

"...Rural areas are often Forgotten..."

A Qualitative study Exploring perceptions of Research Participation among Adults with type 2 Diabetes living in Australian Rural communities.

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Aim: Rural communities are under-represented in diabetes research, with implications for the relevance and implementation of research outcomes. Increased efforts to conduct diabetes research in, or inclusive of, rural communities are predicated on effective participant recruitment. This study explores the motivations for, barriers to, and enablers of, research participation among adults with type 2 diabetes (T2D) in rural communities.

Method: A phenomenological qualitative study was conducted involving 10 adults (18+ years) living with T2D in rural communities (using Modified Monash Model definitions) and recruited via rural community centres, T2D peer support groups, rural health professional associations and non-government organisations. Representation across States and Territories, as well as diverse age and gender was sought. Audio-recorded, semi-structured interviews explored participants prior research experiences as well as personal and perceived community barriers, enablers and motivations for research participation. An abductive coding approach was undertaken to identify salient themes.

Results: Participants were living in five states, ranging in age from 41-76 years; and 40% were women. Preliminary results suggest that barriers to research participation include lack of viable transport infrastructure, travel costs, long wait times for diabetes services, diabetes stigma and lack of community awareness about research. Enablers include promoting research benefits to rural communities, collaborating with community leaders and local networks for recruitment and offering services or access to diabetes care that are not available to rural communities as part of research activities. Strong motivations for research participation included opportunities to advocate for rural communities, highlight poor access and resourcing of diabetes services, as well as altruistic motivations.

Conclusion: These findings can inform practical strategies that may improve recruitment mechanisms for T2D research in rural communities, e.g., community-driven recruitment methods and clear messaging regarding the relevance and benefits to community. Evaluation of the effectiveness of such strategies in research practice will be needed.

“It felt like it was my fault”: Exploring the Social Experiences of Women with Gestational Diabetes and Co-Designing a Measure of Gestational Diabetes Stigma.

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Aim: To explore the social experiences of gestational diabetes mellitus (GDM), including stigma and discrimination, among women with GDM in Australia; and to co-design a measure for quantifying the prevalence and impacts of GDM-specific stigma.

Methods: A GDM-specific Lived Experience Advisory Group (G-LEAG) informed all aspects of the two-phase research process. Women with current or recent (within 3 years) GDM were invited to participate in two online interviews. Phase one included semi-structured interviews with 20 women, which explored social experiences of GDM. Thematic analysis of stigma concepts discussed in interviews and G-LEAG input informed the development of a GDM-specific stigma item pool. Phase two included debriefing of the item pool with a subset of 10 interviewees. The new measure was refined in a collaborative and iterative process.

Results: Phase one interviews suggested that all participants had experienced stigma or internalised stigma. Multiple sources and settings of stigma were reported, predominantly featuring healthcare settings. Examples of stigma and its impact include perceived judgments for the diagnosis and its treatment (e.g., due to assumptions about, or hyperfocus on, individual responsibility), perceived loss of autonomy in clinical care, self-blame and non-disclosure. 66 items were designed. In cognitive debriefing interviews, women reported that the item pool comprehensively covered their experiences of GDM-specific stigma. They perceived the item pool to be of high importance towards supporting the reduction of the stigmatisation of women with GDM.

Conclusions: This study provides novel insights into the experiences and impacts of stigma among women with GDM in Australia. It resulted in a co-designed GDM-specific stigma item pool, assessing experiences of blame, shame, internalised stigma, and prejudicial treatment. The new measure is ready for assessment of its psychometric properties and item reduction.

A joint Endocrinologist-Credentialed Diabetes Educator approach to establish a new model of care for diabetes management

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Aim: To optimise diabetes outcome through a close collaborative framework between Endocrinologists and CDE

Methods: A new Telehealth clinic aimed to deliver intensive consultations over a period of six months by diabetes clinicians to people with Type 2 diabetes diagnosis within the previous two years. It involved three joint consults with both Endocrinologist and CDE and regular follow-ups with CDE in-between. Consults were up to 60 minutes in length, aimed to provide a comprehensive understanding of their diabetes, develop and implement a tailored management plan, thorough education on self-management skills and ongoing guidance. Patients had the same clinicians in this novel clinic to provide continuity of care and direct contact details were provided for prompt communication. Pathology results, medication regimen, weight and waist measurements and quality of life surveys were the benchmark outcomes for this clinic. This abstract follows the journey of one such patient. The author was involved in the clinic and data was collected through the electronic medical records.

Results: The patient was a 40-year-old professional who was living alone in Melbourne with a medical history of severe obesity, OSA and PCOS. There were numerous changes to her diabetes medications due to perceived side effects and medication adherence. Side effects included itchiness, foggy brain, light-headedness, headache, hives, nausea and poor concentration. Diabetes medications were changed from Optisulin, Metformin to Humalog Mix to Ryzodeg. Over a four months period, a total of XX consultations were made via face-to-face and virtually from the diabetes team.

Insert snippets of Weight, A1C, TIR CGM

Conclusion: The joint collaborative approach presents a promising strategy for diabetes patients to understand their diagnosis in their own time, thus empowering them to take control of their health. This will promote long-term adherence to diabetes management and lessen the risks for developing diabetes-led complications.

A Self-controlled, Cross-over study of Intensive Insulin Treatment with Needle-based Injection versus Needle-free Injection in Hospitalized patients with Type 2 Diabetes

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Background and Aims: Needle injection and needle-free injection were proven effective in improving glycated hemoglobin (HbA1c) in type 2 diabetes mellitus (T2DM) patients. However, it is unclear if needle-free and needle injections of insulin during intensive insulin therapy in hospitalized patients provide similar efficacy and safety benefits.

Methods: A self-controlled cross-over study was conducted on 62 patients with T2DM who received intensive long-acting and short-acting insulin injections with or without needles. The 7-point blood glucose test was performed on the 6th day after insulin administration and the injection method switched on the 7th day of hospitalization. The difference was compared in 7-point blood glucose levels.

Results: The blood glucose levels at fasting (mean difference = -1.09 ± 2.38 mmol/L, 95% CI, -1.69 to -0.48, $p=0.0007$) and post-breakfast (-1.14 ± 3.02 mmol/L, 95% CI, -1.91 to -0.37, $p=0.004$) were better when patients were receiving needle-free injections compared to when receiving a needle injection. Indeed, daily blood glucose fluctuation, which presented as the area under the curve of glycemia, was decreased in needle-free injection periods (-0.348 ± 9.64 , 95% CI, -5.95 to -1.01, $p=0.0065$). There was no significant difference in the dose of long-acting insulin between the two injection methods (-0.32 ± 2.69 , 95% CI, -0.99 to 0.37, $p>0.05$). The dose of fast-acting insulin during the needlefree period was lower than that of when patients received needle injections (-1.66 ± 6.45 , 95% CI, -3.29 to -0.025, $p<0.05$). There was no significant difference in satisfaction between the two regimens (-0.59 ± 1.55 , 95% CI, -0.938 to 0.509, $p=0.557$), but there was a significant difference in pain experience, favoring needle-free injections ($p < 0.001$).

Conclusion: Glycemia was better controlled by needle-free insulin injections in hospitalized T2DM patients subjected to intensive glycemic control. These patients also experienced less pain than when insulin was injected with a needle.

Application of Shared Care Clinic in the Management of Type 2 Diabetes

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Aims: The shared care model is an innovative intervention approach that brings together a multi-disciplinary team, including physicians, dietitians, exercise instructors, educational nurses, and online managers. This study aims to assess the impact of the shared care management model on glucose control in patients with type 2 diabetes (T2DM).

Methods: From 2020 to 2024, 873 patients were recruited to participate in the co-care management program in Zhongda Hospital, Southeast University. Based on the online activities including chat frequencies, diet records, self-monitoring of blood glucose, and app login frequencies, we divided the patients into active or inactive users. Multivariate logistic regression analysis was used to determine the influencing factors for HbA1c after one year.

Results: Among the 873 T2DM patients, 126 had fewer than 2 clinic visit during a year (72 online-inactive, 54 online-active), and 747 had at least 2 clinic visits (350 online-inactive, 397 online-active). Online-active patients tended to be younger, had shorter diabetes duration, and higher baseline HbA1c levels, but lower control rates of HbA1c when compared to those inactive online (all $P < 0.05$). Patients with at least 2 clinic visit records were older than those fewer than 2 clinic visit during one year ($P = 0.042$), while there was no significant difference in diabetes duration, HbA1c levels, or HbA1c control rates between groups. The multivariate logistic regression analysis revealed shorter diabetes duration, lower baseline HbA1c levels and a combined management by online and offline were associated with the better HbA1c control after one-year follow up.

Conclusions: Compared to the traditional offline-only management model, the shared care management model could improve HbA1c levels and increase the likelihood of reaching target rates, offering a new pathway for advancing the standardized clinical management of diabetes.

Assessment of a Hospital-based Ambulatory Insulin Dose Titration program post EMR Introduction and Visit scheduling

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Aim: To interrogate the Electronic Medical Record (EMR) and historical glycaemic records to identify predictors of and patterns in referral characteristics, participation and program outcomes after a change from ad hoc to scheduled visits.

Methods: Previously conducted assessments and subsequent improvement measures have demonstrated our ability to improve patient engagement and deliver measurable positive changes to HbA1c with this program. For this assessment, 425 patient referrals post- hospital or clinic presentation were captured to evaluate the program's effectiveness and outcomes. Analysis of over 900 encounters and data including average glucose and Time-in-Range per contact, referral and exit reasons, medication regimen and total daily insulin dose pre & post, presence or absence of hospital presentation, and whether or not a Diabetes Nurse Educator reviewed prior.

Results: Over 435 encounters have been analysed; the full data analysis will be presented at the conference. The findings will be compared with previous program analysis to comment on whether scheduling of visits impacts on engagement or outcomes. Early results indicate replication of results identified in previous program assessments; patients who completed the program or reached glycaemic targets had a lower failure to attend rate.

Conclusion: Assessing a large volume of patient encounters for the ambulatory insulin dose titration program identified workflow gaps that have been able to be immediately addressed. The EMR is highly useful to probe the effectiveness of a program and serves a multi-functional purpose; medical record, operational, workflow and reporting tool. This evaluation will provide insight into which elements influence the effectiveness of a titration program and a direction on where to focus resources or improvements, for example; engagement strategies.

Australasian Type 1 diabetes Immunotherapy Collaborative (ATIC) – Early achievements and learnings

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Introduction: ATIC was established in 2022 with a mission to accelerate the delivery of disease-modifying treatments for T1D. Hosted by St Vincent's Institute of Medical Research (SVI) and supported by seed funding from JDRFA, ATIC is a facilitating clinical trial network with a steering committee, community engagement panel (CEP), scientific advisory group, executive committee and management team overseeing the activities of six interconnected domains: Clinical Trials, Education and Training, Community Engagement, Pre-Clinical and Translation, Data Management, Regulation and Government.

Early achievements: The development of an ATIC prioritisation framework and assessment tools, have enabled efficient review of clinical trial proposals through the steering and executive committees. A centralised approach to participant recruitment has resulted in three clinical trials rapidly reaching recruitment targets. This has attracted attention from international colleagues and industry and brought an increasing number of both investigator-initiated and commercially sponsored trials to Australia.

Strong community engagement is core to early ATIC activities. The CEP provides feedback during the assessment of immunotherapy trial proposals and supports the development of both lay and health professional information materials. A self-initiated, CEP project will be delivered in 2024, filling a gap in community education about the stages of T1D, and the potential for immunotherapy use.

Knowledge translation is essential to ensuring immunotherapy treatment for T1D moves beyond the research domain and into the clinic. Next generation researchers are invited to participate in the ATIC steering committee, and a national mentoring and peer-to-peer support network have been created. A monthly seminar series has been established for national and international speakers to share research in the field.

Future goals: ATIC is striving to build a self-sustaining clinical trial network by the end of seed funding in 2026, to continue driving our mission to deliver disease modifying, immune-based therapies for people living with T1D.

