was conducted. Screening and risk of bias assessment (RoB II) were performed using Covidence. Eligible studies were randomised controlled trials (RCTs) in adults (≥18 years), with or without cardiometabolic disease, examining an acute exercise intervention with a meal challenge compared with a non-exercise control. Outcomes included postprandial endothelial function and glucose. Random-effects meta-analyses using standardised mean differences (SMD) with 95% confidence intervals and pooled effects estimates were conducted in R (v4.3.2).

Results

Thirteen RCTs (n=157; 38 with cardiometabolic disease) were categorised into five exercise-timing windows. Exercise performed within 60 minutes of the meal significantly preserved endothelial function compared with control. No significant effects were observed for pre-meal or delayed post-meal exercise. Increasing proximity to the meal and higher aerobic exercise intensity may further enhance endothelial and glycaemic outcomes.

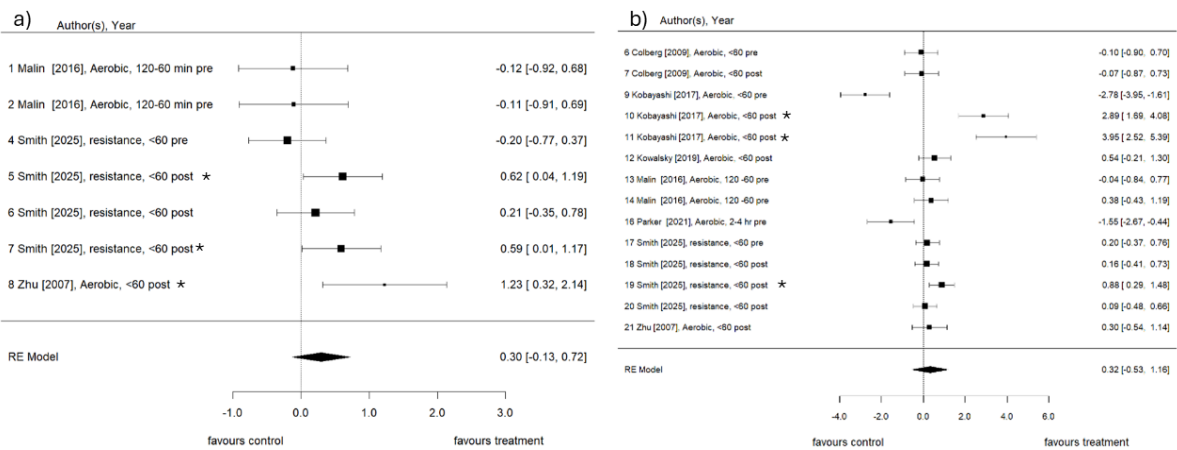


Figure 1. a) Effect of exercise timing on 60-minute postprandial flow-mediated dilation. b) Effect of exercise timing on 60-minute postprandial Glucose. Forest plots of the effect of any acute exercise in comparison to a no-exercise control. * - denotes interventions significantly more beneficial than control.

Conclusions

Exercise undertaken as soon as possible after a meal seems to improve postprandial endothelial function and glucose excursions when compared with pre-prandial, delayed, or no exercise.

Lean-based glucose tolerance testing: a proof-of-concept investigation.

Smith L¹, Roach L¹, Chang C³, Cyriac T¹, Oetsch K¹, Parr E²

¹University Of Wollongong, Caringbah South, Australia, ²Australian Catholic University, Melbourne, Australia, ³University of Toronto, Toronto, Canada

Aim/s

Previous studies have indicated a sex and size disparity in glucose tolerance testing, with post hoc regressions simulating that accounting for height erases the differences in postprandial glucose excursions [1, 2]. The primary objective of this investigation was to examine whether physiologically equivalent glucose and insulin excursions are achieved in males and females when the carbohydrate challenge is individually calculated relative to lean mass.

Methods

Lean mass was measured by dual-energy X-ray absorptiometry (DEXA). Participants n=24 (12:12 M:F) consumed a high-carbohydrate meal formulated from 1.5g of carbohydrates /kg of lean mass. Blood glucose was measured by finger prick at fasting and at 30, 60, 90 and 120 min postprandially. Blood samples were collected via venipuncture at fasting and 60 minutes postprandially; plasma was isolated, and insulin was measured by ELISA.

Results

Male and Female fasting glucose ($p=0.198$) and insulin ($p=0.456$) were equivalent. Following the glucose challenge, glucose ($p=0.209$) and insulin ($p=0.601$) excursions were also not different.

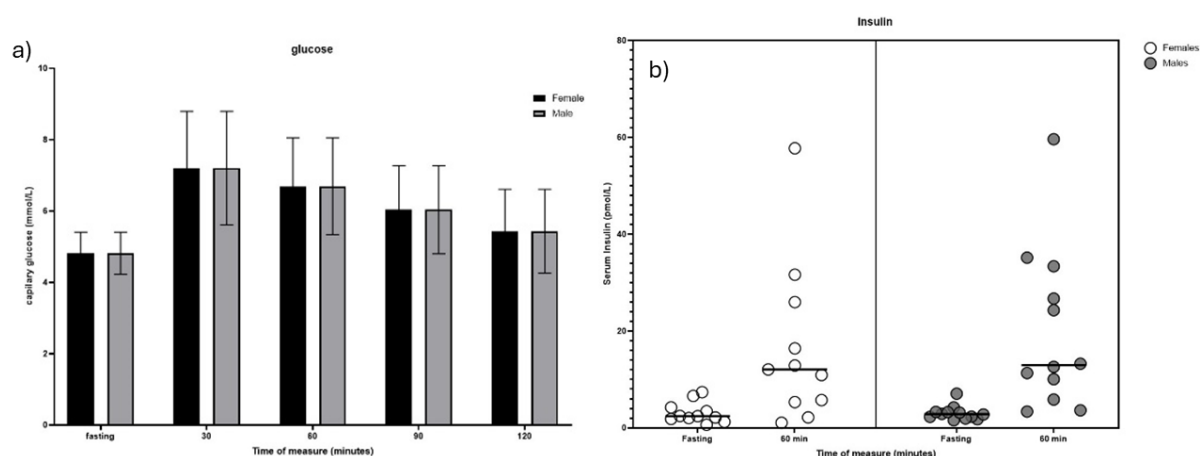


Figure 1. a) Capillary glucose measured at fasting, 30 min, 60 min, 90 min, and 120 min postprandially in females vs males. b) Serum insulin measured at fasting and 60 min postprandially, *Timepoint $P<0.05$.

Conclusions

Our findings demonstrate that, when a carbohydrate challenge is adjusted for lean mass, males and females exhibit a physiological equivalent glucose and insulin excursion, indicating that accounting for lean mass allows a fairer, more standardised assessment of glucose tolerance across individuals. Experimentally, this approach creates a controlled environment enabling more accurate investigation of interventions and sex-based differences in acute glucose responses, without the confounding effects of body size. Given that this method can produce a consistent glucose excursion, future work should evaluate its performance in individuals with very high or very low lean mass and compare its diagnostic value with that of the traditional 75-g OGTT.

1. Sicree, R.A., et al., Differences in height explain gender differences in the response to the oral glucose tolerance test- the AusDiab study. *Diabet Med*, 2008. **25**(3): p. 296–302.
2. Palmu, S., et al., Body surface area and glucose tolerance - The smaller the person, the greater the 2-hour plasma glucose. *Diabetes Res Clin Pract*, 2019. **157**: p. 107877.

Metformin-related reduction in insulin dose requirements in adults with type 1 diabetes is associated with shifts in the gut microbiome

Snaith J^{1,2,3}, Vergroesen J^{4,5}, Jiang X^{5,6}, Yim H^{5,6}, El-Omar E^{5,6}, Greenfield J^{1,2,3}

¹Garvan Institute Of Medical Research, Darlinghurst, Australia, ²St Vincent's Clinical Campus, University of New South Wales, Darlinghurst, Australia, ³St Vincent's Hospital Sydney, Department of Diabetes and Endocrinology, Darlinghurst, Australia, ⁴Erasmus University, Rotterdam, Netherlands, ⁵Microbiome Research Centre, Kogarah, Australia, ⁶St George & Sutherland Clinical Campuses, School of Clinical Medicine, Kogarah, Australia

Background

In a placebo-controlled randomized trial (INTIMET)¹, we reported that metformin 1500mg daily reduced insulin dose in individuals with type 1 diabetes (T1D), without a change in insulin resistance. We hypothesised that metformin-induced changes in the gut microbiome contribute to this effect.

Methods

In a subgroup of 10 adults with T1D who provided stool samples at baseline and after 26 weeks of metformin, we analysed: (i) changes in microbiome genera, species, and functional pathways with metformin treatment; and (ii) the relationship between metformin-induced changes in the gut microbiome and total daily insulin (TDI) dose. Extracted microbiome DNA underwent whole shotgun metagenomics sequencing for taxonomic and functional profiling. Associations were adjusted for confounders and multiple testing.

Results

Baseline characteristics (mean $\pm$ SD) were age 40 ± 6 years, 60% male, diabetes duration 26 ± 10 years, TDI 42 ± 13 units (0.5 ± 0.1 units/kg/day), BMI 27 ± 4 kg/m² and HbA1c $7.4 \pm 0.8\%$. Metformin altered 10 genera, 46 species, and 27 functional pathways. Metformin depleted genera *UBA644* ($p < 0.00001$) and *CAG-41* ($p = 0.003$). There was a positive association between the change in insulin dose and the change in genera *UBA644* ($p < 0.00001$) and *CAG-41* ($p = 0.003$). On a species level, the abundance of *Parabacteroides* sp900548175 ($p = 0.0008$) and *Butyricimonas* sp002161485 ($p < 0.00001$) increased with metformin treatment. The change in *Parabacteroides* and *Butyricimonas* species was inversely related to the change in insulin dose (both $p < 0.0001$). Notably, these taxa are implicated in short chain fatty acid metabolism. No functional pathway changes were associated with insulin dose change.

Conclusion

Metformin treatment in T1D was associated with distinct shifts in gut microbial composition. The association between change in the abundance of specific taxa and insulin dose suggests that the gut microbiome may play a role in metformin-associated insulin dose reduction in T1D.

Reference:

1. [author names withheld for abstract assessment], Effect of metformin on insulin resistance in adults with type 1 diabetes: a 26-week randomized double-blind clinical trial. Nature Communications 2025;16(1):9884.

Semaglutide for insulin resistance management in an adult with type 1 diabetes and healthy weight: a clinical case

Lum C¹, Morris P¹, Abrahamson G¹, Snaith J^{1,2,3}

¹Department of Diabetes and Endocrinology, St Vincent's Hospital Sydney, Darlinghurst, Australia,

²Clinical Diabetes and Metabolism, Garvan Institute of Medical Research, Darlinghurst, Australia, ³St Vincent's Clinical Campus, Faculty of Medicine and Health, University of New South Wales, Darlinghurst, Australia

Background: Insulin resistance in type 1 diabetes is associated with higher insulin requirements, metabolic syndrome, suboptimal glycaemia and elevated cardiovascular risk. Further, increased insulin dose requirements has implications for pump users including more frequent cannula site failure and increased consumable costs, adding to the burden and negatively impacting quality of life for those living with type 1 diabetes.

Semaglutide is increasingly used off-label in individuals living with type 1 diabetes and overweight or obesity to improve weight, glycaemia and insulin dose requirements. There is little experience in its use in individuals living with type 1 diabetes and healthy weight.

Case: A 20 year-old female living with type 1 diabetes since the age of 13 years presents with the issues of mild overweight (65.2kg; BMI 25.4), suboptimal glycaemia (HbA1C 7.7%, time-in-range 58%), insulin resistance (62 units/day; 1.0 units/kg/day) and diabetes distress. Her diabetes was managed with Novorapid insulin via a Medtronic 780G hybrid closed loop system and metformin 1000mg daily. Her diabetes distress related to difficulties managing hyperglycaemia despite increasing insulin requirements, weight reduction, physical exercise and a good quality diet.

Semaglutide 0.125mg weekly was commenced. Over 16 months of adjunctive semaglutide, she maintained weight (63.8kg; BMI 24.9), improved glycaemia (HbA1c 7.5%, time-in-range 72%), reduced insulin requirements (49 units/day; 0.77 unit s/kg/day) and was without treatment side effects.

Conclusion: This case demonstrates that low-dose semaglutide as an adjunct to insulin, can aid in improving glycaemia and insulin dose requirements in adults with type 1 diabetes and normal weight. This case suggests that semaglutide may play a role in improving metabolic health across the BMI spectrum in type 1 diabetes.

Predicting cardiovascular risk reduction with Tirzepatide in Type 1 Diabetes

Ni H^{1,2,3}, Frampton R^{1,3,4}, Samocha-Bonet D^{4,5}, Snaith J^{1,2,3,4}, Greenfield J^{1,2,3,4}

¹Department of Diabetes and Endocrinology, St Vincent's Hospital Sydney, Darlinghurst, Australia,

²Victor Chang Cardiac Research Institute, Darlinghurst, Australia, ³St Vincent's Clinical Campus, School of Clinical Medicine, Faculty of Medicine and Health, University of New South Wales, Darlinghurst, Australia, ⁴Garvan Institute of Medical Research, Darlinghurst, Australia, ⁵School of Health Sciences, University of New South Wales, Kensington, Australia

Aim

Multiple metabolic factors contribute to excess cardiovascular disease (CVD) in people with type 1 diabetes (T1D). In the TIRTLE1 trial, adjunctive tirzepatide reduced weight, HbA1c and insulin requirements in adults with T1D and obesity. In lieu of cardiovascular outcome trials, we evaluated the effect of tirzepatide on estimated CVD risk in T1D.

Methods:

This exploratory analysis used data from a double-blind, randomised, placebo-controlled trial (ACTRN12624000111572), evaluating the metabolic effects of tirzepatide (titrated to 5 mg weekly for 12 weeks) in adults with T1D and BMI>30kg/m². Demographic, anthropometric, and biochemical data from 23 participants (age 41±11 years, diabetes duration 23.2 years, BMI 33.9±3.1kg/m², 57% male, HbA1c 7.3%) were used to estimate 10-year CVD risk at baseline and end of treatment using two validated T1D-specific models: the Scottish Diabetes Research Network (SDRN) risk model and Steno T1 Risk Engine (ST1RE). The median absolute and relative change from baseline were compared, and placebo-adjusted differences were estimated using linear regression with robust standard errors.

Results:

Median baseline 10-year CVD risks were 8% [IQR 3,13] by SDRN and 9.8% [4.4,15.5] by ST1RE. Using SDRN, median absolute and relative risk changes were -1% [-1, 0] and -11.8% [-32.1, 0] for tirzepatide and 0% [-4, 1] and -11.1% [-11.1, 12.5] for placebo (placebo-adjusted difference -0.83%, P=0.52 and -12.4%, P=0.15). Using ST1RE, the median and absolute and relative risk changes were -0.3% [-1.4, 0.75] and -7.5% [-34.1, 8.9] for tirzepatide and 0.3% [-0.7, 0.6] and 5.4% [-5.7, 8.8] for placebo (placebo-adjusted difference -0.28%, P=0.84 and -10.9%, P=0.17).

Conclusion:

Tirzepatide did not significantly reduce estimated 10-year CVD risk in adults with T1D and low baseline risk. Larger studies including individuals at higher baseline risk are needed. Whether change in risk predictive scores reflect true CVD risk reduction with adjunctive therapies requires further validation.

Diagnostic performance of 1-hour versus 2-hour oral glucose tolerance test for identifying Type 2 diabetes in Thai individuals with prediabetes

Srivanichakorn W¹, Washirasaksiri C¹, Wachirapornpruet P¹, Ariyakunaphan P¹, Kositamongkol C¹

¹Faculty Of Medicine, Siriraj Hospital, Bangkok, Thailand

Background: Prediabetes is a high-risk state for progression to type 2 diabetes (T2DM) in Thailand. Although 2-hour plasma glucose after 75-g oral glucose (2hr-PG) remains the gold standard for diagnosis, its duration is clinically impractical. This study evaluated the diagnostic accuracy and performance of 1-hour plasma glucose (1hr-PG) compared to 2hr-PG in Thai individuals with prediabetes.

Methods: This prospective cohort study enrolled 482 participants aged 18–75 years with prediabetes, defined as fasting plasma glucose (FPG) 100–125 mg/dL and/or HbA1c 5.7–6.4%. After excluding 40 participants due to normal glucose regulation, prior diabetes or missing data, 442 underwent a 75-g OGTT measuring FPG, 1hr-PG, 2hr-PG, and HbA1c. Diagnostic accuracy and test performance were subsequently evaluated.

Results: The cohort had a mean age of 58.83 years (66.7% female), mean BMI of 25.9 kg/m², FPG of 94.2 mg/dL and HbA1c of 5.9%. A 1hr-PG threshold >209 mg/dL demonstrated acceptable diagnostic performance, with an area under the receiver operating characteristics curve (AUROC) of 0.75 (sensitivity of 80.8%, specificity of 87.3%, positive predictive value of 55.7% and a negative predictive value of 95.8%), compared to a 2hr-PG (>200 mg/dL) AUC of 0.931. Integrating 1hr-PG into a composite diabetes diagnostic model alongside FPG and HbA1c achieved a high accuracy with an AUC of 0.86. Among participants meeting standard T2DM criteria (FPG≥126 mg/dL or HbA1c≥6.5%), the proportional prevalence identified by the 1hr-PG and 2hr-PG thresholds was 2.71% and 3.17%, respectively (p<0.001).

Conclusion: The 1hr-PG demonstrated high diagnostic accuracy and acceptable diagnostic performance compared to the standard 2hr-PG. Its strong rule-out capability and reduced duration make it a practical alternative for T2DM screening.

Keywords: Prediabetes, Type 2 Diabetes Mellitus, 1-hour Plasma Glucose, 2-hour Plasma Glucose, Diagnostic Accuracy, area under the receiver operating characteristics curve

Diabetes as a predictor of anticoagulation quality in people with atrial fibrillation treated with warfarin: A multi-centre retrospective study

Syed Hamzah S¹, Soelar S², Harun S¹

¹Discipline of Clinical Pharmacy, Universiti Sains Malaysia, , Malaysia, ²Clinical Research Center, Ministry of Health Malaysia, Alor Setar, Malaysia

Aim

To examine the association between diabetes and anticoagulation quality, measured by time in therapeutic range (TTR), among people with atrial fibrillation who were treated with warfarin, with a focus on differences between those living with and without diabetes.

Methods

This multi-centre retrospective cohort study included adults newly initiated on warfarin between 2010 and 2023 at two anticoagulation clinics in Malaysia. Anticoagulation quality was assessed using 6-month TTR, with a target of $\geq 70\%$. Data were collected on whether participants were living with diabetes, as well as demographic and clinical characteristics, concomitant medications, and warfarin treatment-related factors. Multivariable logistic regression was used to identify factors associated with achieving the TTR target.

Results

Among 780 participants, 38.5% were people living with diabetes. Overall, only 36.3% achieved the TTR target. People without diabetes were 1.73 times more likely to achieve this target compared to those living with diabetes (adjusted OR (aOR) 1.73, 95% CI 1.24–2.41; $p = 0.001$). Other associated factors included not having a prior stroke (aOR 1.62), not using thyroid medication (aOR 3.18), and higher warfarin dose intensity (aOR 1.58). Treatment process variables such as a lower weekly warfarin dose to reach the initial therapeutic INR (aOR 1.64) and achieving the first therapeutic INR within 15 to 28 days (aOR 2.61) were the strongest predictors of TTR success.

