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Annual Scientific Meeting

May 13 – 14, 2022

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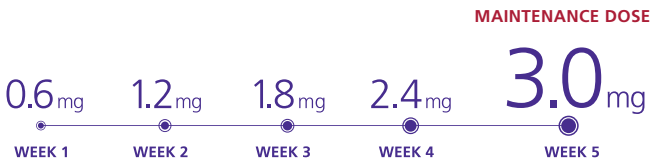

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‡Price based on the average price of takeaway coffee in March 2020 ($3.92) as determined by Stats NZ: *Food Price Index: Selected Monthly Weighted Average Prices for New Zealand (Monthly)*. Available at http://archive.stats.govt.nz/infoshare/ViewTable.aspx?pxID=aeb0a01f-a3c6-46b9-bf60-057a693eb1fd.

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A WORD FROM THE CONVENOR

Welcome to the 45th Annual NZSSD ASM

We made it …

After moving from a full face-to-face conference to a virtual one then to a hybrid option, it is wonderful to welcome you to Wellington whether you are here in person or joining us online.

We have over 290 registrations this year which is a great achievement during a pandemic. With the split 50:50 between in person and online it is a unique experience for the society, and no doubt one which will be repeated.

A big thank you to our sponsors and exhibitors who have stood by NZSSD this year and have all chosen to exhibit in person. I encourage you all to engage with our exhibitors through the platform or over a cup of tea or coffee, the chat option in the app and on the platform means you're only a few clicks from engagement.

We have again received a good number of high calibre submissions. These will all be part of the ASM some live streamed, some live presented and some pre-recorded. Regardless of the format the value we gain from the presentations is immense.

Post conference you will have up to one month to log in and view all the sessions you registered for, again.

Do enjoy the conference and remember to complete your feedback form (emailed to you). This allows the committee to plan for future ASMs.

Ngā mihi

Rosemary

Dr Rosemary Hall
NZSSD ASM 2022 Convenor

INVITED SPEAKERS

PROFESSOR SUE CRENGLE

Professor Sue Crengle (Ngāi Tahu, Ngāti Mamoe, Waitaha) specialises in general practice and public health medicine and has been working as a researcher for over 25 years. She is a Professor, Hauora Māori, at Otago Medical School. Much of her work involves identifying where and how inequities in health occur, and in testing ways to eliminate these inequities. She lives in Invercargill.

Professor Crengle has extensive knowledge, and experience of the health system, primary care, and public health in both a Kaupapa Māori and mainstream setting, significant experience working with Māori communities and organisations and an understanding of Te Tiriti o Waitangi based principles and frameworks as they apply to health.

Professor Crengle is a foundation member of Te Ora and sits on the Taumata of senior clinicians, and in 2021 was appointed
to the board of the Interim Māori Health Authority.

DR SARAH PRICE

Dr Sarah Price is the Director of Obstetric Medicine and an active Obstetric Medicine Physician at The Women's Hospital, Melbourne. She is a staff specialist Endocrinologist at the Royal Melbourne Hospital.

She is also an NHMRC Emerging Investigator Fellow (2022-2027) with the Department of Medicine, University of Melbourne. She holds graduate diplomas in Obstetrics and Gynaecology (RANZCOG) and Child Health (University of Sydney), and a graduate certificate in Obstetric Medicine (SOMANZ). She was awarded an NHMRC post-graduate scholarship and Norman Beischer Medical Research Foundation grant for her PhD studies titled 'Health consequences for mother and baby of substantial pre-conception weight loss in women with obesity', supervised by Professor Joe Proietto. Sarah is the immediate past President of the Australian Diabetes in Pregnancy Society (ADIPS) and has been a board member for the past 8 years. She is also an active member of the Australian Diabetes Data Network (ADDN) and the Type 1 Diabetes Alliance. Sarah combines clinical work, research, and education. Her primary research interest is in metabolic diseases, including obesity, diabetes, and hypertension - in women before, during and after pregnancy. She is also interested in metabolic programming of the offspring. Sarah collaborates broadly and is available to supervise graduate research students.

DR VILIAMI K TUTONE

Dr Viliami Tutone is a nephrologist trained in New Zealand and Scotland. He has been a consultant nephrologist at Middlemore Hospital since 2005 and he is a member of Pacific People Advisory Panel to the Ministry of Pacific Health.

DR TROY MERRY

Dr Troy Merry is a 2015 Rutherford Discovery Fellow and Associate Professor in the Discipline of Nutrition, University of Auckland (N.Z.). He gained a Bachelor of Physical Education from the University of Otago, and PhD from the University of Melbourne, followed by post-doctoral positions in molecular metabolic signalling at Monash University and ETH Zurich. He has recent publications in leading metabolism journal including Nature Communications, Molecular Metabolism and Diabetologia, and received the 2022 Journal of Physiology Editorial Fellowship. His research broadly focuses on understanding molecular mechanisms underpinning metabolic health and disease, with a particular interest in investigating the pathways through which exercise alters metabolism. In recent years his work has focused on investigating genetic risk factors of metabolic disease in people of Polynesian ancestry, metabolic role of mitochondrial-derived peptides and hyperinsulin-signalling pathway obesity and fatty liver disease.

NZSSD ASM Programme
Hybrid meeting. May 13 – 14, 2022
SHED6 Wellington

New Zealand Society NZSSD for the Study of Diabetes

Friday 13 May 2022

	WELCOME AND CONFERENCE OPENING
09:00	Mihi whakatau
	Welcome: Dr Helen Snell – President NZSSD
09:45	**OPENING PLENARY SPEAKER**
	Kaupapa Māori Health Services and Equity in Diabetes Care
	Professor Sue Crengle - Māori Health Authority
	CHAIR - Helen Snell
10:30	**Morning tea among industry exhibitors**
	Oral Presentations: Diabetes care and quality improvement
	CHAIR - Pauline Giles & Nicole McGrath
11:00	O1 Interweaving Diabetes Care - Wellbeing of Tongan People with Type 2 Diabetes Mellitus in New Zealand. *Soana Muimuiheata*
11:15	O2 Is Telehealth an Effective Tool to Address Inequity of Access to Secondary Care Diabetes Services in Aotearoa New Zealand? A Quantitative Study. *Ivana Barbalich*
11:30	O3 Medical Students Are Not Adequately Trained to Manage Diabetes in Inpatients in Aotearoa New Zealand. *Ryan Paul*
11:40	O4 Increasing Insulin Pump Uptake at CMDHB by Enhancing Clinician Expertise. *Stephanie Zhang*
11:55	O5 Diabetic Foot Interventions to Improve Outcomes for Indigenous Populations in High-Income Countries: A Scoping Review. *Michele Garrett*
12:05	O6 The Australian and New Zealand Diabetic and Ischaemic Foot Outcomes Study (ANZ-DIFOS): Preliminary Findings. *Claire O'Shea*
12:20	**Lunch break among the industry exhibitors**

Don't forget to use the chat options in the app and platform to ask questions.

13:30	**Oral poster presentations** **CHAIR Paddy Whitfield**
	OP1 Results from A National Survey on Diabetes Inpatient Management Using the Quality Standards for Diabetes Care 2020. *Lorna Bingham, Lindsay McTavish* OP2 Collaboration to Improve Diabetes Service Delivery, Equity, and Technology Uptake. *Zara Houston* OP3 Collaborative Development of a Real-Time Diabetes Dashboard to Improve Outcomes in Waikato Patients with Type 2 Diabetes. *Ryan Paul* OP4 The Impact of Multimorbidity on the Ability to Make Lifestyle Changes in Those with Prediabetes and Excess Weight – A Qualitative Study. *Jenna Tidswell*
14:00	**PLENARY SPEAKER** **Obesity in Pregnancy and Transgenerational metabolic disease** **Dr Sarah Price – University of Melbourne** **CHAIR - Rosemary Hall & Louise Farmer**
	Oral Presentations: Pregnancy
14:45	O7 Is It Feasible to Use First Antenatal HbA1c to Target Northland Pregnant Women at High Risk for Gestational Diabetes Mellitus for Earlier Intervention? *Tomas Ashford*
14:55	O8 Diabetes in Pregnancy: Using the Sflt-1/PLGF Ratio to Predict Preeclampsia. *Ruth Hughes*
15:05	**Afternoon tea among industry exhibitors**
	Oral Presentations: Pre-Diabetes **CHAIR Ole Schmeidel & Tutangi Amataiti**
15:30	O9 Disincentivised and De-Prioritised Mahi: A Multiple Case Study of Pre-Diabetes Care Undertaken by General Practice in Aotearoa/New Zealand. *Christine Barthow*
15:45	O10 A Diagnosis of Prediabetes When Combined with Lifestyle Advice and Support Is Considered Helpful Rather Than a Negative Label: A Qualitative Study. *Kirsten Coppell*
15:55	O11 The Incidence of Diabetic Ketoacidosis Associated with Empagliflozin Use in Aotearoa New Zealand: A Preliminary Review. *Ryan Paul*
16:15	**NZSSD Annual General Meeting and the Presentation of the i-SENS and NZSSD Research Grants**
17:15	**Evening soiree among the industry exhibitors.**

Saturday 14 May 2022

09:00	**Genetic Research in Diabetes** **Dr Troy Merry - University of Auckland** **CHAIR - Jeremy Krebs & Amanda de Hoop**
	Oral presentations: Genetics and technology
09:40	O12 The Metabolic Effects of A CREBRF Gene Variant in NZ Women – Assessment of Satiety and Incretins. *Bridget Moss*
09:50	O13 First Clinical Test Results for A Low-Cost Light-Based Glucose Sensor. *Lui Holder-Pearson*
10:05	O14 Effect of Divergent Continuous Glucose Monitoring Technologies on Glycaemic Control in Type 1 Diabetes Mellitus: A Systematic Review and Meta-analysis of Randomised Controlled Trials. *Ben Wheeler*
10:20	**Morning tea among industry exhibitors**
10:50	**Oral Presentations: Nutrition** **CHAIR - Kirsten Coppell & Christine Barthow**
10:50	O15 Ketogenic Compared to Control Diets in Pre-Diabetes and Type 2 Diabetes: A Systematic Review and Meta-Analysis. *Amber Parry Strong*
11:05	O16 Saturated and Trans Fat Intakes on Mortality and Non-Communicable Disease Incidence: Systematic Review and Meta-Analyses of Prospective Observational Studies. *Andrew Reynolds*
11:20	**Bob Smith Lecture**
12:20	**Lunch break among the industry exhibitors**
13:20	**Oral poster presentations** **CHAIR - Craig Jefferies**
	OP5 The Effect of Non-funded Continuous Glucose Monitoring on Health Equity in Paediatric Diabetes in Aotearoa, New Zealand. *Mercedes Burnside*
	OP6 IEC Standard Test Results for An Open-Source, Ultra-Low-Cost Insulin Pump. *Lui Holder-Pearson*
	OP7 Insulin Pump Special Eligibility Criteria in New Zealand: A Survey of Prescriber Opinion and Practice. *Michaela Groves*
	OP8 The Optimise Study Protocol: A Multicentre Optimisation Trial Comparing Continuous Glucose Monitoring, Snacking Habits, Sleep Extension and Values-Guided Self-Care Interventions to Improve Glucose Time-In-Range in Youth with Type 1 Diabetes. *Shelley Rose*
	OP9 Metabolic Effects of a *CREBRF* Gene Variant in New Zealand Women. *Patricia Whitfield*

14:00	**Oral presentations: Type 2 Diabetes** **CHAIR - Rob Leikis & Michele Garrett**
14:00	O17 Diabetes Mellitus Prevalence in Northland New Zealand Schizophrenia Patients on Clozapine. *Nicole McGrath*
14:15	O18 Detecting Impaired Glucose Tolerance and Diabetes in People with Compensated Liver Cirrhosis. *Cicely Barron*
14:25	O19 Randomised Cross-Over Trial of Vildagliptin and Pioglitazone as Add-On Therapy in Patients with Type 2 Diabetes: Predicting Which One Is Right Here (Worth) Study. Predicting Type 2 Diabetes Medication Response. *Ryan Yeu*
14:40	Diabetes New Zealand - Innovations in Diabetes Care.
15:00	**CLOSING PLENARY** **Renal disease in T2DM and new medications** **Dr Viliami Tutone - Renal Physician, Counties Manukau** **CHAIR – Kate Smallman**
15:45	Presentation of the oral and poster presenter awards.
16:00	**Conference close**

NOTES

ORAL PRESENTATIONS - GENETICS AND TECHNOLOGY

O1 - INTERWEAVING DIABETES CARE - WELLBEING OF TONGAN PEOPLE WITH TYPE 2 DIABETES MELLITUS IN NEW ZEALAND

Soana Muimuiheata, Gael Mearns, Elizabeth Smythe, Sione Vaka
School of Clinical Science, Auckland University of Technology (AUT), Auckland

Background Quality standards for diabetes care and a range of initiatives have not improved outcomes for Pacific People with Type 2 Diabetes Mellitus (T2DM) in New Zealand. This research examined the meaning of being Tongan with T2DM in New Zealand, Tongan people's food practices, and strategies and services that are needed to improve diabetes management for Tongan people with T2DM.

Methods This study used a combined talanoa and hermeneutic phenomenology approach undertaken by a Tongan researcher for, and with, Tongan leaders to explore their lived experiences. This approach built upon Tongan values of listening to stories and seeking to find the meaning through interpretation of those stories.

Findings Diabetes services for Tongan people with T2DM require a Tongan worldview and holistic approach that encompass mo'ui lōtolu, wellbeing of sino (body), 'atamai (mind), and laumālie (spirit/soul) to fulfil fatongia (duty/obligations). Participants acknowledged the importance of receiving practical and meaningful information that involves family, church, and community. Food practices and diabetes management is never about an individual. It is always about wellbeing within collective communal living. This approach is symbolised by a Tongan food basket, *Kato Polopola,* interweaving talanoa and the holistic approach that is fundamental to mo'ui lōtolu. *Kato Polopola* recognises the critical role of the loto (heart), the centre of authority in deciding what to accept and reject. The importance of loto'i Tonga (Tongan heart), willingness to transform knowledge into action and maintaining an authentic relationship (vā). It is about no one thing, it is about all the strands (factors) woven together, held by 'ofa (love/heart), 'ilo (knowledge/mind) and lotu (prayers/spirit).

Conclusion Tongans with T2DM need meaningful information and appropriate support to enable commitment for sustainable behavioural changes. There are possibilities for modifying practice to enhance the ability of service providers and the Tongan community to get the benefit of talanoa and contextualised services.

NOTES

O2 - IS TELEHEALTH AN EFFECTIVE TOOL TO ADDRESS INEQUITY OF ACCESS TO SECONDARY CARE DIABETES SERVICES IN AOTEAROA NEW ZEALAND? A QUANTITATIVE STUDY.

Ivana Barbalich[1], Trudy Sullivan[2], Janine Cochrane[3], Kirsten Coppell[1]
[1]Department of Medicine, University of Otago, Dunedin, Aotearoa New Zealand; [2]Department of Preventive and Social Medicine, University of Otago, Dunedin, Aotearoa New Zealand; [3]Surgical & Radiology Directorate, Southern District Health Board, Dunedin, Aotearoa New Zealand.

Introduction
Not attending scheduled outpatient appointments is costly in terms of missed appointments and the potentially negative impact on health outcomes. 'Could Not Attend' (CNA) rates for secondary care appointments are consistently higher for Māori and Pasifika throughout Aotearoa New Zealand (NZ). The emergence of the COVID-19 pandemic facilitated increased use of telehealth with a perceived reduction in CNA rates.

Aims
This descriptive study sought to better understand whether the adoption of telehealth is likely to improve or exacerbate inequity of access to the Diabetes and Endocrinology Service at the Southern District Health Board (SDHB), NZ.

Methods
Routinely collected Diabetes and Endocrinology outpatient clinic appointment data for the Southland and Otago regions from July 2014 to June 2021 were obtained from the SDHB. Data included demographic and service details (e.g. attendance, visit type, speciality, staff team, clinical role). Microsoft Excel was used to conduct descriptive analyses (numbers and percentages) stratified by location, sex, ethnicity, and age group. The statistical software SPSS was used to calculate p-values.

Results
The COVID-19 pandemic and subsequent national lockdowns significantly influenced the use of telehealth, particularly for doctors. Telehealth use was ~20% across all demographics including Māori and Pasifika in 2019-20 yet declined in 2020-21 and became significantly different within all demographics; Māori and Pasifika were significantly less likely to use telehealth compared to other ethnicities in 2020-21, CNA rates were slightly lower at 9.3% for telehealth appointments compared to 12.4% and 10.6% for in-person appointments in 2019-20 and 2020-21, respectively. These differences were statistically significant in 2019-20 only. The impact of telehealth on overall attendance rates and equity is less clear.

Conclusions
Whilst ongoing use of telehealth could contribute to improving equity of access to NZ's healthcare system, further targeted solutions are needed to comprehensively understand and improve accessibility for Māori and Pasifika.

O3 - MEDICAL STUDENTS ARE NOT ADEQUATELY TRAINED TO MANAGE DIABETES IN INPATIENTS IN AOTEAROA NEW ZEALAND

Danni Parsons,[1,2] Lynne Chepulis,[1,2] Ryan G. Paul.[1,3]
[1] Waikato Medical Research Centre, University of Waikato, Hamilton; [2] Nursing, Te Huataki Waiora School of Health, University of Waikato, Hamilton; [3] Waikato Regional Diabetes Service, Hamilton

Background and aim
Management of diabetes in inpatients in Aotearoa New Zealand is well known to be suboptimal, resulting in significant morbidity and mortality. Since the diabetes management of inpatients is typically co-ordinated by junior doctors, the aim of this study was to determine the adequacy of their undergraduate medical education.