Can a person with Cognitive Impairment Safely use HCL pump therapy? What resources are required for this to be successful? A case study

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Aim: To adequately support a person with T1DM, hypo-unawareness and cognitive impairment transition from multiple daily injections (MDI) to hybrid closed loop (HCL) insulin therapy.

Method: Intensive intervention was provided by a quaternary diabetes education facility, supporting commencement of HCL therapy in a person with cognitive impairment and memory issues. The impaired cognition was previously undetected by the service due to telehealth workup and gaps in the screening process. Additional support was required from the diabetes educators, HCL company, dietitian and endocrinologists over an extended time period, providing a significant number of additional contacts than standard care. Repeated education and assistance with problem solving was provided. A review of the pump referral and work-up process was conducted.

Results: In this experience, a person with memory issues and impaired cognition required intensive and ongoing support to use an insulin pump. HCL therapy has achieved better glucose control by reducing hypoglycaemia and slightly increasing Time in Range (TIR). Importantly, our patient reports satisfaction with the pump and improved quality of life.

Conclusion: All people starting HCL therapy require significant education and training. We have found that a person with cognitive impairment requires extensive additional support post pump commencement to ensure safety and achieve the desired outcomes. A structured insulin pump work-up program involving the multi-disciplinary diabetes team to thoroughly assess patients prior to starting an insulin pump will assist planning for appropriate resources and supports to facilitate a safe and successful transition to HCL pump therapy. Our experience demonstrates mildly improved TIR and reduced adverse glycaemic events are achievable in a person who is willing and able to engage with ongoing support.

Characteristics of Retinopathy and Cataract Among Hospitalized Individuals with Type 2 Diabetes

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Aims: To assess the glucose profile and clinical characteristics of individuals with Type 2 Diabetes Mellitus (T2DM) hospitalized due to complications from cataract and Diabetic Retinopathy (DR), and to evaluate the relationship between these parameters and DR.

Methods: In this observational study, 1987 individuals with T2DM admitted to ophthalmology departments were enrolled. A total of 25,941 point-of-care tests (POCT) were conducted for blood glucose monitoring from July 2019 to July 2022. Data was collected using an information glucose management system (IGMS). The patient-day model was utilized as a metric to assess glycemic control. Risk factors for DR were also evaluated.

Results: Among the 1987 individuals, 1244 had both cataract and diabetic retinopathy (CAT+DR group), and 743 had only cataract (CAT group). Urea, duration of DM, level 1 hypoglycemia, level 2 hypoglycemia, level 1 hyperglycemia, and age were associated with DR. The standard deviation of blood glucose (SDBG), rates of level 1 hypoglycemia, level 2 hypoglycemia, level 1 hyperglycemia, and level 3 hyperglycemia were higher in the CAT+DR group than in the CAT group.

Conclusions: Urea, duration of DM, and hypoglycemia might be risk factors for DR. The glycemic control and adverse glycemic events in individuals with T2DM complicated by cataract and DR are still far below the targets recommended by guidelines and need improvement.

Climate Control: Assessing the Relationship Between Weather Patterns and Glucose Profile in Type 1 Diabetes

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Background: Many factors influence day-to-day glucose variability in young adults living with type 1 diabetes (T1D). Individuals with T1D are advised that weather extremes can impact their blood glucose levels. No study has examined the evidence for this recommendation.

Aim: To assess the relationship between environmental temperature and metabolic parameters in T1D including time-in-range (TIR; primary outcome), insulin dose and other continuous glucose monitoring (CGM) metrics.

Methods: Eligible subjects were young adults living with T1D wearing CGM who attended the St Vincent's Hospital Sydney Diabetes in Youth (DIY) Clinic during the study period (Feb-2023 to Feb-2024). We obtained daily CGM, total daily insulin dose (TDI), and weather data from the 14 days preceding each quarterly clinic visit. Daily temperatures were sourced from the Bureau of Meteorology's Observatory Hill weather station. Data were grouped by temperature (cool 10-19.9°C, moderate 20-29.9°C, hot 30-40°C) and in a separate analysis, by season. Statistical analyses included one-way ANOVA to detect intergroup differences, and Pearson's correlation ($p < 0.05$ significant).

Results: We collected 302 days of CGM sensor data from 7 young adults with type 1 diabetes (4 men, 2 women, 1 transgender woman; age 19 ± 0.6 years, 7.3 ± 3.0 years with diabetes, HbA1c $7.3 \pm 1.1\%$, BMI $23 \pm 2.7 \text{ kg/m}^2$, 71% hybrid closed loop[HCL]/29% multiple daily insulin injections [MDI]). There was no difference in TIR by temperature (cool $59.8 \pm 12.8\%$ vs moderate $54.6 \pm 14.3\%$ vs hot $51.8 \pm 18.1\%$; $p = 0.69$) or season (spring $53.4 \pm 15.2\%$ vs summer $46.4 \pm 26.1\%$ vs autumn $57.1 \pm 15.3\%$ vs winter $52.3 \pm 23.6\%$; $p = 0.86$). Time-below-range (TBR), time-above-range, coefficient of variation and TDI also did not differ by temperature category or season. Temperature when examined continuously, did not correlate with TIR, TBR or TDI.

Conclusion: In Sydney-based young adults with T1D, weather conditions did not impact TIR. HCL algorithms may mitigate temperature and seasonal metabolic impacts in T1D. Larger studies powered for MDI and HCL subgroups are warranted.

Close to Home Diabetes Program - a Virtual Case Conference Involving Patients, GPs, Diabetologist and an Integrated-Care Diabetes Educator: The Royal North Shore Hospital Experience

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Introduction: Despite an aspirational philosophy that most patients with T2D be managed in general practice, referrals to diabetes outpatient clinics remain high, and waiting times are long. A number of responses are being developed to address this conundrum.

Objectives: To assess the clinical effectiveness of virtual case conferencing for some patients as an alternative to enrolment in the diabetes OPD and to assess the acceptability of this approach for both patients and general practitioners.

Methodology: A triage process was introduced for all patients referred to the diabetes OPD that included a multidisciplinary (Endocrinologist, Diabetes Educator, the referring GP, and relevant family members) virtual case-conference (GPCC).

Results: 86 patients with T2DM (54M, 32F), aged 63y (26-94y), 19% newly diagnosed, 81% existing diabetes (mean duration 13.5 years), are the subject of this report.

88% were referred to the OPD for medication advice, 22% for hypo/hyperglycaemia management. A change in management was recommended in 82% of cases, including an increase of OHA dosage (10%), initiating SGLT-2i (19.6%), GLP-1 RA (21.6%), DPP4i (2.0%), insulin (11.8%), or lipid-lowering agents (3.9%). Digital education materials were supplied to 27.5%, and T2DM group education, dietitian appointment and a 2nd GPCC for 11.8%, 5.9% and 3.9% respectively.

Pre and post GPCC pathology data were available for 51 patients. The mean baseline HbA1c was 7.5%, and fell to 7% at 3-6 months post-GPCC, with 71% achieving target. Of the 29% not reaching target, medication shortage (13.3%), injection refusal (47%), and suboptimal adherence (27%) were explanations.

30% of GPs completed the post-GPCC survey; all found the GPCC useful, improving GP-hospital communication and relationships, and 79% reported increased management confidence with 59% suggesting it could reduce standard OPD referrals.

Conclusion: A multidisciplinary GPCC offers a beneficial alternative to standard OPD appointments, enhancing GP capacity building and fostering improved GP-hospital communication and relationships.

Collaborative Education Programme: A focus on Residential Aged Care (RACF) Nurses in the Northern Sydney Local Health District

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Introduction

The COVID-19 pandemic highlighted a gap in the education and training of RACF nurses in diabetes management. We address the principles recommended by the Agency of Clinical Innovation¹ by providing education to RACF nurses through our collaborative education programme which invited all nurses from the NSLHD to participate in our first online and in person hybrid format.

Aim

To present the evaluation of RACF nurses who attended our annual full day diabetes education programme at Royal North Shore Hospital, Sydney.

Results

- 63 nurses participated, 39 RACF Nurses, 17 Practice Nurses, 7 Others (Community & Hospital Nurses)
- 53% attended in person, while 48% joined virtually
- Despite online-attendance providing increased accessibility & opportunity to participate, there was still a strong preference to attend face to face
- The number of RACF nurses attending online may have been underreported due to using shared logins
- RACF nurses' self-rated confidence in managing diabetes was high but their baseline knowledge on testing was low. Importantly, both knowledge & confidence improved post programme
- Overall the programme was rated very good/good
- Topics that were valued most were basics of diabetes, diabetes medications, BG monitoring, hypo/hyperglycaemia management with a preference for workshops & case study based learning

Conclusion

- RACF nurses' knowledge and confidence in managing diabetes improved after attending the programme
- First time this programme was offered both online and in person but majority still prefer face to face learning

Reference:

1. Agency for Clinical Innovation (2021). Diabetes Management in Residential Aged Care Facilities During COVID-19: Principles. Viewed on 10 May 2024.
https://aci.health.nsw.gov.au/_data/assets/pdf_file/0006/654387/ACI-Diabetes-management-residential-aged-care-during-COVID.pdf

Comparison of Ultrasound Scanning and Clinical Examination for Detecting Insulin Injection Related Lipohypertrophy and Construction of Lipohypertrophy Classification Table

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Aims: To explore an cost-effective, convenient method for lipohypertrophy (LH) detection with a high detection rate, and to construct a classification table for LH, so as to provide reference for LH screening and management.

Methods: From December 2021 to November 2022, 395 hospitalized patients with diabetes from a Tianjin tertiary hospital were enrolled. The LH was detected through ultrasound scanning (USS), structured visual palpation (SVP), and ordinary visual palpation (OVP), and the detection rates were compared. A classification table for LH (LH-LNT table) was constructed based on SVP characteristics.

Results: Under USS, SVP, and OVP, the detection of LH was 89.6%, 78.0%, and 66.6% respectively, with site detection at 92.3%, 71.2%, and 57.8% respectively, showcasing statistically significant differences among the three methods. SVP had a lower misdiagnosis rate than OVP, with upper arm and thighs being common misdiagnosed sites. LH was mostly found in the lower abdomen, with flat appearance, soft texture, and mainly manifested as hyperechogenicity. L1N2T1 (two soft LH on abdomen) was the main type, accounting for 35.4%.

Conclusions : SVP is useful for detecting LH and deserves clinical promotion. The LH-LNT table constructed here effectively summarizes patient LH status, aiding doctor-nurse-patient communication.

Construction and Application of Mobile Health on the Integrated Care of Older People with Diabetes

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Objective: To evaluate the application effect of mobile health (mHealth) on the integrated care of older people (ICOPE) with diabetes.

Methods: Non-Randomized concurrent control trial was used to screen diabetes patients aged 60~79 years who met the research criteria from July 2022 to June 2023 in a medical center in Sichuan, China. According to the patient's willingness, they were divided into a control group and an intervention group. The control group received telephone follow-up, while the intervention group received mHealth service. Firstly, we established a multidisciplinary management team and rely on online and offline medical resources to invite patient children to participate in providing integrated care. Then, the ICOPE process was established, including comprehensive health assessment, hierarchical management and follow-up plan. And the intervention lasted for 6 months.

Results: There were 82 patients in the control group and 80 patients in the intervention group, and the average age was 68.5 vs 67.3 years, 47 males (57.3%) vs 56 males (70.0%), and 24 vs 36 patients in poor health status, 12 vs 22 patients in medium health status, 46 vs 22 patients in good health status. At baseline, the HbA1c levels in the control group and intervention group were 8.0% and 7.9% ($P>0.05$). After 6 months, HbA1c levels decreased by 1% and 0.9% ($P<0.05$), the diabetes specific quality of life (DSQL) increased to 116.8 ± 12.4 points and 126.5 ± 6.8 points ($P<0.05$). In the control group, 5 patients went to the emergency department due to acute complications and 6 patients suffered from hypoglycemia. In the intervention group, 3 patients suffered from hypoglycemia.