Conclusion

People living with diabetes were less likely to achieve optimal anticoagulation quality compared to those without diabetes. Diabetes should be considered a specific factor associated with sub-optimal anticoagulation outcomes. Strategies should support the timely achievement of therapeutic INR while accounting for the healthcare challenges faced by people living with diabetes to ensure equitable cardiovascular care.

Discordance between the estimated glucose disposal rate and traditional cardiovascular risk scores in Malaysian adults with Type 2 Diabetes

Tai C¹

¹Ministry Of Health Malaysia, Johor Bharu, Malaysia

Aims:

Insulin resistance (IR) is a key driver of cardiometabolic risk in people living with type 2 diabetes mellitus (T2DM), yet it is not directly incorporated into traditional cardiovascular (CV) risk prediction tools. This study aimed to examine the relationship between IR, as estimated using the estimated Glucose Disposal Rate (eGDR), and commonly used CV risk scores among Malaysian adults with T2DM who had no prior cardiovascular disease (CVD).

Methods:

A cross-sectional study was conducted in a primary care clinic in Johor Malaysia, involving 569 adults with T2DM. For the main analysis, 399 individuals without a history of CVD were selected. IR was defined using an eGDR cut-off of less than 4.5 mg/kg/min. Association between eGDR and CV risk scores, specifically Framingham Risk Score (FRS) and the Revised Pooled Cohort Equation (RPCE), were evaluated using Spearman correlation and multivariable regression, adjusting for age, gender, body mass index (BMI), HbA1c, systolic blood pressure, and renal function. CV risk scores were compared between IR and non-IR groups.

Results:

No significant correlation was observed between eGDR and either FRS (Spearman $\rho=0.000$, $p=0.996$) or RPCE (Spearman $\rho=0.018$, $p=0.723$). Multivariable regression confirmed that eGDR was not an independent predictor of CV risk after adjustment for conventional risk factors. CV risk scores did not differ significantly between individuals with eGDR less than 4.5 mg/kg/min and those with higher eGDR. However, individuals with IR (eGDR less than 4.5 mg/kg/min) demonstrated higher HbA1c, greater insulin requirements, more features of metabolic syndrome, higher BMI, and reduced renal function, burdens not reflected in the FRS or RPCE.

Conclusion:

Traditional CV risk scores do not reflect the increased metabolic and renal burden associated with IR in Malaysian adults with T2DM who had no prior CVD. Incorporating IR indices such as eGDR may enhance risk stratification and support more effective, targeted interventions in primary care.

Towards clinical utility: A pragmatic recalibration of estimated glucose disposal rate for use in Malaysian Primary Healthcare settings

Tai C¹

¹Ministry Of Health Malaysia, Johor Bharu, Malaysia

Background & Aim: Building on prior findings of limited diagnostic agreement between estimated Glucose Disposal Rate (eGDR) and the TG/HDL-C ratio for insulin resistance (IR) among people living with type 2 diabetes mellitus (T2DM) in Malaysia, this study aimed to recalibrate the eGDR cut-off to enhance its clinical relevance and specificity in primary care.

Methods: A cross-sectional observational study was conducted involving 569 adults with T2DM attending a primary healthcare clinic in Johor, Malaysia. The diagnostic performance of eGDR was evaluated against the TG/HDL-C ratio, using a value above 1.1 as a local surrogate benchmark for IR. Receiver operating characteristic (ROC) analysis and Youden Index were used to determine the optimal eGDR cut-offs. Clinical associations at eGDR less than 4.8 and less than 4.5 mg/kg/min were compared using Chi-square and Mann-Whitney U tests.

Results: ROC analysis yielded an area under the curve of 0.571, indicating modest discriminatory ability. Although Youden Index identified 4.8 mg/kg/min as the optimal eGDR cut-off, a lower threshold of 4.5 mg/kg/min demonstrated better specificity and clinical discrimination. Individuals with eGDR less than 4.5 mg/kg/min had significantly higher insulin requirements, poorer glycaemic control (median HbA1c 9.2 percent vs 7.2 percent), greater obesity, and increased renal risk. This threshold more accurately identified individuals with advanced IR and higher metabolic burden, reducing false positives relative to the conventional threshold.

Discussion / Conclusion: An eGDR threshold below 4.5 mg/kg/min appears to be a more specific and clinically meaningful indicator of IR among people living with T2DM in Malaysia. This recalibrated threshold may support more accurate identification of individuals at increased metabolic and renal risk, enabling more targeted and effective care within primary healthcare settings.

Impact of nutrition interventions tailored based on continuous glucose monitoring data from adults with diabetes mellitus: A systematic review

Taylor R^{1,2}, Asher R^{1,2}, Burrows T^{1,2}, Barnes R³, Jansson A^{1,2}, Stanford J^{1,2}, Gomez Martín M^{1,2}, Tehan P^{1,4}, Clarke E^{1,2}, Chan K⁵, Donnelly H^{1,2,4}, Hure A^{1,2}, Bucher T^{1,2,6}

¹The University Of Newcastle, Newcastle, Australia, ²Hunter Medical Research Institute, New Lambton Heights, Australia, ³South Western Sydney Local Health District, Liverpool, Australia, ⁴Monash University, Clayton, Australia, ⁵Tamworth Hospital, Tamworth, Australia, ⁶Bern University of Applied Sciences, Bern, Switzerland

Aim/s: To review the literature on the impact of nutrition interventions based on patients' continuous glucose monitoring (CGM) data on health outcomes in adults with diabetes mellitus.

Methods: Six electronic databases were searched for experimental studies published from January 2016 to November 2024. Eligible studies included nutrition interventions in adults with diabetes mellitus, including type 1 and type 2, personalised to their CGM data. Intervention characteristics and participant health outcome data were extracted from eligible studies by one reviewer with verification by a second. Methodological quality of the eligible studies was assessed using the Academy of Nutrition and Dietetics checklist. A narrative synthesis and descriptive statistics were used to summarise the extracted data.

Results: From the literature search, 3,186 articles were identified, with nine studies (n=3 RCTs) included. Most studies (n=7) exclusively included adults with type 2 diabetes mellitus. The median duration of the nutrition intervention was three months. The impact of the nutrition interventions was evaluated based on the following health outcomes reported by the studies: glycaemic control (n=8), dietary intake (n=4), anthropometry (n=3), and blood lipids (n=1). Significant between group improvements favouring the intervention were reported in some studies for HbA1c (n=3, -0.41 to -1.30%, p<0.05), total carbohydrate intake (n=1, -73g, p=0.009), and participant dietary self-care and self-efficacy scores (n=1, +0.62 points, p<0.001). No significant between group differences were reported for anthropometry (n=3) or blood lipids (n=1) outcomes. All studies received a high (n=4) or medium (n=5) methodological quality rating.

Conclusion: Nutrition interventions informed by CGM data were shown to improve individual's glycaemic control compared with the control intervention. However, evidence for impact on dietary quality (e.g., vegetable intake), anthropometry measures, and blood lipids remains limited. Robust RCTs are needed to clarify efficacy for this intervention approach, including longer-term effectiveness.

Hyperglycaemic diabetic ketoacidosis associated with glucagon-like peptide-1 receptor agonist therapy: A case report

Teh W², Matthew M², Rana A⁴, Gupta R⁴, Shenoy V³, Malabu U³, Sathyapalan ⁶, Deshmukh H¹

¹Gold Coast University Hospital, Mackay, Australia, ²Mackay Base Hospital, Mackay, Australia,

³Townsville University Hospital, Townsville, Australia, ⁴Royal Brisbane and Women Hospital, Brisbane, Australia, ⁵Redcliffe Hospital, Redcliffe, Australia, ⁶Hull University Teaching Hospital NHS Trust, ,

United Kingdom

Background and Aim:

Glucagon-like peptide-1 receptor agonists (GLP-1RA) are increasingly used in the management of type 2 diabetes mellitus (T2DM) and are generally well tolerated. We report a case of hyperglycaemic diabetes ketoacidosis (DKA) occurring in a patient with T2DM treated with Semaglutide.

Method:

A 38-year-old woman with a background of T2DM presented with acute onset dyspnoea and abdominal discomfort, on a background of several months of polyuria and polydipsia. Her diabetes was managed with metformin 1 g daily, glicazide 60 mg daily, with weekly semaglutide commenced 8 months prior to presentation. Investigations demonstrated severe metabolic acidosis (pH 7.08, bicarbonate 6 mmol/L, base excess -22.5mmol/L) with an elevated anion gap of 24 mmol/L, blood glucose 25.5 mmol/L, and ketones 4.3 mmol/L, consistent with DKA and lactate of 2.4mmol/L with normal renal function. HbA1c was 10.9%. C-peptide was preserved at 0.9 nmol/L with a corresponding glucose levels of 15.1mmol/L. She had negative anti-GAD, anti-ZnT8 and anti-IA2 antibodies, and had no family history of Type 1 diabetes, MODY or LADA. Septic work-up was unremarkable and CT pancreas is pending.

She was managed with intravenous insulin and fluids according to the local DKA protocol, with subsequent normalisation of acid–base status and ketone levels. She was discharged on a basal–bolus insulin regimen with initiation of continuous glucose monitoring.

Conclusion:

While gastrointestinal adverse effects of GLP-1RA are well recognised, clinicians should also be aware of the potential risk of DKA, particularly in patients with poor glycaemic control and with unmasking of latent beta cell dysfunction.

Impact of interventions on measures of glycaemic variability in type 1 diabetes: a systematic review of randomised controlled trials

Templer S^{1,2}, Tsolakis J^{1,2}, Twigg S^{1,2}

¹University of Sydney, Sydney, Australia, ²Royal Prince Alfred Hospital, Sydney, Australia

Aims: Most interventions in type 1 diabetes (T1D) are targeted at reducing hyperglycaemia while also minimising hypoglycaemia, whereas effects of interventions on glycaemic variability (GV) is less explored. This systematic review examined (1) which measures of GV have been reported in randomised controlled trials (RCTs) and (2) the effects of various interventions on GV in people with T1D.

Methods: PubMed and MEDLINE databases were searched from 1 January 2000 to 31 October 2025 using the search terms 'type 1 diabetes', 'random*', 'glycaemic variability', and numerous specific measures of GV. Eligibility criteria were RCTs (crossover or parallel-arm) in adults with T1D, undergoing any intervention compared with usual care, where any measure of GV derived from ≥ 72 hours of continuous glucose monitoring (CGM) was compared between groups.

Results: 757 records were identified, of which 697 were excluded (mainly due to inappropriate study type or outcomes), leaving 60 studies in the final review: 32 were crossover studies and 28 were parallel-arm, with a total of 3,688 participants. The most commonly reported measures of GV were standard deviation (SD; n=40 studies) and coefficient of variation (CV; n=38) followed by mean amplitude of glycaemic excursion (n=23). Categories of intervention included type of basal insulin (n=11 studies), automated insulin delivery (AID; n=7), diet (n=6), SGLT2 inhibitors (n=5), GLP-1 receptor agonists (n=5), and others (n=26). Overall, there was significant heterogeneity across studies in their duration, comparators, and reported GV measures. No consistent findings related to GV could be synthesised to enable meta-analysis. Notably, CV and SD were commonly lower in AID and low carbohydrate diets.

Conclusion: Heterogeneity in reporting of GV limits the comparison of intervention effects and evidence synthesis. Whilst standardised reporting of GV measures in clinical trials is needed to improve interpretability and comparability, low-carbohydrate diets and AID may improve some recognised GV measures.

Identification of maturity-onset diabetes of the young (MODY) through targeted next-generation sequencing in Thai patients with atypical diabetes in real-world practice

Thewjitcharoen Y¹, CHATCHOMCHUAN W¹, WANOTHAYAROJ E¹, NAKASATIEN S¹, LIM C², HIMATHONGKAM T¹, CHAN J²

¹Vimut-Theptarin Hospital, Bangkok, Thailand, ²The Chinese University of Hong Kong, , Hong Kong

Background & Aim: Maturity-onset diabetes of the young (MODY) is often misdiagnosed as either autoimmune type 1 diabetes (T1D) or polygenic type 2 diabetes (T2D), resulting in missed diagnosis and inappropriate treatment. Differentiating MODY from T2D is challenging in Asians with low body mass index (BMI) and strong family history. The clinical impact of genetic testing in a real-world case series of Thai patients with atypical diabetes is not well defined. In this study, we aim to evaluate the diagnostic yield and clinical implications of targeted gene panel testing at a specialized diabetes outpatient clinic in Bangkok.

Methods: Thai patients (age at diagnosis of diabetes ≤ 40 years; BMI ≤ 25 kg/m²) with atypical clinical features who underwent next-generation sequencing analysis of 33 monogenic diabetes genes from 2019-2025 were studied.

Results: Of the 33 probands with atypical diabetes (age at diabetes onset 34.4 ± 14.4 years, BMI 23.7 ± 3.3 kg/m², insulin-treated 39.3%), genetic testing identified a pathogenic or likely pathogenic variant in 4 (12.1%) probands. Variants in GCK were the most frequent (n=2, 50.0%), followed by HNF1A (n=1, 25.0%), and HNF1B (n=1, 25.0%). Genetic diagnoses led to targeted therapies and identification of MODY cases among family members. The latter often have concomitant obesity-driven insulin resistance contributing to hyperglycemia.

Discussion / Conclusion: Genetic testing for monogenic diabetes in a real-world setting identified disease-causing variant in 12.1% of young Thai patients with atypical diabetes. Despite this low yield, accurate genetic diagnoses improved clinical management in both probands and family members. These findings underscore the potential contribution of a strong polygenic background or yet unidentified MODY-X genes among Thai patients. Establishing a register of family-based cohorts documenting the molecular diagnosis of atypical diabetes will advance diagnosis and treatment.

Insulin allergy in insulin-dependent type 2 diabetes successfully managed with insulin pump therapy: A case report

Tjong M¹, Christie-David D^{2,3}, Noh J²

¹Northern Sydney Local Health District (NSLHD), NSW Health, Sydney, Australia, ²Northern Beaches Diabetes Service, Northern Sydney Local Health District (NSLHD), NSW Health, Sydney, Australia,

³Macquarie University, Sydney, Australia

Aim: Insulin allergy, although rare, presents a significant challenge in the management of insulin-dependent diabetes.

Method: We present a case of a patient with type 2 diabetes and insulin allergy successfully managed with insulin pump therapy.

Results: A 60-year-old male presented to the diabetes clinic in March 2023 with a new diagnosis of type 2 diabetes following hospitalisation for hyperglycaemia with HbA1c 9.9%. He was initially commenced on insulin glargine (Optisulin), metformin, and gliclazide. Semaglutide (Ozempic) was later added, and by early 2024 insulin was ceased and glucose levels remained in target range on Ozempic alone.

In mid-2024, following an intercurrent illness, he developed persistent hyperglycaemia. Over the subsequent year he required multiple hospital admissions with symptomatic hyperglycaemia despite recommencement of insulin, gliclazide and linagliptin, with HbA1c increasing to 13.7%. He was unable to tolerate metformin, SGLT2 inhibitors, or GLP-1 receptor agonists due to gastrointestinal side effects, despite previously tolerating Ozempic.

During this time, he developed fatigue, urticaria, and pruritus associated with insulin use and later presented with tongue swelling and dyspnoea two hours after taking Optisulin. Review by an immunologist confirmed an insulin allergy. Trials of several alternative subcutaneous insulin preparations were attempted. Symptoms improved with regular antihistamines and omalizumab, an anti-IgE monoclonal antibody; however, he remained unable to tolerate higher doses of subcutaneous insulin and continued to experience significant hyperglycaemia.

In February 2026 he was admitted to hospital with hyperglycaemia. During admission, he was commenced on insulin pump therapy using an Omnipod system delivering insulin aspart (NovoRapid). He tolerated this regimen well and subsequently achieved significant improvement in glycaemic control.

Conclusion: This case highlights that insulin pump therapy may be a viable management strategy in patients with insulin allergy who are unable to tolerate multiple daily insulin injections.

Investigation of changes in eating behavior and diet-related QOL over 32 months of Tirzepatide administration in patients with Type 2 Diabetes

Toga-Sato S¹, Tosaki T¹, Hodai Y², Nakamura J³, Kondo M⁴, Miura-Yura E⁴, Morishita Y⁴, Himeno T⁴, Kato Y^{4,5}, Kato M⁴, Tsunekawa S⁶, Kamiya H⁴

¹TDE Healthcare Corporation Tosaki Clinic For Diabetes And Endocrinology, 2-1007, Motoueda, Tenpaku Ward, Nagoya, Aichi, Japan, Japan, ²TDE Healthcare Corporation TOSAKI Kariya Clinic for Diabetes and Endocrinology, Kariya, Japan, ³TDE Healthcare Corporation TOSAKI Meito Clinic for Diabetes and Endocrinology, Nisshin, Japan, ⁴Division of Diabetes, Department of Internal Medicine, Aichi Medical University School of Medicine, Nagakute, Japan, ⁵Division of Diabetes, Aichi Medical University Medical Center, Okazaki, Japan, ⁶Department of Diabetes, Endocrinology and Metabolism, Gifu University Graduate School of Medicine, Gifu, Japan

[Aims] This study evaluated changes in eating behavior and diabetes diet-related quality of life (DDRQOL) over 32 months in individuals with type 2 diabetes (T2DM) treated with tirzepatide.

[Methods] Forty-six outpatients with T2DM (37 switched from GLP-1 receptor agonists) were surveyed at baseline, 3 months, and 32 months post-tirzepatide administration. Eating behaviors were assessed using a standardized questionnaire (Japan Society for the Study of Obesity). DDRQOL was measured using three subscales: Satisfaction with diet, Sense of dietary burden, and Sense of dietary benefit (higher scores indicate better QOL). Correlations between 32-month changes in clinical parameters and scores were analyzed.

[Results] Mean tirzepatide doses at 3 and 32 months were 5.3 ± 1.2 and 7.8 ± 3.2 mg/week. Total eating behavior scores significantly improved from 52.2 ± 10.6 at baseline to 46.3 ± 9.1 at 3 months and were sustained at 46.0 ± 7.9 through 32 months (both $p < 0.001$). For DDRQOL, "Sense of dietary burden" scores significantly increased from 52.0 ± 14.8 at baseline to 58.4 ± 14.8 at 3 months and continued to improve to 63.5 ± 17.0 at 32 months ($p = 0.006$, $p < 0.001$), indicating a sustained reduction in perceived dietary stress. "Sense of dietary benefit" also significantly increased by 32 months (62.4 ± 12.5 , $p = 0.043$), while "Satisfaction with diet" showed no significant change. HbA1c ($7.47 \pm 1.73\%$ to $6.38 \pm 0.90\%$) and body weight (81.8 ± 12.3 kg to 75.5 ± 12.8 kg) decreased significantly over 32 months (all $p < 0.001$). A significant negative correlation was found between changes in eating behavior scores and "Sense of dietary benefit" ($r = -0.354$, $p = 0.018$).

[Conclusion] Tirzepatide administration rapidly improves eating behavior and reduces dietary burden. Notably, these clinical benefits and QOL improvements were sustained throughout the 32-month study period.