Methods
Postgraduate year one, two and three doctors in every DHB were invited in February 2022 to partake in an online survey to assess their self-efficacy of inpatient diabetes management.

Provisional results
Over 87% (n=110) of the 126 respondents to date reported they were inadequately trained on inpatient diabetes management at medical school with a median score of 2 on a 7-point Likert scale (0=no skill to 7=expert) at graduation. There were no significant differences between participants from the University of Otago (n=80), University of Auckland (n=40) or international graduates (n=6). Less than 8% of respondents had sufficient knowledge to start or titrate basal insulin, use insulin:carbohydrate ratios for prandial insulin, manage steroid-induced hyperglycaemia or hyperosmolar hyperglycaemic state. Only one in six were aware of the need to stop SGLT2 inhibitors around procedures and intercurrent illness, and only 11% felt confident in managing diabetes in patients who were nil by mouth. Approximately 40% of respondents were not aware of the required frequency of monitoring or target range of blood glucose levels in inpatients with diabetes, and almost 80% were not aware of the same parameters for ketone levels. One in ten reported they had no knowledge of any aspect of inpatient diabetes management.
Conclusions

Undergraduate medical education of inpatient diabetes management in Aotearoa New Zealand appears to be inadequate and likely contributes towards the poor outcomes of inpatients with diabetes.

NB: We expect over 200 respondents so these results will be updated before the presentation in May.

NOTES

O4 - INCREASING INSULIN PUMP UPTAKE AT CMDHB BY ENHANCING CLINICIAN EXPERTISE

Stephanie Zhang[1], Zara Houston[1], Hamish Crocket[2], Yenushka Goonesekera[1, 3], Brandon Orr-Walker[1]
[1]Whitiora Diabetes Centre, Counties Manukau District Health Board Auckland; [2]Te Huataki Waiora School of Health, University of Waikato; [3]Department of Psychological Medicine, University of Auckland

Introduction
Whitiora Diabetes Service at CMDHB had the opportunity to improve service delivery, and address long standing issues with equity following seed funding from the Ministry of Health (MOH) under 'Improved Planned Care'. Since September 2012 when pump therapy became a funded option, patient update has been low, with Māori and Pacific underrepresented. In 2021, the service began revising support for patients with diabetes, including professional development for clinicians.

Aims
To improve clinician expertise to support patients using pump therapy within Whitiora Diabetes Service. With an increase in clinician expertise, we hypothesised that referrals for pump would increase, particularly for Māori and Pacific.

Methods
The diabetes multidisciplinary team (MDT) completed an online survey using SurveyMonkey regarding pump expertise, and professional development needs. This was used to develop a staff education programme. The programme was developed and delivered by the pump project team and industry representatives. 14 staff education workshops were held over nine months in 2021. The survey was completed again at cessation of the programme to evaluate its effectiveness, and gaps in the education programme. Pump referral rates at the end of the staff education programme were compared to the year prior to the programme.

Results
25 specialist diabetes clinicians from the MDT completed the pre-workshop survey. 15 have completed the post-workshop survey to date. Preliminary results indicate that staff report increased knowledge and confidence to support patients using pump therapy. Referrals for pump therapy have increased by 700% over the last 12 months.

Conclusion
A significant clinical and service benefit has been achieved through the implementation of a MDT training programme. Enhancing clinician expertise has an important contribution to CMDHB's goal to increase uptake, and successful use of pump by people with diabetes who have had lower rates of use to this technology, particularly Māori and Pacific.

NOTES

O5 - DIABETIC FOOT INTERVENTIONS TO IMPROVE OUTCOMES FOR INDIGENOUS POPULATIONS IN HIGH-INCOME COUNTRIES: A SCOPING REVIEW

Michele Garrett[1,2], Belinda Ihaka[3], Professor Rinki Murphy[1,2], and Associate Professor Dr Timothy Kenealy[1]
[1] University of Auckland, School of Medicine; [2]Auckland District Health Board; [3]AUT University, School of Clinical Sciences.

Background
Indigenous peoples represent 5% of the world's population (1). They experience higher rates of diabetes and associated complications than non-indigenous people, including poorer outcomes for diabetes foot disease (DFD) (2, 3). Providing equitable care through well-organized diabetes foot interventions can improve outcomes (4). This scoping review provides an overview of the literature on diabetes foot interventions that incorporated a focus on equity for Indigenous peoples.

Methods
This review followed the PRISMA-ScR guidance for scoping reviews (5). MEDLINE, Informit indigenous collection, CINAHL, PsychINFO, SCOPUS, and Embase were searched to the 17 June 2021 using search terms relating to the diabetic foot, interventions, and Indigenous peoples. All publications were eligible if they described a diabetes foot intervention that included Indigenous peoples from high-income countries. Two reviewers independently screened titles, abstracts, and full-text publications, and contributed to data charting. Key study characteristics included country, Indigenous population, intervention description, any foot-related outcomes, and alignment with the CONSIDER statement (6).

Results
We screened 730 publications and 30 met the eligibility criteria. Interventions focused on indigenous peoples from Australia (n=12), Canada (n=6), USA (n=6), New Zealand (n=2), Greenland (n=2) and Nauru (n=2). Primary prevention interventions were predominant (n=20) with a focus on increasing foot screening rates (n=16). Other interventions included health promotion and education (n=4), comprehensive foot interventions (n=4), a diabetic foot ulcer management protocol, and a service brokerage model. Only 1 study of the 27 evaluated met all the CONSIDER checklist requirements; 55% (n=15) met fewer than 9 items; few (n=3) met both items in the participation domain.

Conclusion
A limited number of diabetes foot interventions in the literature described diabetes-related foot outcomes for Indigenous peoples. Specific cultural approaches to foot interventions were not evident. To inform future DFD policies and programs and help guarantee equitable outcomes, research led by non-indigenous researchers needs to be conducted in partnership with Indigenous communities.

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O6 - THE AUSTRALIAN AND NEW ZEALAND DIABETIC AND ISCHAEMIC FOOT OUTCOMES STUDY (ANZ-DIFOS): PRELIMINARY FINDINGS

Odette Hart[1,2], Claire O'Shea[3], Manar Khashram[1,2]
[1] Department of Vascular Surgery, Waikato Hospital, New Zealand; [2] Department of Surgery, The University of Auckland, New Zealand, [3] Waikato District Health Board, New Zealand.

Background
Diabetic foot disease (DFD) is a common and debilitating condition. In New Zealand (NZ) there is a high incidence of lower limb amputation during hospitalisation for DFD and an over-representation within NZ Māori populations.(1, 2) The Australia and New Zealand Diabetic and Ischaemic Foot Outcomes Study (ANZ-DIFOS) is a binational prospective study with an aim to report the presentation, management, and outcomes of DFD.(3)

Methods
This multicentre study includes Waikato Hospital, NZ; Sir Charles Gairdner Hospital, Perth; the Royal Adelaide Hospital and Queen Elizabeth Hospitals, SA; and Prince of Wales Hospital, Sydney. Participants with DFD that meet inclusion criteria will be reviewed at baseline, 1, 3, 6 and 12 months. Service and referral details, demographic, and clinical history, wound and perfusion data, outcomes and discharge information will be collected. The primary outcomes are time to wound healing, major amputation, overall mortality, and amputation-free survival at 12 months. Recruitment began in August 2020 in New Zealand, February 2021 in Perth, March 2021 in Adelaide, and July 2021 Sydney.

Results
Only NZ data will be presented. 120 participants were included, with a median age of 69 years (range 30 – 91 years), 39 were females and 49 (41%) identified as NZ Māori. Major limb amputation at 30 days was 7.5%, with 25 (21%) and 28 (23%) participants overall having undergone a major limb amputation and a minor limb amputation respectively. Furthermore, 68% of major limb amputations occurred in Māori participants. The 30-day mortality is 1.7%. Overall, 20 (17%) NZ participants have died, with 50% of these deaths occurring in Māori participants.

Conclusion
This preliminary data from ANZ-DIFOS highlights the burden of DFD. Whilst recruitment and follow up are ongoing, this study may show emerging evidence of the risk of lower limb amputation, variations in treatment and outcomes in DFD.

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NOTES

ORAL PRESENTATIONS - PREGNANCY

O7 - IS IT FEASIBLE TO USE FIRST ANTENATAL HBA1C TO TARGET NORTHLAND PREGNANT WOMEN AT HIGH RISK FOR GESTATIONAL DIABETES MELLITUS FOR EARLIER INTERVENTION?

Tomas Ashford[1], Nicole McGrath[2], Ashley Abraham[3]
[1]University of Auckland Medical School; [2]Diabetes Service, Northland DHB; [3]Quality Improvement Directorate, Northland DHB.

Background
HbA1c levels fall by approximately 10% in early pregnancy so first antenatal Hba1c 36-49 mmol/mol may indicate pre-diabetes. National guidelines recommend referral to diabetes services only if HbA1c is in the diabetes range of 50 or greater; screening for gestational diabetes mellitus (GDM) at 24-28 weeks' gestation for all others. In Northland, GDM screening and treatment is often delayed or difficult due to geographical spread and low socio-economic status. We therefore sought to establish whether referral based on first antenatal HbA1c would capture women with GDM earlier and allow better intervention. We also audited whether national guidelines are being followed.

Methods
We captured all women who had a first antenatal HbA1c at any Northland laboratory between 1st January to 31st December 2020. We focused on women with HbA1c 36-49 and completed pregnancy. We collected basic demographic data, GDM screening results and subsequent outcomes.

Results
There were 240 women, 67.9% Maori, of 1593 completed pregnancies, who had a first antenatal HbA1c of 36 - 49. 21.6% were not subsequently screened for GDM (40% in subgroup HbA1c 41-49 including 2 women who had polycose test only). Of those who were screened, only 23.9% had GDM.

First antenatal HbA1c	GDM (number of women)	No GDM: polycose only	No GDM: OGTT	Not screened
36-40	31	74	63	42
41-44	10	2	3	8
45-49	4	0	1	2

Of the 30 women with HbA1c 41-49, five required emergency caesarean section (two treated for GDM); four newborn were macrosomic (two GDM pregnancies) and eight had hypoglycaemia (four GDM pregnancies). None of these outcomes were statistically significant.

Conclusion
We did not find that first antenatal HbA1c 36-49 predicted subsequent GDM. Our high non-screening rate, especially for women with HbA1c 41-49, likely influenced this result.

O8 - DIABETES IN PREGNANCY: USING THE SFLT-1/PLGF RATIO TO PREDICT PREECLAMPSIA

Dr Ruth Hughes, [1-2] Dr Ian Philips, [3] Dr Chris Florkowski, [3-4] Dr Jo Gullam [1-2]
[1]Christchurch Women's Hospital, [2]Department of Obstetrics and Gynaecology, University of Otago Christchurch, [3] Canterbury Health Laboratories, [4]Christchurch Diabetes Centre, Christchurch, New Zealand

Background
Placental growth factor (PlGF) based tests are used internationally as prognostic markers in suspected preeclampsia. The Ministry of Health are yet to endorse these tests in NZ. A recent Christchurch study confirmed the effectiveness of the sFlt-1/PlGF ratio in predicting preeclampsia in a NZ population.

Aims
To investigate the utility of the sFlt-1/PlGF ratio in pregnancies complicated by pre-existing diabetes (DM) and prediabetes (pre-DM).

Methods
A subgroup analysis of a prospective cohort study of 240 singleton pregnancies with suspected preeclampsia at 20^{+0} to 36^{+6} weeks' gestation. Participants and clinicians were blinded to the sFlt-1/PlGF ratio results.

Results
Included were 27 pregnancies (10 Type 1 DM, 8 Type 2 DM, 9 pre-DM), 11 participants were Māori, 6 Pasifika, 6 European, 1 Filipino, 1 Indian. In the 11 (40.7%) pregnancies with elevated sFlt-1/PlGF ratios, seven had a clinical diagnosis of preeclampsia, two cases of preeclampsia were misdiagnosed, and two cases of placental insufficiency complicated by abruption were missed. In the 16 pregnancies with normal sFlt-1/PlGF ratios, disclosing the blood results may have prevented hospitalisation and/or reduced the frequency of day unit assessments in four participants. The sFlt-1/PlGF ratio was not raised in cases of chronic proteinuria, chronic hypertension, or worsening renal failure, however subsequent elevations indicated the onset of superimposed preeclampsia. In one pregnancy, renal dialysis caused transient mild elevations in the sFlt-1/PlGF ratio.

Conclusions
In pregnancies complicated by pre-existing DM or pre-DM, the sFlt-1/PlGF ratio performed better than clinical assessment and routine tests at identifying placental insufficiency, including preeclampsia. The sFlt-1/PlGF ratio differentiated between placental-mediated disease and chronic conditions such as hypertension and chronic kidney disease. Further study could assess the utility of a routine sFlt-1/PlGF ratio at 32 weeks' gestation in women with pre-existing DM to identify those at high risk of preterm placental insufficiency.

NOTES

ORAL PRESENTATIONS – PRE-DIABETES

O9 - DISINCENTIVISED AND DE-PRIORITISED MAHI: A MULTIPLE CASE STUDY OF PRE-DIABETES CARE UNDERTAKEN BY GENERAL PRACTICE IN AOTEAROA NEW ZEALAND

Christine Barthow[1], Jeremy Krebs[1,2], Eileen McKinlay[3]
[1]Department of Medicine, University of Otago, Wellington PO Box 7343 Wellington South 6242 New Zealand, [2]Capital and Coast DHB. Wellington Regional Hospital, Private Bag 7902, Wellington 6242, [3]Department of Primary Health Care & General Practice, University of Otago, Wellington PO Box 7343 Wellington South 6242 New Zealand.

Introduction
In Aotearoa/New Zealand (NZ), general practices diagnose and manage pre-diabetes. This work is important as it may prevent or delay the onset of Type 2 Diabetes (T2DM) reduce health inequalities and the burden that T2DM places on health care services. However, no study has previously examined how this work routinely occurs in NZ.

Methods
Two in-depth case studies of practices serving ethnically, and socioeconomically diverse populations, followed by a cross-case analysis. Data included focus groups and clinical case note reviews.

Results
Health care providers put considerable work into those with pre-diabetes; however, the health care context, including funding mechanisms, reporting targets, and the disease-centred focus of care, contributed to an environment that disincentivised and de-prioritised pre-diabetes care.

Health care providers had variable attitudes to pre-diabetes. Some viewed pre-diabetes as an important opportunity to intervene, while others questioned the likelihood of progression to T2DM and were concerned by the lack of ability to identify those at the highest risk and provide targeted care.

Gaps in systematic pre-diabetes screening practices were identified, and interventions used were inconsistent and lacked comprehensive ongoing support, likely impacting individual patient care. In one case, the social determinants of health (SDOH) particularly influenced patients' ability to engage with and respond to pre-diabetes care, significantly increasing general practice work.

Conclusions
Complex multi-layered factors impact pre-diabetes care in NZ, and many barriers cannot be addressed at the general practice level. The practice serving the most disadvantaged population, who concurrently have higher numbers with pre-diabetes/T2DM, were more adversely affected by the barriers identified. The current model of pre-diabetes care in general practice is unlikely to reduce rates of T2DM unless multi-sectoral responses attend to the impact of SDOH. General practice teams have a role in diabetes prevention work, but current funding arrangements models of care need review.

NOTES

O10 - A DIAGNOSIS OF PREDIABETES WHEN COMBINED WITH LIFESTYLE ADVICE AND SUPPORT IS CONSIDERED HELPFUL RATHER THAN A NEGATIVE LABEL: A QUALITIVE STUDY

Kirsten Coppell[1], Sally Abel[2], Lisa Whitehead[3], Angeline Tangiora[4], Terrie Spedding[4], David Tipene-Leach[5]

[1]Department of Medicine, University of Otago, Dunedin, Aotearoa New Zealand; [2]Kaupapa Consulting Ltd., Napier, Aotearoa New Zealand; [3]School of Nursing and Midwifery, Edith Cowan University, Joondalup, Australia; [4]Health Hawke's Bay, Hastings, Aotearoa New Zealand; [5]Eastern Institute of Technology, Taradale, Napier, Aotearoa New Zealand.

Introduction

Testing for prediabetes in high-risk groups meets the criteria for screening. It is considered worthwhile because lifestyle modification can prevent or delay progression to type 2 diabetes (T2D), although not all will progress to T2D. Screening for any disease requires being able to offer appropriate follow-up and treatment for those who test positive, to avoid harm. However, a diagnosis of prediabetes has been considered a harmful, unhelpful label.

Aims

The aim of this study was to explore the experience and perceptions of a diagnosis of prediabetes among a demographically diverse sample of New Zealanders who had, and had not, regressed to normoglycaemia following participation in a primary care nurse-delivered intervention for 6 months.

Methods

A purposefully selected sample of 58 people with prediabetes and BMI >25kg/m^2, stratified by male/female, Māori/non-Māori, and those who had/had not regressed to normoglycaemia, after completing 6-months of a prediabetes intervention were interviewed. Interviews were audio-recorded and transcribed. Data were analysed by thematic analysis.

Results

Most participants recalled being shocked when told they had prediabetes, but they did not perceive the diagnosis to be a label in a negative sense, and some, described the diagnosis as helpful, "an opportunity to do something". Participants appreciated knowing that prediabetes could be reversed, and the opportunity to be able to take supported action and make lifestyle changes through the nurse-delivered prediabetes lifestyle intervention. The vast majority believed their "way of living" had caused their prediabetes, and their clear preference was to take control and make dietary changes, not to take Metformin. They wanted to be proactive rather than "lazy" and taking drugs as the first choice was seen as the "slippery slope".