Conclusion: The mHealth on the ICOPE with diabetes can help improve the level of HbA1c, improve the quality of life of patients, and reduce complications.

Cross-sector Collaboration to address Diabetes related potentially Preventable Hospitalisations and Non-urgent Outpatient Appointments in WA

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Aim: The Integrated Diabetes Care project, funded by WA Primary Health Alliance (WAPHA) and under the management of Diabetes WA, revealed the significant impact that type 2 diabetes is having on potential preventable hospitalisations and outpatient appointments in the WA health system.

Method: The project built on the existing Diabetes Health Network's working group and their contributions to this scope of work. Membership included representation from North, South and East Metropolitan Health Services, WA Country Health Service, Hospital Liaison GPs and WAPHA.

Extensive consultation and cross-sector collaboration with tertiary hospitals, community health services, clinicians, GPs and consumers, validated the challenges in diabetes care in WA and saw clear themes emerge; increasing complexity of diabetes, complex medication regimes, fragmented services and an inadequate and overwhelmed diabetes specialised workforce leading to treatment delays and unnecessary referrals to tertiary endocrinology clinics.

Results: This project culminated in a truly codesigned simple, yet innovative solution 'Diabetes Connect', integrating services across the primary, community and tertiary sectors to facilitate continuity of care and provide timely provision of appropriate, safe and quality care.

Diabetes Connect will:

- Connect GPs to timely and efficient specialist endocrinology and credentialled diabetes education from the Diabetes Connect team at Diabetes WA
- Provide virtual case conference opportunities for GPs for more complex patients
- Enable GP practices to connect consumers to ongoing virtual and digital self-management support from Diabetes WA, and to other community services
- Build GP and practice capacity to manage more complex diabetes cases in community

Conclusion: Diabetes Connect will make efficient and effective use of limited resources and facilitate, drive and support collaboration across the sectors with the person living with diabetes always at the centre. It will deliver an integrated whole pathway approach, optimising early intervention to achieve outcomes across the quintuple aim and ultimately reducing diabetes preventable hospitalisations.

Developing Digital resources to Address Climate-related Health risks for People living with Diabetes.

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With increasing numbers of Australians being impacted by extreme weather events, there is a need to raise awareness among people living with diabetes about the importance of planning and preparing for natural disasters and extreme weather.

Aim: The aim of this project was to review and update existing NDSS natural disaster resources and co-design new digital resources to help people living with diabetes access this information anywhere, anytime.

Method: People with type 1 diabetes (T1D) or type 2 diabetes (T2D), living in an area prone to natural disasters, were invited to participate in a facilitated online bulletin board (BB) discussion exploring how they navigate information about diabetes and disaster management, and seeking feedback on existing natural disaster information, as well as content and visuals for an online animation.

Results: Nineteen people living with diabetes (14 T1D; 5 T2D) participated in the BB. Qualitative feedback suggested improvements to language, readability, format, and content of the NDSS 'My Diabetes Plan for natural disasters' checklist. Participants responded positively to the animation script 'Diabetes and natural disasters: Have a plan be ready' and to the call to action 'Plan, pack and check.' Feedback provided guidance for the development of promotional assets and communications.

Conclusion: Outcomes of this project include (1) updating of the NDSS checklist, which is available to be printed or completed online for saving and/or sharing; (2) development of assets to support digital delivery including a short video animation and social media assets about preparing for a natural disaster and (3) audio grabs for local radio. Further work is being undertaken to develop information for people with diabetes about extreme heat.

Using a digital delivery format provides opportunities for dissemination of real-time targeted communications to NDSS registrants in areas at high-risk of a natural disaster or extreme weather event.

Development of a Competency Assessment Tool for Diabetes Education practice

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Aim: The ADEA Credentialed Diabetes Educator (CDE) is a multidisciplinary role practicing in a variety of clinical settings. CDE status signifies quality of care and is recognised by the National Diabetes Services Scheme, Medicare and the Department of Veteran's Affairs. However, there is currently no formal assessment of competency, with appraisal of quantity and not quality of professional practice for credentialling and re-credentialing. The aim of this project was to develop and validate a competency assessment tool for assessing novice diabetes educators' practice in the clinical setting.

Method: The criteria for the Diabetes Education Competency Assessment Tool (DECAT) were adapted from the ADEA National Competencies for Credentialed Diabetes Educators (ADEA, 2017) and the Capability Framework for Diabetes Care (Murfet, 2022). The DECAT was evaluated in two phases: i) a survey of key stakeholders to validate the DECAT content, and ii) a pilot study to assess inter-rater agreement and obtain feedback on the user experience. Participants watched six short videos of simulated diabetes education consultations and recorded their ratings using an online form and attended a focus group interview.

Results: The DECAT includes six dimensions, 24 clinical elements, and three levels of performance. Nine CDEs completed the video assessments, and seven attended the focus group. The performance of the educator observed in the videos was most frequently scored 'Developing Practitioner' (45%); 24% of scores 'Consolidating Practitioner', and 30% 'Effective Practitioner'. Intra-class correlation coefficient 0.612 (95% CI 0.335; 0.793) $p < .001$ indicated low to moderate agreement between assessors. The DECAT was considered acceptable and feasible to use at all stages of the professional practice pathway.

Conclusion: The DECAT fills a current gap in the demonstration and assessment of competencies required to practice as a CDE. Resources for training educators and assessors in utilising the tool will be needed to effectively implement the tool.

References:

Australian Diabetes Educators Association (ADEA). (2017) National Competencies for Credentialed Diabetes Educators. Canberra

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Diabetes Knowledge Disparities in Western NSW Communities

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Background: In the landscape of public health, where Type 2 diabetes mellitus (T2DM) poses a formidable challenge, fostering knowledge and awareness becomes imperative. Currently, T2DM affects approximately 1.2 million Australians, with a daily diagnosis rate of around 125 individuals. Alarmingly, up to 500,000 individuals unknowingly live with undiagnosed T2DM. This study, situated in Western NSW, seeks to assess the diabetes knowledge of its residents, recognizing the urgent need for improved awareness. By addressing knowledge gaps, health authorities can tailor interventions to this context, fostering proactive community health management and positively impacting outcomes.

Methods: Over five months, 97 participants underwent a diabetes knowledge test as part of a pharmacy-led screening project. The survey covered key aspects: general knowledge of diabetes (5 items), complications (6 items), diet (8 items), lifestyle (4 items), symptoms (4 items) and risk factors of diabetes (4 items). Data on demography, lifestyle and medical history were also collected. Correct responses were allocated one point, with a cumulative maximum score of 31. Data were analysed using nonparametric tests.

Results: Demographic analysis highlighted older (≥ 55 years; 63, 65%), female (51, 53%), and Australian-born (92, 95%) participants as significant cohorts. The median DKT score of all the participants was 22 (IQR: 3) with 50% of the scores falling within the range of 20-23. Those not taking blood pressure medication (58, 60%) showed significantly higher knowledge scores (6.0, $P = .03$). Having at least 2.5hrs of physical activity daily correlated with higher scores in diabetes complications awareness, participants with known high blood glucose had higher scores for general knowledge (4.13, $P = .009$) and lifestyle (2.47, $P = .013$) domains, emphasizing the link between personal health status and diabetes awareness.

Conclusions: This study demonstrated substantial knowledge gaps in the Bathurst community regarding diabetes. Tailoring interventions for older individuals, emphasizing physical activity, and targeting those with high blood glucose levels can effectively address these disparities. The findings provide a foundation for nuanced strategies to enhance diabetes awareness in regional settings, empowering communities for proactive health management and positive health outcomes.

Diabpedia - A new free on-line Educational Tool about Diabetes: Methodology and Preliminary results

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Aim: Diabetes education is a critical part of diabetes management that is associated with health professional and client time and cost. There are increasing capacity and budget constraints in our health system that limit appointment availability, and many people with diabetes seek advice online, often from unreliable sources. Our aim was to produce an app to give access to evidence-based diabetes education for people with Type 1, Type 2 and gestational diabetes.

Methods: Scripts for key diabetes topics were written by the Baker Institute clinical team. Short videos were developed using Canva®, a web-based design tool for video production and the artificial intelligence (AI), text-to-speech voice generator MURF.AI® for localised, speech generation. Topics were categorised by Type 1 diabetes, Type 2 diabetes and gestational diabetes. For testing, the files were made available on an app to patients attending the Baker Institute diabetes clinics, with access via the QR code below.



Results: Metrics were available for the number of video views. In the first 2-weeks there were 196 views by separate users (105, 73 and 18 for Type 1 diabetes, Type 2 diabetes and gestational diabetes (respectively)). User feedback collection is ongoing.

Conclusion: We have produced a low-cost educational tool to provide reliable and accurate information for people living with diabetes who have limited access to diabetes education. The use of AI-assisted videos has provided an inexpensive, high-quality product that can be updated and added to over time without the need for the high time and costs usually associated with video production. A national product launch is planned mid-2024. We are hopeful that this type of educational tool will improve access to basic diabetes education, particularly in poorly resourced regions and may also guide ongoing education.

Digital Interventions to Prevent Type 2 Diabetes: A Systematic Review

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Aim: Digital health has transformed how health care is provided and experienced, leading to great health system efficiencies and clinical benefits. In the past ten years, advanced digital interventions have been applied to diabetes prevention studies. No study has systematically and comprehensively been undertaken to examine effectiveness of these cutting-edge digital interventions. Our aim was to systematically review the current literature to examine the effectiveness of digital interventions for type 2 diabetes prevention.

Method: The review was conducted and reported following PRISMA guidelines 2020 for the last 10 years. We searched four databases (PubMed, Embase, CINAHL and Web of Science) in the last 10 years and systematically reviewed 52 articles of effectiveness of digital interventions for type 2 diabetes prevention. Digital interventions were coded using WHO's digital intervention classification 2023 version.

Results: Our review covered a variety of digital interventions, categorised as untargeted client communication, targeted client communication, personal health tracking, telemedicine, health professional decision support and data management. The efficacious outcomes of digital interventions in prevention of type 2 diabetes were demonstrated, particularly within categories of targeted client communication, personal health tracking and telemedicine. The combination of diverse digital interventions displayed superior outcomes. Using digital interventions with human support was more effective than digital interventions alone. However, there is still lack of evidence of effective implementation of virtual reality, artificial intelligent or big data in type 2 diabetes prevention.

Conclusion: Digital interventions were effective tools for diabetes type 2 prevention. Health professionals should use different kinds of digital interventions and integrate them with clinical support to optimize the effectiveness.

Targeted client communication, personal health tracking and telemedicine were effective tools. Further research is needed to examine the effectiveness of virtual reality, artificial intelligent or big data for type 2 diabetes prevention.

Digital Solutions and Their Impact on the Quadruple Aim in Outpatient Diabetes Management: A Scoping Review

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Aim: Diabetes significantly burdens global health, with nearly 1.5 million deaths in 2019, and is a major chronic health issue in Australia, affecting an estimated 5% of the population. The traditional outpatient management model is under pressure due to the chronic nature of diabetes, an ageing demographic, and an impending healthcare workforce shortage. While numerous studies highlight the clinical potential of digital solutions, a holistic literature review that encompasses all digital interventions within outpatient diabetes care, directly addressing the Quadruple Aim, remains absent. This study assesses digital interventions in outpatient diabetes care—such as telehealth, mobile health (mHealth), robotics, Electronic Medical Records (EMRs), and artificial intelligence (AI)—to understand their impact on the Quadruple Aim of healthcare.

Method: Employing the JBI methodology for scoping reviews and adhering to the PRISMA-ScR guidelines, systematic searches were conducted in PubMed, Embase, Cochrane, Scopus, and the Web of Science for relevant articles. From 4397 articles initially identified, 56 met the eligibility criteria for inclusion. Data extraction was descriptive.