Identifying the optimal rolling percentile threshold for baseline estimation from continuous glucose monitoring in adults at risk of Type 2 Diabetes

Tong Y^{1,2}, Hutchison A^{1,2}, Turner L^{1,2}, Variji A^{1,2}, Chang Y^{1,2}, Liu K^{1,2}, Heilbronn L^{1,2}, Vincent A^{1,2}

¹School of Medicine, Adelaide University, Adelaide, Australia, ²Lifelong Health Theme, South Australian Health and Medical Research Institute, Adelaide, Australia

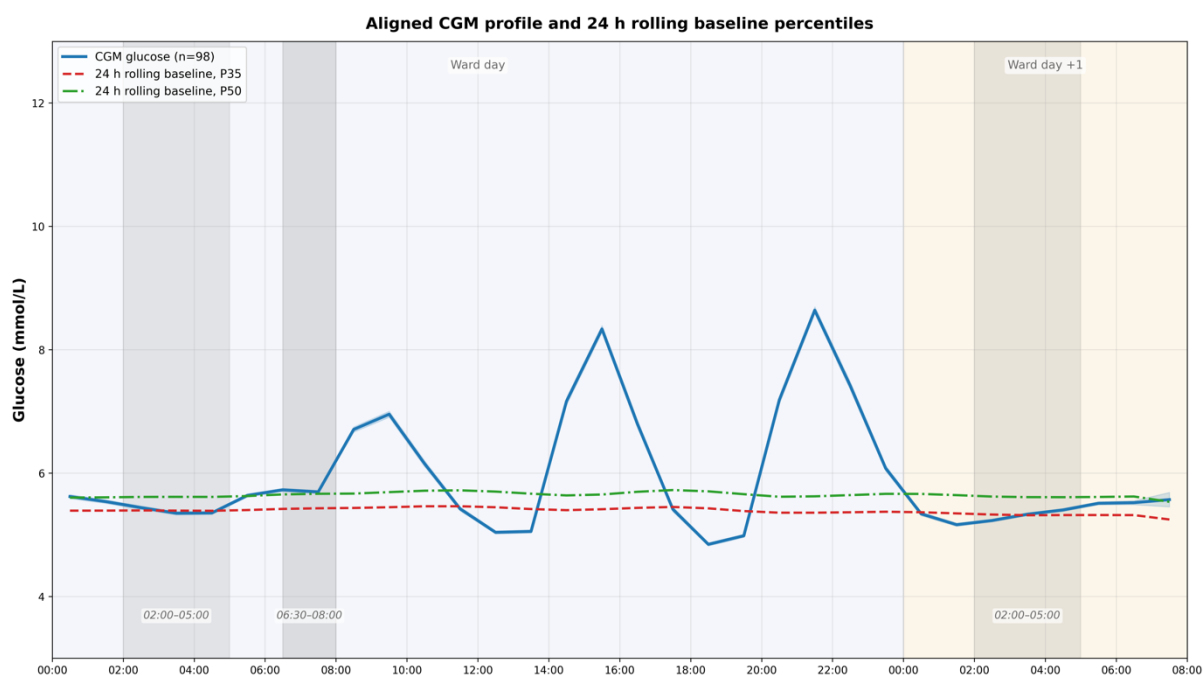
Background: Accurate interpretation of continuous glucose monitoring (CGM) data requires a stable individual baseline from which postprandial glucose excursions can be calculated. While nocturnal and pre-prandial glucose often serving as the reference state, the dawn phenomenon means these two states are physiologically distinct. A 24-hour rolling percentile method has been proposed, and the 40th percentile (P_{40}) has been identified as ideal for pre-breakfast values in healthy adults.

Aim: To identify the optimal rolling percentile threshold for CGM baseline estimation across nocturnal and pre-prandial reference targets in adults at risk of T2DM.

Methods: CGM data from 98 adults at risk of T2DM (NCT05769335) were analysed across a supervised 28-hour metabolic ward admission and up to 12 preceding free-living days. Rolling 24-hour before percentile baselines (P_{20} – P_{60}) were evaluated against three reference targets: ward and free-living nocturnal glucose means (2–5 am) and pre-breakfast mean (6:30–8 am) under controlled fasting conditions. Agreement was assessed by Bland–Altman analysis.

Results: The P_{35} showed the smallest bias against the nocturnal reference under both ward (0.011 [−0.046, 0.068] mmol/L) and free-living conditions (−0.002 [−0.028, 0.024] mmol/L), whereas P_{50} best matched the pre-breakfast reference under supervised fasting conditions (−0.031 [−0.093, 0.031] mmol/L).

Conclusion: In adults at risk of T2DM, P_{35} was the most suitable rolling percentile threshold for estimating the nocturnal baseline, whereas P_{50} better reflected the pre-breakfast state. Both thresholds may be affected by prolonged preceding eating, which tended to inflate rolling percentile estimates.



Daily glycemic variability after switching to once-weekly insulin icodec: A real-world study using CGM data

Tosaki T¹, Toga-Sato S¹, Hodai Y², Nakamura J³, Kondo M⁴, Miura-Yura E⁴, Morishita Y⁴, Himeno T⁴, Kato Y^{4,5}, Kato M⁴, Tsunekawa S⁶, Kamiya H⁴

¹TDE Healthcare Corporation TOSAKI Clinic For Diabetes And Endocrinology, Nagoya, Japan, ²TDE Healthcare Corporation TOSAKI Kariya Clinic for Diabetes and Endocrinology, Kariya, Japan, ³TDE Healthcare Corporation TOSAKI Meito Clinic for Diabetes and Endocrinology, Nisshin, Japan, ⁴Division of Diabetes, Department of Internal Medicine, Aichi Medical University School of Medicine, Nagakute, Japan, ⁵Division of Diabetes, Aichi Medical University Medical Center, Okazaki, Japan, ⁶Department of Diabetes, Endocrinology and Metabolism, Gifu University Graduate School of Medicine, Gifu, Japan

[Aims] Insulin icodec, a once-weekly basal insulin launched in Japan in January 2025, is available in only five countries as of March 2026. This study investigated daily glycemic fluctuations using FreeStyle Libre 2 (FL2) after initiating icodec in clinical practice.

[Methods] Thirteen outpatients with diabetes (11 with T1D) who switched from other basal insulins to icodec were included. Changes in CGM metrics (TAR, TIR, TBR) were retrospectively analyzed up to 12 weeks. Additionally, for six patients with continuous data up to 22 weeks, 14 weeks of FL2 data (weeks 9–22) were analyzed by day of the week, with the day of administration defined as Day 0.

[Results] Mean age was 48.8±14.5 years; duration 17.6±10.6 years. Overall, HbA1c (baseline: 7.22±0.63%, 3 months: 7.20±0.61%; p=0.850), TIR (baseline: 67.5±17.6%, 4w: 68.5±19.0%, 12w: 70.9±15.1%), TBR (baseline: 1.6±2.4%, 12w: 2.6±1.9%), and TAR showed no significant changes. Basal insulin doses were also stable (71.6±33.1 vs. 70.0±43.5 U/week; p=0.653).

In contrast, daily analysis (n=6) revealed significant improvements on Day 2 and Day 4 compared to Day 0 (166.5±25.3 mg/dl). Mean glucose decreased significantly on Day 2 (150.5±25.4) and Day 4 (154.5±21.5). On these days, TAR significantly decreased (Day 0: 36.2±20.8%, Day 2: 27.3±17.3%, Day 4: 27.4±14.3%) and TIR significantly increased (Day 0: 61.9±21.1%, Day 2: 69.3±16.3%, Day 4: 69.8±14.7%). No significant differences were found in TBR across the week. Three cases of hypoglycemia occurred, including one severe case requiring emergency transport.

[Conclusion] Switching to insulin icodec can reduce injection frequency while maintaining glycemic control. However, the glucose-lowering effect may intensify 2 to 4 days post-administration, consistent with clinical trial results.

Influence of training in Normobaric hypoxia on carbohydrate metabolism in women aged 50-59 years

Tota Ł¹, Morawska-Tota M², Bagińska M³

¹Department of Physiology and Biochemistry, University of Physical Culture in Krakow, Kraków, Poland, ²Department of Sports Medicine and Human Nutrition, University of Physical Culture in Krakow, Kraków, Poland, ³Department of Water Sports, University of Physical Culture in Krakow, Kraków, Poland

Aim

The study aim was to evaluate the effect of 4-week training in conditions of normobaric hypoxia on glucose, insulin and HOMA-IR levels in women age 50-59.

Methods

The study group comprised 57 women aged 50-59 years. The studied groups (random assignment) were: HT (n=15, training - normobaric hypoxia), NT (n=13, training - normoxia), B (n=15, passive exposure to normobaric hypoxia), and C (n=14, control). The intervention included a 4-week progressive training programme (3 x week, 60 minutes). Exercise intensity was individualised based on maximum heart rate (HRmax). Each session combined cycle ergometer endurance training with resistance training using resistance bands. Simulated altitudes were 2,500 m a.s.l. (HT and B), and 223 m a.s.l. (NT). Glucose and insulin levels, and HOMA-IR were assessed. Measurements were performed three times: I - pre-test, II - immediately post-test, III - follow-up (after 21 days).

Results

Analysis of selected indices revealed significant changes in glucose concentration in the passively exposed group. A decrease was noted in measurement II compared to I ($p = 0.024$); II and III did not differ. No significant changes were noted for the remaining groups. For the group training in hypoxic conditions, slight decreases in mean glucose concentration and HOMA-IR were observed between measurements I and II, II and III, and I and III, but without significance. No other correlations were observed.

Conclusion

High-altitude training was not considered beneficial in preventing carbohydrate metabolism disorders. However, the observed changes in mean glucose concentration for groups B and HT suggest that repeating the protocol at higher altitudes and with longer exposure time should be contemplated.

The publication is co-financed by the national budget under the "Science for Society II" programme of the Minister of Education and Science, project number: NdS-II/SP/0512/2023/01, funding in the amount of 1,401,144.00 and total project value of 1,401,144.00.

Who accesses the Better at Home Diabetes Dietitian service?

- A clinical audit of patients living with Type 1 Diabetes

Tournas K¹

¹Western Health, Melbourne, Australia

Aim

The management of Type 1 Diabetes Mellitus (T1DM) is time-intensive and often requires multiple healthcare appointments. The Victorian Government's Better at Home (B@H) initiative was developed to expand home-based healthcare through telehealth, including diabetes management. This project aimed to describe the demographic and clinical characteristics of patients living with T1DM attending dietitian consultations within the B@H service over six months at a tertiary hospital in Melbourne's west to aid in the review of the service model.

Methods

A retrospective audit of electronic medical records was conducted for patients with T1DM referred to a dietitian within the B@H service between July and December 2024. Data collected included patient demographics, engagement with dietitian consultations, and associated conditions related to T1DM.

Results

Over the six-month period, 98 new dietitian referrals were accepted into the B@H service. Most patients were aged 19–25 years, while the highest proportion of new T1DM diagnoses occurred between 31–40 years. Most patients either had a recent diagnosis or had lived with T1DM for more than 10 years. Participants represented diverse cultural backgrounds, with 40% born outside Australia. Engagement with telehealth was high, with 80% completing at least one or two dietitian consultations, despite 73% having previously seen a dietitian. Microvascular and macrovascular complications, cardiovascular disease indicators, and mental health disorders were each present in approximately 35% of patients. No formal eating disorder diagnoses were recorded; however, disordered eating compensatory behaviours were identified in 2% of the cohort, with unclear documentation in 54% of records.

Conclusion

This audit highlights the diverse sociodemographic profile of patients accessing the service and strong engagement with telehealth dietetic care. Patient engagement may further increase with appointment management strategies and video appointments. Subsequently, improvements in the quality of healthcare provided through the B@H service may occur with concise documentation of patient conditions.

Severe hypoglycaemia in critically ill adults: A contemporary audit of the NICE-SUGAR protocol in an Australian tertiary ICU.

Pena Duarte L¹, Seymour B¹, Triay J¹

¹Gold Coast University Hospital, Gold Coast, Australia

Background: Hypoglycaemia is a major safety concern in critically ill patients. Contemporary real-world data evaluating the glucose control strategy established by the NICE-SUGAR protocol remain limited.

Objective: To outline the incidence and contributing factors of hypoglycaemia and severe hypoglycaemia in a modern intensive care unit (ICU) cohort utilizing the NICE-SUGAR glucose protocol.

Methods: Retrospective cohort study in an adult tertiary ICU in Australia from 2019 to 2025. Exclusion criteria: Type 1 diabetes, diabetic ketoacidosis, pregnancy, and palliative care. ICU deaths were also excluded to allow assessment of post-ICU glycaemic outcomes. Hypoglycaemia was defined as blood glucose ≤ 3.9 mmol/L and severe hypoglycaemia as < 2.2 mmol/L. Glycaemic control during the first seven ICU days was assessed using coefficient of variation (CoV) and time in target in range (TIR; 7.8–11.1 mmol/L). All severe hypoglycaemia episodes underwent structured chart review to identify contributing factors. Analyses followed STROBE recommendations.

Results: Among 11,766 ICU admissions, there were 44 episodes of severe hypoglycaemia (0.36%) over six years, consistent with the findings of the NICE-SUGAR trial (0.5%). Insulin infusions were administered in 12.4% of admissions ($n=1,454$) and were associated with higher rates of severe hypoglycaemia (1.3% vs 0.2%, $p<0.001$), greater glycaemic variability (CoV 23 vs 14, $p<0.001$), and higher TIR (0.46 vs 0.22, $p<0.001$). Hypoglycaemia within 24 hours of ICU discharge was less frequent among patients receiving insulin infusion (0.6% vs 1.1%, $p=0.045$). Modifiable contributing factors included interruption of nutritional support, insulin administration errors (15% of events), and protocol deviations. Additional risk factors included greater illness severity (APACHE III, SOFA scores), renal replacement therapy, sepsis, and diabetes.

Conclusion: The NICE-SUGAR conventional protocol remains a safe and effective strategy for glucose management in ICU patients, with a low incidence of severe hypoglycaemia. Ensuring uninterrupted nutritional support and safe insulin administration may further reduce hypoglycaemia in critically ill adults.

Relationship between postpartum sleep and Continuous Glucose Monitoring (CGM) metrics in women with Type 1 diabetes: Pilot Feasibility Study from the CIRCUIT Trial

Vijayan K¹, Simmons D^{2,3}, Donovan L⁴, Thiagalingam A^{5,6}, Marschner S⁶, Padmanabhan S^{1,6}, Rhou J^{1,6}, Jiang N¹, Price S⁷, Feig D⁸, Ross G^{6,9}, Sweeting A^{6,9}, Nolan C^{10,11}, Cheung N^{1,6}

¹Department of Diabetes and Endocrinology, Westmead Hospital, Westmead, Australia, ²Western Sydney University, Sydney, Australia, ³Macarthur Diabetes Endocrinology and Metabolism Services, Sydney, Australia, ⁴University of Calgary, Calgary, Canada, ⁵Department of Cardiology, Westmead Hospital, Westmead, Australia, ⁶Faculty of Medicine & Health, University of Sydney, Sydney, Australia, ⁷Department of Medicine, University of Melbourne, Melbourne, Australia, ⁸Department of Medicine, University of Toronto, Toronto, Canada, ⁹Royal Prince Alfred Hospital, Sydney, Australia, ¹⁰Canberra Hospital, Canberra, Australia, ¹¹Australian National University, Canberra, Australia

Background: Sleep is increasingly recognised as an important modulator of glycaemic regulation. The relationship between sleep and glycemia in individuals with type 1 diabetes (T1D) remains unclear. We explored whether poor sleep may adversely affect glycaemia, particularly in the postpartum period with its associated fragmented and unpredictable sleep.

Methods: This was an exploratory sub-study of the CIRCUIT randomised controlled trial evaluating automated insulin delivery (AID) therapy during T1D pregnancy¹. Ten postpartum participants were invited however only three participated in the study: one using multiple daily injections (P1) and two using AID (P2 and P3). Participants wore Dexcom G6 CGM devices and Garmin Vivofit4 wearables that automatically recorded sleep onset, sleep offset, and duration of light and deep sleep. For each 24-hour period, sleep duration was compared with CGM-derived indicators, including mean glucose and glucose variability (CV). Bivariate Pearson correlation analyses were conducted to evaluate associations between sleep duration and glucose metrics for each participant.

Results: Participants were aged 35, 37, and 36 years. Analyses were conducted from 3, 3, and 6 months postpartum, with 29, 76, and 201 days of data available, respectively. No significant linear associations were observed between sleep duration and either mean glucose or glucose variability.

	Duration sleep vs mean CGM glucose			Duration sleep vs CGM glucose variability	
	p value	r		p value	r
P 1	0.88	0.028		0.54	-0.119
P 2	0.32	-0.115		0.77	0.34
P 3	0.55	0.043		0.87	0.012

Discussion: This study demonstrates the feasibility of examining the relationship between sleep and CGM metrics using wearable technology. However, including among people on AID, sleep duration had no discernible effect on daily glucose metrics in the postpartum setting.

References:

¹Donovan LE et al. Closed-Loop Insulin Delivery in Type 1 Diabetes in Pregnancy: The CIRCUIT Randomized Clinical Trial. JAMA. 2025 Dec 23;334(24):2176-2185.

BCSI-T2DA Novel β -Cell stress index to guide timely insulin initiation in Type 2 Diabetes

Vishwanathan A¹, Shabbir A¹, Sukumaran H¹, S P S¹

¹Tambaram Medical Center, Chennai, India

Introduction and Objective: Insulin initiation in type 2 diabetes (T2D) is often delayed due to reliance on downstream glycaemic markers that fail to capture progressive β -cell stress, resulting in reactive rather than preventive care to Progression . (BCSI), a novel physiology-integrated biomarker that quantifies compensatory β -cell overwork. The aim is to develop and validate the β -Cell Stress Index (BCSI) as a stratification tool for early identification of unsustainable β -cell function and insulin use in type 2 diabetes.

Methods: This cross-sectional analytical study included 350 adults with T2D. BCSI was derived using parameters from the Oxford HOMA2 model: $BCSI = (C\text{-peptide} / HOMA2\text{-}\%B) \times HOMA2\text{-}IR$. Routine clinical markers were compared between insulin-treated and non-treated individuals. Logistic regression and receiver operating characteristic (ROC) analyses were performed to evaluate BCSI as a predictor of insulin use.

Results: Routine parameters including HbA1c, BMI, triglycerides, fasting glucose, and duration of diabetes failed to independently predict insulin use (all $p > 0.05$). However, BCSI was significantly higher among insulin users than non-users (0.218 ± 0.260 vs 0.126 ± 0.101 ; $p = 0.001$). In logistic regression, elevated BCSI increased odds of insulin use (OR 23.2; $p = 0.017$), and the overall model significantly improved classification ($p = 0.003$). BCSI demonstrated fair discriminatory performance for insulin-treated status (AUC = 0.61; 95% CI: 0.62–0.78; $p = 0.022$).

Conclusion: BCSI is a promising, mechanistic biomarker that quantifies compensatory β -cell stress and differentiates individuals requiring insulin even when traditional markers appear similar. Clinical implementation of BCSI could shift insulin therapy from delayed, HbA1c-driven escalation to proactive pancreatic preservation and prevents disease progression and Complications, supporting precision, physiology-based Proactive diabetes care rather than a last-line response to poor glycaemic control. Future studies will do Prospective validation is warranted to integrate BCSI into routine clinical decision algorithms and strengthen early intervention strategies.