Conclusions

Prediabetes was not considered a negative label, but an opportunity to prevent T2D, when coupled with a supportive primary care nurse-delivered dietary intervention.

O11 - THE INCIDENCE OF DIABETIC KETOACIDOSIS ASSOCIATED WITH EMPAGLIFLOZIN USE IN AOTEAROA NEW ZEALAND: A PRELIMINARY REVIEW

Lynne Chepulis,[1,2] An Yu,[2] Ryan G. Paul.[1,3]
[1]Waikato Medical Research Centre, University of Waikato, Hamilton; [2]Nursing, Te Huataki Waiora School of Health, University of Waikato, Hamilton; [3]Waikato Regional Diabetes Service, Waikato District Health Board, Hamilton

Aims and Objectives
Diabetic ketoacidosis (DKA) is a rare severe adverse effect of empagliflozin in patients with type 2 diabetes (T2D), with trial data suggesting an incidence of 1/3000–1/1000 patient years (0.03–0.1% per year). Empagliflozin only became available in Aotearoa New Zealand from February 2021 (via Special Authority), so provides a unique opportunity to investigate the real-world incidence of DKA in new empagliflozin users.

Methods
Retrospective data were collected from the National Pharmaceutical dataset for all patients prescribed empagliflozin between Feb and Oct 2021. These data were linked by NHI to the National Minimum dataset, and admissions for DKA were recorded. A DKA admission was deemed to be associated with empagliflozin use if it occurred within the time covered by dispensed medication, allowing for a medication possession ratio of 0.8. DKA incidence was then reported by age group, gender, DHB and ethnicity.

Results
During the 9-month period, there were 167 admissions for DKA in 40,523 patients prescribed empagliflozin, but only 94 admissions were associated with empagliflozin use (92 individual patients; 0.23% or 3/1000 patient years). There was no predominant regional (incidence in the 15 DHBs affected 0%-0.54%) or gender variation (95% CI 0.89-2.10 for men), but DKA admissions were at least two-fold more common in European (0.35%) than in Māori (0.17%), Pacific (0.18%) or Asian (0.10%) patients ($P \leq 0.01$). Median age at DKA admission was 60.5 years, with the highest incidence occurring in those aged < 30 years (0.75%) compared to 0.17%-0.25% in those aged > 30 years.

Conclusions
The real-world incidence of DKA associated with empagliflozin use in Aotearoa New Zealand appears to be several-fold higher than international data but remains rare. Prescribing behaviour and/or use of special authority may explain why DKA was more common in Europeans and emerging adults.

NOTES

ORAL PRESENTATIONS – GENETICS AND TECHNOLOGY

O12 - THE METABOLIC EFFECTS OF A CREBRF GENE VARIANT IN NZ WOMEN – ASSESSMENT OF SATIETY AND INCRETINS

Bridget Moss[1], Robin Willink[2], Kirsty Danielson[3], Ana Holley[3], Rosemary Hall[4,5], Peter Shepherd[6,7], Troy L. Merry[7,8], Jeremy Krebs[4,5], Patricia Whitfield[1,4].
[1]Dept. of Medicine, University of Otago, Wellington; [2]Biostatistics Group, University of Otago, Wellington; [3]Dept. of Surgery and Anaesthesia, University of Otago, Wellington; [4]Centre for Endocrine, Diabetes and Obesity Research, Capital and Coast DHB; [5]School of Medical Sciences, University of Otago, Wellington; [6]Dept. of Molecular Medicine and Pathology, School of Medical Sciences, The University of Auckland, Auckland; [7]Maurice Wilkins Centre for Molecular Biodiscovery, The University of Auckland, Auckland; [8]Discipline of Nutrition, School of Medical Sciences, The University of Auckland, Auckland

Introduction
A variant of the *CREBRF* gene (rs373863828-A; p.Arg457Gln) is associated with an increase in BMI but a decrease in the risk for type 2 diabetes and gestational diabetes. This variant is found almost exclusively in people of Māori and Pacific ancestry. Although the exact function of *CREBRF* is unknown, this variant has been found to be associated with an increase in postprandial insulin release in men. Glucagon-like peptide 1 (GLP-1) and gastric inhibitory peptide (GIP) are incretin hormones which mediate insulin release following a meal and regulate satiety.

Aim
The primary objective of this study was to investigate the effect of the rs373863828-A *CREBRF* variant on postprandial incretin release in Māori and Pacific women, and to assess whether this effect is associated with a concordant difference in experiences of satiety.

Methods
Fifty participants (14 homo- or heterozygous for rs373863828-A (AX), 35 reference genotype (GG), 1 excluded) were recruited to take part in a study where plasma samples and satiety scores were taken at baseline and 30, 60, 90, 120, and 150 minutes following a standardised mixed-meal test. Hormone quantification by ELISA and magnetic immunoassay was undertaken for a matched cohort of 28 participants (14 GG and 14 AX; matched for BMI, age and Polynesian ancestry). Postprandial GLP-1 and GIP concentration and satiety were analysed using a baseline-adjusted area-under-the-curve (AUC) and suddenness score.

Results
No significant differences were found between the matched AX/GG pairs for AUC measurements and suddenness scores for both incretin release (Figure 1) and satiety reports.

Conclusion
Preliminary evidence in women suggests that differential incretin or satiety responses do not appear to mediate the reduced risk of type 2 diabetes associated with the rs373863828-A allele. A larger sample size may be necessary to reveal any potential differences based on the rs373863828-A variant.

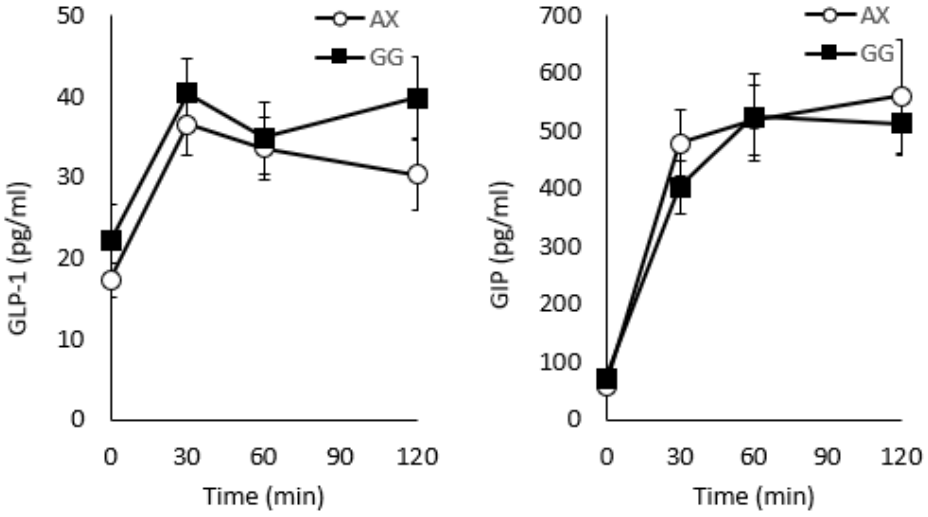

Figure 1. Plasma a) GLP-1 and b) GIP levels before (t=0) and after a standardised mixed meal in Māori and/or Pacific women with an AX (n=14) or GG (n=14) genotype for *CREBRF*. Data is presented as the mean ± the standard error of the mean.

NOTES

O13 - FIRST CLINICAL TEST RESULTS FOR A LOW-COST LIGHT-BASED GLUCOSE SENSOR

Jake Campbell[1], Josie Dixon[1], Christopher D. McKinlay[2,3], Rachel Smith[1], Lisa Mravevich[2], Chris Pretty[1], Jane Alsweiler[2], Sabine Huth[2], J Geoffrey Chase[1]
[1]Department of Mechanical Engineering, Centre for Bioengineering, University of Canterbury, New Zealand; [2]Liggins Institute, University of Auckland, New Zealand; [3]idz First Neonatal Care, Middlemore Hospital, South Auckland, New Zealand

Background
Measuring blood glucose (BG) is central to diabetes management. However, glucometer BG measurements are infrequent, invasive, and painful, semi-invasive interstitial continuous glucose monitors (CGMs) are prohibitively expensive, and no non-invasive methods are currently available. This study presents first clinical validation test results for a low-cost (<NZ$250) light-based, non-invasive glucose sensor using discrete wavelength LEDs in the near infra-red (1400-1700nm) range.

Methods
Heathy adults (ethics approval from University of Canterbury Human Ethics Committee) and neonatal ICU infants (ethics approval from NZ HDEC South) were tested. Adult subjects drank 330ml of Coca-Cola (17.5g glucose). At 9 measurement intervals (t = 0-60mins every 10mins, 90mins and 120mins) glucometer measurements and 3 light-based measurements (carotid artery, palm, and finger) were made, yielding 33 comparison pairs per test. For NICU subjects light-based glucose measurements were taken at 3 sites (foot, wrist, chest) every time a standard clinical BG measurement was made. Reference and light-based BG values are compared using a modified Clarke Error Grid (CEG).

Results
N=27 subjects (22 neonates; 5 adults) with 290 measurements, yielded 163 pairs, where 117 did not record a pulse for light-based data analysis. The glucose range was 1.9-7.9mmol/L. The CEG contains 62%, 31%, 6% and 1% in zones' A, B, C and D respectively. Outliers in the C and D ranges had poor pulsatile signals for analysis, yielding larger error. Bland Altman analysis demonstrated slight overestimation of BG for neonates, and slight underestimation for adults using a joint overall calibration.

Conclusion
Results show good performance for a first prototype non-invasive light-based blood glucose monitor. There is a need to test a wider glucose range into hyperglycemia and to improve test use and/or light intensity to ensure a good pulse waveform is captured for analysis.

NOTES

O14 - EFFECT OF DIVERGENT CONTINUOUS GLUCOSE MONITORING TECHNOLOGIES ON GLYCAEMIC CONTROL IN TYPE 1 DIABETES MELLITUS: A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CONTROLLED TRIALS

Mona Elbalshy[1], Jillian Haszard[2], Hazel Smith[1], Sarahmarie Kuroko[1], Barbara Galland[1], Nick Oliver [3], Viral N Shah [4], Martin I de Bock[5], and Benjamin J Wheeler[1,6].
[1]Department of Women's and Children's Health, Dunedin School of Medicine, University of Otago, New Zealand. 201 Great King St, 9016, Dunedin, Otago, New Zealand; [2]Division of Sciences, University of Otago, New Zealand. University of Otago. PO Box 56. Dunedin 9054, New Zealand; [3]Department of Metabolism, Digestion and Reproduction, Faculty of Medicine, Imperial College, London, UK; [4]Barbara Davis Center for Diabetes, University of Colorado Anschutz Medical Campus, Aurora, CO 80045, USA; [5]Department of Paediatrics, University of Otago Christchurch, New Zealand. 2 Riccarton Avenue. PO Box 4345, Christchurch 8140, New Zealand; [6]Paediatric Endocrinology, Southern District Health Board, Dunedin 9016, New Zealand.

Aims
We aimed to conduct a systematic review and meta-analysis of randomised controlled clinical trials (RCT) assessing separately and together the effect of the three distinct categories of continuous glucose monitoring (CGM) systems (adjunctive, non-adjunctive and intermittently scanned CGM [isCGM]), compared to traditional capillary glucose monitoring, on HbA1c and CGM metrics.

Methods
PubMed, Web of Science, Scopus and Cochrane Central register of clinical trials were searched. Inclusion criteria were: randomised controlled trials; participants with type 1 diabetes of any age and insulin regimen; investigating CGM and isCGM compared to traditional capillary glucose monitoring; and reporting glycaemic outcomes of HbA1c and/or time-in-range (TIR). Glycaemic outcomes were extracted post-intervention and expressed as mean differences and 95%CIs between treatment and comparator groups. Results were pooled using a random-effects meta-analysis. Risk of bias was assessed using the Cochrane Rob2 tool.

Results
This systematic review was conducted between January to April 2021; it included 22 RCTs (15 adjunctive, 5 non-adjunctive, and 2 isCGM)). The overall analysis of the pooled three categories showed a statistically significant absolute improvement in HbA1c percentage points (mean difference (95% CI): -0.22% [-0.31 to -0.14], I^2=79%) for intervention compared to comparator and was strongest for adjunctive CGM (-0.26% [-0.36, -0.16]). Overall TIR (absolute change) increased by 5.4% (3.5 to 7.2), I^2=71% for CGM intervention compared to comparator and was strongest with non-adjunctive CGM (6.0% [2.3, 9.7]).

Conclusions
For individuals with T1D, use of CGM was beneficial for impacting glycaemic outcomes including HbA1c, TIR, and time-below-range (TBR). Glycaemic improvement appeared greater for TIR for newer non-adjunctive CGM technology.

ORAL PRESENTATIONS – NUTRITION

O15 - KETOGENIC COMPARED TO CONTROL DIETS IN PRE-DIABETES AND TYPE 2 DIABETES: A SYSTEMATIC REVIEW AND META-ANALYSIS

Amber Parry Strong[1], Morag Wright-McNaughten[1], Mark Weatherall[1], Rosemary Hall[1], Kirsten Coppell[2], Christine Barthow[1], Jeremy Krebs[1].
[1]Department of Medicine, University of Otago Wellington; [2]Department of Medicine, University of Otago, Dunedin

Background
Ketogenic diets are popular but their role in management of Type 2 diabetes (T2DM) and pre-diabetes is uncertain.

Objective
To estimate the effect of ketogenic diets in pre-diabetes and T2DM based on a systematic review and meta-analysis of randomised controlled trials (RCTs).

Methods
A systematic review of Medline (OVID), Embase (OVID), Scopus, EBM Reviews - Cochrane Central Register of Controlled Trials (Ovid) and Web of Science databases identified RCTs that compared efficacy and safety of very low carbohydrate ketogenic diets (≤ 50g carbohydrate or ≤10% total energy from carbohydrate per day) with a control diet, a carbohydrate content above this carbohydrate threshold, in adults with pre-diabetes or T2DM, with a study duration of at least 6 months. The primary outcome variable was HbA1c after 12 months. The meta-analysis method was inverse variance weighting of mean values for continuous variables.

Results
Key word searches identified 2290 studies of which 2221 were not in the scope of the review. Full text review of 69 studies identified eight meeting inclusion criteria, with a total of 606 participants. Six studies reported the primary outcome variable; four as change from baseline with a fixed effects estimate (95% CI) of HbA1c (%) Ketogenic minus Control of 0.0 (-0.22 to 0.25); and two as change from baseline; -0.65% (-0.99 to -0.31)% P<0.001. Serum triglycerides were lower with Ketogenic diet versus control: -0.28 (-0.44 to -0.11) mmol/L P<0.001, and HDL was higher with an estimate of 0.04 (0.01 to 0.08) mmol/L, P=0.03, in the five studies reporting summary data after 12 months.

Conclusion
In people with pre-diabetes and T2DM a low carbohydrate, ketogenic diet may cause clinically significant reductions in Hba1c and triglycerides. The strength of evidence is low with variable methods of reporting important outcome variables.

NOTES

O16 - SATURATED AND TRANS FAT INTAKES ON MORTALITY AND NON-COMMUNICABLE DISEASE INCIDENCE: SYSTEMATIC REVIEW AND META-ANALYSES OF PROSPECTIVE OBSERVATIONAL STUDIES

Andrew N Reynolds,[1,2] Leanne Hodson,[3] Russell de Souza,[4] Huyen Tran Diep Pham,[1] Lara Vlietstra,[1] Jim Mann[1,2,5]
[1]Department of Medicine, University of Otago, Dunedin; [2]Edgar National Centre for Diabetes and Obesity Research, University of Otago, Dunedin; [3]Radcliffe Department of Medicine, University of Oxford, Oxford; [4]Faculty of Health Sciences, McMaster University, Ontario; [5]Healthier Lives National Science Challenge, New Zealand

Objective
To examine the totality of evidence available from prospective observational studies on saturated and trans fats intakes and mortality or non-communicable disease incidence.

Methods
We conducted a systematic review and meta-analysis of studies from database inception to October 2020. We considered total saturated or trans fats, specific chain lengths or isomers, and food sources in extreme quantile, dose response, and replacement analyses where saturated and trans fats were replaced with other macronutrients.

Results
There were 112 publications (3,696,568 participants) relating to saturated fats and 55 publications (2,227,241 participants) relating to trans fats and prespecified outcomes. Higher dietary intakes of saturated fats were associated with increased mortality. Mortality reduced when 5% of total energy from saturated fats was replaced with polyunsaturated fats (PUFA; RR 0.85 95%CI 0.75 to 0.97), monounsaturated fats (MUFA; RR 0.84 95%CI 0.75 to 0.95), plant MUFA (RR 0.85 95%CI 0.82 to 0.88) and carbohydrates (RR 0.92 95%C 0.86 to 0.99). Coronary heart disease (CHD) incidence reduced with a 5% energy replacement with PUFA (RR 0.89 95%CI 0.81 to 0.98), plant MUFA (RR 0.83 95%CI 0.69 to 1.00) and slowly digested carbohydrates (RR 0.94 95%CI 0.89 to 0.99). Higher tissue measures of total saturated fats were associated with increased CHD and type 2 diabetes incidence. Higher dietary intakes of trans fats were associated with increased mortality, CHD, and cardiovascular disease. A 2% replacement of trans fats with plant MUFA reduced mortality (RR 0.90 95%CI 0.85 to 0.96) and CHD (RR 0.80 95%CI 0.70 to 0.92). The certainty of evidence was graded from moderate to very low, largely due to the amount of data available.