Results: This review covered interventions in telehealth (30), mHealth (32), robotics (1), EMR (1), and AI (5), categorised across three digital horizons: Building digital workflows, Utilising descriptive data analytics, and Transforming scaled digital health. Evidence of positive outcomes for the Quadruple Aim—population health, patient experience, healthcare costs, and healthcare team well-being—was prevalent. Nonetheless, the findings indicate a dearth of evidence for digital interventions in robotics, EMR, and AI, highlighting the necessity for more robust research in these areas.

Conclusion: Digital solutions in outpatient diabetes management show diverse designs with mostly positive effects on Quadruple Aim outcomes. Yet, the limited evidence supporting robotics, EMR, and AI interventions highlights the need for more comprehensive studies to validate these findings and drive future healthcare innovations.

Distance is No Barrier for a Virtual Gestational Diabetes Education and Support service

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Aim: Health services in rural and remote WA are often challenged by huge distances, long term staff vacancies and specialist tertiary services concentrated in metropolitan Perth. Diabetes WA's aim was to develop a virtual gestational diabetes (GDM) education and support service for women living in country Western Australia (WA), integrating with local protocols and supporting more women to birth on country.

Method: With the support of the Western Australian Country Health Service, initial service development was undertaken with consultation and guidance from the diabetes education team at the state's tertiary maternity hospital. Utilising best practice care and person-centred principles and supported by technology, a centralised, fully virtual GDM service, led by diabetes educators with backgrounds in nursing and midwifery, dietetics, exercise physiology and pharmacy was rolled out. To understand and integrate with local protocols, the diabetes education team consulted and worked alongside obstetric teams from regional hospitals in WA.

Results: Since its commencement in 2017, the service has expanded to support women from all country regions of WA. In 2023 the service supported 188 women to manage their gestational diabetes, with over 1400 virtual appointments attended. This was particularly notable in the Pilbara region, with the virtual GDM Service supporting approximately 80% of women diagnosed with GDM in 2023. The service has now grown and developed to work alongside local obstetrics teams, Aboriginal Medical Services and local protocols to support more complex patients using insulin to manage GDM, thus supporting more women to birth on country instead of travelling to Perth.

Conclusion: Since the service first rolled out, the recent expansion of the virtual GDM service has seen the centralised multidisciplinary diabetes education team working with regional obstetric teams and Aboriginal Medical Services to support women birthing on country who would have previously been transferred to Perth due to complexity of diabetes care, hence overcoming some of the challenges of delivering time sensitive services to women diagnosed with GDM.

Does Lowered Mental Health Functioning influence the Health Service Use of people with Diabetes?

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Aims: Diabetes Mellitus is often a long-term health condition that continues to raise concerns regarding the burden upon an individual's mental health, due to the commitment required for day-to-day self-care. People living with diabetes frequently use complementary medicine as part of their diabetes self-care to manage their mental health and this raises a number of significant risk management issues. Unfortunately, no research has explored the influence of lowered mental health functioning upon both the conventional and complementary medicine health service use amongst people living with diabetes.

Methods: Using the mental health subscale of the Short Form Health Survey (SF-20), an examination of the conventional and complementary medicine health service use amongst men and women living with diabetes and normative or lowered mental health functioning, was undertaken by completing a secondary analysis of the Complementary Medicine Use, Health Literacy and Disclosure (CAMUHLD) study.

Results: Of the 176 participants reporting a diabetes diagnosis, 74% reported lowered mental health functioning, compared to 60% without a diabetes diagnosis.

Those with lowered mental health functioning were:

- nine times more likely to consult with a Western herbalist
- twice as likely to use vitamins or minerals
- five times more likely to engage in relaxation or meditation practice
- almost 4 times likely to consult with a counsellor or mental health worker
- less likely to consult with a specialist doctor

Conclusion: People living with diabetes who have lowered mental health functioning appear even more likely to use complementary medicine than conventional medicine, than those with normative mental health functioning.

Effect of Physical Activity intensity on Carotid Intima-media thickness in people with Type 2 Diabetes Mellitus

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Aim To analyze the relationship between different levels of physical activity (PA) and Carotid intima-media thickening (CIMT) in T2DM.

Method From 2019 to 2022, a total of 3,099 people with T2DM were selected from endocrinology clinics at two tertiary hospitals in Jiangsu Province, China. The IPAQ was used to assess their PA level, and were categorized into mild-intensity, moderate-intensity, and high-intensity PA group. Restricted cubic splines were used to evaluate the dose-response relationship between PA and CIMT thickening. For the people with sub-optimal HbA1c, stratified analyses were performed based on the status of BP and blood lipids.

Results There was a nonlinear relationship between PA and CIMT thickening ($P_{\text{nonlinear}}=0.029$). Moderate-intensity PA was negatively associated with the risk of CIMT thickening ($OR=0.747$, $95\%CI:0.605,0.923$, $P<0.05$). Stratified analyses showed that, in the mild-intensity PA group, compared with the subjects that neither BP nor LDL-C reached the standard, reaching the standard for either index or both was negatively correlated with CIMT thickening ($P<0.05$). Compared with the subjects that only BP reached the standard, both indicators reached the standard and only LDL-C reached the standard was negatively correlated with CIMT thickening ($P<0.05$). Compared with the subjects that only LDL-C reached the standard, both indicators did not reach the standard and only BP reached the standard was positively associated with CIMT thickening ($P<0.05$). In the moderate-intensity PA group, there was no statistical correlation between the achievement of each indicator and CIMT thickening. In the high-intensity PA group, there was a negative correlation between the achievement of both indicators and CIMT thickening ($P<0.05$).

Conclusion There was a dose-response relationship between PA and CIMT thickening. Moderate-intensity PA was negatively associated with CIMT thickening, especially in people with sub-optimal HbA1c, and, focusing on LDL-C compliance is particularly important to avoid CIMT thickening.

Effect of Training Program based on the Guideline “Facilitating Client Centered Learning” on Diabetes Specialist Nurse’s Health Education Ability: A pilot randomized controlled trial

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Objective: To explore the effect of training program based on the guideline "Facilitating client centered learning" on health education ability training of diabetes specialist nurses.

Methods: The convenient sampling method was used to select 49 nurses who had received the theoretical training of diabetes specialist nurses from the Chinese Nursing Society and passed the examination as the research objects. According to the cluster random method, they were divided into the experimental group and the control group, with 26 cases in the experimental group and 23 cases in the control group. The control group adopts traditional health education teaching and practice. The experimental group adopted the "Guidelines for Facilitating Client Centered Learning" for teaching and practice, including: interpretation of the "Guidelines for Facilitating Client Centered Learning", structured problem education, diversified health education materials (such as education color pages, food models, videos, etc.), and the use of health education operation scoring tables for teaching guidance during the education process. Finally, the intervention effect within the group was evaluated using a health education operation scoring table, and the intervention effect between the groups was evaluated using a nurse's health education ability evaluation scale and a patient's disease knowledge questionnaire.

Results: Baseline knowledge scores were similar between the groups. A statistically significant increase in health education ability and diabetic patients knowledge score was evident immediately post intervention for the intervention group ($t=7.947$, $P=0.000$), ($t=2.896$, $P=0.005$).

Conclusions: The health education training in diabetes specialist nurses based on the Guideline "Facilitating Client Centered Learning" is superior to the traditional health education training, which can improve the health education ability of diabetes specialist nurses and the degree of disease knowledge of diabetic patients.

Key words: Facilitating client centered learning, Diabetes Specialist nurse, Health education ability

Effects of Digital intelligent interventions on Self-management of Patients with Diabetic foot: A systematic review and meta-analysis

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Aim: To determine the effects of digital intelligent interventions on self-management in DF patients.

Method: Search was performed across 11 medical literature databases, up to March 13, 2024, to identify eligible randomized controlled trials. Two researchers independently conducted literature screening, quality assessment, and data extraction. The Cochrane Risk of Bias 2.0 tool was used for quality evaluation. Meta-analysis was performed using Review Manager 5.3.

Results: A total of 967 articles were retrieved, and 22 studies were finally included. All studies were rated as high risk. Meta-analysis was performed only on the 11 included studies due to different reporting formats of results. Compared to conventional interventions, digital intelligent interventions improved self-management ability among DF patients (n=962, SMD=1.49, 95% CI=0.92 to 2.05, I²=93%). Funnel plot analysis showed no obvious publication bias. Interventions were more effective in patients with Wagner grade 0 (SMD=1.35, 95% CI=0.62 to 2.08) compared to patients with Wagner grade ≥1 (SMD=0.92, 95% CI=0.13 to 1.71). WeChat interventions had the best effect (SMD=2.24, 95% CI=0.81 to 3.67), followed by video interventions (SMD=1.90, 95% CI=0.06 to 3.74) and mixed interventions (using at least 2 types of digital intelligent interventions) (SMD=1.27, 95% CI=0.56 to 1.98), while the effect of app interventions was not significant (SMD=0.68, 95% CI=-0.62 to 1.97). Interventions for 6 months were significant (SMD=1.52, 95% CI=0.61 to 2.44), while interventions ≤3 months were not significant (SMD=0.80, 95% CI=-0.01 to 1.61). The remaining 11 studies not included in the meta-analysis all showed that digital intelligent interventions had a beneficial effect on self-management of DF patients.

Conclusion: Digital intelligent interventions can improve self-management of DF patients. However, there is no consensus on the form, duration and specific strategies of intervention for different populations. In the future, more well-designed studies are needed to provide high-quality evidence in this field.

Registration number: CRD42024524473 (PROSPERO).

Effects of Supervised home-based Elastic Band Exercise in Pre-frail Older Patients with type 2 Diabetes Mellitus: A randomized controlled trial

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Background: Frailty has become a common syndrome in clinic as with the aging of whole population, which has increased incidence rate especially in patients with type 2 diabetes mellitus (T2DM). While the awareness of applying early interventions to prevent frailty is still lacking. This study aimed to explore potential effects of elastic band exercise in pre-frail older T2DM patients in China.

Methods: This study was a randomized controlled trial. The control group received a routine care, while the resistance training group received an extra 12-week elastic band resistance training under online and offline supervisions. The HbA1c, blood lipids, body composition, physical function, scales of diabetes specificity quality of life scale (DSQL), pittsburgh sleep quality index (PSQI) and short form geriatric depression scale (GDS-15) of the patients were evaluated before and after intervention.

Results: A total of 100 patients were included in this study. The patients were randomly divided into the resistance training group (n = 50) and control group (n = 50). The clinical characteristics of the two groups were comparable. After 12 weeks' training, muscle mass of the limbs ($P < 0.05$), physical function indicators ($P < 0.01$) including grip strength, chair stands, walking time, biochemical parameters including HbA1c ($P < 0.01$), HDL-C ($P < 0.05$), TC ($P < 0.01$) and LDL-C ($P < 0.01$), DSQL scores ($P < 0.01$) and the depressive status ($P < 0.01$) improved significantly in the resistance training group.

Conclusion: Supervised home-based elastic band resistance exercise could improve limb muscle mass, physical fitness, glucose and lipid control and quality of life in pre-frail older T2DM patients.

Keywords: Bone/Musculo-Skeletal, Diabetes Mellitus, Nursing care, Geriatric Medicine, Quality of Life

Enablers and Barriers of Active Health behaviors in Elderly patients with type 2 Diabetes: An analysis informed by the theoretical domains framework and COM-B model

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Aims: Active health is the sum total of all social activities of human beings centered on the creation of the value of life and health. Interventions targeting self-management in diabetes patients are on-going but few identify the status of active health behaviors and the underlying behaviour change mechanism. To enhance intervention effectiveness, recent tools in behavioural science such as the Theoretical Domains Framework (TDF) and COM-B model have been employed to understand behaviours for intervention development. The study examined enablers and barriers of active health behaviors in elderly patients with type 2 diabetes in China.

Methods: A qualitative, descriptive approach was used. Face-to-face semi-structured interviews were conducted with elderly patients with type 2 diabetes in a large academic maternity hospital in China. Interviews were recorded and transcribed into NVivo V.12 software. Data analysis followed the framework approach, drawing on the TDF and the COM-B model.