A proof-of-concept study of type 2 diabetes remission with pharmacotherapy.

Walia R¹, Chakraborty A¹, Kaur J¹, Pooja R¹, Jha V¹, Mishra S¹, Bhansali S², Bhujade H³, Sachdeva N¹, Bhadada S¹

¹Department of Endocrinology, PGIMER, Chandigarh, Chandigarh, India, ²Diabetes and Hormone care, Chandigarh, Chandigarh, India, ³Department of Radiology, PGIMER, Chandigarh, Chandigarh, India

Background:

The management of type 2 diabetes mellitus (T2DM) is increasingly expanding beyond glycemic control to include remission as a therapeutic goal in selected individuals. This pilot study evaluated whether a combination of semaglutide, dapagliflozin, and metformin could induce and sustain remission following withdrawal of therapy.

Methods:

In this open-label, randomized, pilot trial, 60 adults with T2DM diagnosed within the previous 2 years were assigned to either semaglutide, dapagliflozin, and metformin (trial arm) or vildagliptin, glimepiride, and metformin (control arm). After 24 weeks, glucose-lowering medications were withdrawn in participants who achieved HbA1c <6.5%. Remission was defined as HbA1c <6.5% for ≥12-weeks without pharmacotherapy. The co-primary outcomes were the proportions of participants maintaining HbA1c <6.5% at 12 and 52 weeks after treatment withdrawal. Secondary outcomes included body composition, insulin sensitivity (HOMA-IR), beta-cell function (HOMA-β), hepatic/pancreatic steatosis, and relapse predictors.

Results:

At 12 weeks after withdrawal, 25/27 (92.6%) participants in the trial arm and 10/28 (35.7%) in the control arm remained in remission. At 52 weeks, sustained remission was observed in 13/30 (43.3%) and 1/30 (3.3%), respectively. The trial arm showed greater improvement in insulin sensitivity indices, while changes in HOMA-β were numerically favorable but not significantly different between groups. MRI-based reductions in hepatic and pancreatic fat were greater in the trial arm. For patients who had relapse of diabetes, the time to relapse was significantly longer in the trial arm (median 40.1 vs 19.8 weeks). Higher HbA1c at 24-weeks and lesser reduction in hepatic steatosis predicted earlier relapse.

Conclusion:

In this pilot randomized trial of recent-onset T2DM, short-term treatment with semaglutide, dapagliflozin, and metformin was associated with substantially higher rates of drug-free remission after treatment withdrawal than an active comparator regimen. These findings support further evaluation in larger, longer-term trials.

Establishing glucose telemetry systems to assist in-hospital diabetes management: a practical guide

Wang R^{1,2}, Kyi M^{1,2}, Rawlinson S¹, Cohen T¹, Fourlanos S^{1,2}

¹The Royal Melbourne Hospital, Department of Diabetes & Endocrinology, Parkville, Australia,

²University of Melbourne, Department of Medicine (RMH), Parkville, Australia

Background:

For people with diabetes admitted to hospital, blood glucose abnormalities are associated with worse clinical outcomes. Adapting ambulatory care diabetes technologies for inpatient diabetes care can improve glycaemia. First described in the USA in 2018 [1], the use of real-time continuous glucose monitoring (CGM) to provide ward-based 'glucose telemetry' has gained significant interest in recent years.

Aim:

To describe the practical steps involved in setting up a real-time continuous glucose monitor-based glucose telemetry system to assist in-hospital diabetes management in a quaternary hospital.

Methods/Results:

Utilising existing commercially available continuous glucose monitor (CGM) technologies, we have become one of the first hospitals in Australia to implement a ward-based glucose telemetry system that displays patients' real-time CGM glucose results visible to their healthcare providers. The goal of this glucose telemetry system is to support ward nurse-led responses and clinician decision-making using CGM data, to prevent hypoglycaemia and reduce hyperglycaemia amongst acutely unwell people with diabetes admitted to hospital. We will provide key considerations for adapting CGM technologies to the acute inpatient environment. Additionally, we will detail the practical steps required for the successful set-up and day-to-day running of a glucose telemetry system. These include ward nursing and medical health professional training, CGM device considerations, telemetry system design, as well as hardware and software requirements.

Conclusions:

As CGM use becomes more prevalent, and expectations of in-hospital medical care continue to rise, use of real-time inpatient CGM is likely to become increasingly common in future. CGM-based glucose telemetry systems can improve in-hospital glycaemia and support clinical decision-making, and clinicians will need to become familiar with relevant design and set-up considerations.

References:

1. Spanakis EK, et al. The Effect of Continuous Glucose Monitoring in Preventing Inpatient Hypoglycemia in General Wards: The Glucose Telemetry System. J Diabetes Sci Technol. 2018 Jan;12(1):20-25. doi: 10.1177/1932296817748964.

High correlation between point-of-care and continuous glucose monitoring glucometrics in adults with type 1 diabetes in hospital

Wang R^{1,2}, Kyi M^{1,2}, Fournalanos S^{1,2}

¹The Royal Melbourne Hospital, Department of Diabetes & Endocrinology, Parkville, Australia,

²University of Melbourne, Department of Medicine (RMH), Parkville, Australia

Aim:

Continuous glucose monitoring (CGM) use in hospital is increasing and provides further insights into glycaemia, including adequacy of point-of-care (POC) blood glucose. We aimed to assess correlation between POC and CGM glucose measures in adults with type 1 diabetes (T1D) admitted to hospital.

Methods:

The CONFIDE-1 Australian multi-centre retrospective observational study assessed adults with T1D requiring multi-day acute hospital admissions, who continued CGM use in hospital. For this analysis, we excluded participants requiring critical care, dialysis, with DKA, paediatric/obstetric/palliative/psychiatry admissions, known CGM-interfering medications, or <70% inpatient CGM data capture. Comparisons were made between QID POC glucose (pre-meal and pre-bed) and CGM glucose, using metrics of patient-stay mean/minimum/maximum glucose, CV%, and day-averaged area-above-range/area-below-range (AAR/ABR).

Results:

The included 36 adults (n=17 male; median age 48y; median stay 6d) had mean HbA1c 8.6% (SD 1.3%), with 92% using multiple daily insulin injections. Patient-stay mean glucose was 11.5mmol/L (SD 2.5) via POC and 11.5mmol/L (SD 2.0) via CGM.

Correlation between POC and CGM was very strong for patient-stay mean glucose (Spearman's $r=0.893$, $p<0.0001$), AAR $>10\text{mmol/L}$ ($r=0.91$, $p<0.0001$), AAR $>13.9\text{mmol/L}$ ($r=0.869$, $p<0.0001$); strong for minimum glucose ($r=0.623$, $p<0.0001$), maximum glucose ($r=0.747$, $p<0.0001$), CV ($r=0.733$, $p<0.0001$), ABR $<3.9\text{mmol/L}$ ($r=0.76$, $p<0.0001$); but weak for ABR $<3.0\text{mmol/L}$ ($r=0.378$, $p=0.021$).

Conclusions:

In adults with T1D admitted to hospital, intermittent POC glucose generally correlated strongly to CGM metrics, except for level 2 hypoglycaemia where correlation was weak. For most glucose metrics, including hyperglycaemia, POC was consistent with CGM measures.

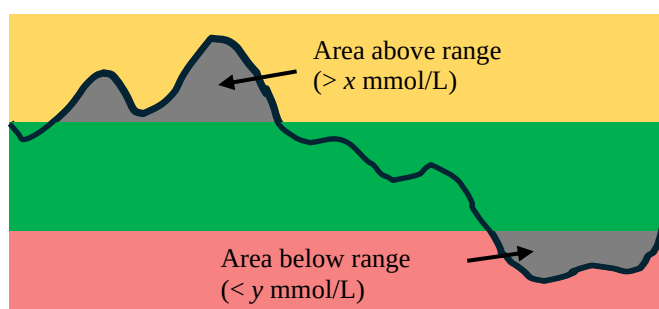


Figure: Representation of area above range (AAR) and area below range (ABR) calculations

Changes in autoantibody levels from baseline after pancreatic islet allotransplantation in type 1 diabetes are not associated with changes in islet function or insulin therapy

Ward G^{1,2,3}, Nguyen G¹, MacIsaac R^{1,2,4}, Tran Y^{2,3}, Ierino F^{2,5}, Holmes-Walker D^{6,7}, Torpy D⁸, Gooley J², Loudovaris T⁹, Jenkins A^{1,10}, Coates P⁸, O'Connell P^{6,7}, Rogers N^{6,7}, Kay T^{1,2,9}

¹Endocrinology and Diabetes Dept, St Vincent's Hospital Melbourne, Fitzroy, Australia, ²University of Melbourne Department of Medicine, Fitzroy, Australia, ³Biochemistry Dept, St Vincent's Hospital Melbourne, Fitzroy, Australia, ⁴Australian Centre for Accelerating Diabetes Innovations, University of Melbourne, Melbourne, Australia, ⁵Nephrology Dept, St Vincent's Hospital Melbourne, Fitzroy, Australia, ⁶Western Sydney Local Health District, Sydney, Australia, ⁷Westmead Institute of Medical Research, University of Sydney, Sydney, Australia, ⁸Royal Adelaide Hospital, Adelaide, Australia, ⁹St Vincent's Institute of Medical Research, Melbourne, Australia, ¹⁰Baker Heart and Diabetes Institute, Melbourne, Australia

Aims: We reported (ADC2024) a five-year followup of autoantibodies after Pancreatic Islet Allotransplantation (ITx) in 19 persons living with Type 1 Diabetes Mellitus (T1D), showing a decrease in insulin antibodies (INSAb), an increase in glutamic acid decarboxylase antibodies (GADAb), and no change in insulinoma-associated-protein-2 antibodies (IA-2Ab). The current Aims are: 1) to extend the study to 54 subjects; 2) to evaluate the relationship of autoantibody changes to (a) islet graft function and (b) exogenous insulin usage.

Methods: Serial autoantibodies (GADAb, IA-2Ab, INSAb) over 5 years post-ITx were measured in 54 ITx-recipients from the Australian Islet Transplant Consortium (Westmead Hospital, Royal Adelaide Hospital, St Vincent's Hospital Melbourne) (median age: 53y; T1DM-duration 36.5y). Autoantibodies changes from pre-transplant baselines were grouped as <12mths or >12mths from first ITx and tested by quantile regression. The difference in Areas Under the Curve (AUC) of INSAb between insulin-dependent and -independent groups were assessed using the Mann-Whitney test in both <12mths and >12mths periods. Fasting C-peptide levels were used as markers of islet beta cell function. Spearman test assessed correlation of changes in autoantibody levels with islet function.

Results: GADAb changed from pre-ITx baseline by median (interquartile range(IQR)) +2.9(0,11.9,p=0.01)U/mL <12mths post-first-ITx, and +3.1(-0.1,19.7,p=0.002) in >12mths. Corresponding changes in INSAb were -3.8(-7,-0.8,p<0.001) and -5.2(-9.1,-1.9,p<0.001) and in IA-2Ab were 0(-0.3,0,NS) and +0.07(0,5.1,p=0.002) respectively. The median(IQR) 0.2(0.03,0.4)ng/mL changes in C-peptide <12mths post-ITx were not significantly associated with the corresponding rises in GADAb levels (Spearman, Rs=0.44,p=0.1). There were no significant differences in INSAb serum levels between insulin dependent and independent groups in either the <12mths (Mann-Whitney,p=0.39) or >12mths periods (p=0.53).

Conclusion: Post-ITx studies in this larger cohort confirmed gradually decreasing INSAb, increasing GADAb, and no change in IA-2Ab. Rises in GADAb were not associated with decline in islet function. Falls in INSAb were not associated with cessation of insulin therapy.

Shared decision-making associated with enhanced treatment decision quality and clinical outcomes in Type 2 diabetes

Wei M¹, Liu S¹, Huang W², Yeh M², Huang C², Chen M³, Hung H^{1,2}

¹Chi Mei Medical Center, Chronic Care Center, , , ²Chi Mei Medical Center, Department of Endocrine & Metabolism, , , ³Chi Mei Medical Center, Department of Nursing, ,

Aim/s

To examine whether a structured shared decision-making (SDM) framework is associated with improved treatment decision quality and glycaemic outcomes among adults with type 2 diabetes requiring treatment intensification.

Methods

This retrospective study included 32 adults with type 2 diabetes managed at a medical center in 2025. Patient with HbA1c > 8.5% while receiving ≥3 oral antidiabetic agents. A digitally integrated SDM workflow was implemented using cloud-based patient decision aids accessed via QR codes. Certified diabetes educators facilitated SDM discussions to clarify treatment preferences and support informed therapeutic choices. Outcomes included treatment selection, three-month HbA1c changes, and patient-reported understanding and satisfaction.

Results

Following SDM, 28.1% of participants elected to initiate injectable therapy. More than 80% demonstrated high understanding of glycaemic targets, diabetes-related complications, and available treatment options, and satisfaction scores ranged from 4.45 to 4.57 out of 5. Mean HbA1c decreased significantly from 10.6% at the SDM visit to 9.2% at three months ($t(31) = 3.73, p < 0.001$), representing a mean reduction of 1.4%. These findings suggest improved decision quality and enhanced engagement in diabetes self-management.

Conclusion

SDM was associated with clearer and more informed treatment choices, high patient understanding and satisfaction, and significant improvement in HbA1c. These results support integrating SDM as a practical and patient-centred approach to strengthen individualized diabetes management.

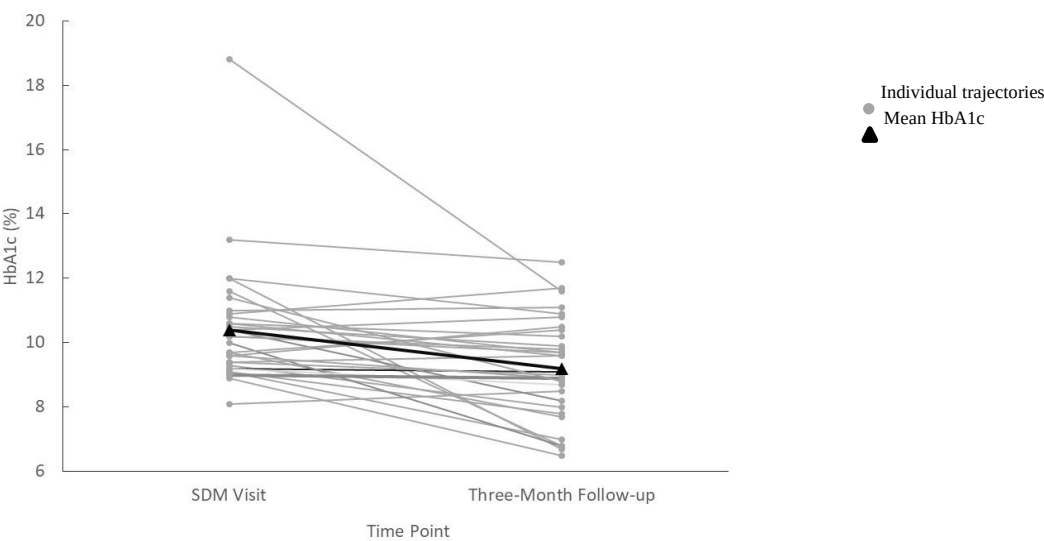


Fig 1 HbA1c(%) at the SDM Visit and Three-Month Follow-up
Gray lines indicate individual trajectories. Black triangles mark the mean HbA1c at each time point, connected by a bold line to show the overall change.

Improved beta cell function following a single dose of human antithymocyte globulin in type 1 diabetes : results of an Australian phase 1 clinical trial.

Wentworth J¹

¹Royal Melbourne Hospital / St Vincent's Institute of Medical Research, Melbourne, Australia

Abstract

T cell immune-modulating therapies preserve beta cell function in type 1 diabetes (T1D). To further explore a multi-specific mechanism of action and improved dosing regimen, immunogenicity and tolerability SAB BIO developed a fully human antithymocyte globulin (hATG) that underwent phase 1 testing in partnership with the Australasian T1D Immunotherapy Collaborative.

Method

A single ascending and multiple dose study was conducted in healthy adults and adults with T1D. The primary outcome was safety and tolerability. Secondary outcomes included serum cytokines, immune cell phenotype and, in T1D adults, beta cell function, glucose and insulin dose. For Phase1a, 62 healthy adults were randomised to receive a single course of placebo (n=16) or hATG (0.03 to 4.5mg/kg; n=46). Seven received a second dose of 1.5mg/kg six months after an initial 2.5mg/kg dose. For Phase1b, six T1D adults were randomised to receive placebo (n=2) or 2.5mg/kg (n=4).

Results

hATG was well tolerated, with similar rates of adverse events in the pooled hATG (48/50; 96%) and placebo (15/18; 83%) groups. The anticipated treatment-related side effects of headache, flu-like symptoms and lymphopaenia were generally mild in severity and resolved within one week. There were no drug-related serious adverse events, no serum sickness and no anti-drug antibodies upon redosing. hATG induced a transient increase in serum cytokines during the week following treatment and increased expression of the PD-1 exhaustion marker on T cells that peaked by day 90 and was sustained until day 120. In T1D adults, hATG treatment was associated with increased C-peptide responses to mixed meal and decreased insulin requirement despite improved continuous glucose monitoring metrics.

Conclusion

hATG has an acceptable safety profile and a mechanism of action consistent with that of other efficacious T cell therapies. Promising efficacy signals in T1D justify the Phase 2 SAFEGUARD trial (NCT07187531) involving 70 sites across 15 countries.

Improved glycaemic outcomes following initiation of insulin pump therapy in adults with Type 2 Diabetes: A case series

Wright J¹, Wong T^{1,2,3}, Marimuthu R^{1,4}, Li C¹, Le Q¹, Abdo S^{1,2}

¹Department of Diabetes and Endocrinology / Bankstown-Lidcombe Hospital, Bankstown, Australia,

²School of Medicine, Western Sydney University, Sydney, Australia, ³Faculty of Medicine, University of New South Wales,, Sydney, Australia, ⁴Faculty of Medicine & Health, The University of Sydney, Sydney, Australia

Background:

Achieving glycaemic targets in people with Type 2 diabetes mellitus (T2DM) remains challenging, particularly in those with longstanding disease requiring intensive insulin therapy. Multiple daily injections (MDI) may contribute to treatment burden, glucose variability, and persistent hyperglycaemia despite escalating insulin doses. Continuous subcutaneous insulin infusion (CSII) therapy has traditionally been used in Type 1 diabetes, but emerging evidence suggests potential benefits in selected individuals with T2DM.

Aim:

To evaluate early clinical outcomes of insulin pump therapy in adults with poorly controlled T2DM despite intensive MDI therapy.

Methods:

Five adults with T2DM and persistently elevated HbA1c despite intensive insulin therapy commenced insulin pump therapy using the Medtronic MiniMed 780G at Bankstown-Lidcombe Hospital between October 2025 and May 2026. Data collected 2–7 months following pump commencement included HbA1c, insulin requirements, continuous glucose monitoring (CGM) metrics, hypoglycaemia frequency, and body weight. Patients were reviewed regularly after pump initiation, with insulin settings adjusted according to CGM trends and glycaemic response.