Conclusion
These findings reinforce dietary and clinical guidelines that saturated and trans fats in the diet should be replaced by PUFA, plant MUFA and slowly digested carbohydrates.

ORAL PRESENTATIONS – TYPE 2 DIABETES

O17 - DIABETES MELLITUS PREVALENCE IN NORTHLAND NEW ZEALAND SCHIZOPHRENIA PATIENTS ON CLOZAPINE

Nicole McGrath[1], Verity Humberstone[2], Ashley Abraham[3]
[1]Diabetes Service, Northland DHB; [2]Department of Psychiatry, Northland DHB; [3]Quality Improvement Directorate, Northland DHB

Background
Clozapine is a unique atypical anti-psychotic agent with best efficacy for treatment resistant schizophrenia compared to other agents but increased metabolic adverse effects. We sought to audit the prevalence of diabetes and pre-diabetes in Northland patients on clozapine.

Method
We captured all 287 patients in Northland who were prescribed clozapine in September 2021 and obtained demographic, clinical and laboratory data.

Results
We discovered that 26.48% had diabetes (one patient type one, 75 type two diabetes) and 14.63% had pre-diabetes that developed after a median of 6 years' clozapine treatment. Diabetes prevalence is approximately 6% in the general population. NZ Māori made up 65.85% of the entire cohort (35.8% of the general population) and 85.53% of the diabetes patients. NZ Europeans represented most of the remaining 30.66% on clozapine consistent with the largely bicultural ethnic mix of our region. Māori on clozapine were younger: mean age 42 years compared to NZ Europeans mean age 49 years. The average BMI was 37 kg/m^2 for Māori, 32 for Europeans (range 21-63, SD 8); there was a moderate relationship between clozapine use and increasing BMI (correlation coefficient of 0.74). For the diabetes patients, glycaemic control was overall suboptimal with a mean Hba1c of 66 mmol/mol (range 41-117).

Conclusions
Culturally appropriate, flexible, and accessible services which integrate both the mental and physical health needs of Northland people with treatment resistant schizophrenia on clozapine are required to reduce the 41% rate of dysglycaemia in this predominantly Māori group.

NOTES

O18 - DETECTING IMPAIRED GLUCOSE TOLERANCE AND DIABETES IN PEOPLE WITH COMPENSATED LIVER CIRRHOSIS

Cicely VM Barron[1], Helen F Heenan[2], Harmony Thompson[2], Huan Chan[2], Jeffrey Ngu[3], Helen Lunt[1,2].
[1] Department of Medicine, University of Otago Christchurch, New Zealand; [2]Diabetes Outpatients, Canterbury District Health Board, New Zealand; [3]Gastroenterology Department, Canterbury District Health Board, New Zealand.

Background
In liver cirrhosis, diabetes prevalence is around 30%. People with cirrhosis should undergo regular, structured surveillance for complications such as hepatocellular carcinoma. If diabetes screening was included in this surveillance programme, what might the best, most pragmatic screening test be?

Methods
Participants with no known dysglycaemia (impaired glucose tolerance or diabetes) were recruited from a liver cirrhosis register, managed by the Gastroenterology department. Participants attended a half day research clinic visit and underwent; i) a standard 75 g oral glucose tolerance test, ii) a laboratory HbA1c and iii) had a 'blinded' CGM inserted (Libre Pro). Additional investigations included a haptoglobin test, to check for intravascular haemolysis which might in turn affect red cell turnover, and a food frequency questionnaire.

Results
Twenty participants successfully completed data collection, which included returning the interstitial glucose sensor by mail (one participant was unable to return their sensor and was excluded). No participant was carbohydrate avoidant. All had compensated cirrhosis (Child-Pugh Class A for 18 participants, Class B for two participants). The commonest underlying reason for cirrhosis was hepatitis C (N=10). Dysglycaemia was detected by OGTT in 7 participants and 4 participants had an elevated HbA1c. Bland-Altman comparison of laboratory and CGM-estimated HbA1c was broadly comparable (95% CI: -3 to 12 mmol/mol). Laboratory HbA1c tended to be higher than CGM-estimated HbA1c (4mmol/mol difference), but participants may have changed their lifestyle during their two weeks of CGM sensor wear, despite being requested not to do so. Bland-Altman comparison was unaffected by haptoglobin status.

Conclusions
Findings are consistent with other studies, showing that OGTT tends to diagnose more cases of dysglycaemia than HbA1c. The HbA1c appeared to reflect 'true' average glucose and is a convenient screening test in this setting. 'Blinded' CGM provided day-to-day insights into glycaemic excursions but is not suitable for diabetes screening.

NOTES

O19 - RANDOMISED CROSS-OVER TRIAL OF VILDAGLIPTIN AND PIOGLITAZONE AS ADD-ON THERAPY IN PATIENTS WITH TYPE 2 DIABETES: PREDICTING WHICH ONE IS RIGHT HERE (WORTH) STUDY. PREDICTING TYPE 2 DIABETES MEDICATION RESPONSE

Rebecca Brandon[1,2], Yannan Jiang[3,4], Rui Qian Yeu[1,2], Ry Tweedie-Cullen[1,2], Kate Smallman[5], Glenn Doherty[6], Kerry A Macaskill-Smith[7], Rebekah J Doran[7], Penny Clark[7], Allan Moffitt[8], Troy Merry[2,9], Norma Nehren[10], Frances King[11], Jennie Harré Hindmarsh[11], Megan Leask[2,12,13], Tony R Merriman[2,12,13], Brandon Orr-Walker[14], Peter R Shepherd[2,15], Ryan Paul[2,16], Rinki Murphy[1,2]

[1]Department of Medicine, Faculty of Medical and Health Sciences, University of Auckland; [2]Maurice Wilkins Centre for Molecular Biodiscovery; [3]Department of Statistics, Faculty of Sciences, The University of Auckland; [4]National Institute for Health Innovation, School of Population Health, University of Auckland; [5]Diabetes Foundation Aotearoa; [6]Tongan Health Society Auckland; [7]Ventures/Pinnacle Incorporated, Hamilton, Waikato; [8]Procare Primary Health Organisation; [9]Discipline of Nutrition, University of Auckland, New Zealand; [10]Te Hiku Hauora, Kaitaia, Northland District Health Board; [11]Ngāti Porou Hauora, Tairāwhiti; [12]Department of Biochemistry, University of Otago; [13]Division of Clinical Immunology and Rheumatology, University of Alabama at Birmingham, Alabama, United States; [14]Middlemore Clinical Trials, Auckland; [15]Department of Molecular Medicine and Pathology, School of Medical Sciences, University of Auckland; [16]Department of Medicine, University of Waikato

Aims

To investigate comparative glycaemic lowering by vildagliptin and pioglitazone among people (a) of Māori or Pacific (M/P) ethnicity (b) with obesity and/or hypertriglyceridemia (OHTG) or (c) with *CREBRF rs373863838* (p.Arg457Gln) A-allele.

Methods

A randomised, open-label, two-period crossover trial was conducted in New Zealand adults with type 2 diabetes, HbA1c>58mmol/mol (>7.5%), who received 16 weeks of either pioglitazone [P] (30mg) or vildagliptin [V] (50mg) daily, then switched over for another 16 weeks of treatment. Differences in HbA1c [P vs V] were tested for interaction with ethnicity, OHTG or genotype, controlling for baseline HbA1c using linear mixed models. Secondary outcomes included weight, blood pressure (BP), side effects and diabetes treatment satisfaction.

Results

346 participants were randomised (55% M/P) between February 2019 to March 2020. Overall, HbA1c after pioglitazone was lower than after vildagliptin (mean difference -4.9mmol/mol [0.5%]; 95% CI -6.3,-3.5; p<0.0001). Primary intention-to-treat analysis showed no significant interaction effect by M/P vs other ethnicity (1.5mmol/mol [0.1%], 95%CI -0.8, 3.7), and per-protocol analysis (-1.2mmol/mol [0.1%], 95% CI -4.1, 1.7). An interaction effect was found by OHTG status (interaction effect -4.7mmol/mol [0.5%], 95% CI -8.1, -1.4), but not by *rs373863828* genotype. Weight gain after pioglitazone relative to vildagliptin was lower among those with the A allele vs those homozygous for the GG genotype (interaction effect -2kg, 95%CI -3.4, -0.6).

Conclusions

Comparative glucose-lowering by pioglitazone and vildagliptin does not differ in M/P compared to those of other ethnic groups. OHTG is a useful predictor for stratified glucose response to these medications.

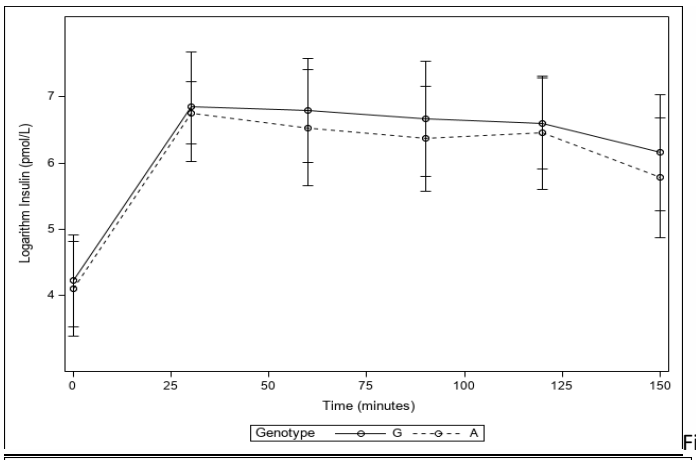

Figure 1: Plasma insulin in response to MMTT (mean (SD))

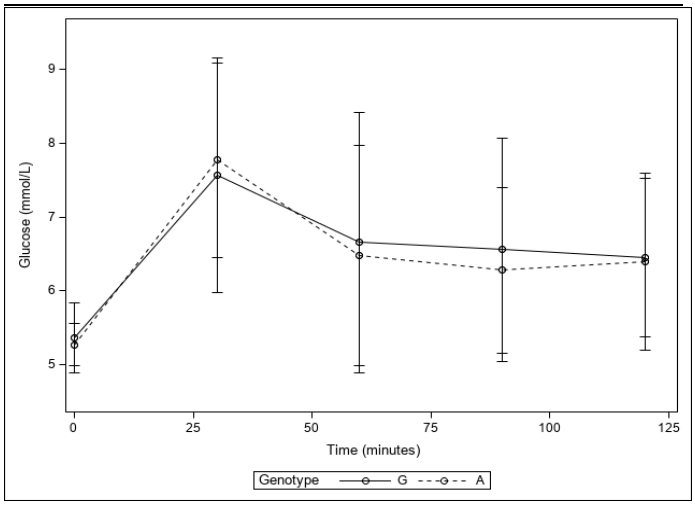

Figure 2: Plasma glucose in response to MMTT (mean (SD))

Conclusion: These preliminary results do not demonstrate an association between rs3733863828-A and increased glucose-stimulated insulin release in women, in contrast to men. Increased lean mass may be associated with increased insulin sensitivity, however this was not shown in our cohort. Increased lean mass is unlikely to be the sole physiological explanation for the reduced risk of T2DM and GDM associated with rs3733863828-A in women. A larger sample size is required to fully analyse these outcomes.

References:

1. Burden HJ, Adams S et al. The *CREBRF* diabetes-protective rs373863828-A allele is associated with enhanced early insulin release in men of Māori and Pacific ancestry. *Diabetologia* 2021; 64(12): 2779-89
2.

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ORAL POSTER PRESENTATIONS - FRIDAY

OP1 - RESULTS FROM A NATIONAL SURVEY ON DIABETES INPATIENT MANAGEMENT USING THE QUALITY STANDARDS FOR DIABETES CARE 2020.

L J Bingham[1], L McTavish[1]
[1.] *Endocrine, Diabetes & Research Department, Capital and Coast District Health Board (CCDHB)*

Background
Following a keynote address at NZSSD in 2015 many clinicians were interested to investigate what was happening in New Zealand Diabetes inpatient care. We designed and administered an online survey using the Standards for Diabetes Care 2020, to get a snapshot of diabetes clinical care nationally.

Aims
The aim of this survey was to investigate aspects of inpatient clinical care for people with diabetes in NZ in relation to the Quality Standards for Diabetes Care across 20 DHBs. The information could be used for Quality improvement initiatives, both locally and nationally.

Objectives
To design and survey all 20 DHBs on aspects of inpatient Diabetes care in relation to Standards 13 -15, in the Quality Standards for Diabetes Care Toolkit 2014.

Methods
The Quality Standards for Diabetes Care were reviewed. A survey of 20 questions was designed using SurveyMonkey, which was then emailed to Diabetes Nurses and Pharmacists across all DHBs, through the national professional organizations. The anonymized feedback was collated and analysed.

Results
Feedback was received from 32 participants. Results demonstrated disparities across the DHBs for many aspects of Diabetes Clinical Care in relation to the Quality Standards for Diabetes Care 2020. The findings could be a useful basis for Quality Improvement initiatives both locally and nationally.

NOTES

OP2 - COLLABORATION TO IMPROVE DIABETES SERVICE DELIVERY, EQUITY, AND TECHNOLOGY UPTAKE

Zara Houston[1], Hamish Crocket[2], Stephanie Zhang[1], Yenushka Goonesekera[1, 3], Brandon Orr-Walker[1]
[1] Whitiora Diabetes Centre, Counties Manukau District Health Board Auckland; [2]Te Huataki Waiora School of Health, University of Waikato; [3]Department of Psychological Medicine, University of Auckland

Introduction
Whitiora Diabetes Service at CMDHB historically has low patient uptake of PHARMAC-funded insulin pump therapy. Approximately 2% of the eligible population with type 1 diabetes (T1DM) use this treatment option, with Māori and Pacific, approximately 37% of the T1DM population, making up only 5% of pump patients.

Aims
Use of targeted funding to develop a model of care (MOC) for pump therapy to improve and upscale service delivery, co-designed with our CMDHB patients. The focus was on equity and quality, with the ability to share tools and resources nationally.

Methods
Development of a successful funding bid, with clear aims, objectives, and project deliverables to improve planned care. A governance group of stakeholders, and a project working group of multidisciplinary diabetes clinicians, and diabetes technology researcher, Hamish Crocket, were formed. The project working group collaborated with other DHBs, undertook pump user focus groups, and telephone reviews to inform the development of resources to support patients and staff. A staff pump training programme was developed and implemented in 2021.

Results
A patient centric MOC is being developed. This includes a pump start pathway that all patients with type 1 diabetes at CMDHB will be offered, and a broad range of patient resources: hardcopy, electronic, and video. Staff knowledge and confidence was enhanced following the pump training programme. Referrals for pump therapy have increased.

Conclusion
MoH resourcing for the project has enabled CMDHB to address historic challenges with service delivery, and technology uptake, particularly for Māori and Pacific. With an equity and quality focus, the MOC has been developed in collaboration with our patients and other DHBs, particularly Waikato DHB that have a much larger pump service. Resources will be shared nationally, ensuring access for all which should serve those with diabetes well as we move towards the Health NZ transition.

NOTES

OP3 - COLLABORATIVE DEVELOPMENT OF A REAL-TIME DIABETES DASHBOARD TO IMPROVE OUTCOMES IN WAIKATO PATIENTS WITH TYPE 2 DIABETES

Ryan Paul[1,2], Lynne Chepulis[1], Suzanne Moorhouse[3], Reuben Kendall[3], Elizabeth Johnson[4], Aman Sandhu[4], Kathy Knight[5], Alex Poor[5], Jo-Scott Jones[5]
[1] Waikato Medical Research Centre, University of Waikato; [2] Waikato Regional Diabetes Service, Waikato District Health Board; [3] Hauraki Primary Healthcare Organisation, Waikato; [4] National Hauora Coalition, Waikato; [5] Pinnacle Primary Healthcare Organisation, Waikato

Background
Implementation of clinical guidance to manage type 2 diabetes (T2D) is typically problematic resulting in marked inequities in care. Data analysis, education, and benchmarking all independently improve diabetes management and outcomes, and reduce the 'post-code' variation and inequities in care. Consequently, we describe the collaborative development of a regional diabetes dashboard to provide real-time data to enable benchmarking, education, identification of people with T2D (PWT2D) and research to improve diabetes outcomes.

Methods and description
Lead diabetes clinicians and data analysts from the DHB diabetes service and all three Waikato primary healthcare organisations worked collaboratively to develop a 'live' dashboard for the 25,000 PWT2D in the region. Consensus was reached for practice-level data to be presented by ethnicity for key targets and appropriate prescribing as outlined by the NZSSD national T2D guidance including 1) % with HbA1c < 53 mmol/mol; 2) % on metformin with eGFR > 30 mL/min; 3) % on ACEi/ARB with renal disease; 4) % on empagliflozin or dulaglutide (and 5) % with LDLc < 1.8 mmol/L) with renal or cardiovascular disease (CVD), or a 5 year CVD risk > 15%; 6) % with HbA1c > 90 mmol/mol on insulin etc. Practices receive a benchmarking report identifying inequities and potential areas to improve care. Education is provided on ideal management and staff can easily identify PWT2D not meeting each target, enabling proactive care. Studies using the dashboard data are planned to investigate the relationship between system- and practice-level factors and outcomes.

Results and conclusions
No data are currently available on the effects of the dashboard on diabetes outcomes. But we believe the collaborative approach and demonstration of the dashboard 'in action' will be of particular interest to the NZSSD audience, as the dashboard will likely be a useful tool in improving regional diabetes outcomes.