Results: Seventeen elderly patients with type 2 diabetes were interviewed (aged 60-83 years). Seven themes were summarised and used to explain the active health behaviors. The seven themes were (1) individual knowledge and experience of active health behaviors management, (2) beliefs about consequences and capabilities, (3) interactions of interpersonal situations, (4) environment, resources, and decision-making processes, (5) personal goal-setting and efforts towards behaviour change, (6) emotional influences on decisionmaking, and (7) personal characteristics.

Conclusion: Enablers and barriers of active health behaviors are multidimensional. The study findings confirm the need for multiple interventions to support active health behaviors management in elderly patients with type 2 diabetes, focusing on enhancing knowledge and skills in active health behaviors and using appropriate behaviour change techniques to provide a supportive environment.

Engagement with an App to Improve Mental Health and Diabetes Self-management among Young Adults with Diabetes

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Background and Aim: Young adults with diabetes experience many challenges during their transition from adolescent to adult life which can adversely affect their mental health (MH) and diabetes self-management. This study aimed to assess health engagement and self-management in a cohort of young adults with diabetes invited to use a digital care management program, Perx Health, tailored with self-managed health tasks and resources for diabetes and MH.

Method: Young adults aged 16-30 years, with Type 1, Type 2 or rare forms of diabetes were recruited from eight hospital services (7 in New South Wales and 1 in Victoria) as part of a Randomised Controlled Trial (RCT). Consenting participants were classified according to diabetes type and screened using the Kessler Psychological Distress Scale (K10) and Problem Areas In Diabetes Scale (PAID), and classified as having a mental health condition (MHC) if K10 \geq 20 and/or PAID \geq 40 or no mental health condition (NMHC) if K10 $<$ 20 and PAID $<$ 40. Participants from both groups (MHC and NMHC) were randomised to a Perx program configured through a multi-stage process involving both healthcare professionals and people with lived experience. Monthly metrics were collected in-app by Perx.

Results: Of the 116 randomised to the app, 76 (65.5%) on-boarded successfully. To date, the 76 participants utilising the Perx app are engaging with the app a mean of 6 times/day, utilising the app for 31 minutes/ week and completing 73% of the configured content. Self-reported health management task adherence is currently running at 68%, with participants completing on average 3 self-scheduled tasks per day, the main task types being medication (62%), measurements (15%) and activity including a step counter (24%).

Conclusion: Preliminary results indicate that the cohort are consistently engaged with the configured Perx app. Its effects on MH and diabetes outcomes will be explored at the completion of the RCT.

Enhancing Glycaemic Management in Respiratory Inpatients: A Nurse Practitioner-Led Model for Managing Glucocorticoid-Induced Hyperglycaemia

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Enhancing Glycaemic Management in Respiratory Inpatients.docm (could not be inserted)

Background:

Glucocorticoid-induced hyperglycaemia (GIH) is a common complication in respiratory inpatients receiving glucocorticoid therapy, often leading to significant morbidity. Traditional models of glucose management in hospitalised patients may not adequately address specific challenges posed by glucocorticoid-induced fluctuations in glucose levels.

Objective:

To evaluate the efficacy of a nurse practitioner (NP)-led model of care (MOC) in managing GIH among respiratory inpatients.

Methods:

This study was conducted in a tertiary hospital between June 2023-May 2024. We implemented a new MOC where Diabetes-NP assisted in the glycaemic management of respiratory inpatients with GIH. Key metrics collected after the implementation included the length of hospital stay (LOS), duration of glucocorticoid, instances of insulin commencement, total daily insulin dose (TDD) requirements, and overall glycaemic management. Paired t-test was used to compare serial BGL data.

Results:

36 patients (21 females), aged 73.4 ± 11.7 years were included. The commonest indication for steroid use in respiratory inpatients was exacerbation of chronic lung disease 19 (53%). LOS 5.9 ± 4.7 days, duration of glucocorticoids 6.9 ± 7.1 days and time to NP review from steroid initiation 2.9 ± 1.9 days. 21 (58.3%) patients were commenced on insulin, 20 (55.6%) patients had their oral hypoglycaemic agents adjusted and 4 (11.1%) patients had existing insulin doses adjusted. Significant declines in fasting blood glucose levels (BGLs) occurred between day 1 and day 4 (8.7 ± 3.1 vs 6.5 ± 1.3 , $p < 0.05$), and post-prandial BGLs between day 1 and day 6 (13.0 ± 4.6 and 9.8 ± 2.3 ; $p < 0.05$) of glucocorticoid treatment. In the 24 insulin requiring patients, TDD increased from 18.5 ± 43.6 units/day to 47.3 ± 43.6 units/day (mean increase 28.8 ± 19.9 units/day, $p < 0.0001$).

Conclusion:

The implementation of a NP-led MOC for managing GIH in respiratory inpatients resulted in improved glycaemic management, through appropriate adjustment of existing DM medications, insulin commencement and dose titration. This model could serve as a viable approach to enhance the management of GIH. Attaining prompt glycaemic management may be facilitated by earlier referral to a NP.

Enhancing Glycaemic Outcomes with Intensive Follow Up and Insulin Pump Optimization

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Background: The 2022 International Society of Paediatric and Adolescent Diabetes (ISPAD) guidelines recommends a HbA1c target of 7.0%, yet attainment remains low among children with Type 1 diabetes at Queensland Children's Hospital (QCH).

Aim: To investigate whether intensive diabetes education from a CDE combined with close follow up and optimisation of insulin pump settings for 8-12 weeks post pump commencement results in improved glycaemic outcomes for 26 children who commenced insulin pump therapy at the QCH Pump Clinic between August 2023 and January 2024.

Method: Pre- Pump Families attended a group education session on available insulin pump options and chose the technology they preferred.

Day 1 focused on insulin pump training and education which was customised depending on the needs of the family.

Day 2 targeted education on advanced features unique to the chosen insulin pump and algorithm, emphasising complex meals and exercise management.

Post-pump start: Bi-weekly telephone calls with the family for 4 weeks at a time convenient to them, followed by in-person review at 4 weeks which focused on self-management. Subsequently, there were weekly phone calls for a further 4-8 weeks. Families had direct access to the CDE via phone or email during this time. For each pump technology, optimisation of settings prioritised:

- Medtronic 780g: Active Insulin Time (AIT) and Smartguard Target
- T slim with Control IQ: Focusing on Insulin Sensitivity Factor (ISF)
- Ypso pump with Cam APS FX: Adjusting Personal Glucose Targets (PGT) and Insulin to Carb Ratio (ICR)
- Omnipod Dash: Basal testing and glycaemic impacts of fat and protein

Results: Across the 26 children the average HbA1c reduced from 8.3% to 7.0%:

Conclusion: Significant improvements in HbA1c were observed following pump initiation across all insulin pumps. Further activity is needed to assess the sustainability of HbA1c improvement over time.

Establishing a Pilot Hospital Clinic to Foster Diabetes remission in the Real world

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Aim: Exploring potential approaches to establish a clinic in metropolitan Australia to facilitate recently diagnosed diabetes into remission.

Methods: Intensive consultations were provided by diabetes clinicians to devise a multi-disciplinary remission plan in up to three Endocrinologist – Diabetes Educator co-consultations. Delivery was entirely via Telehealth with consultations lasting up to 60 minutes. Pharmacotherapy, nutrition and/or physical activity interventions were provided in addition to thorough education to ensure patients comprehend their diabetes diagnosis. Admission criteria were diabetes-diagnosis within two years and abdominal obesity, and commitment to implement lifestyle changes and absence of untreated active axis 1 mental health disorders. Direct contact details were available to clinicians and patients to ensure continuity of care and prompt communication along with brochures for its promotion. Diabetes Clinical Nurse Consultants (CNCs) were upskilled to ensure they were able to guide patients effectively with intense dietary interventions and refer to allied health clinicians. Pathology results, medication regimen, weight and waist measurements and quality of life surveys were the benchmark outcomes for this clinic.

Results: Management pertaining to their diabetes was given in addition to implementing lifestyle changes. 263 consultations were made. Virtual delivery enabled frequent intensive consultations with an 87% attendance. Due to medications shortages, CNCs adjusted insulin doses and/or obtained alternate substitutes promptly. Over the first 18 weeks, 58% of patients attained a HbA1c < 6.5% with a mean HbA1C drop of 2.8% and a 5% loss in body weight.

Conclusion: In patients with a recent diabetes diagnosis (within two years), devising a remission plan is feasible in a virtual hospital healthcare setting. The intent is to execute the elements of the diabetes remission plan in an ongoing manner in the primary healthcare setting.

Evaluation of the Effect of ChatGPT combined with Diabetes Case Manager in Diet Self-management Education and Support for Patients with Diabetes

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Aim: To evaluate the effect of ChatGPT combined with diabetes case manager on diet self-management education and support for patients with newly diagnosed type 2 diabetes.

Method: Fifty patients with newly diagnosed T2DM were randomly divided into intervention or control group. The control group received routine diabetes diet self-management education and support, while the intervention group received ChatGPT-based diabetes diet self-management education and support: (1) The diabetes case manager received training on best practices for using ChatGPT; (2) ChatGPT was pre-trained using the latest diabetes care guidelines, and its accuracy in answering diabetes diet questions was tested; (3) The diabetes case manager developed personalized diet plans with the help of ChatGPT and made adjustments based on patient feedback; (4) A diabetes diet Q&A database was constructed using ChatGPT, embedded into a remote diabetes case management platform. Patients were guided on how to use the intelligent diet Q&A module to obtain continuous education support. The scores of diet self-management knowledge, behavior and satisfaction scales were compared between the two groups. The experiences of patients in the intervention group were collected through interviews.

Results: The accuracy score (out of 5 points) of ChatGPT for the diet knowledge question-answering was 4.60 ± 1.75 . Compared with the baseline, the score of the diabetes diet self-management knowledge, behavior and satisfaction scales were improved after intervention in both groups, and the intervention group was superior to the control group ($P < 0.05$). Some patients' negative experience included the limited knowledge acquired by intelligent question-answering.

Conclusion: The application of ChatGPT in diabetes diet self-management education and support is feasible and effective, but it needs to be further studied in a large sample and in a long term.

Four-year Evaluation of Patient Cohort and Clinical outcomes from a Dietitian-Diabetes Educator led Model of care for Insulin Dose adjustment in a Renal Outpatient clinic

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Aim: Medical management of Diabetic Kidney Disease (DKD) is challenging given limited medication choices, hypoglycaemia risk, complex dietary management, health literacy, socioeconomic status and limited access to care. We aimed to evaluate our novel dietitian-diabetes educator (DDE) led insulin dose adjustment (IDA) service within a renal outpatient clinic for initial and 12-month post-intervention outcomes for adults with DKD and describe any patients who are more likely to be re-referred to the service or had positive clinical outcomes.

Method: Demographic, CKD stage, HbA1c, occasions of service, re-referral rates and reasons for intensive input were collected from medical charts pre- and post-DDE intervention for adult patients referred by nephrologists for IDA between January 2020 and March 2024. Data was analyzed using descriptive statistics, chi-squared and independent samples t-tests.

Results: One-hundred and two patients were eligible (55% male, 62±12.5yrs) where 45% (n=46) had CKD 5, 27% (n=27) CKD 3 and 25% (n=25) had CKD 4. Sixty-six (65%) were referred for glycaemic optimisation where 57% met targets (n=56). HbA1c from initial input to 12 months post was lower by 0.9%±2.0 (p<0.001, n=81/102). Between 2020-2024, twenty-eight (28%) patients required re-referral for IDA, and twenty-eight (28%) received >8 occasions of service. Reasons for extended input included self-monitoring deficits (71%; n=20/28), commencing non-insulin injectables (32%; n=9/28), corticosteroid use (28%; n=8/28), infections or oral hypoglycaemic agent changes (25%; n=7/28).

Age, gender or CKD stage did not differ between patients who were or were not re-referred to the IDA service (p>0.05). Age, gender and CKD stage were also similar between patients who met or did not meet their glycaemic targets, or maintained or did not maintain HbA1c improvements one year post intervention (p>0.05).