Results:

All five patients demonstrated improved glycaemic control following pump commencement, including reduced mean glucose (8.9mmol/L vs 13.2mmol/L, $p=0.001$), improved time in range (65.6% vs 27.2%, $p=0.001$), and lower glycaemic management indicator (7.3% vs 8.8%, $p=0.019$). Significant weight gain was observed across participants (98.1 kg vs 87.9 kg, $p=0.003$), while total daily insulin requirements remained unchanged (102 units vs 108 units, $p=0.67$). Informal patient feedback indicated improved treatment satisfaction, greater flexibility, and enhanced confidence in self-management. No episodes of severe hypoglycaemia occurred.

Conclusion:

This small case series highlights the potential role of insulin pump therapy in selected adults with T2DM experiencing persistent hyperglycaemia despite intensive insulin regimens. Early outcomes suggest improved glycaemic control and patient satisfaction, supporting broader consideration of CSII therapy in complex T2DM management. Larger studies are needed to evaluate long-term efficacy, safety, and cost-effectiveness.

Association of point-of-care HbA1c measurements using the Yumizen M100 banalyst with laboratory HbA1c in outpatient with diabetes

Wu C¹, Wang J^{1,2,3}

¹Division of Endocrinology and Metabolism, Department of Internal Medicine, Taichung Veterans General Hospital, Taichung, Taiwan, ²Department of Post-Baccalaureate Medicine, College of Medicine, National Chung Hsing University, Taichung, Taiwan, ³Department of Medicine, School of Medicine, National Yang Ming Chiao Tung University, Taipei, Taiwan

Aim/s:

Point-of-care (POC) HbA1c testing may facilitate timely clinical decision-making in outpatient diabetes care. However, data comparing POC HbA1c measurements with central laboratory results in clinical practice remain limited. This study aimed to evaluate the association between POC HbA1c measurements using the Yumizen M100 Banalyst and standard laboratory HbA1c assays.

Methods:

This study included 55 adult outpatients with type 2 diabetes (mean age 53.4 ± 10.3 years; 65.5% male). POC HbA1c was measured using the Yumizen M100 Banalyst with both finger-prick capillary blood and venous blood samples. The data were compared with laboratory HbA1c measurements. The associations between POC and laboratory HbA1c were assessed using linear correlation analysis. Subgroup investigations were performed according to sex, body mass index, and HbA1c levels ($<7\%$ and $\geq 7\%$).

Results:

The mean laboratory HbA1c was $6.9 \pm 1.1\%$. There was a significant association between POC and laboratory HbA1c values using finger-prick capillary blood ($R^2 = 0.984$, $p < 0.001$) and venous blood samples ($R^2 = 0.988$, $p < 0.001$). Consistent associations were observed across subgroups stratified by sex, body mass index, and HbA1c levels.

Conclusion:

In outpatients with type 2 diabetes, there was a significant association between POC and laboratory HbA1c values using finger-prick capillary blood and venous blood samples. Our findings suggest that the Yumizen M100 Banalyst may be used in daily practice of diabetes care to enable timely treatment decisions.

Brain-guided stratification for anti-obesity treatment

Wu T¹, Bi Y¹, Cong X¹, Qu S²

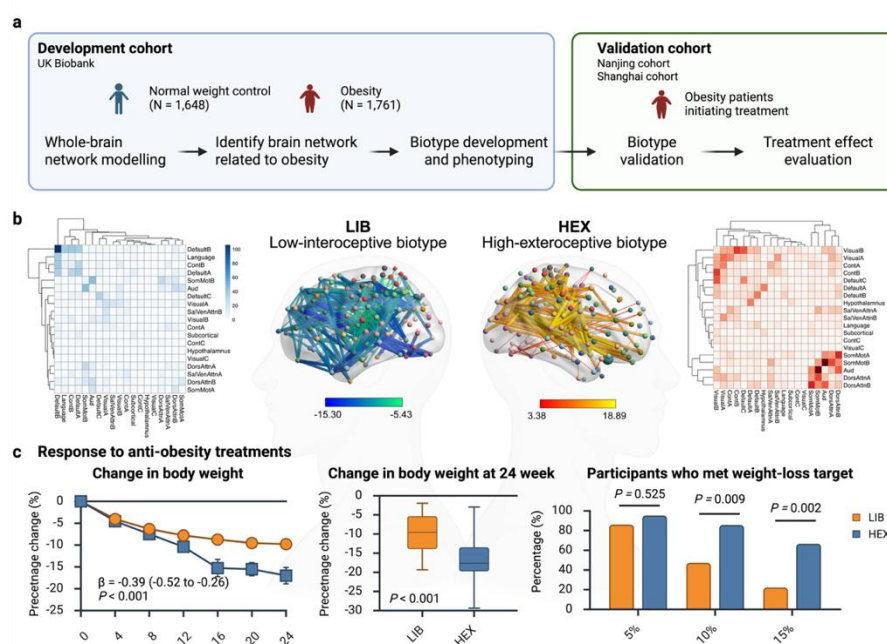
¹Nanjing Drum Tower Hospital / Affiliated Hospital of Medical School / Nanjing University, Nanjing, China, ²Shanghai Tenth People's Hospital Affiliated to Tongji University, Shanghai, China

Background: Anti-obesity treatment exhibits wide variation of responses in real-world setting, necessitating the development of biomarkers to optimise decision-making. With brain's central role in energy homeostasis, we hypothesized that the response variation stems from divergent brain functional profiles. This study aims to profile brain function features in persons with obesity, thereby identify relevant biomarkers to guide anti-obesity treatment.

Methods: We characterized whole-brain functional connectivity in individuals with obesity and applied hierarchical clustering using UK Biobank as a discovery cohort, which yielded two neurofunctional profiles as candidate biomarkers. Phenotyping was conducted to characterise their relevance spanning neurofunction, genetics and clinical features, with findings validated in our two independent cohorts. Finally, the validity of these profiles as weight-loss response biomarkers were validated in our two cohorts undergoing GLP-1 receptor agonist treatment to guide precision anti-obesity therapy.

Results: We identified two neurofunctional biotypes in persons with obesity: the High-Exteroceptive biotype (HEX) exhibited exaggerated salience-ventral attention network connectivity, whereas the Low-Interoceptive biotype (LIB) showed reduced default-mode network connectivity. Clinically, HEX patients presented with visceral adiposity and disordered eating, while LIB patients showed psychiatric vulnerability. Notably, GLP-1RA treatment preferentially normalized connectivity in HEX patients, paralleling significantly greater weight loss (Cohort 1: 16.1% vs. 9.8%, $P < 0.001$; Cohort 2: 13.3% vs. 6.1%, $P = 0.002$) and higher response rates (weight loss $>10\%$: Cohort 1: 85.7% vs. 47.2%, $P < 0.001$; Cohort 2: 71.43% vs. 0%, $P = 0.026$) compared with LIB patients.

Conclusion: This study establishes HEX as a neurofunctional biomarker to predict GLP-1RA treatment response, providing the first brain-based framework to optimise decision-making in anti-obesity treatment.



The insulinotropic response to endogenous GIP in people with suboptimally controlled type 2 diabetes before and after 12 weeks of sitagliptin treatment

Sun Y¹, Veedfald S⁴, Xie C^{1,2}, Borg M¹, Bound M¹, Grivell J¹, Jones K^{1,2}, Horowitz M^{1,2}, Gasbjerg L⁴, Holst J⁴, Wu T¹, Rayner C^{1,3}

¹School of Medicine and Centre of Research in Translating Nutritional Science to Good Health, College of Health, Adelaide University, Adelaide, Australia, ²Endocrine and Metabolic Unit, Royal Adelaide Hospital, Adelaide, Australia, ³Department of Gastroenterology and Hepatology, Royal Adelaide Hospital, Adelaide, Australia, ⁴Department of Biomedical Sciences, University of Copenhagen, Copenhagen, Denmark

Background and aim

The insulinotropic response to exogenous glucose-dependent insulinotropic polypeptide (GIP) is abolished in people with T2D and poor glycaemic control. We aimed to quantify the response to endogenous GIP in individuals with T2D and slightly suboptimal glycaemic control, and determine whether it was augmented with intensified glucose-lowering therapy.

Materials and methods

Twelve participants with T2D (HbA1c $7.5 \pm 0.1\%$) managed by diet or metformin monotherapy underwent 12 weeks sitagliptin therapy (100 mg daily). Participants were studied twice in both Weeks 1 and 12 during hyperglycaemia (15 mmol/L; $t = -30$ –210 min), with intravenous infusion of GIP receptor antagonist, GIP(3-30)NH₂ (800 pmol/kg/min), or control (0.9% saline) ($t = 0$ –210 min, and intraduodenal glucose infusion (2 kcal/min; $t = 70$ –170 min). Blood was sampled frequently for blood glucose and plasma C-peptide concentrations.

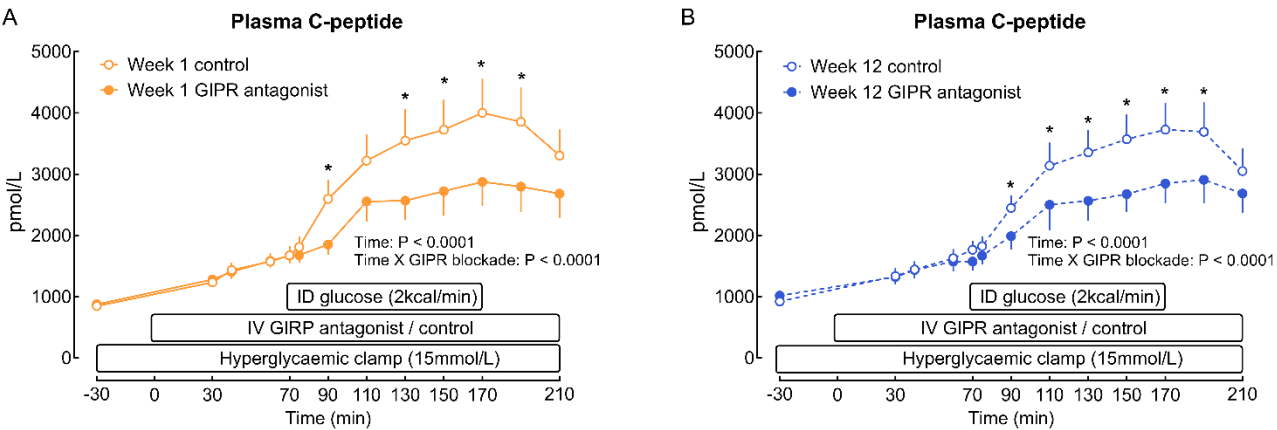
Results

Mean HbA1c decreased from 7.5% to 7.0% after 12 weeks' sitagliptin ($P = 0.002$). Plasma C-peptide responses to intraduodenal glucose were substantially lower with GIP(3-30)NH₂ than control during both Week 1 (iAUC_{70-210 min}, 116654 ± 31410 vs. 233394 ± 49421 pmol/L*min, $P = 0.008$) and Week 12 (131828 ± 25057 vs. 198438 ± 36231 pmol/L*min, $P = 0.0005$), without any difference between Weeks 1 and 12 (**Figure 1**).

Conclusion

In people with T2D and slightly suboptimal glycaemic control, endogenous GIP contributes substantially to insulin secretion during hyperglycaemia. However, a modest improvement in glycaemic control does not further augment this effect. These findings highlight the importance of endogenous GIP signalling to the maintenance of glucose homeostasis in this subset of people with T2D.

Figure 1.



A data-driven nurse-led model of care: Integrating primary sense to enhance diabetes management in general practice

Xu X¹

¹Hamilton Harbour Medical Centre, Hamilton, Australia

Aim

Traditional general practice models often rely on opportunistic encounters, limiting the ability to systematically identify and manage patients with chronic conditions such as diabetes. Emerging digital health tools offer new opportunities to transform workflows through population-based, proactive care. Primary Sense, a real-time population data extraction and clinical decision-support tool, enables practices to monitor care gaps, stratify risk, and support targeted outreach. This project aimed to explore how integrating Primary Sense into a nurse-led workflow could function as an innovative model of care delivery and assess its impact on diabetes monitoring over a 3-month period, with a planned 12-month review of sustainability.

Methods

This quality improvement initiative was conducted in a general practice setting. Adult patients with a confirmed diagnosis of diabetes were identified through Primary Sense. A nurse-led model of care was introduced, in which monthly data reports were generated to track key monitoring indicators, including HbA1c, urine albumin-creatinine ratio, and estimated glomerular filtration rate (eGFR). Care gaps identified through the reports were addressed through structured recall systems, patient outreach, pathology coordination, and scheduled diabetes review appointments. The primary measure of model effectiveness was the proportion of patients with a current HbA1c result. Data were analysed over an initial 3-month period, with a retrospective 12-month review planned.

Results

Implementation of this data-driven, nurse-led model resulted in a 10% increase in the proportion of patients with an up-to-date HbA1c result over 3 months. Preliminary review suggests similar improvements in other monitoring parameters, with full 12-month evaluation underway.

Conclusion

Embedding Primary Sense within a structured nurse-led workflow represents a practical and scalable innovation in chronic disease care delivery. The shift from reactive to proactive, population-based management demonstrated measurable improvements in diabetes monitoring. This model may offer a sustainable and transferable approach to enhancing care for people with chronic conditions in general practice, with ongoing analysis expected to clarify longer-term impacts.

BALLAST: A multicenter randomized trial of luseogliflozin in older adults with type 2 diabetes receiving leucine-enriched amino acid supplementation and structured exercise

Yabe D^{1,2,3}, Hayashi M⁴, Kato T³, Horikawa Y³, Tsunekawa S³, Kuwata H^{2,5}, Seino Y^{2,5}, Ogata R⁶, Murotani K⁶, Takahashi Y³

¹Kyoto University, Kyoto, Japan, ²Kansai Electric Power Medical Research Institute, Osaka, Japan,

³Gifu University, Gifu, Japan, ⁴Matsunami General Hospital, Gifu, Japan, ⁵Kansai Electric Power Hospital, Osaka, Japan, ⁶Kurume University, Kurume, Japan

Aim: In older adults with type 2 diabetes (T2D), glucose-lowering therapy should achieve glycemic control while minimizing hypoglycemia and preserving skeletal muscle health. Although SGLT2is effectively improve glycemia and reduce body weight, concerns remain regarding potential muscle loss. The BALLAST study evaluated the long-term efficacy and safety of luseogliflozin in older T2D adults receiving leucine-enriched amino acid supplementation and structured exercise.

Methods: BALLAST was a 52-week, multicenter, open-label, randomized controlled trial conducted at 14 sites in Japan (jRCTs041210048). Adults aged ≥ 65 years with T2D and BMI 18–30 kg/m² were enrolled. Key exclusion criteria included prior use of SGLT2is, insulin, or GLP-1 receptor agonists, severe renal impairment, and suspected sarcopenia according to AWGS 2019 criteria. All participants received leucine-enriched amino acid supplementation and a structured exercise program before randomization to luseogliflozin or control treatment. The primary endpoint was change in HbA1c at week 52. Secondary endpoints included body weight, body composition assessed by bioelectrical impedance analysis, grip strength, five-times sit-to-stand test, dietary intake, and safety.

Results: Eighty-five participants were randomized (luseogliflozin n=44; control n=41). Baseline characteristics were balanced (mean age 75.0 years, HbA1c 7.01%, BMI 24.61 kg/m²). At week 52, luseogliflozin significantly improved HbA1c versus control (difference -0.36% ; 95% CI -0.61 to -0.12 ; $p=0.0043$) and reduced body weight (-1.15 kg; 95% CI -2.13 to -0.17 ; $p=0.0248$). Total muscle mass and skeletal muscle index showed no significant between-group differences. Small reductions were observed in upper-arm and trunk muscle mass, whereas lower-limb muscle mass, grip strength, and sit-to-stand performance were preserved. No major differences were observed in energy intake or basal metabolic rate. No hypoglycemia, ketoacidosis, amputation, or volume depletion occurred.

Conclusion: In older T2D adults receiving nutritional supplementation and exercise, luseogliflozin provided sustained glycemic and weight benefits over 52 weeks without clinically meaningful deterioration in muscle mass, strength, or physical function.

Glycemic Variability Unifies the Time in Range and Time in Tight Range Relationship in Type 1 and Type 2 Diabetes: A Real-world CGM Study

Yao Y¹, Hu Z^{2,3}, Mo Y², Han M^{2,4}, Cao L¹, Cai J¹, Ma X¹, Lu J¹, Wu X⁵, Zhou J¹

¹Shanghai 6th Peoples Hospital Affiliated To Shanghai Jiaotong University, Shanghai, China,

²Shenzhen Sibionics Technology Co., LTD, Shenzhen, China, ³School of Biomedical Engineering,

Tsinghua University, Beijing, China, ⁴Institute of Biopharmaceutical and Health Engineering, Tsinghua

Shenzhen International Graduate School, Shenzhen, China, ⁵Shenzhen Center for Chronic Disease Control, Shenzhen, China

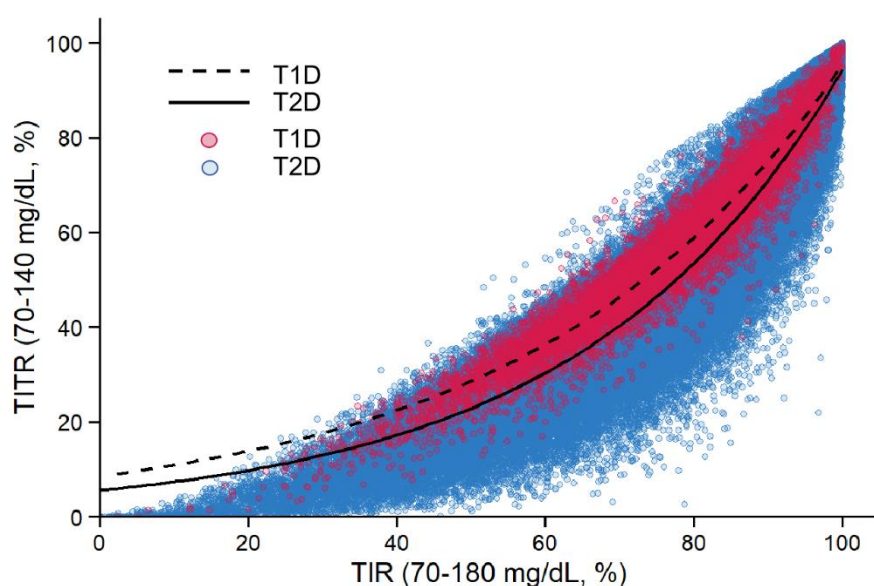
Aim: To explore the relationship between time in range (TIR) and time in tight range (TITR) in individuals with type 1 diabetes (T1D) and type 2 diabetes (T2D) using real-world continuous glucose monitoring (CGM) data, and to assess the impact of glycemic variability on this relationship.

Methods: This cross-sectional study included 204,480 CGM users with diabetes. Basic demographic and clinical information were self-reported through in-app fields. Exponential regression models were developed separately for T1D and T2D to characterize the TIR-TITR relationship. Coefficient of variation (CV) was then incorporated to evaluate the impact of glycemic variability and derive a unified model.