NOTES

OP4 - THE IMPACT OF MULTIMORBIDITY ON THE ABILITY TO MAKE LIFESTYLE CHANGES IN THOSE WITH PREDIABETES AND EXCESS WEIGHT – A QUALITATIVE STUDY

Jenna Tidswell[1], Lisa Whitehead[2], Kirsten Coppell[1]
[1]Department of Medicine, Dunedin School of Medicine, University of Otago, Dunedin, Aotearoa New Zealand; [2]School of Nursing and Midwifery, Edith Cowan University, Joondalup, Australia

Background
Multimorbidity, where an individual is living with two or more conditions, is increasing world-wide. It is common among those with prediabetes, a risk factor for Type 2 diabetes (T2D) and cardiovascular disease. The aim of this study was to qualitatively examine the impact of multimorbidity on the ability to make lifestyle changes among adults with prediabetes and overweight/obesity.

Methods
In the primary care-based Prediabetes Intervention Package study, 58 participants were interviewed on completion of the 6-month intervention. They were asked about the impact of other health conditions on making lifestyle changes for their prediabetes. Interviews were transcribed and data analysed thematically. The socio-ecological model of personal, interpersonal, organisational, community and policy guided interpretation as to how multimorbidity impacted on ability to make lifestyle changes, how different conditions created challenges, and the ways these challenges were able to be overcome.

Results
Of the 58 participants, almost half (48%) were Māori. Participants ranged in age from 28-69 years. At 6 months 45% had regressed to normoglycaemia, and 55% had persisted with prediabetes or progressed to T2D. Fifty-five (95%) participants reported living with at least one other condition. More than half (53.4%) described how specific conditions were a barrier or challenge to making lifestyle changes. Joint pain reducing mobility, and mental health or stress, including weight stigma were the most frequently described difficulties. Health professional and community support such as free supportive pool access helped to overcome challenges. While there were challenges, many participants recognised their lifestyle changes not only positively impacted glycaemia and weight, but also other conditions e.g., hypertension, and dyslipidaemia.

Conclusions
This study confirmed multimorbidity is common among those with prediabetes and overweight/obesity, and this influenced their ability to implement lifestyle changes. The external environment presented challenges which often required interpersonal and community support to facilitate healthy lifestyle changes.

STATIC POSTER DISPLAY - Friday

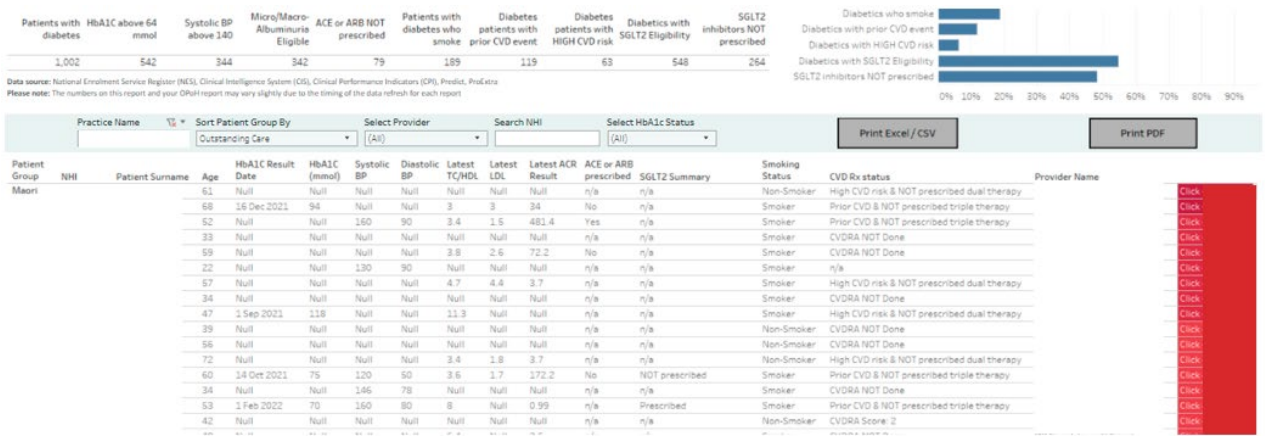
P1 - IMPROVING DIABETES CARE THROUGH PATIENT IDENTIFICATION AND PRIORITISATION

Allan Moffitt[1,2] Susan Wells[1,3] Ashmeet Dutta[1] Sara Aprea[1] John Cameron[1,4], Jin Ahn[1] Prathyusha Gaddipati[1] Matt Doherty[1] Diana Yao[1]
[1]ProCare Health (PHO) Limited, Auckland; [2]The Fono Manurewa, Auckland; [3] School of Population Health, University of Auckland, Auckland; [4]Westmere Medical Centre, Auckland
ProCare Health

Background
Practice Management Systems provide information on patient care at an individual patient level but does not allow a 'balcony view' of all diabetes indicators for each patient, nor according to each practice's diabetes register including outstanding care for those who may not be presenting to general practice or highlight indicators that are above desirable levels.

Methods
Working with GPs, we identified clinical indicators that are routinely measured and have the biggest impact on patient outcomes (also including patients meeting Pharmac SGLT-2 eligibility criteria). These indicators are aggregated into a single diabetes report that identifies each patient 15+years with diabetes (Type 1 and Type 2) in a practice and the areas of care that are complete or due for review. A patient is eligible for all elements of care from diagnosis of diabetes. The more areas that need reviewing (e.g. old blood tests or elevated ACR but no ACE/ARB prescription), the higher up on the list the patient will appear. The list is prioritised by Māori, Pacific, NZDep quintile 5, Indian (non-quintile 5), then other patients. Data for the report looks back five years. If a result is more than 15 months old, it will be considered 'due for review' (except for CVD risk assessment).

Results
Feedback from practices has been very positive, particularly being able to see all their patients in one view, and in a prioritised list. We have yet to see an impact on diabetes care, as this report was released just before Level 4 lockdown last year. Post-Omicron surge, we will promote the report again to practices.



Conclusion
Having a balcony view report of patients requiring care, enables practices to prioritise and proactively reach out to patients that have outstanding care needs. Co-designing the report with practices ensures meeting the needs of a busy practice.

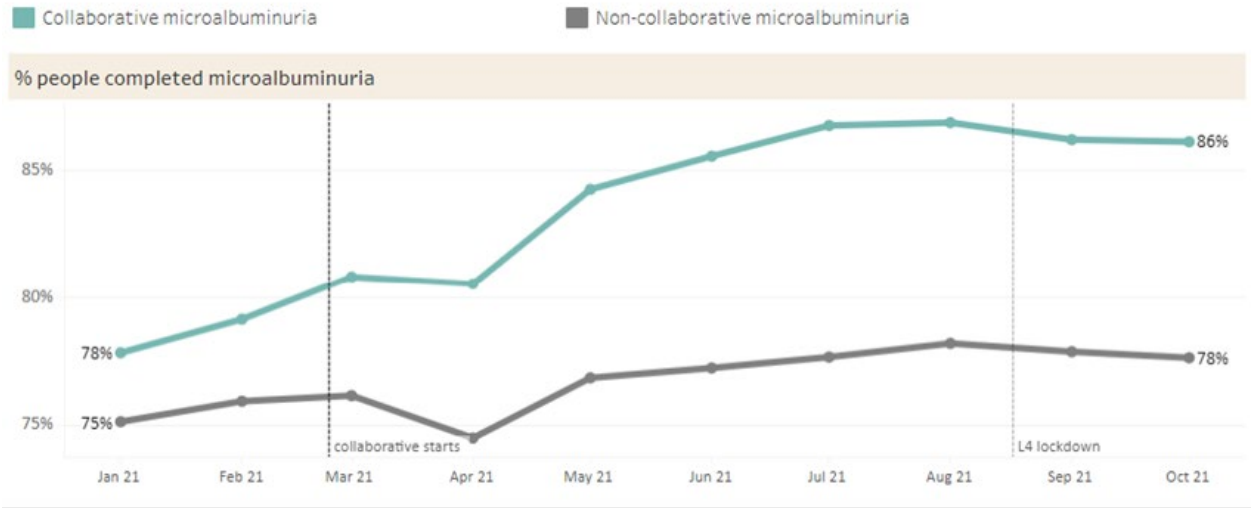
P2 - IMPROVING MICROALBUMINURIA MANAGEMENT THROUGH OUR 'BETTER TOGETHER' COLLABORATIVES

Allan Moffitt[1,2] Susan Wells[1,3] Sara Aprea[1] Ken Kok[1] Janet Henderson[1] Laura Marchant[1]
[1]ProCare Health (PHO) Limited, Auckland; [2]The Fono Manurewa, Auckland; [3]School of Population Health, University of Auckland, Auckland.
ProCare Health

Background
A quality improvement collaborative involves multiple practice teams coming together to learn, share and improve equity and performance for a given healthcare topic. In 2021 the PHO chose seven 'Better Together' collaborative topics, one of which was Microalbuminuria management.

Methods
Adapting international methodology, we developed 3x one-hour interactive Zoom sessions which were conducted over 6-8 months. In the sessions, practices identified barriers to management, their current baseline and goal for achievement. Teams were encouraged to document their processes of care and share change ideas. Between sessions, practices implemented PDSA cycles to review and improve management. The metric for improvement was the percentage of people with diabetes and an elevated ACR prescribed an ACE inhibitor or an ARB. Every practice could access eligible patient NHI lists and could monitor overall and ethnic-specific progress via practice-specific run charts. In addition, statistical process control charts and run charts were developed aggregating collaborative performance compared with the rest of the network (Control group).

Results
Nine of the 17 practice teams who were interested in participating in the microalbuminuria collaborative, attended one or more sessions. Overall, attending practices increased their management from 78% to 86% (8% absolute increase) compared to 75% to 78% (3% absolute increase) for the control group. Higher absolute increases were achieved for Māori (10%) and Pacific (9%) collaborative patients compared to network controls (3% and 2% respectively).



Other change ideas included the development of a patient hand out and video and use of exemption codes for patients not receiving treatment, to understand the proportion who are contraindicated, intolerant or decline treatment.

Conclusion
Virtual collaboratives are an effective way for practices to improve the management of microalbuminuria. They allow practices to identify other barriers to care which ProCare has been able to address and develop resources for our whole network.

P3 - PROJECT MABEL: A PROOF OF CONCEPT (POC) EVALUATION OF A CONSUMER PORTAL

Carl Peters
Waitemata DHB Diabetes Service

We tested the feasibility and usefulness of providing an online portal that enabled a small group of consumers of Northern Region District Health Boards' (DHBs') services to view their hospital letters, test results and medication records from Northern Region datasets and Ministry of Health (MOH) data systems. We branded this online portal as Mabel.

The user experience was limited to targeted cohorts, including a group of patients with diabetes, and a group with renal disease. The users taking part in the POC reported Mabel to have high usability and reported several benefits from having access to their health information. Not all those offered Mabel accepted the invitation and half of the users provided feedback. The majority of those that provided feedback reported using Mabel 2-3 times over a 3-6-week period. All users found Mabel to be useful and reported no issues with using it. The main benefits were around being able to access the information they did not otherwise have easy access to, having the information all in one place, being able to track information over time, being able to access it whenever they wanted, being able to correct information, and feeling more informed and involved in their care. Suggestions for improvement included having more information (such as appointment details, COVID and other results), being able to book appointments, linking to GP (General Practitioner) information, and being able to access children/others' information.

There are multiple ways to present healthcare information to consumers. The important finding from the POC is that we can make a person's healthcare information digitally available in a centralised place, and that they find it useful.

[1] Results taken from '*Accuracy assessment of bolus and basal rate delivery of different insulin pump systems used in insulin pump therapy of children and adolescents', Ziegler et al. 2020*

NOTES

P4 - CLINICAL INERTIA IN WAIKATO PATIENTS WITH TYPE 2 DIABETES

Christopher Mayo[1], Lynne Chepulis[2], Ross Lawrenson[2], Ryan Paul[2,3]
[1] Faculty of Medical and Health Sciences, University of Auckland, Auckland; [2] Waikato Medical Research Centre, University of Waikato, Hamilton; [3] Waikato Regional Diabetes Service, Waikato District Health Board, Hamilton.

Aims and Objectives
Clinical inertia is the greatest barrier in preventing the recommended stepwise escalation of glucose lowering therapies in type 2 diabetes (T2D) to reach the target HbA1c of < 53 mmol/mol. In particular, insulin is recommended if the HbA1c is > 90 mmol/mol at any time, or if the HbA1c is above target on maximal other therapies. Given Covid has greatly impacted diabetes care, the aim of this study was to characterise clinical inertia in Waikato patients with T2D before the Covid pandemic.

Methods
Clinical data was collected for all patients with T2D who were dispensed any glucose lowering therapies ≥ 2 times in 2018 (n=4063) from 31 general practices in the Waikato region. Patients on insulin therapy in 2018 (n=1285) were excluded due to an inability to accurately determine whether escalation of therapy occurred in 2019.

Results
Fifty-four percent (n=1489) of patients had an HbA1c > 53 mmol/mol in 2018. Only 29% of these patients had an escalation of glucose lowering therapies in 2019 despite the HbA1c increasing in over a quarter (n=381) of the 93% (n=1380) that had a repeat HbA1c. Insulin therapy was commenced in only 18% of those with an HbA1c > 90 mmol/mol (n=146) and in none of the 16 participants with an HbA1c > 53 mmol/mol on maximal oral glucose lowering therapies. Failure to escalate any therapy was not related to the age, gender, or ethnicity of participants, or whether the practice was very low-cost access (P all > 0.05).

Conclusions
Less than half of patients with T2D had an HbA1c to target prior to Covid and the vast majority received no escalation of therapy. In particular, escalation to recommended insulin therapy seldom occurred. Substantial work is required to address clinical inertia in the management of Waikato patients with T2D.

P5 - THEY'RE SICKER THAN WE THINK: AN EXPLORATORY STUDY PROFILING THE CARDIO-METABOLIC HEALTH OF ADULTS WITH PRE-DIABETES IN AOTEAROA NEW ZEALAND

Christine Barthow[1], Sue Pullon[2], Mark Weatherall[1,3], Jeremy Krebs[1,3]
[1] Department of Medicine, University of Otago, Wellington PO Box 7343 Wellington South 6242 New Zealand; [2] Department of Primary Health Care & General Practice, University of Otago, Wellington PO Box 7343 Wellington South 6242 New Zealand; [3] Capital and Coast DHB. Wellington Regional Hospital, Private Bag 7902, Wellington 6242,

Background
Pre-diabetes detected by elevated glycated haemoglobin (HbA1c 41-49 mmol/mol) is common and associated with progression to Type 2 diabetes mellitus. This study aimed to explore the cardio-metabolic health of a group of adults with pre-diabetes in Aotearoa/New Zealand (NZ). Secondly, we considered if tools evaluating multiple risk factors rather than glycaemia alone may be useful to identify those most needing interventions to prevent diabetes and optimise long-term health outcomes.

Methods
Baseline data from 153 NZ adults recruited to an intervention trial for adults with pre-diabetes were used to estimate the prevalence of metabolic syndrome (MetS) calculated using Adult Treatment Panel III criteria. These criteria include blood pressure, lipids, and obesity, in addition to glycaemic measures. The severity of MetS was calculated by MetS Z-scores. The associations of MetS severity related to sex, ethnicity, and HbA_{1c} were assessed by logistic regression and ANCOVA.

Results
Overall, 74% of the study population had MetS, and the prevalence varied according to ethnicity and HbA_{1c} level. The severity of MetS was highly variable, with MetS Z-scores ranging from –1.0 to 2.8. While mean MetS Z-scores differed according to ethnicity and HbA_{1c} level, all subgroups included individuals with widely differing severity of MetS, suggesting quite different risks for progression to diabetes or cardiovascular disease occur across the range of pre-diabetes defined by HbA_{1c}.

Conclusions
Single biochemical markers are unlikely to be sufficient to assess cardio-metabolic risk in pre-diabetes. Further development of MetS Z-scores or similar contemporary scores incorporating multiple variables and estimating a range of pre-diabetes-associated health risks may be useful. These could identify high-risk individuals most in need of pre-diabetes care, improve methods for monitoring treatment effects, have implications for reducing diabetes-related health inequities, and the optimal use of limited health care resources.

P6 - AUDIT OF DIABETES PSYCHOLOGISTS' PATIENTS SEEN OVER 6 MONTH PERIOD AT CMDHB

Dr Brandon Orr-Walker[1], Nic Cao[2, 3] Lisa Hoyle[1,3]
[1]Diabetes Service, Counties Manukau District Health Board; [2]Le Va; [3]Psychological Medicine, Faculty of Medical and Health Sciences, University of Auckland.

Aims/Objectives: Despite being an integral part of a multidisciplinary team (MDT) in the management of diabetes, allied health resources have historically been underfunded in New Zealand. CMDHB Diabetes Service received funding to employ a full-time diabetes psychologist for the first time to complement the DNS Liaison service and prioritise seeing those who were in hospital with DKA and/or had multiple hospital admissions. The aim was to review the increase in resource to determine the impact on patient care and outcomes and help proposals for FTE and service development.

Methods
Data was collected on all patients seen during a six-month period. Data included demographics, referral reason, psychological treatments used and impact on care such as HbA1c results, changes in adherence behaviour and mood. Patient referrals were received from the MDT either at nurse handovers or via the CMDHB referral system.