Conclusion: This innovative DDE service showed improved ongoing clinical outcomes. The need for individualised interventions to address barriers to efficient and effective care based on patient needs is important.

Frailty as a predictor of adverse outcomes in people with diabetes: A systematic review and meta-analysis

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Objective: To evaluate the impact of prefrailty and frailty on adverse outcomes in patients with diabetes.

Setting and Participants: Following registration (CRD42023437191), two authors independently searched PubMed, Web of Science, Embase, and CINAHL databases until April 10, 2024, to identify studies reporting on adverse outcomes related to prefrailty and frailty in diabetes. The methodological quality was evaluated using the Newcastle-Ottawa Scale (NOS).

Measurements: The primary outcome was all-cause mortality; Secondary outcomes included cardiovascular disease, all-cause hospitalization, and microvascular complications of diabetes.

Results: Twenty-two cohort studies incorporating a total of 1,134,936 participants were included, with moderate to good methodological quality. Based on different frailty criteria, the prevalence of frailty ranged from 0.3% to 50.5%, with a median of 21.8%, and the prevalence of prefrailty ranged from 21.9% to 58.6%, with a median of 43.3%. Compared with non-frail, the pooled odds ratio (OR) for all-cause mortality was 1.51 (95% CI: 0.95-2.41) for prefrailty and 2.22 (95% CI: 1.76-2.79) for frailty. The pooled odds ratio for all-cause hospitalization was 1.51 (95% CI: 0.95-2.41) for prefrailty and 2.09 (95% CI: 1.29-3.40) for frailty. Additionally, frailty and prefrailty are related to cardiovascular disease, with a pooled odds ratio of 2.02 (95% CI: 1.41-2.90) for frailty and 1.55 (95% CI: 1.21-2.16) for prefrailty. Similarly, the hazard ratio (HR) for microvascular complications of diabetes was 1.52 (95% CI: 1.36-1.69) among frail patients with diabetes.

Conclusions and Implications: Frailty predicts adverse outcomes in patients with diabetes, including all-cause mortality, all-cause hospitalization, and cardiovascular disease. Therefore, frailty should be routinely assessed among patients with diabetes to prevent adverse prognoses and provide evidence to support future targeted interventions. Although a relationship was observed between frailty and complications of diabetes, this finding is based on a limited number of studies, thus robust results could not be obtained. Further examination is needed in the future.

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How lived experience of Type 1 Diabetes shaped an Online program for Hypoglycaemia Prevention, Awareness of Symptoms and Treatment: HypoPAST.

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Aim: To seek lived experience expertise, as part of a co-design process, to inform the development of HypoPAST, a novel fully online, self-guided, psychoeducational program for adults with type 1 diabetes (T1D) designed to address fear of hypoglycaemia.

Method: The HypoPAST T1D Lived Experience Steering Group (T1SG; N=8) were invited to review draft intervention materials (including text, imagery, and activities) and provide feedback during a semi-structured cognitive debriefing interview. Interview questions included a focus on content acceptability, relevance, and ease-of-understanding. Interviews were conducted online, recorded, and lasted between 36-100 minutes. Afterwards, the interviewer prepared a slide-by-slide summary, and reported back to members of the HypoPAST team for discussion and implementation. Decision making regarding implementation of feedback was reported back to the T1SG and discussion was invited.

Results: Six T1SG members each reviewed 1-2 separate modules of HypoPAST content. The reviewers (4 women, 2 men) were aged 29 to 56 (median age 39) and lived in metropolitan (n=4) or regional (n=2) areas of NSW, QLD, SA, and Vic. Overall, reviewers provided positive feedback, and made constructive suggestions for intervention improvement, including: 1) use of additional positive images, language and messages (e.g. normalising, encouragement, hope), 2) improve instructions and signposting (e.g. clarity of outlines, activities and content), and 3) incorporating examples of alternative viewpoints or experiences, to acknowledge that T1D is not the same for everyone.

Conclusion: Lived experience review of HypoPAST highlighted the need for positive, clear, and inclusive imagery and messaging to improve intervention relevance and reflect the diverse needs and experiences of people with T1D. Importantly, those with lived experience offered powerful insights and perspectives to enhance the acceptability and applicability of the evidence-based and clinically-informed content. The findings of this research emphasise the value of involving lived experience perspectives in projects significantly impacting them.

Identifying and Mapping effective Behaviour Change Techniques for the Promotion of Physical Activity and Healthy Eating to inform the redevelopment of the Life! program

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Aims: The *Life!* program is a 12-month behaviour change program, available to Victorian adults at risk of type 2 diabetes and/or cardiovascular disease. To inform the redevelopment of this long-standing program (since 2007), we aimed to identify (via rapid review) effective behaviour change techniques (BCT) for the promotion of physical activity or healthful eating, and; map these to *Life!* program objectives.

Methods: Databases were searched (Medline, CINAHL, Psych INFO; date: 8/9/2023) using variants of 'physical activity', 'diet', 'body weight', and 'behaviour change' terms to identify contemporary literature (published between 2020-2023). Eligible studies were reviews, trials, cohort, case-control and cross-sectional studies conducted among adults. Effective BCTs were extracted from studies and mapped onto the objectives of each *Life!* program session.

Results: In total, 63 relevant studies (out of 2,487 total articles screened) were identified, commonly including randomised controlled trials (k=19) and reviews (k=12), with a focus on physical activity (k=37), eating behaviour (k=10) or both (k=10). Eight effective BCTs were common to both behavioural outcomes: self-monitoring of behaviour (k=28), goal setting (behaviour) (k=25), feedback on behaviour (k=15), action planning (k=13), problem solving (k=10), review behaviour goal(s) (k=9), instruction on how to perform behaviour (k=9) and social support (unspecified) (k=8). For healthy eating, information about health consequences (k=5) and prompts/cues (k=2) were also identified. All identified BCTs could be mapped to the objectives of one or more session, though were inconsistency adopted within session content.

Conclusions: Identification of the effective BCTs, with mapped relevance to the *Life!* program, will inform systematic evidence-based refinements to the program. Recommendations include the consistent adoption and extension of effective BCTs, particularly relating to *goals and planning (four BCTs)* and *feedback and monitoring (two BCTs)*, to build and reinforce participants' knowledge, skills and self-efficacy cumulatively throughout the program. *Life!* program allowed for clear direction on improvements.

Word count: 299/300

Impact of Digital Therapeutics for the Management in Adult Diabetes Patients: A meta-analysis of randomized controlled trials

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Aim: To report on the effectiveness of digital therapeutic (DTx) interventions in the management of diabetes patients.

Methods: Data sources included Web of Science, Medline, Embase, and the Cochrane Library. We included randomized controlled trials assessing the effectiveness of DTx interventions in the health management of individuals with prediabetes and diagnosed type 1 and type 2 diabetes. Our primary outcomes were HbA1c, FBG, BMI, and weight.

Results: Nineteen studies were included in the meta-analysis (n=3264). The intervention of DTx demonstrated a noteworthy reduction in HbA1c levels among individuals with diabetes (-0.54%, 95% CI -0.72 to -0.36), as well as a decrement in FBG levels (-0.56, 95% CI -0.76 to -0.37) and BMI (-0.84, 95% CI -1.23 to -0.45). Additionally, it played a contributory role in the amelioration of LDL-C (-0.13, 95% CI -0.22 to -0.03) and triglycerides (-0.18, 95% CI -0.34 to -0.02). Subgroup analyses revealed a salutary impact of DTx on HbA1c improvement in patients with type 2 diabetes mellitus (MD -0.66, 95% CI -0.92 to -0.41). However, this intervention did not elicit a comparable enhancement in HbA1c levels for those with type 1 diabetes mellitus (MD -0.45, 95% CI -0.89 to -0.00). DTx did not exhibit a significant effect on weight reduction (-1.07, 95% CI -2.33 to 0.20), systolic and diastolic blood pressure, total cholesterol, and high-density lipoprotein.

Conclusion: The intervention of DTx holds promise in enhancing health management among individuals with diabetes, potentially ameliorating levels of HbA1c, FBG, and BMI, especially in T2DM.

Impact of inpatient diabetes team on length of stay: analysis of an inpatient diabetes prevalence survey at a metropolitan tertiary referral teaching hospital

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Aim: Diabetes mellitus has a significant impact on the healthcare system and is associated with almost 1.3 million (11%) hospitalisations. People with diabetes mellitus have higher rates of hospitalisation and longer length of stay (LOS) compared to people without diabetes mellitus.

We conducted inpatient diabetes prevalence surveys in 2013, 2014, 2016, 2019 and 2022 at St Vincent's Hospital Sydney (SVHS), a metropolitan tertiary referral teaching hospital, to understand diabetes prevalence and LOS. Several strategies to reduce LOS have been implemented at SVHS including a dedicated inpatient diabetes team, delivery of rapid-access, insulin adjustment and post-discharge clinics, and availability of 24-hour on-call endocrinology support.

Method: A single-day point prevalence survey of all inpatients (including emergency department, but excluding day procedure patients) whose clinical notes were available at the time of the survey was performed. Data was collected by 13 two-member surveying teams via a bedside survey of patient clinical records using a 20-item survey tool.

Results: Inpatient diabetes prevalence in 2022 was 23% (82 of 349), compared to 21% (74 of 354) in 2019. Overall median LOS for patients with diabetes mellitus decreased from 13 days in 2019 to 9 days in 2022. There was a reduction in LOS > 30 days to 16% (13 of 82) of patients with diabetes in 2022, compared to 31% (23 of 74) in 2019.

Conclusion: Median LOS of inpatients with diabetes has decreased following the implementation of multiple interventions to facilitate earlier discharge and prevent admissions. Investment in appropriately staffed and skilled diabetes services is critical for high quality and cost-effective healthcare delivery at a tertiary teaching hospital.

Impact of using a Web-based tool to Escalate Blood Glucose Levels (BGL) and Titrate Insulin doses in Women with Gestational Diabetes Mellitus (GDM)

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GDM poses significant risks to both maternal and foetal health. Effective management of BGLs in a timely manner during pregnancy is crucial in preventing adverse outcomes. Self-monitoring of BGLs has become a cornerstone in GDM management, and because of this it is important to empower ladies with tools to help them identify and escalate elevated BGLs.

Two web-based tools were created to help support ladies from diagnosis to birth, the first tool “initial GDM self-escalation guide” and the second tool “GDM insulin titration guide”. With the first tool the ladies attend the initial education session in which their diagnosis, monitoring and diet are discussed. Following this they receive a link via email after 5 days in which they are asked to answer 3 questions about their fasting BGLs and if they are elevated they are asked to email their record to the diabetes nursing team. This has been beneficial as the ladies are then escalated to the endocrinologist straight away and are commenced on insulin two days after using this tool, and this has reduced waiting time. The diabetes educators do not need to contact ladies who have not had glucose elevations.

The second tool is used to support the ladies who are commenced on Protaphane. The patients attend a telehealth appointment on Tuesday, then on Friday morning they receive a link to review their fasting BGLs from Wednesday, Thursday and Friday. If a patient has 3 elevations they are then prompted to increase their dose of Protaphane by maximum 2 units. Ladies feel more comfortable increasing their insulin doses with the support of the tool. This tool enables the team to identify users and also keep a record. These tools have facilitated the diabetes team to provide, fast, safe and efficient care to the ladies with GDM.

Incidence of Skin Problems caused by Insulin Pump Therapy and associated factors in Children with Type 1 Diabetes Mellitus : A large cross-sectional survey in China

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Aims: To document the prevalence of skin problems associated with insulin pump use and identify contributing factors among children with type 1 diabetes mellitus in China.

Method: In total, 461 children were recruited from an online community (i.e., a Wechat group) of pediatric patients with T1DM. A self-developed questionnaire was filled by parents, collecting the information on social demographics, disease and insulin pump therapy related characteristics, and skin problems. We applied the Mann–Whitney U test, Chi square test and logistic regression analysis to identify the associated factors of skin problems.