Results: The relationship between TIR and TITR was nonlinear in both T1D and T2D, with exponential models showing the best fit. A TIR of 70% corresponded to a TITR of 40.3%-46.3%, while TITR of 50% required TIR of 73.2%-77.6%. For TIR below 60%, each 5-percentage-point increase in TIR was associated with a less than 5-percentage-point increase in TITR, whereas above 60%, the increase in TITR exceeded 5 percentage points. After adjustment for CV, differences between the T1D and T2D curves were reduced, and the unified equation suggested a shared clinical standard across diabetes types.

Conclusion: This study established type-specific exponential models and a CV-adjusted unified equation for the TIR-TITR relationship using large-scale real-world CGM data. These findings suggest that glycemic variability should be considered when interpreting TIR and TITR, and may support individualized glycemic target setting in clinical practice.

Figure: Scatter plot of TIR versus TITR in individuals with T1D and T2D



Scatter plot of TIR (3.9–10.0 mmol/L [70–180 mg/dL]) versus TITR (3.9–7.8 mmol/L [70–140 mg/dL]) in individuals with T1D (red) and T2D (blue), with exponential fitting curves shown as dashed lines for T1D and solid lines for T2D

TIR, time in range. TITR, time in tight range. T1D, type 1 diabetes. T2D, type 2 diabetes.

Incidence of inpatient hypoglycaemia at Logan Hospital

Yap S¹

¹Latrobe Regional Health, Traralgon, Australia

Background and Aim

The incidence of hospital-acquired hypoglycaemia at Logan Hospital increased during the third quarter of 2024. This audit aimed to identify contributing factors and gaps in care to inform quality improvement strategies.

Methods

A retrospective audit was conducted using quality and safety data capturing hypoglycaemic events. An Excel spreadsheet containing all recorded events was manually verified using the electronic medical record. Data collected included baseline demographics, presence and type of diabetes, confirmation of true hypoglycaemia, hypoglycaemic agents (oral agents, insulin, or both), comorbidities, reason for admission, severity of hypoglycaemia, and associated morbidity, mortality, or need for escalation of care.

Hypoglycaemia severity was classified according to Australian guidelines: **mild** (3.0–3.9 mmol/L), **moderate** (<3.0 mmol/L without need for assistance), and **severe** (requiring third-party assistance regardless of glucose level). Descriptive analyses were performed, with continuous variables reported as mean ± standard deviation and categorical variables as frequencies and percentages.

Results

Thirty patients experienced hypoglycaemia recorded as a hospital-acquired complication. Eighteen were male and 12 female. Baseline demographics were similar, although males had a higher burden of comorbidities. Eighteen patients had diabetes (11 type 2, 7 type 1), while 12 did not. True hypoglycaemia was confirmed in 18 patients; six did not meet criteria, and six had no documented glucose measurement. Among those with true hypoglycaemia, chronic kidney disease was most common (n=8), followed by cardiovascular disease, hypertension, and malignancy. There was no difference in the incidence of mild or moderate hypoglycaemia between type 1 and type 2 diabetes. No severe hypoglycaemia was observed. Precipitants included reduced oral intake, fasting for procedures, and insulin stacking.

Conclusion

Inpatient hypoglycaemia is associated with significant morbidity, particularly in patients treated with insulin and those experiencing fasting or reduced oral intake. Accurate identification of true hypoglycaemia is essential as management differs. Potential strategies to reduce inpatient hypoglycaemia include implementation of a diabetes stewardship program, education for junior medical officers, nursing in-service programs and electronic dashboards.

Incidence of diabetic ketoacidosis in the setting of sodium-glucose co-transporter-2 inhibitor use at Logan Hospital

Yap S¹

¹Latrobe Regional Health, Traralgon, Australia

Background and Aim

Sodium–glucose co-transporter-2 inhibitors (SGLT-2i) are an established therapy for type 2 diabetes mellitus (T2DM), providing additional cardiovascular and renal benefits. Recent expansion of prescribing criteria has increased their use in patients with cardiovascular or renal disease, including those without diabetes. However, SGLT-2i use is associated with an increased risk of diabetic ketoacidosis (DKA), including euglycaemic presentations. This study aimed to determine the incidence of SGLT-2i–associated DKA at Logan Hospital, identify high-risk patient groups, and improve clinician and patient awareness of this complication.

Methods

This single-centre retrospective quantitative study included all patients admitted with DKA at Logan Hospital between January 2024 and January 2025. DKA cases were identified using ICD-10 codes and review of clinical documentation. SGLT-2i exposure was manually verified using the integrated electronic medical record. Data collected included baseline demographics, indication for SGLT-2i use, diabetes type, glycaemic control, medical comorbidities, reason for admission, DKA severity, management of SGLT-2i therapy during admission, and recurrent DKA events. Descriptive analyses were performed, with continuous variables reported as mean $\pm$ standard deviation and categorical variables as frequencies and percentages.

Results

A total of 875 DKA admissions were identified, of which 30 patients (3.4%) were associated with SGLT-2i use. Male patients predominated, with similar baseline characteristics between sexes. Indications for SGLT-2i therapy included T2DM (86%), type 1 diabetes mellitus (10%), and cardiovascular indications without diabetes (4%). Eight patients presented with mild DKA, twelve with moderate DKA, and eight with severe DKA. No deaths occurred. Common precipitants included acute illness, peri-operative states, and other triggers. Seventeen patients had SGLT-2i therapy ceased during admission. Of the 13 patients in whom therapy was restarted, two experienced recurrent DKA. Two patients were reclassified from T2DM to type 1 diabetes mellitus.

Conclusion

SGLT-2i–associated DKA is uncommon but clinically significant. Improved recognition, appropriate patient selection, and targeted education—particularly during periods of illness, fasting, or reduced oral intake—are essential to reduce preventable morbidity and improve patient safety.

Low-carbohydrate diet improves glycaemic variability and reduces insulin requirements in hospitalised insulin-deficient diabetes

Wang J¹, Song J², Yin J¹

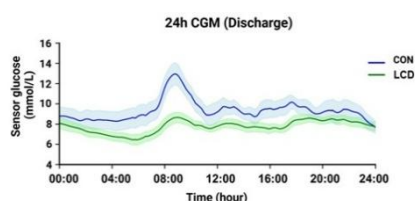
¹Shanghai Sixth People's Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China, ²Shanghai Eighth People's Hospital, Shanghai, China

Aim/s: To evaluate short-term metabolic effects of a low-carbohydrate diet (LCD) versus a control diet (CON) on glycemic variability (GV) in hospitalized people with insulin-deficient diabetes, and to explore whether residual β -cell function modifies dietary response.

Methods: A total of 359 inpatients with fasting C-peptide ≤ 1.0 ng/mL chose either an LCD (15% carbohydrate, 69% fat, 16% protein) or CON (45% carbohydrate, 39% fat, 16% protein) during hospitalization (median 9 days). Capillary glucose profiles (nine timepoints/day) were used to derive GV metrics; a subset underwent blinded continuous glucose monitoring (CGM). The primary outcome was coefficient of variation (CV). Subgroup analyses were performed by baseline C-peptide (<0.5 vs. ≥ 0.5 ng/mL).

Results: CV decreased from $35.4 \pm 12.6\%$ to $21.9 \pm 8.4\%$ with LCD and from $37.0 \pm 12.0\%$ to $26.8 \pm 9.0\%$ with CON (diet-by-time interaction $p=0.03$). LCD also improved MAGE and SD and increased time in range, with greater reductions in time above range. In the CGM subset, discharge incremental AUC was lower with LCD ($p=0.036$). LCD reduced insulin requirements (discharge 13.9 ± 8.0 vs. 25.5 ± 13.6 units) and insulin injection frequency (median 1 vs 2 injections/day), and fewer oral agents were needed at discharge. No DKA occurred; hypoglycemia incidence was similar between groups. Benefits were more pronounced in those with lower baseline C-peptide (interaction $p=0.002$).

Conclusion: A short-term LCD in hospitalized people with insulin-deficient diabetes improves glycemic variability and simplifies diabetes therapy without increasing acute safety events, with greater benefit among those with more severe β -cell dysfunction.



Effect of combined Traditional Chinese Medicine (TCM) Therapy on sleep quality, blood glucose, and emotions in Type 2 Diabetes (T2DM) patients with insomnia

Yin Y¹

¹Zhongda Hospital Affiliated to Southeast University, Nanjing, China, Nanjing , China

Aims : To investigate the effects of a combined TCM therapy protocol (including auricular acupoint massage + scraping therapy + auricular acupressure) on sleep quality, blood glucose control, and emotional state in patients with T2DM and insomnia, aiming to provide a novel nursing strategy for diabetes care.

Methods : 100 T2DM patients with insomnia admitted to the endocrinology department of a tertiary hospital from January 2024 to January 2025 were enrolled. They were randomly divided into the control group (n=48) or intervention group (n=52). The control group received routine diabetes care and sleep hygiene education. The intervention group received additional interventions: auricular acupoint massage (once a day) , scraping therapy (twice weekly), and auricular acupressure (replaced every 3 days) for 4 weeks. The Pittsburgh Sleep Quality Index (PSQI), fasting plasma glucose (FPG), glycated hemoglobin (HbA1c), Self-rating Anxiety Scale (SAS), and Self-rating Depression Scale (SDS) scores were compared before and after the intervention.

Results: After 4 weeks , the total PSQI score in the intervention group was significantly lower than that in the control group (7.32 ± 1.85 vs. 11.67 ± 2.34 , $P < 0.001$). Its subscale scores, including sleep duration (4.6 ± 0.7 h vs. 3.5 ± 0.8 h, $P < 0.001$), sleep latency (1.4 ± 0.5 h vs. 2.5 ± 0.6 h, $P < 0.001$), and sleep efficiency (4.3 ± 0.6 vs. 3.2 ± 0.7 , $P < 0.001$), were also significantly lower than those in the control group. Meanwhile, the intervention group showed significantly lower SAS scores (41.25 ± 5.36 vs. 48.63 ± 6.12), SDS scores (42.18 ± 5.12 vs. 49.85 ± 5.78), FPG levels (6.58 ± 0.92 mmol/L vs. 7.85 ± 1.13 mmol/L), and HbA1c levels ($6.42 \pm 0.75\%$ vs. $7.26 \pm 0.88\%$) compared to the control group (all $P < 0.001$). No serious adverse events occurred, and the compliance rate in the intervention group was 96.15%.

Conclusion: The combined TCM therapy intervention effectively improves sleep quality, aids in optimizing glycemic control, and alleviates anxiety and depression for T2DM patients. It is safe and suitable for clinical nursing application.

A web-based platform for increasing accessibility and utilisation of glucometric benchmarking in Australia

Yoo J¹, Quang J¹, Kyi M¹, Furlanos S¹, Barmanray R¹

¹The Royal Melbourne Hospital, Carlton, Australia

Aims:

Glucometric benchmarking is paramount to evaluating inpatient diabetes care interventions.¹ We aimed to develop a comprehensive tool that increases the accessibility of glucometrics to Australian hospitals by simple submission of data, which is then processed for automatic benchmarking of glycaemic quality across institutions within Australia.

Methods:

We developed AUSg1u, a web-based platform. The system accepts multi-format data uploads (Excel, CSV) with rule-based column mapping. The platform calculates glucometrics as per the original description by Goldberg et al (2006).² Glucometrics can be calculated for each patient group type (e.g. medical, surgical, critical care, etc). Performance metrics calculated include median, mean, proportion above and below hyper- and hypo- glycaemia, adverse glycaemic days, and good diabetes days. The platform contains the unique feature of aggregating hospital characteristics (e.g. location, modified monash model rurality, electronic vs. paper-based, Traditional Owners, etc.). These hospital characteristics are captured through audit forms. An integrated offline data cleaner was developed that removes sensitive data locally before submission such that no sensitive data can be uploaded, even inadvertently.

Results:

We validated glucometric calculations with results from prior Singaporean work.³ The platform has to-date demonstrated successful processing of submissions containing over 100,000 glucose measures. Other key features are operational including user registration, hospital selection with domain verification, geographic visualisation and multi-format data upload. The data validation tool successfully identifies privacy issues and formatting errors before submission.

Conclusion:

We developed a web-based platform enabling multi-institutional glucometric calculation, harmonisation, and benchmarking, while maintaining institutional data privacy. The platform addresses accessibility and privacy barriers that have limited widespread adoption of previous glucometric tools. Such platforms could support national inpatient diabetes audit processes and quality improvement initiatives in Australian healthcare.

[1] Barmanray RD, Kyi M, Colman PG, Furlanos S. Longitudinal Digital Glucometric Benchmarking to Evaluate the Impact of Institutional Diabetes Care Initiatives in Adults With Diabetes Mellitus Over the 2016-2020 Period. *J Diabetes Sci Technol*. 2024 May;18(3):610-617. doi: 10.1177/19322968221140126.

[2] Goldberg PA, Bozzo JE, Thomas PG, Mesmer MM, Sakharova OV, Radford MJ, et al. "Glucometrics"--assessing the quality of inpatient glucose management. *Diabetes Technol Ther*. 2006;8(5):560-9. doi: 10.1089/dia.2006.8.560.

[3] Chen Y, Ning Y, Thomas P, Salloway M, Tan MLS, Tai ES, Kao SL, Tan CS. An open source tool to compute measures of inpatient glycemic control: translating from healthcare analytics research to clinical quality improvement. *JAMIA Open*. 2021 Jun 16;4(2):00ab033. doi: 10.1093/jamiaopen/00ab033.

Investigating application of machine learning models to predict risk of experiencing adverse glycaemia during inpatient stay

Yoo J¹, Quang J¹, Kyi M¹, Furlanos S¹, Barmanray R¹

¹The Royal Melbourne Hospital, Parkville, Australia

Aims:

The Melbourne Clinical Prediction Tool identified risk for adverse glycaemia in hospital.¹ We aimed to assess the value of four machine learning (ML) models as alternatives for predicting inpatient adverse glycaemia and to introduce a no-code pipeline for rapid ML model prototyping.

Methods:

ML models were trained using data from the STOIC-D Surgery trial including clinical characteristics and glycaemic metrics of a cohort of surgical inpatients who either had a pre-existing diabetes diagnosis or newly-detected hyperglycaemia. Eligible participants were randomised to proactive vs. standard diabetes care. We trained four ML models to predict inpatient adverse glycaemia, defined as glucose <4.0 or >10.0 mmol/L based on the volume of data present to train the models. ML models trained were: Random Forest Classifier (RFC), Neural Network (NN), Light Gradient-Boosting Machine (LGBM), and Support Vector Machine (SVM). The models underwent missing-data handling, feature engineering, and normalisation/transformation before internal validation. Evaluation metrics used were ROC AUC, accuracy, recall, precision, and F1-score.

Results:

Amongst 691 patients admitted for a mean of 10.0±11.2 days, all algorithms exhibited adequate accuracy scores ≥0.7, indicating reliable predictive performance. However, other metrics fluctuated with positive training data volume; higher positive data corresponded to improved ROC AUC, recall, precision, and F1-scores. Normalisation/transformation also affected performance, with outlier-sensitive models (SVM, NN) showing greater variation across techniques. All models performed optimally with outlier-resistant normalisation. These results informed the development of a no-code pipeline for users without ML development expertise.

Conclusion:

ML models show promise for predicting inpatient adverse glycaemia risk. These models enable interventions by an inpatient diabetes service, proven to be effective, to be targeted to those most likely to benefit. Our no-code pipeline will allow ML model implementation at sites currently lacking ML development expertise, making it accessible for future research projects at additional institutions to further validate model characteristics.

References:

[1] Kyi M, Gorelik A, Reid J, Rowan LM, Wraight PR, Colman PG, Furlanos S. Clinical Prediction Tool To Identify Adults With Type 2 Diabetes at Risk for Persistent Adverse Glycemia in Hospital. *Can J Diabetes*. 2021 Mar;45(2):114-121. doi: 10.1016/j.jcjd.2020.06.006.

Beyond TIR: CGM metabolic intelligence reveals six prescribing archetypes and hidden glycaemic worsening

Yoo S¹

¹Catholic Kwandong University College of Medicine, International St. Mary’s Hospital, Incheon, South Korea

Aims: Time-in-range (TIR, 70–180 mg/dL) does not differentiate metabolic heterogeneity within its 110 mg/dL window. We developed a CGM-derived analytic framework (Gluco-Dynamics) to determine whether composite glycaemic indices can support differentiated prescribing decisions for people with diabetes.

Methods: Retrospective CGM data from 215 adults living with type 1 and type 2 diabetes (FreeStyle Libre and Dexcom G7) were analysed. AGP-quality segments were extracted (14-day rolling-window density ≥70%); participants with ≥42 valid days comprised the analytic cohort (N=203). Composite indices (MDRS, HPS, and Resilience Index) were constructed using CGM variability and glycaemic exposure metrics, with component weights derived from principal component analysis anchored to ATTD consensus thresholds. Six prescribing archetypes and weekly trajectory monitoring were applied.

Results: The central finding was a 20.4-percentage-point TIR–TITR gap (mean TIR 70.3±20.9% versus TITR 49.9±23.3%), indicating nearly half of time nominally “in range” falls in the 140–180 zone. Six prescribing archetypes were identified; notably, participants with TIR above 70% spanned four archetypes requiring different medication strategies. Weekly trajectory monitoring revealed glycaemic status is not static: 34% Improving, 48% Stable, 18% Worsening. Sixteen participants worsening over time appeared stable on cross-sectional classification alone (Figure 1). Sensitivity analysis confirmed index robustness (rank correlation 0.999).

Conclusions: Cross-sectional CGM metrics, including TIR, treat glycaemic status as fixed. Gluco-Dynamics demonstrates that integrating composite indices with trajectory monitoring captures ongoing metabolic change, enabling clinicians to identify who needs treatment adjustment, how urgently, and in what direction.

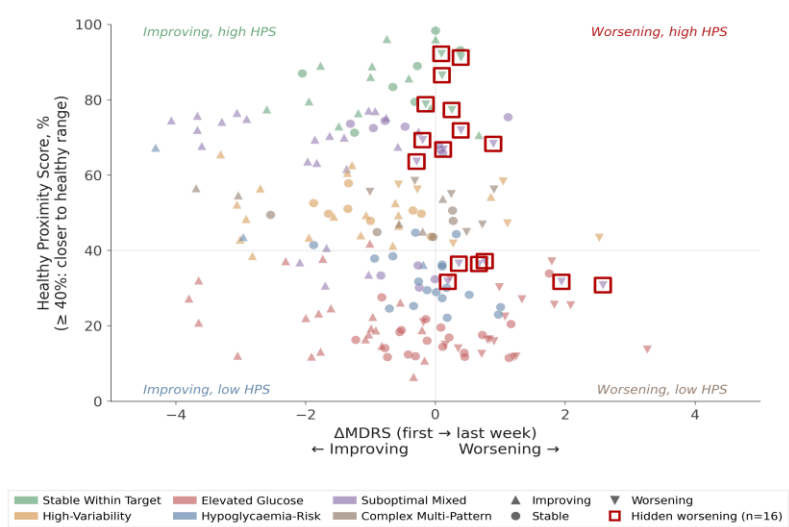


Figure 1. Healthy Proximity Score versus ΔMDRS (change from first to last week). Marker shape indicates trajectory (▲ Improving, ● Stable, ▼ Worsening); colour indicates prescribing archetype; red squares = participants worsening despite apparently favourable archetype (n=16). Dashed line at HPS 40% separates those closer to healthy glycaemic range (above) from those further away (below).

Cost-effectiveness of multidisciplinary preoperative diabetes care versus usual care in adults undergoing elective noncardiac surgery.