Results
The psychologist worked with 65 patients, of which one third were under 26 years old; 50% were Pacific Island or Māori; and 55% had T1DM. Referral reasons were non-adherence, DKA admission, mood, anxiety/stress, adjustment, needle phobia, burnout, or pump assessment. Interventions used included CBT, ACT, self-compassion, motivational interviewing, and in-vivo systematic desensitization. Outcomes included improvements in mood and anxiety; adherence behaviour; HbA1cs; and reduced hospital admissions. Case examples will also be presented.

Conclusions
Including a diabetes psychologist in the diabetes MDT is imperative for improving patient care, especially mental wellbeing, and its influence on physical wellbeing. 100% of the psychologists' workload is with the most complex patients in the service. This certainly leads to cost savings for the DHB. Future service proposals and MDT clinics will continue to include diabetes psychologists and advocacy should continue for diabetes psychologists in all parts of NZ.

NOTES

ORAL POSTER PRESENTATIONS - Saturday

OP5 - THE EFFECT OF NON-FUNDED CONTINUOUS GLUCOSE MONITORING ON HEALTH EQUITY IN PAEDIATRIC DIABETES IN AOTEAROA, NEW ZEALAND.

Mercedes Burnside[1], Hannah Davis[1], Craig Jefferies[2], Ryan Paul[3], Ben Wheeler[4], Esko Whiltshire[5], Jonathan Williman[6], Martin de Bock[1].
[1]Paediatric Department, University of Otago, Christchurch; [2]Paediatric Diabetes and Endocrinology, Starship Children's Health, Auckland; [3]Waikato Regional Diabetes Service, Waikato District Health Board, Hamilton; [4]Department of Women's and Children's Health, Dunedin School of Medicine, University of Otago, Dunedin; [5]Department of Paediatrics and Child Health, University of Otago, Wellington; [6]Department of Population Health, University of Otago, Christchurch.

Background
Continuous glucose monitoring (CGM) is less invasive, and more sophisticated than fingerstick blood glucose monitoring. Real time CGM (RT-CGM) improves glycaemia and quality of life in a range of people with T1D. Despite reimbursement rates increasing globally, CGM systems are not funded in Aotearoa. The purpose of this cross-sectional study was to assess the effects of non-funded CGM on health equity in children with T1D in Aotearoa.

Methods
Demographic and clinical data were collected from all available children/adolescents with T1D managed by a secondary care diabetes centre in Aotearoa as of 01 October 2021. Relevant data was obtained from existing databases or electronic chart review and supplied to the researchers de-identified. Statistical analyses will describe differences in demographic variables (age, gender, district health board (DHB), ethnicity, NZ Deprivation score) between CGM and non-CGM users, and assess the association between glycaemic control, as measured by HbA1c, and CGM use.

Results
Data were returned for 1593 children/adolescents with T1D from all 20 DHBs. **Table 1** shows some preliminary results, with further analyses underway.

Conclusion
Preliminary results suggest inequities in CGM use according to ethnicity and DHB. CGM use is associated with lower HbA1c. The results of this study are highly relevant to the diabetes landscape in Aotearoa and will go some way to improving access to advanced diabetes technologies for children with T1D.

Table 1. CGM use by ethnicity and DHB, and HbA1c by CGM use.

	CGM (%)	Non-CGM (%)	Total
Overall	1036 (65.0)	557 (35.0)	1593
Ethnicity			
- Māori	128 (48.1)	138 (51.9)	266
- NZ European	811 (73.3)	295 (26.7)	1106
DHB			
- Auckland/Counties Manukau/Waitemata	184 (48.8)	193 (51.2)	377
- Bay of Plenty	59 (76.6)	18 (23.4)	77
- Capital and Coast	91 (68.9)	41 (31.1)	132
- Canterbury	168 (81.6)	38 (18.4)	206
- Hawkes Bay	43 (56.6)	33 (43.4)	76
- Hutt Valley	49 (72.1)	19 (27.9)	68
- Lakes	23 (65.7)	12 (34.3)	35
- Mid central	42 (53.2)	37 (46.8)	79
- Nelson	42 (75)	14 (25)	56
- Northland	28 (54.9)	23 (45.1)	51
- South Canterbury	22 (56.4)	17 (43.6)	39
- Southern	133 (79.6)	34 (20.4)	167
- Tairawhiti	10 (62.5)	6 (37.5)	16
- Taranaki	35 (63.6)	20 (36.4)	55
- Waikato	83 (69.7)	36 (30.3)	119
- Wairarapa	9 (100)	0	9
- Whanganui	15 (48.4)	16 (51.6)	31
Mean HbA1c mmol/mol (SD)	65.6 (3.5)	76.7 (5.2)	71.0 (7.2)

OP6 - IEC STANDARD TEST RESULTS FOR AN OPEN-SOURCE, ULTRA-LOW-COST INSULIN PUMP

Matt Payne[1], Francis Pooke[1], Jake Campbell[1], Lui Holder-Pearson[1], Jennifer Knopp[1], Martin de Bock[2,3], J Geoffrey Chase[1]
[1]Department of Mechanical Engineering, Centre for Bioengineering, University of Canterbury, New Zealand;
[2] Department of Paediatrics, University of Otago, Christchurch, New Zealand (de Bock); [3]Department of Paediatrics, Canterbury District Health Board, Christchurch, New Zealand

Background
Insulin pumps are the most consistent and accurate means of regulating blood glucose levels in T1 and T2 diabetes. However, insulin pump technology is underutilised due to high costs of NZ$7,000-10,000 and limited reimbursement. An ultra-low-cost insulin pump made widely available with an open-source design would significantly improve equity of access to the best care and outcomes. This study presents results validating the accuracy of an open-source ultra-low-cost (<NZ$150) insulin pump.

Methods
The low-cost insulin pump was tested in-vitro to the IEC 60601-2-24 standard and set at a basal rate of 1U/h, delivering a 0.25U dose every 15 minutes. over a 25-hour period following a 24-hour stabilisation period. Insulin delivery was measured by total displaced fluid mass with a microscale. Data was processed into trumpet curves per the unit standard. Data was also processed to calculate accuracy over individual 1-hour windows, and compared to published literature for the Medtronic 640G, Medtronic 670G, and Tandem t:Slim pumps.

Results
N=5 tests, with a total of 500 individual doses administered. Overall percentage error in each of the five tests was 0.60%, 0.54%, 2.35%, -0.90%, 0.30%. Accuracy across 1-hour windows was ±15% for 99% of doses, ±10% for 96.8% of doses and ±5% for 88.8% of doses. Comparable published data on commercial systems are shown in Table 1.
Table 1: Accuracy of Insulin pump dosing across 1-hour windows[1]

Insulin Pump	**Doses delivered to accuracy of within:**		
	±15%	**±10%**	**±5%**
Medtronic 640G	95.6%	93.1%	84%
Medtronic 670G	99.4%	97.8%	90.3%
Tandem t:Slim	99.8%	98.9%	91.4%

Conclusion
We demonstrate highly accurate insulin dosing using a prototype ultra-low-cost insulin pump. Our data compares favourably with commercially available systems. Clinical testing and further validation are required to ensure the design is robust and meets or exceeds all IEC standard requirements.

NOTES

OP7 - INSULIN PUMP SPECIAL ELIGIBILITY CRITERIA IN NEW ZEALAND: A SURVEY OF PRESCRIBER OPINION AND PRACTICE

Michaela Groves[1], Sara Styles[2], Martin de Bock[1,3].
[1]Department of Paediatrics, Canterbury District Health Board, Christchurch, New Zealand; [2]Department of Human Nutrition, University of Otago, Dunedin, New Zealand; [3]Department of Paediatrics, University of Otago, Christchurch, New Zealand

Objective
Funding for insulin pump therapy (CSII) in New Zealand for people with type 1 diabetes is determined by meeting PHARMAC special authority (SA) criteria. We aimed to survey the opinion and practice of CSII prescribers with respect to the current SA criteria and contextualise the results with respect to contemporary literature and best practice.

Method
Quantitative and semi-qualitative survey of CSII prescribers in New Zealand. Mixed qualitative and quantitative analyses were used.

Results
Of the 94 survey respondents, 88% stated the criteria needed updating. However, 75% maintained CSII funding by PHARMAC should remain under updated SA criteria. Most (60%) of respondents thought the current criteria did not promote health equity for Māori and Pasifika. Only 33% of respondents strictly adhered to the criteria. Thematic analyses of free text responses indicated that the criteria did not reflect quality of life benefits offered by CSII, changes in life course, clinician or patient autonomy, and beneficence of CSII not otherwise stated in the current criteria.

Conclusion
The majority of CSII prescribers in New Zealand disagreed with the SA criteria, resulting in most not strictly adhering to them. Updated criteria are required to improve health equity and reflect best evidence.

OP8 - THE OPTIMISE STUDY PROTOCOL: A MULTICENTRE OPTIMISATION TRIAL COMPARING CONTINUOUS GLUCOSE MONITORING, SNACKING HABITS, SLEEP EXTENSION AND VALUES-GUIDED SELF-CARE INTERVENTIONS TO IMPROVE GLUCOSE TIME-IN-RANGE IN YOUTH WITH TYPE 1 DIABETES

Shelley Rose [1,2,3,4], Jillian J. Haszard [5], Barbara C. Galland [1], Esko J. Wiltshire [2,6], Martin I. de Bock [7,8], Carmel E. Smart [9,10], Miriama Ketu-McKenzie [11], Anna Campbell [12], Ruth Thomson [13], Craig A. Jefferies [14,15], Benjamin J. Wheeler [1,12], Sara E. Styles [4]

[1]Department of Women's and Children's Health, University of Otago, Dunedin; [2]Department of Paediatrics & Child Health, University of Otago Wellington, Wellington; [3]Diabetes and Endocrinology Service, Palmerston North Hospital, MidCentral District Health Board; [4]Department of Human Nutrition, University of Otago, Dunedin.
[5]Biostatistics Centre, University of Otago, Dunedin; [6]Paediatric Department, Wellington Hospital, Capital and Coast District Health Board; [7]Department of Paediatrics, University of Otago, Christchurch; [8]Paediatric Department, Christchurch Hospital, Canterbury District Health Board; [9]John Hunter Children's Hospital, Hunter New England Local Health District, NSW Australia; [10]School of Medicine and Public Health, University of Newcastle, NSW Australia.
[11]Ngāti Tūwharetoa and Ngāti Raukawa (ki Horowhenua), New Zealand; [12]Paediatric Department, Dunedin Hospital, Southern District Health Board; [13]Dietetic and Nutrition Services, Dunedin Hospital, Southern District Health Board.
[14]Paediatric Diabetes and Endocrinology Service, Starship Children's Health, Auckland; [15]Department of Paediatrics, Liggins Institute, University of Auckland, Auckland.

Introduction
Many young people with type 1 diabetes (T1D) experience higher than recommended glucose levels, increasing their risk for short- and long-term diabetes complications. Multicomponent interventions to improve glycaemic control, psychosocial and/or behavioural functioning may be more effective than single-component interventions in young people with type 1 diabetes, but may be more burdensome, and it is unknown which combination of components is most effective.

Aim
The OPTIMISE study uses a Multiphase Optimisation Strategy (MOST) to identify the best combination of four interventions targeting key diabetes self-care behaviours for use in clinical practice to improve short term glycaemic outcomes.

Methods*:*
his 6-week trial will recruit 80 young people (aged 13-20 years) with T1D (≥6 months duration), and pre-enrolment HbA1c ≥58 mmol/mol [7.5%] in the prior 6 months. Both main and interaction effects will be estimated using a linear regression model with change in glucose time-in-range (TIR: 3.9-10.0 mmol/L) as the primary outcome. Participants will be randomised to one of 16 conditions in a factorial design using four intervention components: 1) real-time continuous glucose monitoring, 2) targeted snacking education, 3) individualised sleep extension, and 4) values-guided self-care goal setting. Baseline and post-intervention glucose TIR will be assessed with blinded continuous glucose monitoring. Changes in self-care (snacking habits, sleep timing and duration, and psychosocial outcomes) will be assessed at baseline and post-intervention to determine if these interventions impacted behaviour change.

Discussion*:*
The study outcomes will enable selection of effective and efficient intervention components that increase glucose TIR in young people who struggle to achieve targets for glycaemic control. The optimised intervention will be evaluated to inform a future randomised controlled trial and guide planning of effective clinical interventions in adolescents and young adults living with type 1 diabetes.
Trial registration: Australian New Zealand Clinical Trials Registry ID: ACTRN12620001017910.

OP9 - METABOLIC EFFECTS OF A *CREBRF* GENE VARIANT IN NEW ZEALAND WOMEN

Patricia Whitfield[1,2], Danielle Sword[1], Ana Holley[1], Emily Walsh,[2] Mark Weatherall[1], Peter R Shepherd[3,5], Troy L Merry[3,4], Rosemary M Hall[1,2], Jeremy D Krebs[1,2].
[1]Department of Medicine, University of Otago, Wellington; [2]Centre for Endocrine, Diabetes and Obesity Research, Wellington Hospital, Capital and Coast DHB; [3]Maurice Wilkins Centre for Molecular Biodiscovery, The University of Auckland; [4]Discipline of Nutrition, Faculty of Medical and Health Sciences, University of Auckland; [5]Department of Molecular Medicine and Pathology, Faculty of Medical and Health Sciences, University of Auckland

Background
An Arg457Gln missense variant in the *CREBRF* gene (rs373863828) is prevalent in NZ Māori and Pacific people but rare in other ethnic groups. The A allele of this variant is associated with increased BMI, but paradoxically reduced risk of Type 2 diabetes mellitus (T2DM) and gestational diabetes (GDM). rs373863828-A is associated with increased glucose-stimulated insulin release in men.[1] Here we present preliminary data on the metabolic effects of rs373863828-A in NZ women.

Methods
Plasma insulin and glucose were measured at 30-minute intervals for 150 minutes during a mixed meal tolerance test (MMTT) in 50 NZ Māori and Pacific women (A allele, n=14). Body composition and resting metabolic rate (RMR) were measured using DXA (Hologic, USA) and indirect calorimetry (Promethion, Sable Systems USA). The associations between insulin and glucose measurements over time after the MMTT and allele type were estimated by mixed linear models. ANCOVA estimated associations between allele type and other variables, with age, ancestry, and BMI as covariates.

Results
rs373863828-A was associated with increased total lean mass of 4.9kg (95% CI 1.5-8.3), p=0.005 and increased RMR of 116.8 kcal/day (95%CI 13.4-1414.7), p=0.03 after adjusting for BMI and other covariates. There was no effect of rs373863828 on either plasma insulin or glucose response to a meal (figures 1 and 2). There were no statistically significant differences in other outcome measures, including HOMA2-IR and HOMA2-%B.

NOTES

STATIC POSTER DISPLAY - Saturday

P7 - DIY DIABETES TECHNOLOGY USE IN NEW ZEALAND IN 2022

Hamish Crocket[1,2], Tim Gunn[2], Damian Wiseman[2], Sam Leathwick[2], Garry Dyet[2], Justin Walker[2].
[1] Te Huataki Waiora School of Health, University of Waikato, Hamilton; [2] Nightscout New Zealand, Te Awamutu

Introduction
Over the past 10 years a global type one diabetes user innovation community has emerged creating a range of do-it-yourself (DIY) and open-source diabetes technologies. These include off-label use of both flash glucose monitoring and continuous glucose monitoring (CGM) via third party technologies and open source CGM apps as well as multiple algorithms for open-source automated insulin delivery (AID). Although multiple randomised clinical trials of these technologies are being conducted within New Zealand, little is known about the existing users of DIY diabetes technologies within New Zealand.

Aim
To describe the existing DIY diabetes technology user-community including demographics, motivations for using DIY diabetes technologies, support needs of users, and perceived benefits of using DIY diabetes technologies.

Methods
A 31 item survey was developed using a co-design process with the trustees of Nightscout New Zealand. The project received an out-of-scope assessment from the Health and Disability Ethics Committee and was submitted to the University of Waikato Human Research Ethics Committee. The survey will be conducted online via SurveyMonkey in late March. The survey will be promoted through the New Zealand diabetes online community. Quantitative data will be analysed in Microsoft Excel to produce descriptive statistics. Qualitative data will be analysed using thematic analysis.

Results
Results will be presented at the NZSSD meeting in May.

Conclusion
The findings from this survey will be of benefit to clinicians with DIY diabetes technology users in their care, as well as to Nightscout New Zealand, to inform their work in supporting users of new diabetes technologies.

P8 - SMART WATCH INTEGRATED DO-IT-YOURSELF CONTINUOUS GLUCOSE MONITORING (DIY-CGM) IN ADULTS WITH TYPE 1 DIABETES - A QUALITATIVE STUDY

Octavia Palmer[1], Shekhar Sehgal[1], Alisa Boucsein[1], Sara Styles[2], Hamish Crocket[3], Ryan G Paul[4,5], Benjamin J. Wheeler[1,6]

[1]Department of Women's and Children's Health, Dunedin School of Medicine, University of Otago, Dunedin 9016, New Zealand; [2]Department of Human Nutrition, Division of Sciences, University of Otago, Dunedin 9054, New Zealand; [3]Waikato Medical Research Centre, University of Waikato, Hamilton, New Zealand; [4]Te Huataki Waiora School of Health, University of Waikato, Hamilton, New Zealand; [5]Waikato Regional Diabetes Service, Waikato District Health Board, Hamilton, New Zealand; [6]Paediatric Endocrinology, Southern District Health Board, Dunedin, New Zealand.

Aims

To explore experiences of adults with type 1 Diabetes (T1D) using a smartwatch integrated "Do-it-yourself" continuous glucose monitoring (DIY-CGM) system.