Results: 308 (66.8%) children were reported with the presence of skin problems. More specifically, 38.8% had pigmentation, 22.3% allergy/dermatitis, 20.2% scar, 11.5% pain, 10.8% infection, 10.6% subcutaneous lipohyperplasia, and 6.1% lipoatrophy. Logistic regression analysis showed that independent risk factors of skin problems were caregiver's educational level as college or above, having skin allergy, and using the Brand 2 insulin pump (p values < 0.05).

Conclusion: The present study documented the incidence of skin problems and identified associated factors, such as caregiver's education, skin allergy and using a specific brand of pump. Health education should address these factors in addition to the traditionally-emphasized factors.

Integrating Digital Diabetes Patient Survey for Enhanced Patient-Centred Care: A Collaborative Approach

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Aim: Western Sydney Diabetes (WSD) has embraced a patient-centred approach to diabetes care by implementing a digital patient survey grounded in improving health outcomes. The aim is to enhance patient engagement and experience through this survey by acknowledging and prioritising patients' concerns.

Utilizing the GoShare platform, the survey is sent electronically to all new patients before their first appointment. The survey encompasses various facets of diabetes management. Integrated in the survey are tailored educational videos that addresses specific patient needs and interests. This personalized educational component enhances patient empowerment and facilitates informed decision-making.

This study reviews the survey results as a tool for diabetes education.

Method: The survey was codesigned with patients and healthcare providers.

Survey results are reviewed prior to clinic appointments and guide discussion during the consultations. We gathered data on the first 100 patients who were sent the survey, including response rates, and survey responses for this innovative method of education.

Results: Preliminary findings from February to April 2024 indicate encouraging levels of engagement, with 32 out of 97 (33%) patients completing the survey, 3 did not consent. This is far higher than previous surveys used by WSD, which had response rates of 3-10%.

Some of the main findings are:

- SMS is the preferred contact method
- 97% wanted us to talk to their GP
- 62% wanted help with diet
- 59% wanted help with understanding diabetes
- 48.3% reported stress about their diabetes
- 41% are on insulin and 38% on GLP1 RA
- 48% and 45% respectively reported being worried about eye and foot health

Conclusion: The survey serves as a catalyst for person-centred clinical care, emphasizing patient goals and priorities, promoting a thorough pre clinic work-up.

Moving forward, efforts will focus on refining the survey process and leveraging insights to continuously improve diabetes care delivery.

Knowledge and Willingness to Use Continuous Glucose Monitoring of Diabetes Liaison Nurses in China: A cross-sectional study

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Aim To investigate the knowledge and willingness to use continuous glucose monitoring (CGM) of diabetes liaison nurses (DLNs); and to determine the potential influencing factors.

Method A descriptive, cross-sectional study was conducted in 59 tertiary hospitals and 91 secondary hospitals in China from August to November of 2023. The registered nurses meeting all DLN qualifications were eligible for the study. Details of demographic characteristics, knowledge of CGM and willingness to use CGM were collected using an online questionnaire. Multiple linear regression method was used to analyse the potential influencing factors of knowledge and willingness to use CGM of DLNs.

Results Among the 1602 eligible respondents surveyed (1586 females, mean age (32.78±5.94) years), the knowledge score was 0-27 (14.77±9.44), the score of willingness to use CGM was 34-95 (71.45±9.84). Multiple linear regression showed that DLNs with bachelor's degree, duration as a DLN, in-service education experience in diabetes specialties, number of person with diabetes and diabetes nursing care hours in the unit were influencing factors of DLNs' CGM knowledge scores; Level of hospital, recognition of a DLN, sources of diabetes care knowledge, in-service education experience in diabetes specialties, number of person with diabetes and diabetes nursing care hours in the unit were influencing factors of DLNs' CGM using willingness. Spearman correlation analysis revealed that there was a positive correlation between knowledge score and CGM using willingness score in DLNs ($r=0.311$, $p<0,001$).

Conclusion The score of knowledge and willingness to use CGM of DLNs in China are at intermediate level and above. There remains room for improvement in encouraging DLNs to spend more time in clinical nursing practice and be closer to person with diabetes, particularly in terms of in-service education experience, to further improve knowledge and use of CGM.

Keywords: Diabetes liaison nurse; continuous glucose monitoring; knowledge; willingness

Low Glycaemic index or Low Glycaemic load Diets in the Management of Diabetes: A meta-analysis

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Aim: The utility of the glycaemic index (GI) and glycaemic load (GL) in diabetes is still debated. We aimed to determine the clinical effects of low GI/GL diets compared to any other diet for diabetes.

Method: Randomised controlled trials (RCTs) comparing a low GI/GL diet with another diet for at least 4 weeks, in people with type 1 (T1D) or type 2 diabetes (T2D) were eligible. CENTRAL, MEDLINE, Embase, CINAHL and clinical trial registries were searched to November 2023 with no restrictions on language. Two authors independently screened and extracted records. We assessed quality using the Cochrane risk of bias (RoB 2) tool. Meta-analyses were undertaken in RevMan (v5.4) with random effects models. The primary outcome was glycated hemoglobin (HbA1c).

Results: We identified 45 RCTs (3,363 participants). Low GI/GL diets lowered HbA1c by 0.28% points more other diets with high certainty (95% CI -0.38 to -0.18%, n=2,943, 35 RCTs). There were additional reductions in body weight, Body Mass Index; waist circumference and fasting glucose and an increase in HDL cholesterol, with no differences in insulin, HOMA-IR, or other lipids. Hypoglycaemia and quality of life were infrequently reported and no study reported mortality or morbidity.

Conclusion: Low GI diets improve glycaemic control, and weight in people with diabetes beyond that achieved by other diets, without adverse effects on cardiovascular risk factors. This simple food-based approach may be acceptable as a low-cost, sustainable intervention, particularly in countries where a variety of low GI foods are traditional staples.

Funding: None

Multidisciplinary team work will improve Glycaemic control using NDIS funded Insulin Pump in a client with Type 1 Diabetes who has Stroke-related Deficits.

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Aim: To improve the quality of life and glycaemic control in a 39-year-old female with a history of type 1 diabetes and who had bilateral cerebellar infarcts in 2018.

Method: The client had not seen a diabetes team for several years. Discussions with the GP showed the client 'did not want to die yet' and wanted to improve control but was terrified of hypoglycaemia. Memory and dexterity deficits as a result of the stroke impacted on her ability to self-manage. Options were reviewed and an application, successfully, made to NDIS for an insulin pump.

The multi-disciplinary team included the GP, Practice Nurse, Endocrinologist, Credentialed Diabetes Educator and Dietitian. Insulin doses were titrated prior to the pump start. Pump settings were determined from insulin doses at time of pump initiation. The commencement of the pump was slowly performed on several occasions with education integrated. The Medtronic G4 sensor was started two weeks before the pump was started with Smartguard technology and bolus calculations to slowly improve control.

Results: Prior to the pump start the HbA1c was 12.3%. The stroke had a significant impact on her ability to manage her diabetes treatment and she was reliant on her partner/carer to do her insulin injections. Using the insulin pump and with appropriate encouragement the client is gradually reducing her average glucose. She is now below 15 mmol/L more than 50% of the time. She has changed her reaction to dropping glucose levels. She now has improved self-esteem through taking back her own diabetes management and increased energy levels has improved her quality of life.

Conclusion: All members of the multi-disciplinary team are aware of the plans and the client and carer must be involved at all stages in making decisions. With teamwork, innovative thinking and identifying and overcoming barriers anything is possible in diabetes management.

Needs Analysis of Young Adults Diabetes Clinic – A Topic of Conversation

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Background: Royal North Shore Hospital is a large tertiary hospital based in metropolitan NSW with a Young Adult Service (YAC) consisting of a multi-disciplinary team (MDT) that provides care for people with diabetes from ages 16-30 years. The MDT consists of an Endocrinologist, Dietitian and Diabetes Educator. Clients attending the service attend every 3-6 months either virtually or in person. Following a review in model of care to the YAC, a survey was conducted to identify areas of interest for discussion during their appointments.

Aim: To increase service engagement and client focused care in the YAC, by identifying the priorities and areas of interest for education to help guide service delivery.

Method: Over a 12-month period, and on arrival to their YAC appointments clients were asked to complete a survey covering both Diabetes Education and Nutrition topics based on common themes relevant to young adults. This information was then used by the MDT to shape the focus of the MDT appointments and plan for future appointments.

Results: A total of 62 clients completed the survey, of which 39 were male and 23 were female, between the ages of 17 to 30. Findings showed the most popular topics for discussion with the diabetes educator were travel (30), pumps and continuous glucose monitoring (28) and work life, studying and diabetes (21). The most requested nutrition topics were increasing muscle mass (19), weight loss (17) and fat and protein – impact on glucose levels (17).

Conclusion: To improve engagement in the YAC, the MDT will continue to deliver a range of educational topics. Education will be more tailored to the clients' preferences, with opportunistic teaching points for important topics. This survey has also highlighted some needs for resource development particularly around nutrition and diabetes management. Being able to provide education that is more client centric will improve rapport building opportunities between health professionals and clients.

Refining the Inpatient Diabetes Referral process using Specific Checkable Criteria

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Aim: This initiative aimed to improve the number of appropriate inpatient diabetes educator referrals. The objective is to have over 75% of inpatient referrals meet Diabetes Service clinical criteria by December 2023

Method: The initial investigation was a collaborative effort, leveraging the existing digital health record (DHR) system to analyse inpatient diabetes referrals systematically. Data extraction and organisation were conducted using Excel to discern patterns and reasons behind the referrals. The analysis, which resulted from our collective efforts, uncovered significant discrepancies, including repeated referrals, misdirected referrals, submissions lacking essential information, and requests for supplies from patients already covered by the National Diabetes Services Scheme (NDSS). Therefore, our team decided to refine the referral process by introducing specific, checkable criteria to enhance precision and relevance using tick boxes.

Results: The revision of referral criteria led to a notable improvement in the quality of referrals. The data was gathered on three occasions, each extending about 20 working days. Initial data showed that only 61.3% (76 out of 124) of referrals met existing criteria between August 9th and September 6th. Post-revision, compliance rose to 76.8% (73 out of 95) from October 11th to December 12th. A subsequent evaluation from February 15th to March 13th, 2024, demonstrated sustained improvement, with 84.8% (67 out of 79) of referrals meeting the revised criteria.

Conclusion: The initiative effectively met its target, significantly raising the percentage of referrals aligning with clinical criteria. The reduction in total referral numbers underscores a shift towards more precise and relevant referral practices, which directly translates to improved patient care management. This reduction supports both the effectiveness and sustainability of the implemented changes. This project highlights the importance of continuously monitoring and updating referral processes to ensure relevance and efficiency in patient care management.

Research on Impact Mechanism of Mobile Health Services utilization among Patients with Diabetes based on Anderson behavior model

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Aims: To investigate the current status and explore the influencing factors of mobile health services utilization among patients with diabetes.

Methods:

This study was a cross-sectional study. In this study, 533 patients with diabetes from a general hospital and two community health service centers from August 2021 to August 2022 were selected according to the inclusion and exclusion criteria. The content of this study was designed and classified according to the theoretical framework of Anderson model, it included predisposing factors, enabling factors and need factors.

Results:

1. Descriptive statistical results showed that among the 533 patients with diabetes, the proportion of patients aged ≥ 60 years old was 56.3%, and 196 patients had used mobile health services in the past, accounting for 36.8%. Patients most often use mobile health for appointment registration, test result query and online consultation, accounting for 46.7%, 44.1% and 40.5%, respectively.

2. The results of multivariate analysis showed that educational level, employment status, and mobile health knowledge among the predisposing factors, network accessibility, residence, and health literacy among the enabling factors, and self-assessed health status and diabetes course among the need factors were the influencing factors for patients' mobile health utilization, with statistically significant differences ($p < 0.05$).

3. The results of structural equation model showed that predisposing factors, enabling factors and need factors could directly affect the mobile health utilization of patients with diabetes, and their direct effect values were 0.060, 0.043 and 0.140, respectively.