Yu A¹, Whitfield K², Hale A³, D'Emden M¹, Snoswell C²

¹Royal Brisbane And Women's Hospital, Brisbane, Australia, ²The University of Queensland, Brisbane, Australia, ³Queensland University of Technology, Brisbane, Australia

Background & Aim:

Perioperative hyperglycaemia adversely affects postoperative outcomes, yet economic evidence supporting interventions to improve perioperative blood glucose management is lacking. This study aimed to assess the healthcare costs and outcomes associated with a multidisciplinary preoperative diabetes service and compare its cost-effectiveness with usual care in adults with diabetes undergoing elective noncardiac surgery.

Methods:

An economic evaluation was conducted using data from a three-year, prospective interventional study involving adults with sub-optimally managed diabetes who were scheduled for elective surgery. Analysis was conducted from a healthcare institution perspective with a one-year time horizon. Healthcare costs and outcomes, in terms of HbA_{1c} change and quality-adjusted life years (QALYs), were compared between an intervention arm receiving multidisciplinary preoperative diabetes input and a simulated usual-care arm.

Results:

The intervention arm achieved a 1.9% (95% CI 1.5-2.2) greater reduction in preoperative HbA_{1c} and 0.7 (95% CI 0.5-0.9) gain in QALYs at an incremental cost of A\$2602 per person. The incremental cost-effectiveness ratios (ICERs) were A\$1369 per 1% reduction in HbA_{1c} and A\$3690 per QALY. Sensitivity analyses indicated greater cost-effectiveness among individuals with higher baseline HbA_{1c} levels, with diminishing cost-effectiveness as baseline HbA_{1c} decreased, and notable uncertainty when baseline HbA_{1c} levels were below 8.0%.

Conclusion:

Compared with usual care, a multidisciplinary preoperative diabetes service achieved greater preoperative improvements in glycaemic management and quality-adjusted life years and was highly cost-effective from a healthcare institution perspective. This study addressed an important gap in the literature by demonstrating it was cost-effectiveness to operate a dedicated service focused on improving diabetes management in the perioperative setting and provides evidence to support the implementation of similar services across other healthcare institutions.

5:2 Intermittent fasting with meal replacement improves TyG index and insulin resistance in early Type 2 Diabetes: A post hoc analysis of the EARLY trial

Yu D¹, Yuan H², Chen S³, Xi Y⁴, Jin W⁵, Zhang L⁶, Liu Y⁷, Cheng X⁸, Qin G⁹, Guo L¹

¹Department of Endocrinology, Beijing Hospital, National Center of Gerontology, Institute of Geriatric Medicine, Chinese Academy of Medical Sciences, Beijing, China, ²Department of Endocrinology, Henan Provincial People's Hospital, Zhengzhou, China, ³Department of Endocrinology, Hebei Provincial People's Hospital, Shijiazhuang, China, ⁴Department of Endocrinology, The Third Affiliated Hospital of Jinzhou Medical University, Jingzhou, China, ⁵Department of Endocrinology, Nanyang Central Hospital, Nanyang, China, ⁶Department of Endocrinology, The Second Hospital of Hebei Medical University, Shijiazhuang, China, ⁷Department of Endocrinology, Sir Run Run Hospital, Nanjing Medical University, Nanjing, China, ⁸Department of Endocrinology, The First Affiliated Hospital of Soochow University, Soochow, China, ⁹Department of Endocrinology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China

Aim/s: To evaluate whether a 5:2 intermittent fasting regimen with meal replacement (5:2 MR) improves the triglyceride-glucose (TyG) index and other parameters of insulin resistance (IR) more than metformin or empagliflozin in adults with early type 2 diabetes (T2D) and metabolic syndrome (MetS).

Methods: This is a secondary analysis of the EARLY trial, which included 323 adults with overweight or obesity and MetS across nine hospitals in China. Participants were randomized in a 1:1:1 ratio to 16 weeks of 5:2 MR, metformin, or empagliflozin. The primary outcome was the change in TyG index. Secondary outcomes included homeostasis model assessment of IR (HOMA-IR), fasting insulin, C-peptide, HbA1c, body mass index, and lipid levels. Treatment effects were estimated using analysis of covariance.

Results: Effects were assessed in T2D and MetS patients (104 in the 5:2 MR group, 107 in the metformin group, and 112 in the empagliflozin group). At week 16, 5:2 MR produced a greater reduction in the TyG index than metformin and empagliflozin (least-squares mean differences -0.52 [95 % CI -0.68 , -0.37] and -0.51 [95 % CI -0.67 , -0.35]; both $P < 0.001$). The 5:2 MR regimen also yielded significantly larger decreases in HOMA-IR, fasting insulin, HbA1c, body mass index, and waist circumference versus both drugs (all $P \leq 0.018$). No significant differences were found between the two drug groups.

Conclusion: In adults with overweight or obesity and early T2D with MetS, a 16-week 5:2 MR regimen provided superior improvements in the TyG index and multiple cardiometabolic risk factors compared with metformin or empagliflozin. This regimen is an effective treatment option for this high-risk population, with the TyG index serving as a sensitive marker for assessing clinical response.

Construction of a predictive model for insulin-related latent adipose hyperplasia based on clinical data and injection behavior characteristics

Yu S¹

¹Beijing Hospital, Beijing, China

Objective: To develop a predictive model for latent adipose hyperplasia in insulin-injected patients, enabling early identification of high-risk individuals and supporting targeted education and early warning by healthcare providers.

Methods: A cross-sectional study enrolled 150 diabetic patients receiving subcutaneous insulin injections at a tertiary hospital in Beijing (January 2025–January 2026). Latent adipose hyperplasia was defined as cases with ultrasound-confirmed abnormalities but normal visual/palpation findings. Candidate variables were screened via univariate analysis, Boruta algorithm, and LASSO regression. Seven models (logistic regression, XGBoost, LightGBM, random forest, AdaBoost, decision tree, SVM) were developed and compared; the best-performing model was internally validated using bootstrap.

Results: Among 150 subjects, 50 had latent adipose hyperplasia and 100 had no lipohypertrophy. Univariate analysis identified 23 associated variables (all $P < 0.05$). Nine predictive factors were retained: C-reactive protein, needle replacement frequency, NLR, monocyte count, insulin injection area, urinary albumin, smoking status, educational level, and blood glucose fluctuation. The logistic regression model showed superior discrimination, stability, calibration, and interpretability, with an apparent AUC of 0.968, five-fold cross-validation average AUC of 0.911, and bootstrap internal validation AUC of 0.944.

Conclusion: The logistic regression model based on nine readily available clinical factors demonstrates excellent predictive value for latent adipose hyperplasia in insulin-treated patients. It can serve as an early screening tool in nursing clinics and diabetes education, guiding ultrasound referral and individualized management.

Keywords: Diabetes mellitus; Latent adipose hyperplasia; High-frequency ultrasound; Machine learning; Predictive model; Nursing care

A 6-year follow-up study of a wearable device-based exercise program combined with an information platform on metabolism and arterial function in Type 2 Diabetes

Yuan H¹, Yang M¹, Gong F¹, Li P¹, Zhang R², Du H², Wang M², Gao M², Jia Z², Jiang H²

¹School Of Nursing, Henan University Of Science And Technology, Luoyang, China, ²The First Affiliated Hospital, and College of Clinical Medicine of Henan University of Science and Technology, Luoyang, China

Objective: To investigate the long-term effects of a 24-week wearable device-based exercise program combined with an information platform on metabolic control and arterial function in type 2 diabetes (T2DM).

Methods: In this randomized controlled trial, 90 T2DM patients were randomly assigned to an intervention group (n=45) receiving a personalized exercise program monitored by wearable devices (heart rate armband and muscle oxygen sensor) connected to an information platform, or a control group (n=45) receiving standard exercise education. All participants underwent a 24-week intervention and were followed for 6 years. Glucose and lipid metabolism, arterial stiffness (brachial-ankle pulse wave velocity [baPWV], ankle-brachial index [ABI]), and visceral fat area (VFA) were assessed at baseline and 6 years. Missing data were handled by multiple imputation. Between-group differences in changes from baseline were analyzed using independent t-test or Wilcoxon rank-sum test; within-group changes were evaluated using paired t-test or Wilcoxon signed-rank test. All P-values were Bonferroni-corrected.

Results: Baseline characteristics were comparable between groups. At 6 years, 41 intervention patients (8.9% dropout) and all 45 controls completed follow-up. Within-group, the intervention group showed significant reductions in HbA1c ($8.88 \pm 2.18\%$ vs. $7.50 \pm 1.73\%$, $P=0.003$) and uric acid (318.3 ± 61.9 vs. 265.4 ± 79.4 $\mu\text{mol/L}$, $P=0.007$), with stable baPWV (left: 1444.6 ± 280.7 vs. 1533.2 ± 243.2 cm/s, $P=0.584$; right: 1436.9 ± 292.6 vs. 1535.7 ± 248.4 cm/s, $P=0.273$). The control group exhibited significant increases in baPWV (left: 1527.4 ± 237.4 vs. 1851.8 ± 387.7 cm/s; right: 1514.5 ± 246.1 vs. 1827.5 ± 361.7 cm/s) and VFA (97.8 ± 44.1 vs. 115.9 ± 41.3 cm²) (all $P < 0.001$). Between-group comparisons favored the intervention for baPWV (left: +78 vs. +324 cm/s, $P=0.004$; right: +99 vs. +322 cm/s, $P=0.002$) and VFA (-4.0 vs. +18.1 cm², $P < 0.001$). No significant differences were observed in lipid parameters (all $P > 0.05$).

Conclusion: A 24-week wearable device-based exercise program combined with an information platform provides sustained benefits for up to 6 years in T2DM, preserving arterial elasticity and attenuating visceral fat accumulation.

Real-world effectiveness of sodium-glucose cotransporter-2 inhibitors and glucagon-like peptide-1 receptor agonists combination therapy on weight management under an Online-offline shared care for type 2 diabetes

Zhang C¹, Wang M¹, Xu J¹

¹The Second Affiliated Hospital Of Xi'an Jiaotong University, Xi'an, China

Background & Aim: The prevalence of type 2 diabetes (T2D) with overweight/obesity is rising globally. While SGLT-2 inhibitors (SGLT-2is) and GLP-1 receptor agonists (GLP-1RAs) are recommended for weight management, real-world evidence on their combination within digital care models remains limited. This study evaluated the weight management efficacy of SGLT-2i and GLP-1RA combination therapy in overweight/obese T2D patients under an online-offline shared care model.

Methods: This real-world retrospective study enrolled 921 overweight/obese T2D patients from a tertiary hospital diabetes shared care clinic in Northwest China between January 2022 and January 2025. Based on actual medication exposure, patients were stratified into four groups: SGLT-2i monotherapy, GLP-1RA monotherapy, combination therapy, and control (neither drug). All participants received integrated offline-online care via a mobile health platform enabling dietary logging, remote consultation, and health education. Primary outcomes included changes in body weight, BMI, waist circumference, and HbA1c after median 1.84 years follow-up. Hierarchical multivariable logistic regression identified predictors of $\geq 5\%$ weight loss, adjusting for demographics, clinical characteristics, and digital engagement metrics.

Results: Combination therapy achieved the greatest median weight reduction (5.1%; 4.0 kg). GLP-1RA monotherapy showed the largest HbA1c reduction (-1.20%). After adjusting for digital engagement, the odds of $\geq 5\%$ weight loss in the combination group increased by 5.02% (OR: 1.97; $p < 0.001$). Higher baseline BMI and longer diabetes duration predicted weight loss success, while higher baseline HbA1c was negatively associated.

Discussion / Conclusion: SGLT-2i and GLP-1RA combination therapy provides superior weight management in overweight/obese T2D patients, with effects enhanced by online-offline shared care engagement. These findings support an integrated "drug-behavior-digital" intervention model for optimizing weight management in real-world clinical practice.

Insulin pump therapy for T1D: A real-world analysis of a novel two-in-one insulin pump in Chinese adults with Type 1 Diabetes

Zhang F⁴, Lu Y¹, Li Z², Yang Y³, Lian X⁴, Shi S⁵

¹Department of Nephrology, Lianyungang Municipal Oriental Hospital, Lianyungang, China,

²Department of Endocrinology, Maoming People's Hospital, Maoming, China, ³Department of Endocrinology, Huizhou Municipal Central Hospital, Huizhou, China, ⁴Department of Endocrinology, Peking University Shenzhen Hospital, Shenzhen, China, ⁵Department of Endocrinology, The First Huizhou Affiliated Hospital of Guangdong Medical University, Huizhou, China

Aim: To evaluate the real-world application, glycemic outcomes, and patient experience of a novel two-in-one insulin pump (featuring switchable patch/pocket modes and a balanced cannula) in Chinese adults with Type 1 Diabetes (T1D).

Methods: A cross-sectional, online questionnaire-based study was conducted in December 2025. Eligible participants were adults (aged 18-80 years) with T1D (duration ≥ 1 year) who had been using the Arei insulin pump for ≥ 3 months. The survey assessed glycemic management, quality of life (QoL), product experience, and future expectations.

Results: Among 47 respondents, glycemic control showed a mean Time in Range (TIR, 3.9-10.0 mmol/L) of 74.0%. Over 55% of patients reported a “significant reduction” in both hypoglycemic and hyperglycemic events. Regarding QoL, 48.9% reported a “significant improvement” in life confidence and freedom. Product satisfaction was high, with 89.3% satisfied with the overall “two-in-one” design. A notable 38.3% of users had experience with both patch and pocket modes, validating the design’s clinical utility for site rotation and lifestyle adaptability. Patients’ foremost expectations for future technology were “automatic insulin dose adjustment” and “seamless CGM integration”.

Conclusion: This first real-world study in China demonstrates that the novel two-in-one insulin pump is associated with effective glycemic control (TIR 74%) and enhanced QoL. Its innovative switchable design directly addresses the critical challenge of skin health in long-term pump therapy, offering exceptional flexibility. Future development should focus on progression toward an automated closed-loop system.

Beyond the device: A healthcare provider perspective on the clinical impact of a novel switchable insulin pump in Chinese adults with Type 1 Diabetes

Zhang F¹, Li Z², Lu Y³, Yang Y⁴, Lian X¹, Shi S⁵

¹Department of Endocrinology, Peking University Shenzhen Hospital, Shenzhen, China, ²Department of Endocrinology, Maoming People's Hospital, Maoming, China, ³Department of Nephrology, Lianyungang Municipal Oriental Hospital, Lianyungang, China, ⁴Department of Endocrinology, Huizhou Municipal Central Hospital, Huizhou, China, ⁵Department of Endocrinology, The First Huizhou Affiliated Hospital of Guangdong Medical University, Huizhou, China

Aim/s: To evaluate, from the perspective of diabetes care providers, the clinical utility, advantages, and current challenges of a novel insulin pump featuring a unique "patch/pocket switchable" design and a balanced indwelling needle in managing Type 1 diabetes (T1D).

Methods: A cross-sectional online survey was conducted among healthcare professionals (HCPs) in China from December 1 to 31, 2025. A total of 180 valid responses were analyzed. Respondents included endocrinologists (36.7%), diabetes specialist nurses (30.0%), and clinical dietitians (33.3%), all with direct insulin pump management experience. Their professional experience in diabetes care was distributed as: 1-5 years (30.0%), 5-10 years (46.7%), and over 10 years (23.3%). The questionnaire covered three domains: professional observations, training/support experiences, and future expectations.

Results: HCPs were most inclined to recommend this pump to T1D patients and those with significant glycemic variability. Clinically, providers observed a mean reported improvement in glycemic control in 72.00% ($\pm 21.40\%$) of patients and in quality of life (QoL) in 75.00% ($\pm 18.52\%$) of patients post-adoption, with these outcomes being strongly correlated ($r=0.887$, $p<0.001$). The pump demonstrated good usability: 56.67% of HCPs estimated training could be completed within 2 hours, and 80.00% believed patients could achieve proficiency within 2 weeks. Clinical support primarily consisted of regular follow-ups (30.21%) and operational training (30.21%), with psychological support being less emphasized (17.70%). For future development, HCPs prioritized integration with glucose monitoring devices, reduction of treatment costs, and enhancement of closed-loop functionality. Regarding hybrid closed-loop systems, the most desired features were "automatic insulin dose adjustment" (20.45%) and "seamless connectivity with Continuous Glucose Monitoring (CGM)" (20.45%).

Conclusion: From the provider's lens, this innovative insulin pump shows favorable clinical acceptance, usability, and therapeutic effectiveness for T1D management in China. Future efforts should focus on advancing device integration and intelligence, optimizing cost-effectiveness, and strengthening psychological support within patient care ecosystems.

Association between fetal growth trajectories and adverse pregnancy outcomes in women with gestational hyperglycemia

Jiang W¹, Zhang M¹

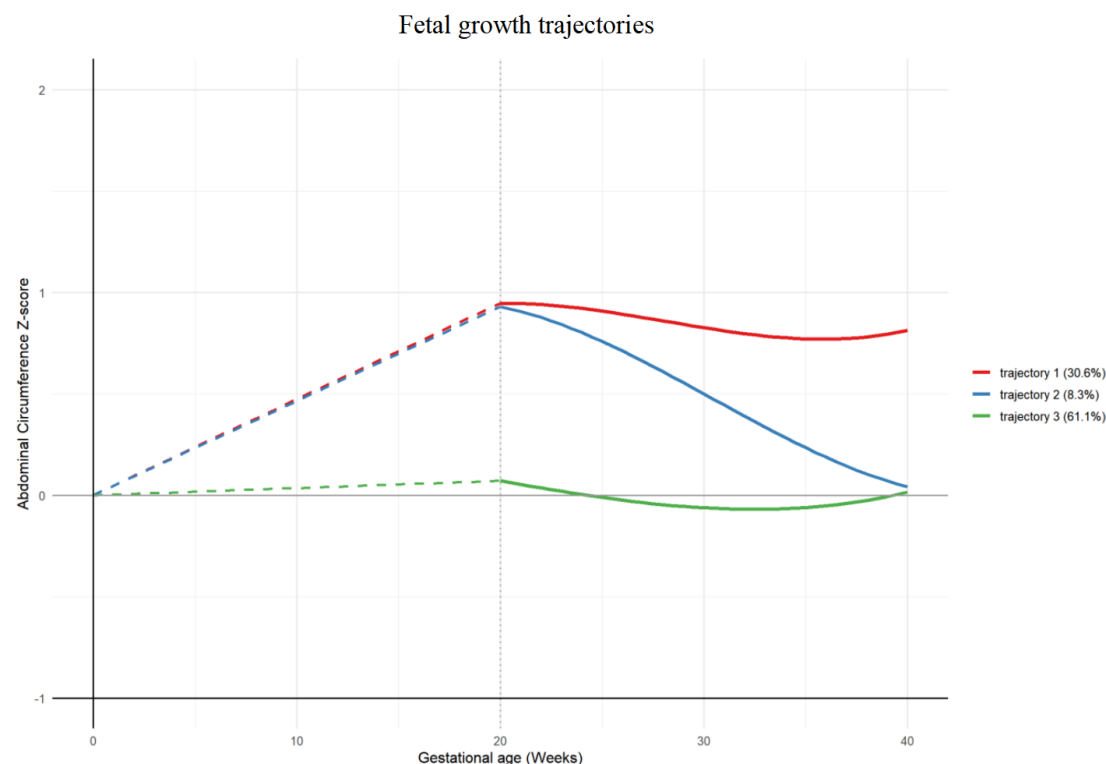
¹Nanjing Medical University, nanjing, China

Background & Aim: Gestational hyperglycemia is a heterogeneous risk factor for adverse pregnancy outcomes. This study aimed to examine the impact of maternal glucose metabolism on fetal intrauterine growth trajectories and subsequent pregnancy outcomes.