Methods

This qualitative study takes advantage of a funded RCT investigating glycaemic control in adults living with T1D using DIY-CGM (MiaoMiao combined with Abbott Freestyle Libre). Convenience sampling was used to recruit participants. Semi-structured interviews investigated user experience with DIY-CGM. Key themes were identified using thematic analysis.

Results

Interviews were conducted with 12 participants who had been using DIY-CGM for a minimum of one month. Participants noted a perception that DIY-CGM helped them improve their glycaemic control. Alarm and trend functionality were useful in allowing participants to avoid hypo/hyper-glycaemic events overnight and to better manage glucose levels after high carbohydrate meals. Smartwatch integration meant users could be alerted overnight without waking their partners. Barriers identified included signal loss during high-intensity exercise and alarm fatigue whilst using the smartwatch. Short battery life was also identified as a disadvantage of MiaoMiao use. Only one participant used remote monitoring. Almost all participants (11 out of 12) intended to use DIY-CGM or upgrade to real-time continuous glucose monitoring (rtCGM) after the end of the trial.

Conclusions

DIY-CGM allowed the participants to harness the functionalities of real time CGM (rtCGM) that were important to their self-management priorities, namely alarms and trend information, without the expense of commercial rtCGM. Trend data appeared to inform behavioural changes, including the timing of pre-meal boluses. Glucose threshold alerts appeared valuable overnight. Participants identified a number of technical challenges with DIY-CGM use. Namely, the short battery life, limited compatibility with non-Android devices and Bluetooth connectivity issues. Smartwatch Bluetooth connectivity was reported to be particularly unreliable. Despite these inconveniences, DIY-CGM with support and training appears an affordable solution for people with T1DM in countries that do not have universal funding for rtCGM technology.

P9 - INSULIN PUMP THERAPY USERS' EXPERIENCES IN COUNTIES MANUKAU DHB DIABETES SERVICE

Yenushka Goonesekera[1, 2] Lisa Hoyle[1]
[1]Whitiora Diabetes Service, Psychological Medicine, Middlemore Hospital, Counties Manukau DHB; [2]Dept. of Psychological Medicine, University of Auckland, Auckland

Introduction
Inequities in initial access to insulin pumps across non-European populations are well documented in New Zealand and worldwide. Additionally, despite T1DM being more common among Pākehā, Māori and Pasifika are disproportionately affected by diabetes-related complications. Considering these inequities in diabetes care, it is essential for diabetes services to develop their own model of care to improve service delivery for typically underserved communities.

Aim
In this current study, the Counties Manukau DHB Diabetes service aimed to explore the experiences of insulin pump users within the service to inform a model of care that promoted equitable outcomes for all insulin pump users.

Methods
This qualitative study used 15–20-minute semi-structured phone interviews to explore the experiences and satisfaction of insulin pump users. Due to the equity focus of the project, the recruitment of Māori and Pasifika insulin pump users was prioritised. Themes were generated using inductive thematic analysis.

Results
A total of 14 T1DM patients using an insulin pump completed the phone interviews. Several themes related to patient-clinician relationships, continuity of care, service interactions and patient education were identified.

Conclusion
In conclusion, this study demonstrated the varied experiences of T1DM within Counties Manukau DHB Diabetes insulin pump therapy service. The themes that emerged highlighted several areas in which the service could improve and provide equitable care.

NOTES

P10 - URINARY VITAMIN C EXCRETION IS INAPPROPRIATELY ELEVATED IN PEOPLE WITH HYPOVITAMINOSIS C AND DIABETES

Helen Heenan[1], Helen Lunt[1,2], Anitra Carr[3], Emma Spencer[3], Monica Vollebregt[4], Timothy CR Prickett[2].
[1]Diabetes Outpatient department, Canterbury District Health Board, Christchurch; [2]Department of Medicine, University of Otago, Christchurch; [3]Nutrition in Medicine Research Group, Department of Pathology and Biomedical Science, University of Otago, Christchurch; [4] Centre for Postgraduate Nursing Studies, University of Otago, Christchurch

Background
Healthy participants subjected to prolonged dietary vitamin C restriction have no measurable urinary vitamin C. Healthy individuals are therefore able to conserve vitamin C. Previous research has shown that people with diabetic nephropathy and hypovitaminosis C have a reduced ability to conserve their urinary vitamin C, but these studies were small. This study aimed to measure urinary vitamin C in people with diabetes and hypovitaminosis C and explore possible associations between elevated urinary vitamin C and other clinical variables.

Methods
Adult participants from a previous cardiorenal biomarker study who were willing to provide permission to allow measurement of vitamin C in their stored urine and plasma samples, were included. Subsequent clinical comparisons were then undertaken in participants with hypovitaminosis C, defined as a plasma vitamin C <23 µmol/L.

Results
There were 64 participants with hypovitaminosis C, 25 with T1DM and 39 with T2DM. Of these, 83% had measurable urinary vitamin C. Participants were categorised into two equal subgroups, by urinary vitamin C concentrations greater or less than 17.8 µmol/L. (This value represents the median urine concentration for the 64 participants). When comparing results for these two subgroups of participants, there were no differences in median values for the following variables: Age, plasma vitamin C, plasma cystatin C, HbA1c, eGFR, urinary albumin:creatinine ratio and BMI. Thus, the clinical characteristics of hypovitaminosis C patients with high and those with lower urinary vitamin C concentrations, were similar.

Conclusions
The occurrence of inappropriately high urinary vitamin C excretion in people with both diabetes and hypovitaminosis C, is not restricted to those with known renal disease; it can occur in the absence of obvious underlying renal disease. This inability to conserve vitamin C is likely to be one of several reasons why plasma vitamin C levels tend to be low in people with diabetes.

P11 - NOT STRAIGHTFORWARD TYPE 1 DIABETES

Erin Wharemate, Simon Young
Waitemata DHB

Patient referred to diabetes clinic as recent immigrant from South Africa with a diagnosis of Type 1 diabetes for 5 years. One grandparent had diabetes but no first degree relative. Patient is a slim 30-year-old Caucasian female. She had brought a year's supply of biphasic insulin from South Africa but had run out some 4 months before. Patient had not had DKA but control poor with HBA1C 119. Patient prescribed insulin and tested for Type 1 diabetes. Islet cell antibodies negative and C peptide 891 pmol/L, results not supporting a diagnosis of T1 diabetes.
Patient had DNA sent for Exeter gene panel. Gene test positive for pathogenic mutation of ABCC8 gene, a known cause of neonatal diabetes mellitus. This mutation more commonly causes transient neonatal diabetes which may recur in adulthood in contradistinction to the KCNJ11 mutation which usually causes persistent neonatal diabetes. This mutation may be associated with neurological features. Patient has now been switched to a trial of glibenclamide tablets with good initial response.
This case highlights an unusual cause of MODY and the observation that first degree family history may be absent in a significant number of MODY cases.

NOTES

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Teresa	Cleary	Counties Manukau DHB	Diabetes Dietitian
Miria	Cleaver	Nelson Marlborough DHB	Diabetes CNS
Fiona	Cloete	Mediray	Team Leader
Pamela	Clough	Midcentral DHB	Diabetes Specialist Dietitian

Barry	Collecutt	Sanofi	Marketing Manager
Jo	Comper	Moorhouse Medical centre	Pharmacist
Andrea	Connell	Auckland DHB	Associate Podiatry Clinical Lead
Davide	Conti	Capital and Coast DHB	Diabetes trainee
Catherine	Conway	Canterbury District Health Board	Clinical Director Diabetes and Endocrinology
Kirsten	Coppell	University of Otago	Research Assoc Prof
Vickie	Corbett	Waikato Regional Diabetes Service	Nurse Practitioner
Stephanie	Cox	Auckland DHB	Obstetric Physician / Endocrinologist
Val	Crawford	Capital and Coast DHB	CNS - Diabetes
Sue	Crengle	Maori Health Authority	Keynote Speaker
Pip	Cresswell	Capital and Coast DHB	Diabetes CNS
Hamish	Crocket	University of Waikato	Senior Lecturer
Emma	Cummack	Canterbury District Health Board	Dietitian
Amanda	Cunneen	Eli Lilly	Territory Manager
Arindam	Das	Pharmaco NZ Ltd	Territory Manager
Rachel	Davidson	Bay of Plenty DHB	Dietitian
Theresa	Davies	Mediray	Sales
Sue	Dawber	Barrington Medical Centre	diabetes nurse
Amanda	de Hoop	Midcentral DHB	Nurse Practitioner
Cherry	De Ramas	Waikato DHB	CNS
Lisa	Douglas	Auckland DHB	Registrar
Will	Dransfield	Auckland DHB	Physician
Beatrice	Drury	Waikato DHB	Dietitian
Paul	Drury	Retired	Retired physician
Jo	Duncan	Capital and Coast DHB	CNS
Hazel	Dunn	Waitemata DHB	Diabetes Nurse Specialist
Helen	Dunn	Invercargill Medical Centre	Practice Nurse
Shannon	Durey	FootSense Podiatry NZ Ltd	Podiatrist
Nicola	Edwards	Boehringer Ingelheim NZ	Sales
Kate	Ellison	Auckland DHB	Dietitian
Kailua	Faafoi	Tu Ora Compass Health	Diabetes Nurse Specialist
Diane	Fairhall	West Coast District Health Board	CNS Diabetes
Louise	Farmer	THINKhauora	CNS Diabetes
Alison	Fellerhoff	MidCentral Health	Clinical Nurse Specialist
Carmel	Ferguson	Midcentral DHB	CNS - Candidate Diabetes
Rose	Fifield	Bay of Plenty DHB	Diabetes Nurse
Mario	Franzoni	Eli Lilly	Territory manager
Sonya	Fraser	Waikato DHB	Diabetes Dietitian
Cathy	Fraser-Reading	Te Awamutu Medical Centre	Diabetes Nurse Specialist
Carly	Fry	Capital and Coast DHB	Dietitian
Dan (Chloe)	Gao	Riccarton Clinic	RN
Michele	Garrett	University of Auckland	PhD Candidate
Helen	Gibbs	Diet Consulting	Dietitian
Wendy	Gifford	Lakes DHB	Diabetes Clinical Nurse Specialist
Pauline	Giles	Whanganui Hospital	Nurse Practitioner
Yenushka	Goonesekera	Intern Psychologist	Counties Manukau DHB
Michaela	Groves	Capital and Coast DHB	Paediatric Registrar
Rosemary	Hall	Capital and Coast DHB	Endocrinologist
Chris	Harrison	Capital and Coast DHB	Diabetes CNS
Odette	Hart	University of Auckland	PhD Candidate
Kirsten	Hatton	Capital and Coast DHB	CNS
Janine	Hayes	Waitaki District Health Services	Diabetes Outreach Nurse
Helen	Heenan	Canterbury District Health Board	Diabetes Research Nurse

Sarah	Hensby-Bennett	Boehringer Ingelheim NZ	Medical Manager
Lilian	Herrmann	Bay of Plenty DHB	Registered nurse
Nilu	Hewapathirana	Capital and Coast DHB	Endocrinologist
Stacey	Hodgman	Nursemaude	Community Diabetes Nurse Specialist
Rebecca	Holbrook	TDHB	Professional Lead Podiatry
Lui	Holder-Pearson	University of Canterbury	Academic
Nicola	Holmes	WDHB	CNS - diabetes
Kevin	Holwill	Territory Manager	NZMS Diabetes
Zara	Houston	Counties Manukau DHB	Diabetes dietitian
Lisa	Hoyle	Counties Manukau DHB	Consultant Health Psychologist
Ruth	Hughes	Capital and Coast DHB	SMO
Julianne	Jackson	Silverstream Podiatry	Podiatrist
Alexandra	James	Interim Health New Zealand	Advisor
Neil	Jarvis	Boehringer Ingelheim NZ	Marketing Manager
Craig	Jefferies	Starship Children's Health	Dr
Elizabeth	Johnson	National Haouroa Coalition PHO	diabetes nurse specialist
Jacqui	Journeaux	Southern DHB	Podiatrist
Jill	Julian	Nelson Marlborough DHB	Clinical Nurse Specialist: Diabetes
Gail	Keane	Comprehensive Care PHO	Service Manager LTC CCPHO
Jackie	Keenan	TDHB	Dietitian
Thomas	Kim	Northland DHB	Podiatrist
Dean	Kinloch	MidCentral Health	Nurse Practitioner Cardiology
Kathy	Knight	Pinnacle PHO	Clinical Diabetes Specialist
Renate	Koops	Counties Manukau DHB	Physician
Hilary	Krebs	Tu Ora Compass Health	Clinical advisory pharmacist and prescriber
Jeremy	Krebs	University of Otago, Wellington	Professor
Nadine	Kuiper	PUCHS	GP
Beatitude	Kusemamuriwo	Auckland DHB	Diabetes Nurse
Heena	Lakhdhir	CMH	SMO
Alexandra	Landl	Lakes DHB	Nurse
Paul	Larson	Larson's Pharmacy	Managing Director
Sue	Laywood	Pharamco NZ Ltd	Territory Manager
Emma	Le Lievre	Otago University	Masters Student
Katie	Lee	Field Sales Manager	NZMS Diabetes
Alda	Lee	Total wellness Group	Private Practice Dietitian
Robert	Leikis	Hawkes Bay DHB	Endocrinologist
Donald	Lemieux	Waikato DHB	Podiatrist
Bee	Leow		Clinical Pharmacist Facilitator
Sally	Levie	Auckland DHB	CNS - diabetes
Laura	Li	Bay of Plenty DHB	Dietitian
Cynthia	Libalib	Auckland DHB	Diabetes NS-Nurse Prescriber
Qiliang	Liu	Auckland City Hospital	Diabetes Registrar
Amy	Liu	Auckland DHB	Team Leader Dietitian
Catherine	Lofthouse	Ministry of Health	Programme Manager, Diabetes
Marise	Logan	Waitemata DHB	Podiatrist
Marise	Logan	Waitemata DHB	Podiatrist
Helen	Lunt	Canterbury District Health Board	Diabetes Physician
Mavin	Macauley	University of Auckland	Senior Lecture - Medicine
Bonnie	MacInnes	Northland DHB	CNS- Diabetes
Brittany	Malcolm	Eastern Bay Primary Health Alliance	Dietitian
Olivia	Marchand	Southern DHB	Clinical Dietitians
Jo	Marshall	Waitemata DHB	Diabetes Dietitian
Eruera	Maxted	Lakes DHB	Diabetes Dietitian

Jo	McCaughan	Hauora Tairawhiti	Paediatrician
Jo	McClintock	Waikato DHB	Clinical Psychologist
Lynda	McDrury	Riccarton Clinic	Nurse
Nicole	McGrath	Northland DHB	SMO
Sharon	McKeon	Aramoho Health Centre	Nurse Prescriber/Diabetes Support
Brent	McKernan	Able Foot Clinic	Podiatrist
Eileen	McKinlay	University of Otago	Associate Professor
Catherine	McNamara	WDHB	Consultant in Diabetes
Lindsay	McTavish	Capital and Coast DHB	Diabetes CNS
Troy	Merry	University of Auckland	Invited Speaker
Kaarin	Middlebrook	BD Diabetes Care	National Business Development Manager
Roberta	Milne	Counties Manukau Health	CNM-Diabetes & NP
Jan	Milne	Te Awakairangi Health Network	Dietitian
Eloise	Mitchell	Clinical Nurse Specialist Diabetes	Bay of Plenty DHB
Suzanne	Moorhouse	Te Puna Hauora Matua o Hauraki	nurse
Florence	Moret	Comprehensive Care PHO	NZ Registered Dietitian
Bridget	Moss	University of Otago	Student
Nono	Motsatsi	THINKhauora	Diabetes Specialist Podiatrist
Soana	Muimuiheata	Total Well-being Consultancy Serviced Ltd	Dietitian Consultant
Amy	Murdoch	InterMed Medical Limited	Diabetes Product Specialist
Rinki	Murphy	University of Auckland	Professor of Medicine
Jasper	Nacilla	The Terrace Medical Centre	Practice Nurse
Misty	Ngatai	Capital and Coast DHB	Nurse
Alexandra	Noble-Beasley	Auckland DHB	Practice Supervisor Podiatry
Sylvia	North	AUT	PhD candidate
Thomas	Norton	Lilly	Territory Manager - Auckland & Northland
Aoife	O'Dowd	Riccarton Podiatry	Podiatrist
Sharon	Oliver	Tu Ora Compass Health	Diabetes Nurse Specialist
Myli	Once	Novo Nordisk	Product Specialist
Caron	Orelowitz	Step + Stride Podiatry	Podiatrist
Brandon	Orr-Walker	Endocrinologist	Counties Manukau DHB
Claire	O'Shea	Waikato DHB	Podiatrist
Luiz	Paganelli	Novo Nordisk	Endocrine Product Specialist
Ashley	Park	Auckland DHB	Diabetes Nurse
Amber	Parry Strong	Capital and Coast DHB	Diabetes Research Fellow
Jonathan	Partington	Nurse Maude	CNS
Kathryn	Patrick	Boehringer Ingelheim NZ	Pharma Rep
Ryan	Paul	Waikato DHB	Endocrinologist
Varsha	Paul	Lilly	Territory Manager - diabetes
Rhian	Payne	Bay of Plenty DHB	Clinical Nurse Specialist Paediatrics
Karen	Pickering	Diabetes Foundation Aotearoa	Manager/RN
Bella	Piper-Jarrett	Northland DHB	Diabetes Dietitian
Jay	Pirnia	Novo Nordisk	Country Manager
Barbara	Powell	Auckland DHB	Podiatrist
Gita	Pragji	THINKhauora	Diabetes Podiatrist
Gita	Pragji	THINKhauora	Diabetes podiatrist
Sarah	Price	The Royal Women's Hospital	Keynote Speaker
Cleo	Quann	University of Auckland	Student
Karen	Reed	Diabetes New Zealand	District Manager
Maggie	Reihana-Finau	Northland DHB	Podiatrist
Andrew	Reynolds	University of Otago	Senior Research Fellow
Esther	Rimmer	MidCentral DHB	Diabetes Clinical Nurse