Conclusion:

The utilization rate of mobile health services for patients with diabetes was low. Based on the theoretical analysis of Anderson model, among the predisposing factors, the educational level, employment status and mobile health knowledge of patients with diabetes affected the utilization of mobile health services.

Reviewing a Suite of Structured Group Self-management Education Programs to ensure they Utilise the Latest evidence in Behaviour Change Techniques.

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Aim: To ensure the Smarts programs remain evidence based and continue to empower participants to increase their confidence and competence to self-manage their diabetes.

Method: The Smarts suite of self-management programs were developed by Diabetes WA in 2016 and were reviewed in 2018. They are now delivered nationally as part of the National Diabetes Services Scheme (NDSS). The suite of programs must be reviewed regularly to ensure they are clinically up to date and continue to empower people living with diabetes to change behaviours they identify as helpful for managing their diabetes.

The programs have been developed based on Social Cognitive Theory and part of the review will focus on revisiting the suitability of this theory, together with identifying whether additional theories might also be suitable to underpin the foundation of the programs. The Behaviour Change Taxonomy will be utilised to identify the active ingredients of behaviour change given that people do not change their behaviour on knowledge alone.

Results: The theories that underpin the program will have been expanded to also identify additional theories that were already in action within the programs but were not previously named. Recognising these additional theories, which complement each other, ensures the programs utilise as many relevant tools as possible and provide the greatest opportunity for participants to identify and modify their individualised behaviours for making meaningful changes.

Conclusion: National Evaluation Data indicates that this suite of programs delivered under the NDSS continues to increase self-efficacy and promote self-management. Improved self-management of diabetes can lead to a decreased risk of short and long-term diabetes related complications and a decreased economic burden on the health system.¹

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Setting up a service for success: Organisation and Structure of a Quaternary Hospital Diabetes Education service; Designing a Nurse-led service around quality improvement

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Aim: To promote innovation, service agility and apply whole system quality in a dynamic and demanding Diabetes Education Service.

Methods: Needs analysis and staff consultation were conducted within a Safe Timely Effective Patient Centred (STEP) model of care. Service values and domains were defined. Buy-in and commitment was sought from the team and department leadership. Nine Service Streams and portfolios were organised (in parallel with Endocrinologist Stream Leads) involving Administrative and Diabetes Clinical Nurse Consultant team members. A new daily allocated Float Diabetes Nurse Educator role was introduced with defined responsibilities and no assigned patient load. Protected Professional Time (PPT) was instituted with a structured schedule for Stream Lead portfolio work, professional development, reflective practice and team meetings.

Results: Enhanced communication, efficiency and capacity to drive multiple quality projects. Leadership roles and opportunities to continuously elevate the skills and professional development of team members have increased staff satisfaction. Every team member's input is invited, and each person's ideas are valued, promoting positive workplace culture. Improved workflows and consistency are demonstrated across the Diabetes Education Service.

Conclusion: These strategies, together with generative leadership have been fundamental to provide a co-ordinated, intentional and outcomes focused service, with STEP and quality considered in care design and delivery. The model serves to drive improvement, key-person risk avoidance and future proofing, refine operational systems and, improve patient care. An emphatic element of PPT was 'Protected'; with value and consistency placed on the activity despite competing priorities, requiring efficient planning. While the approach is not entirely unique to our Diabetes Education Service, the design is not readily described in any literature; disseminating a description of our service operations could provide a benchmark for others pursuing an improved, responsive, resilient health care service. Our model may not be reproducible; however, aspects could be adopted or vary.

Strategies to Increase Uptake of Continuous Glucose Monitoring for Adults with Type 1 Diabetes in Australia: An Integrative Review.

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Aim: Continuous glucose monitoring therapy (CGM) has been found to improve glycaemic control, improve quality of life, and reduce health care costs for adults with type 1 diabetes. Despite this many people with T1D do not use CGM. This review aims to explore strategies to increase uptake of CGM by adults with T1D in Australia through examining barriers to CGM and making recommendations for practice.

Methods: An integrative review was used as recommended in the Whitemore & Knafelz framework, and included the five phases of problem identification, literature search, data evaluation, data analysis and presentation.

Results: Three themes were identified as barriers; 1) ethnic and socioeconomic disparity, 2) inadequate training for people with T1D and 3) healthcare professionals. Three strategies for CGM uptake and continued use were 1) providing personalised training and support, 2) healthcare service redesign and 3) healthcare professional training.

Conclusion: There are many barriers to CGM for people with T1D, those at system, healthcare professional and individual levels. These barriers can be overcome by reconfiguring healthcare systems and training healthcare professionals to meet the needs of this population.

Supporting Australian Adolescents with Type 1 Diabetes – A mixed methods study

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Aim: To understand and identify strategies to address diabetes education program service needs faced by adolescents (13-18yrs) with type 1 diabetes (T1D), their parents/carers and diabetes clinicians.

Method: Semi-structured interviews were conducted with adolescents with T1D. Findings from interviews were used to develop separate surveys for parents/carers and diabetes clinicians to understand their priorities when it came to caring for an adolescent with T1D. Template analysis was used to code qualitative data and determine common themes. Descriptive analysis was completed for quantitative survey data.

Results: All adolescents (n=14) were currently engaged in regular clinical care with diabetes healthcare professionals and felt well supported by their families in their diabetes management. Topics adolescents wanted information on in relation to diabetes included mental health, exercise, living independently and travel. Adolescents expressed a strong preference for face to face diabetes programs or services, a need for interactivity rather than didactic education, and opportunities to chat with peer leaders about living with diabetes. 93% of parents/carers surveyed (n=29) felt they had enough knowledge to support their child while only 86% had the confidence to do so. Key challenges parents/carers felt adolescents faced included their ability to fit in with their peers, general diabetes management, the unrelenting nature of diabetes and the burden diabetes places on food choices. Majority of diabetes clinicians who responded (n=34) were CDEs (68%) followed by Endocrinologists (21%) and dietitians (15%). Top challenges that clinicians feel adolescents face include adjusting to “normal life” with diabetes, emotional and mental wellbeing and general diabetes management.

Conclusion: There is mismatch between priority of topics between adolescents, parents/carers and clinicians, highlighting the importance of shared decision-making and goal-setting. Findings also show that there is an appetite from adolescents to attend tailored diabetes education programs to support their diabetes management.

The Creation of a Robust Service Development Model as a Novel Approach to a New Community Insulin Pump Service

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Aim: To create a clinical service development model informed by a clinical governance framework and gold-standard best practice guidelines to guide the establishment of a new private clinical service, an insulin pump start-up and support clinic.

Method: Starting with project management principles to identify need, strategic fit, financial and workforce modelling, identifying roles and stakeholders from the organisation's clinical governance framework. The steps and required activities were planned from risk assessment and management, staff training, resources and assets required, consultation and review, communication plan and service implementation.

Results: From modifying the project management principles to better reflect the requirements under a clinical governance framework, a risk-assessment was performed to inform the service blueprint, a business plan was presented to a Health Services Sub-Committee of the board, an endocrinologist was consulted on the service blueprint and accompanying documentation, and finally consumer feedback was sought on the final service.

Conclusion: From combining project management principles with a clinical governance framework and best practice clinical guidelines, a model for developing, reviewing, and implementing a new clinical service has been developed and tested on the commencement of an insulin pump start-up and support clinic.

The Diabetes Regional Education, Access and Management (DREAM) Initiative: Enhancing Patient and Clinicians Satisfaction through GP Case Conferencing in Diabetes Management.

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Background: St Vincent's Hospital, Sydney Diabetes Service has initiated a rural and remote General Practice (GP) Case Conferencing Diabetes Management service in the Murrumbidgee region in partnership with the Primary Health Network. This service not only aims to enhance clinician skills, but also ensures that patients receive tailored diabetes management at their GP practice, leading to increased satisfaction with their healthcare experience. Patient and clinicians satisfaction was undertaken within the DREAM Model of Care.

Methods: Patient and clinician satisfaction were evaluated through questionnaire completion, facilitated by QR codes or hard copies. Responses were anonymous and collected using Microsoft Forms software

Results: To date, DREAM clinics have conducted two clinics, involving 49 patients and 8 GP case conferencing sessions. We received 53% (26) responses to the patient satisfaction survey and 63% (5) responses to the GP satisfaction survey. Both patients and GP participants expressed high levels of satisfaction with the DREAM Initiative consultation format. Key themes emerged, highlighting factors contributing to patient satisfaction, include accessibility, convenience, communication, and improved coordination of their care between healthcare providers. GPs and practice nurses unanimously indicated that DREAM clinics met their expectations in terms of education, access, and management of diabetes cases. Suggestions for improvement related to follow up clinics being held face to face rather than via telehealth.

Conclusion: The results indicate high satisfaction among patients and GPs with the DREAM clinics initiative, supported by positive response rates and identified key themes such as accessibility and communication. Patients expressed satisfaction with the consultation format, while GPs found value in professional development opportunities. High satisfaction with communication during appointments further emphasises the initiative's effectiveness. Overall, these findings affirm the success of the DREAM initiative in meeting stakeholder needs and improving healthcare delivery in regional areas of need.

The Role of Willpower Beliefs in Diabetes Distress and General Emotional well-being in Adults with type 2 Diabetes

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Aim: To examine the role implicit theories of willpower play in the experience of diabetes distress and general emotional well-being using a cross-sectional study design.

Method: Australian adults with type 2 diabetes (N=270; 56% women; age: 61±12 years), recruited via a national diabetes registry, completed an online survey assessing: willpower beliefs, general emotional well-being, diabetes distress, personality, general self-efficacy, and diabetes self-efficacy. Analyses included bivariate correlations and linear regression, adjusted for demographic, clinical, and psychological variables.

Results: Unadjusted analyses showed willpower beliefs have moderate correlations with general emotional well-being, emotionality and general self-efficacy; and weak correlations with diabetes distress, diabetes self-efficacy, extraversion, conscientiousness and age. Adjusted analyses showed willpower beliefs are a significant predictor of general emotional well-being, but not diabetes distress, independent of self-efficacy and diabetes distress, and potentially mediated by personality and diabetes self-efficacy.

Conclusion: Willpower beliefs predict general emotional well-being, but not diabetes distress. Further research is needed to confirm these pathways.

Youth type 2 diabetes CGM access program

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Aim: The introduction of subsidised continuous glucose monitoring (CGM) for youth with type 1 diabetes resulted in rapid uptake and improvements in glycaemic control. Youth with type 2 diabetes (T2D) are ineligible for this NDSS subsidy and must continue with finger-prick glucose monitoring despite complex treatment, including insulin. The aim of this project was to provide access to CGM for youth with T2D as a component of their clinical care.

Method: Funding was first obtained in 2022 and again in 2023 from Perth Children's Hospital Foundation, for children with T2D to access at no cost, either Freestyle Libre 2 or Dexcom G6 CGM. Patients could choose their preferred device. Clinic-based eligibility guidelines included insulin users, HbA1c $\geq 7\%$ with metformin at maximum tolerated dose, when adding a new medication, newly diagnosed or patients with complex care needs. Education was provided at CGM start followed by routine clinical care. A modified CGM satisfaction survey measured person reported outcomes (PROs).

Results: Since the start of this ongoing program 74 patients aged 8 – 17 years, have used either Freestyle Libre 2 or Dexcom G6 for a mean (r) of 26 (2 – 84) weeks. Patients who used CGM for ≥ 3 months ($n=45$) mean [SD] HbA1c % was 9.8 [2.7] at baseline and 7.9 [2.1] ($p = < 0.05$) at 3 months. For users of ≥ 6 months ($n=28$), mean [SD] HbA1c % at baseline was 9.4 [2.4] and 7.5 [1.8] ($p = < 0.05$) at 6 months. Children and families reported predominantly positive exposure to CGM, including being easier than finger prick testing and not burdensome. Minor skin irritations were reported.

Conclusion: Youth with T2D in an Australian paediatric hospital setting responded positively to CGM, when offered at no cost. Uptake was higher than expected and real-world glycaemic data along with PROs were favourable.