Methods: We analyzed a cohort of pregnant women with gestational hyperglycemia from XX Hospital. Data on demographics, metabolic profiles, serial fetal abdominal circumference measurements, and pregnancy outcomes were collected. Group-based trajectory modeling (GBTM) was applied to the serial abdominal circumference measurements to identify distinct fetal growth trajectories. Maternal characteristics, glucose metabolism, and pregnancy outcomes were compared across trajectories. Multivariable logistic regression assessed the independent association between trajectory groups and macrosomia risk.

Results: The study included 649 women with gestational hyperglycemia and 230 normoglycemic controls. GBTM identified three fetal growth trajectories: normal (61.1%), larger (30.6%), and rapid-early-then-slowed (8.3%). Pre-pregnancy BMI differed significantly among groups, with the larger growth group having the highest (all $P < 0.05$). Larger and rapid-early-then-slowed groups had higher OGTT glucose levels than normal group ($P < 0.001$). Third-trimester HbA1c was lower in rapid-early-then-slowed vs. larger groups (5.02% vs 5.25%, $P < 0.001$). Macrosomia rate was similar between rapid-early-then-slowed and normal groups ($P > 0.05$) but lower than the larger group (6.8% vs 16.0%, $P < 0.001$). Multivariable regression showed only the larger growth group was independently associated with macrosomia (OR=2.30, 95% CI: 1.29–4.12, $P = 0.005$).

Conclusion: Fetal growth trajectories are highly heterogeneous, and maternal glucose metabolism significantly influences them. This study emphasizes the need to integrate dynamic fetal growth monitoring with maternal glycemic assessment and strengthen glucose management through comprehensive evaluation based on this combination.



Group-based fetal growth trajectories in gestational hyperglycemia: Associations with maternal glycemia and macrosomia

Zhang M¹, Jiang W¹, Qin Y¹, Yin Y²

¹Department of Endocrinology, First Affiliated Hospital Of Nanjing Medical University, Nanjing, China, ²Department of Obstetrics, the First Affiliated Hospital with Nanjing Medical University, Jiangsu Province Hospital, Nanjing 210029, China, Nanjing, China

Aim: Gestational hyperglycemia is a heterogeneous risk factor for adverse pregnancy outcomes. This study aimed to examine the impact of maternal glucose metabolism to fetal intrauterine growth trajectories among women with gestational hyperglycemia and adverse pregnancy outcomes among women with gestational hyperglycemia.

Methods: We analyzed a cohort of pregnant women with gestational hyperglycemia from the First Affiliated Hospital of Nanjing Medical University. Data on demographics, metabolic profiles, serial fetal abdominal circumference measurements, and pregnancy outcomes were collected. Group-based trajectory modeling (GBTM) was applied to the serial abdominal circumference measurements to identify distinct fetal growth trajectories. Maternal characteristics, oral glucose tolerance test (OGTT) results, third-trimester HbA1c, and pregnancy outcomes were compared across trajectories. Multivariable logistic regression assessed the independent association between trajectory groups and macrosomia risk.

Results: A total of 879 women were included (649 with gestational hyperglycemia and 230 normoglycemic controls). TGBTM identified three fetal growth trajectories: normal (61.1%), larger (30.6%), and rapid-early-then-slowed (8.3%). Pre-pregnancy BMI differed significantly among groups, with the larger growth group having the highest (all $P < 0.05$). Larger and rapid-early-then-slowed groups had higher OGTT glucose levels than normal group ($P < 0.001$). Third-trimester HbA1c was lower in rapid-early-then-slowed vs. larger groups (5.02% vs 5.25%, $P < 0.001$). Macrosomia rate was similar between rapid-early-then-slowed and normal groups (6.8% vs 6.5%, $P > 0.05$) but lower than the larger group (6.8% vs 16.0%, $P < 0.001$). Multivariable regression showed only the larger growth group was independently associated with macrosomia (OR=2.30, 95% CI: 1.29–4.12, $P = 0.005$).

Conclusion: Fetal abdominal circumference growth trajectories are heterogeneous in pregnancies complicated by gestational hyperglycemia, and maternal glycemic status is associated with trajectory patterns. Integrating longitudinal fetal growth trajectory monitoring with maternal glycemic assessment may improve antenatal risk stratification and support targeted glucose management to reduce macrosomia risk.

Keto to ketoacidosis: Unmasking late-onset T1DM in an elderly patient

Zhang N¹, Koh M¹, Wong T¹, Abdo S¹

¹Bankstown Hospital, Bankstown, Australia

Aim

Type 1 diabetes mellitus (T1DM) is classically considered a disease of the young, yet it can present at any age. Its incidence in older adults (≥ 60 years) remains underappreciated and poorly characterised (1). We report a case of severe insulin deficiency presenting as ketoacidosis in an elderly patient with long-standing diabetes, precipitated by a ketogenic dietary intervention.

Methods/Results

An 85-year-old female presented to the ED with two days of lethargy, nausea and loose bowel motions. Background included osteoporosis, "T2DM" (on oral metformin and vildagliptin) and breast cancer. In the preceding two months, she had commenced a low carbohydrate dietary programme ('Freedom from Diabetes') to manage significant prandial hyperglycaemia. This included 10 days of a liquid-only ketogenic diet, resulting in 15kg of weight loss and severe malnutrition on presentation (weight 25kg, BMI 11.1). Venous blood gas confirmed metabolic acidosis (pH 7.24 and bicarbonate 17 mmol/L) with glucose 19.5 mmol/L and blood ketones of 7 mmol/L. She was admitted to intensive care under endocrinology on an insulin-dextrose infusion. Investigations revealed HbA1c 8.5%, a low C peptide of 122 pmol/L (ref: 370-1470) and negative GAD, islet cell and ZnT8 antibodies. Seronegative T1DM was diagnosed based on clinical features (ketosis, insulin dependence and significant weight loss) and C-peptide deficiency. She was discharged on an insulin regimen to an aged care facility following multidisciplinary input from diabetes education, physiotherapy, occupational therapy and social work.

Conclusion:

This case highlights the diagnostic and therapeutic challenges of severe insulin deficiency in the elderly. We discuss the evolving continuum of diabetes phenotypes for patients who present with long-standing "T2DM", insulin dependence and ketosis. As the burden of diabetes in elderly adults continues to grow, greater clinical awareness, timely diagnosis and age-appropriate management strategies are crucial.

Early prediction of insulin resistance improvement after metformin therapy in Type 2 Diabetes

Zhao Y¹, Wang Z², Wang W¹, Pan Q¹, Guo L¹

¹Beijing Hospital, Beijing, China, ²Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, China

Aims

To develop and validate an early prediction model for improvement in insulin resistance among patients with type 2 diabetes (T2D) treated with metformin.

Methods

Three independent cohorts of metformin-treated patients with T2D were analyzed: the EARLY cohort (n=102) and the MARCH cohort (n=311) for model development and internal validation, and a Sino-US cohort (n=270) for external testing. The primary outcome was the percentage change in HOMA-IR. Prediction models were constructed using an ensemble of regression approaches. Two strategies were evaluated: a baseline model incorporating baseline characteristics and follow-up duration, and an extended model additionally including early follow-up metabolic measurements. Model performance and clinical utility were assessed using discrimination metrics and decision curve analysis.

Results

In internal validation, the extended model outperformed the baseline model in identifying patients achieving $\geq 30\%$ improvement in HOMA-IR. In the external cohort with shorter follow-up, the baseline model demonstrated stable performance after threshold recalibration. Baseline adiposity-related indices and early metabolic changes were the main contributors to prediction.

Conclusions

This early prediction approach enables identification of metformin responders before long-term follow-up and may support more timely and individualized treatment decisions in T2D.

TEXOB1 (Tirzepatide ± Exercise in Adults with Overweight/Obesity and Type 1 Diabetes): Preliminary Findings from a Randomised Trial

Zhen XM^{1,2,3,4,5}, de Ciutiis I^{2,5}, Williamson K⁵, Nettel-Aguirre A^{6,7}, Twigg SM^{1,2,5}, Fontana L^{1,2,5}, Hocking S^{1,2,5}, Luo C¹, Gauld A¹, Lee A^{1,2}, Wu T¹, Djakovic S⁵, Ross G^{1,2}, McGill M^{1,2}, Middleton T¹, Constantino M¹, Wong J^{1,2,5}

¹Department of Endocrinology, Royal Prince Alfred Hospital, Camperdown, Australia, ²Faculty of Medicine and Health, University of Sydney, Camperdown, Australia, ³Department of Diabetes and Endocrinology, Blacktown Hospital, Blacktown, Australia, ⁴School of Medicine, Western Sydney University, Blacktown, Australia, ⁵Charles Perkins Centre, University of Sydney, Camperdown, Australia, ⁶School of Social Sciences, University of Wollongong, Wollongong, Australia, ⁷Department of Pediatrics, University of Calgary, Calgary, Canada

Aims:

Data on tirzepatide use in type 1 diabetes (T1D) are limited⁽¹⁾. This pilot trial evaluates the efficacy and safety of tirzepatide ± a resistance–aerobic exercise program in adults with T1D and overweight/obesity, with preliminary findings reported here.

Methods:

We conducted an open-label individually-randomised pilot trial (modified stepped-wedge design) in adults with T1D and overweight/obesity (Figure 1). Co-primary outcomes were change in %body weight and CGM-derived %time-in-range (TIR).

Results

After 12 weeks of tirzepatide (up to 5mg/week, n=10), the mean (SD) change in weight was -8.0% (4.8) versus +1.8% (0.8) in controls (n=10); the difference in mean change was -9.8% (95%CI -13.3 to -6.3). The mean (SD) change in %TIR was +16.2 (15.4) with tirzepatide versus -1.9 (7.4) in controls; the difference in mean change between groups was +18.1% (95%CI 6.4 to 29.8). Compared to tirzepatide, tirzepatide+exercise resulted in numerically greater %weight loss [difference in mean change 3.7 (95%CI -0.4 to 7.8)] but a smaller increase in %TIR [difference in mean change 2.6 (95%CI -11.9 to 17.1)] in our sample. There were no major adverse events.

Conclusions:

In people with T1D and overweight/obesity, tirzepatide was superior to usual care with significantly greater %weight loss and increased %TIR. Adding exercise to tirzepatide resulted in numerically greater weight loss but a smaller increase in TIR in this pilot sample.

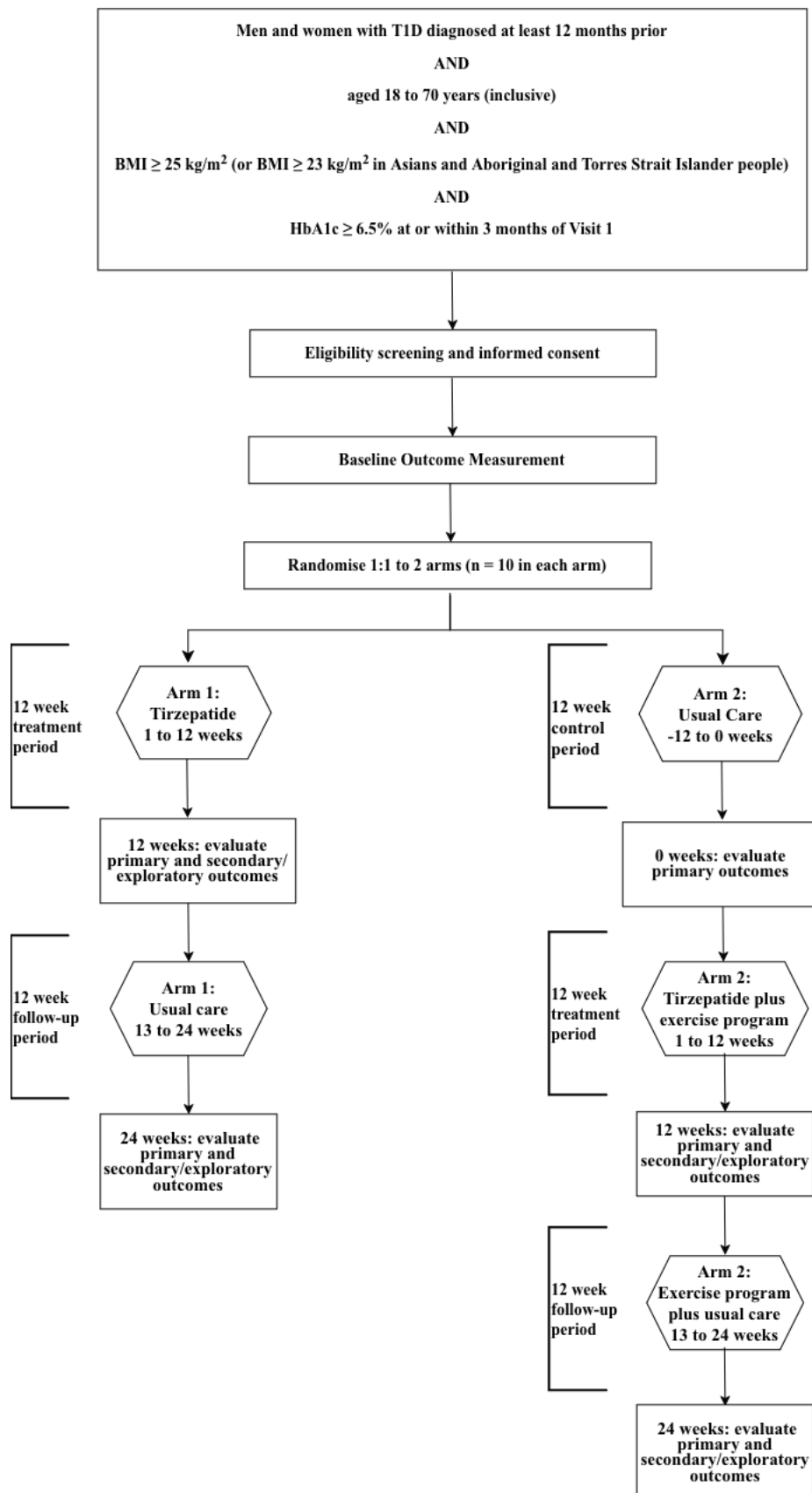


Figure 1. Study flowchart

References

1. Snaith JR, Frampton R, Samocha-Bonet D, Greenfield JR. Tirzepatide in Adults With Type 1 Diabetes: A Phase 2 Randomized Placebo-Controlled Clinical Trial. *Diabetes Care*. 2026 Jan 1;49(1):161–70.

Cost-effectiveness of health technologies in adults with type 1 diabetes: an updated systematic review and narrative synthesis

Uddin F¹, Ghoshal R¹, Pease A¹, Bloom D², Jones T^{3,4}, Davis E^{3,4}, Zoungas S¹, Zomer E¹

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia,

²Department of Global Health and Population, Harvard T.H. Chan School of Public Health, Harvard University, Boston, USA, ³Children's Diabetes Centre, The Kids Research Institute, Perth, Australia,

⁴Department of Diabetes and Endocrinology, Perth Children's Hospital, Perth, Australia

Aim/s: With the rapid evolution of type 1 diabetes (T1D) technologies, contemporary evidence on their economic value is essential to guide clinical and policy decisions. This review updates the systematic review by Pease et al. (2020), which found insulin pumps and continuous glucose monitoring (CGM) frequently cost-effective, while evidence for sensor-augmented pump (SAP) and early automated insulin delivery (AID) systems was inconsistent. We summarise new evidence on the cost-effectiveness of current T1D technologies.

Methods: A systematic search of PubMed, EconLit, the International Health Technology Assessment Database, the Cost-Effectiveness Analysis Registry, and Research Papers in Economics was conducted from 25 April 2019 to 7 May 2025. Eligible studies were full economic evaluations of insulin pumps, CGM, SAP, or AID systems compared with usual care (multiple daily injections (MDI) and/or self-monitoring of blood glucose (SMBG) and/or other technologies) in adults with T1D. Costing studies and budget-impact analyses were excluded.

Results: Of 1,581 records identified, 36 studies were included. As in the earlier review, most were model-based (n=34), commonly using the IQVIA CORE Diabetes Model. CGM remained favourable: all real-time CGM studies (100%) and most intermittently scanned CGM studies (89%) reported cost-effective or cost-saving results. Findings for more advanced technologies mirrored previous variability. Eleven studies reported AID systems to be cost-effective, whereas five reported non-cost-effective or uncertain results, often due to differing modelling assumptions. Determinants of cost-effectiveness were consistent with Pease et al., including patient population, time horizon, intervention cost, treatment effects, and quality-of-life gains, particularly reductions in fear of hypoglycaemia. Societal perspectives improved cost-effectiveness, but few considered carer costs.

Conclusion: This updated review reinforces earlier evidence that modern diabetes technologies, particularly CGM, are generally cost-effective. However, cost-effectiveness evidence for advanced systems such as AID remains mixed. Further standardised, high-quality evaluations that capture the full societal costs are needed as technologies and clinical evidence evolve.

Effects of sodium-glucose cotransporter-2 inhibitor use on major adverse cardiovascular events in participants with type 2 diabetes and cardiovascular disease treated with tirzepatide versus dulaglutide

Zoungas S^{1,2}, D'Alessio D³, J. Wiese R⁴, Nishiyama H⁴, J. Nicholls S⁵

¹School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia, ²The George Institute for Global Health, Sydney, Australia, ³Duke University Medical Center, USA, ⁴Eli Lilly and Company, USA, ⁵Victorian Heart Institute, Monash University, Australia

Aim: In SURPASS-CVOT, tirzepatide's (TZP) cardiovascular (CV) effects in participants with T2D and CV disease were compared to dulaglutide (DULA) in those with/without sodium-baseline glucose cotransporter-2 inhibitors (SGLT2i) use.

Methods: This Phase-3, double-blind study randomized participants 1:1 to once-weekly TZP ≤15 mg or DULA 1.5 mg, comparing time to first MACE-3 endpoint for participants with/without baseline SGLT2i use. Secondary analyses included time to first occurrence of MACE-4 and time to all-cause death. Adverse events (AEs) were evaluated by baseline SGLT2i use.

Results: At baseline, 30.6% participants used SGLT2i and had similar demographics across groups. At 36-months TZP and DULA usage increased to 33.8% and 41.1%, respectively. Baseline SGLT2i use was not associated with an impact on the relative treatment effect of TZP vs. DULA for MACE-3, MACE-4, and all-cause death. At 36-months, the treatment effect for TZP vs DULA was HbA1c (-0.81% p<0.001 vs. -0.77% p<0.001), weight (-6.55% p<0.001 vs. -6.88% p<0.001), and eGFR (0.86 mL/min/1.73m² p=0.036 vs. 0.87 mL/min/1.73m² p=0.005) in both subgroups with and without SGLT2i, respectively. AEs were consistent with the known safety profiles, regardless of SGLT2i use.

Conclusions: The relative effect of TZP vs. DULA on MACE-3, MACE-4, and all-cause death was similar with or without baseline SGLT2i use.