Angie	Roddick	Novartis Pharmaceuticals	Senior Brand Manager
Matire	Ropiha-Stewart	Diabetes New Zealand	Diabetes Community Co-ordinator
Carol-Ann	Rorke	Novo Nordisk	Field Sales Manager
Shelley	Rose	MidCentral DHB	Diabetes Specialist Dietitian
Cecilia	Ross	Wellington Regional Hospital	Diabetes Research projects Manager
Alexis	Ross	Student Dietitian	University of Auckland
Theresa	Rossellini	MediRay	Territory Manager
Timothy	Ryan	Lakes DHB	Clinical Nurse Specialist - Diabetes
Ole	Schmiedel	Auckland DHB	SCD Auckland Diabetes Centre
Bryony	Secret	WDHB	CNS
Fiona	Seekup	Bay of Plenty DHB	Nurse
Chandra	Selvadurai	Pharmaco NZ Ltd	Managing Director
Diane	selves	Counties Manukau DHB	midwife
Sandeep	Sharma	Pharmaco NZ Ltd	Product Manager
Kiri	Sharp	Taranaki District Health Board	Diabetes Specialist Dietitian
Leigh	Shaw	Bay of Plenty DHB	Professional Leader Podiatry
Katlin	Sheary	Waikato DHB	RN
Ashna Medina	Siraj	Novartis Pharmaceuticals	Key Account Manager
Kate	Smallman	Diabetes Foundation Aotearoa	Nurse Practitioner
Sophie	Smith	Central Otago Health Services	Dietitian
Stacey	Smith	Pharmacist	NZ Formulary
Melanie	Smith	Eli Lilly	Territory manager
Helen	Snell	MidCentral DHB	Nurse Practitioner
Lisa	Sparks	WDHB	Diabetes CNS
Terrie	Spedding	Health Hawkes Bay	Diabetes Clinical Nurse Specialist
Vida	Stanbury	NZSSD Secretariat	NZSSD
Akira	Stephenson	Capital and Coast DHB	Podiatrist
Katherine	Stern	HVDHB	Dietitian
Leanne	Stewart	Araiteuru	Nurse
Sallie	Sthory	Hauora Tairawhiti	Clinical Dietitian
Kylee	Stok	Diabetes New Zealand	Diabetes Community Coordinator
Nicci	Stoneman	Pharmaco NZ Ltd	Territory Manager
Kelly	Storey	Waitemata DHB	Diabetes Dietitian
Patricia	Stowell	Soul to Sole	podiatrist
Chantal	Summerton	InterMed Medical Limited	Diabetes & Wound Care Business Manager
Brian	Swain	Eli Lilly	Territory Manager
Jane	Symonds	Capital and Coast DHB	RN
Sue	Talbot	Timaru Medical Centre	
Natalie	Tanner	Knox Podiatry	Senior Podiatrist
Hadeel	Thaher	Novo Nordisk	Marketing Manager
Jacqui	Thompson	MHT Diabetes Trust	Clinical Manager
Jenna	Tidswell	Otago Medical School	Medical Student ALM4
Sue	Todd	Oratoa	GP
Claire	Toshach	Pharmaco NZ Ltd	Sales Manager
Viliami	Tutone	Auckland DHB	Keynote Speaker
Sue	Tutty	Ministry of Health	Clinical lead diabetes
Nana	Tweneboah-Mensah	Auckland Diabetes Service	Diabetes Nurse Specialist
Anna	Van den Borst	Bay of Plenty DHB	Diabetes Specialty Nurse
Belinda	van Essen	Comprehensive Care PHO	CVD/Diabetes Nurse Educator
Joan G	van Rooyen	Northland DHB	Clinical Nurse Specialist Diabetes
Charleen	Waddell	Southern District Health Board	CNS-Diabetes

Emily	Walsh	Capital and Coast DHB	Specialty Nurse
Margaret	Ward	Endocrine Diabetes & Research Centre	Research Nurse
Anne	Waterman	Western Bay of Plenty PHO	Diabetes CNS
Erin	Wharemata	Waitemata DHB	Endocrine Registrar
Ben	Wheeler	University of Otago	Paediatric Endocrinologist
Kristen	White	MHT Diabetes Trust	Diabetes dietitian
Paddy	Whitfield	Capital and Coast DHB	Consultant Endocrinologist
Jane	Whitta	Auckland Diabetes Centre ADHB	DNS
Tom	Wilkinson	Canterbury District Health Board	Endocrinology registrar
Sarah	Willacy	Northland DHB	CNS Diabetes
Laurie	Wing	Nelson Hospital	Endocrinologist
Lynne	Wood	Eli Lilly	Territory Manager
Rui Qian (Ryan)	Yeu	Counties Manukau DHB	Diabetes Registrar
Kathryn	Yntema	Pharmaco NZ Ltd	Territory Manager
Simon	Young	WDHB	Endocrinologist
Jenny	Young	Novartis Pharmaceuticals	Key Account Manager
Brian	Yow	Counties Manukau DHB	Service Manager Diabetes/Endocrinology
Angela	Yu	Comprehensive Care PHO	NZ Registered Dietitian
Stephanie	Zhang	Counties Manukau DHB	CNS - Diabetes
Zhuoshi	Zhang	Waitemata DHB	Diabetes Dietitian

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Your patients can enjoy the freedom of managing their diabetes with ZERO fingerpricks* and no calibrations.

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- Urgent low soon alert
- Outstanding accuracy[1]
- Simple auto-applicator

See How Easy **Control** Can Be

t:slim X2™ Insulin Pump

WITH Control-IQ TECHNOLOGY

2.6 hrs **Average additional time in range** per day for study participants who used Control-IQ technology.[2]

97% Percent of study participants who used Control-IQ technology and **said it was easy to use.**[3]

Visit our stand to find out more about our product range.

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We're devoted to helping people living with diabetes. For over 20 years we've given thousands of people the tools and support they need to improve their quality of life.

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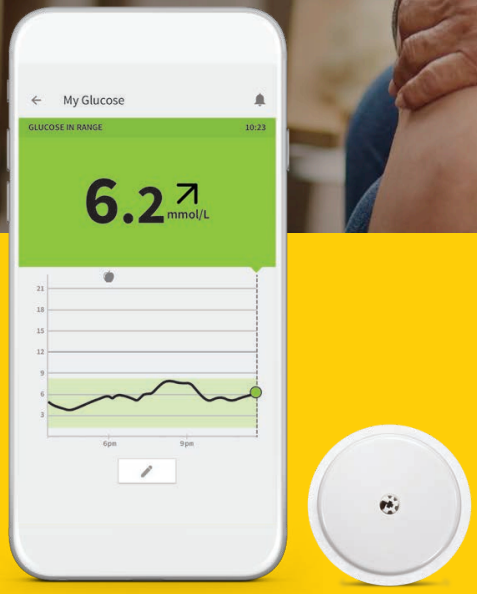
nzmsdiabetes.co.nz

*If glucose alerts and CGM readings do not match symptoms or expectations, use a blood glucose meter to make diabetes treatment decisions. 1. Wadwa RP, Laffel LM, Shah VN, Garg SK. Accuracy of a Factory-Calibrated, Real-Time Continuous Glucose Monitoring System During 10 Days of Use in Youth and Adults with Diabetes. Diabetes Technol Ther. 2018. 2. Forlenza GP, Li Z, Buckingham BA, Pinsker JE, et al. Predictive low glucose suspend reduces hypoglycemia in adults, adolescents, and children with type 1 diabetes in an at-home randomized crossover study: Results of the PROLOG trial [published online August 8, 2018]. Diabetes Care. doi:10.2337/dc18-0771. CGM sold separately. The t:slim X2 Insulin Pump is intended for the subcutaneous delivery of insulin, at set and variable rates, for the management of diabetes mellitus in persons requiring insulin. When the System is used with a compatible iCGM, Basal-IQ Technology can be used to suspend insulin delivery based on CGM sensor readings. Interpretation of the System results should be based on the trends and patterns seen with several sequential readings over time. The System is indicated for use in individuals 6 years of age and greater. The System is indicated for use with NovoLog or Humalog U-100 insulin. The System is not approved for use in pregnant women, persons on dialysis, or critically ill patients. Distributed in New Zealand by NZMS Diabetes, 2a Fisher Crescent, Mt Wellington, Auckland 1060. Ph: 09 259 4062.

FreeStyle Libre
FLASH GLUCOSE MONITORING SYSTEM

Now it's easy to know your patients' hidden glucose patterns[1]



The FreeStyle Libre sensor based glucose monitoring system helps your patients easily share their glucose levels to facilitate virtual or in-person consultations.[2,3]

Now You Know

FreeStyleConnect.co.nz

life. to the fullest.

Abbott

The FreeStyle Libre Flash Glucose Monitoring System is indicated for measuring interstitial fluid glucose levels in people (aged 4 and older) with insulin-dependent diabetes. The indication for children (age 4 - 17) is limited to those who are supervised by a caregiver who is at least 18 years of age. Always read the instructions for use. The sensor must be removed prior to Magnetic Resonance Imaging (MRI).

1. Unger, J. Postgrad Med (2020): https://doi.org/10.1080/00325481.2020.1744393.

2. The LibreView website is only compatible with certain operating systems and browsers. Please check www.LibreView.com for additional information.

3. The user's device must have internet connectivity for glucose data to automatically upload to LibreView.

For more information call Customer Service on 0800 106 100. Medi'Ray New Zealand, 53-55 Paul Matthews Road, Albany, Auckland 0632 www.mediray.co.nz
NZBN 9429041039915 ADC-55802 v1.0

BD safety solutions

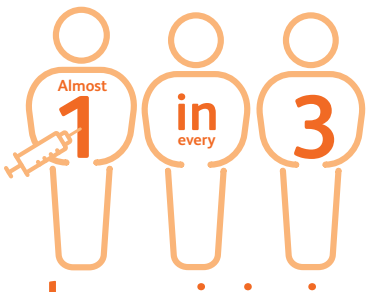
The economic and emotional burden of needlestick injuries (NSIs)

18,730
NSIs occur in
Australia every year[1]

That's
51
NSIs per day!

under-reporting rates are up to
80%[2]

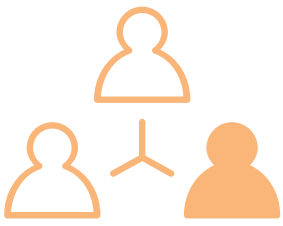
Injection procedures
account for



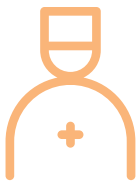
sharps injuries[3]

Testing and associated staff time can cost up to **$256** per NSI[4]

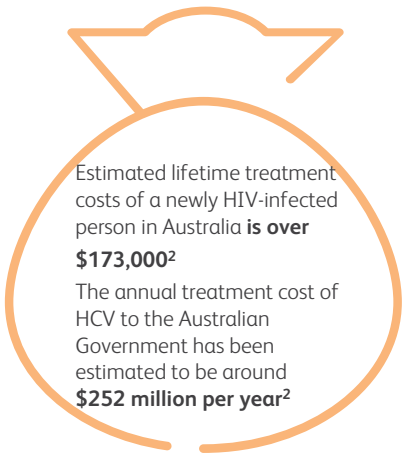
Counselling is often sought following a NSI, each session can cost up to **$105**[5]



The cost of staff absence is up to
$4,032 per NSI[6]



1 in 4
nurses in long term care (LTC) have suffered from NSI in nursing homes[7^]



Estimated lifetime treatment costs of a newly HIV-infected person in Australia **is over $173,000**[2]

The annual treatment cost of HCV to the Australian Government has been estimated to be around **$252 million per year**[2]

BD safety solutions, along with training and education, have been proven to reduce the risk of needlestick injuries

70% reduction in NSIs with the introduction of **BD SafetyGlide™ needle and BD™ Blunt Fill Needle**[8*]

67% reduction in NSIs with the introduction of **BD AutoShield Duo™** to inject diabetes medication[9*#]

BD

BD safety solutions

BD Microtainer® Contact-Activated Lancet

Designed with a positive patient experience in mind.

Low flow

Ref: 366592
Depth: 1.5mm
Needle: 30 G

Medium flow

Ref: 366593
Depth: 1.8mm
Needle: 21 G

High flow

Ref: 366594
Depth: 2.0mm
Width: 1.5mm (blade)

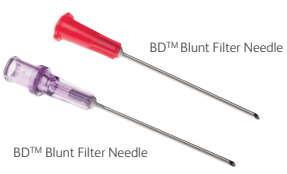
Ergonomic design
Provides user comfort with an ergonomic design for a comfortable grip.

Clear visibility
The lancet covers only a small contact area, which allows visibility of the desired puncture site.

Easy sampling
It activates only when positioned and pressed against the skin, facilitating a consistent puncture depth for easy sampling.

Intuitive procedure
Intuitive procedure and safety design prevents reuse, reducing the possibility of patient and clinician harm.‡

BD safety hypodermic solutions



BD™ Blunt Fill Needle and BD™ Blunt Filter Needle

Designed to reduce NSI and contamination risks and standardise clinical practice

BD SafetyGlide™ Needle

Gliding technology: Where safety meets performance

BD Eclipse™ Needle

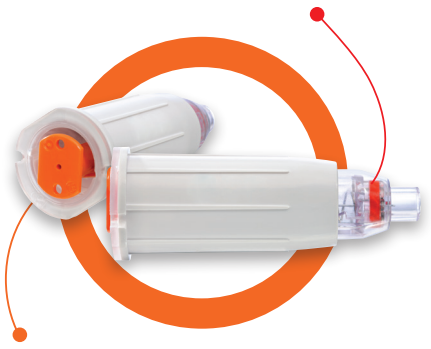
Designed for one-handed activation and ease of use

BD Integra™ Syringe

Featuring retracting technology

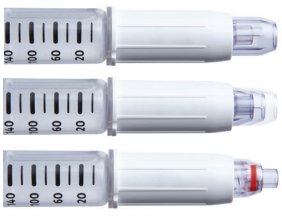
The first pen needle with passive dual-ended safety

On the patient end, a **red** indicator confirms the safety mechanism has been activated. On withdrawal from the skin, the shield at the patient end will lock.



On the cartridge end, protection is confirmed when the **orange** shield deploys and covers the needle upon removal from the pen.

Inject diabetes medication more safely~



BD AutoShield Duo™ Safety Pen Needles reduce the risk of NSIs and the transmission of blood-borne diseases when administering insulin.

BD AutoShield Duo™ Safety Pen Needle. 0.30mm (30G) x 5mm.
Box of 100
Product Reference: 329505

BD AutoShield Duo™ Safety Pen Needles are compatible with leading diabetes medication pen devices.†

BD offers customised clinical training and product support

Together we can help create a culture of safety

Contact your BD Account Manager or BD Customer Service on 1800 656 100 to discuss how BD safety solutions can significantly reduce the risk of NSIs at your facility.

References: 1. Murphy C. *Healthc Infect.* 2008;13(2): 33-37. **2**. Medical Technology Association of Australia (MTAA). Value of Technology: Needlestick and Sharps Injuries and Safety-Engineered Medical Devices. North Sydney, Australia: MTAA; 2013. **3**. International Safety Centre. EPINET report for needlestick and sharp object injuries, 2013. **4**. Professor Graves was engaged to synthesise values from the literature, existing data sources and from consultations with experts. The cost of testing is based on July 2017 Medicare Benefits Schedule accessed at mbsonline.gov.au. **5**. Professor Graves was engaged to synthesise values from the literature, existing data sources and from consultations with experts. This is the cost based on 30-60 minutes with a trained nurse counsellor. **6**. Professor Graves was engaged to synthesise values from the literature, existing data sources and from consultations with experts. This is the cost of staff absence for a high risk NSI with 14 lost work days. **7**. Fascia P, Khouider N, Fine A, *et al.* Risks of needlestick injuries in nursing homes for dependent seniors: myth or reality? Poster presentation, ICPIC 2015. **8**. Adams D and Elliott TS. *J Hosp Infect.* 2006; 64(1): 50–55. **9**. McAlister M and Gartland C. *Aust Nurs Midwifery J.* 2019; 26(8): 18-21

*Compared to when healthcare professionals were using conventional devices. ^ Based on a study conducted in France.
Based on a study conducted in Australia at a 359 patient-bed hospital providing a large range of acute medical and surgical services.
† as at August 2020. ‡ Compared to non-safety, non-retracting lancets. ~ Compared to non-safety pen needles.

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* A blood glucose (BG) reading is needed when entering SmartGuard™ feature. If glucose alerts and CGM readings do not match your symptoms, use a BG meter to make diabetes treatment decisions.

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Pharmaco Diabetes

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Pharmaco (NZ) Ltd, Auckland. 0619YM02 TAPS DA1926IM

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For news, updates and information about Lilly Diabetes, visit us at the Lilly stand or at www.lilly.co.nz

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PP-DG-NZ-0077. TAPS BG2133 Date of preparation: April 2022. FR9959.