A diabetes registrar assisted workflow intervention in general practice for systematic initiation of cardiorenal medications for patients with type 2 diabetes and albuminuria in Aotearoa New Zealand

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ABSTRACT

AIMS: To evaluate whether a weekly diabetes registrar clinic and case discussions conducted over 12 weeks in primary care improves guideline management of type 2 diabetes (T2D).

METHODS: A registrar-led diabetes clinic was incorporated into two primary care practices in Tāmaki Makaurau Auckland for 3 months. Patients with T2D and albuminuria appearing on practice dashboards as not prescribed angiotensin-converting enzyme inhibitor/angiotensin receptor blocker (ACEi/ARB), or sodium-glucose cotransporter-2 inhibitor/glucagon-like peptide-1 receptor agonist (SGLT2i/GLP1RA) were booked into these clinics. Opportunistic education sessions were provided by the diabetes registrar and prescribers were surveyed to understand the challenges in management of T2D.

RESULTS: Of 125 patients booked, 80 attended the registrar clinic. Of these, 68% were clinically suitable for SGLT2i/GLP1RA and 8% for ACEi/ARB. SGLT2i/GLP1RA were initiated in 92% and ACEi/ARB in 89% of eligible patients. Two patients had contraindications for SGLT2i/GLP1RA, and one patient declined both. Additional cardiorenal medications were initiated in 16% of patients.

Survey responses of 12 prescribers indicated acute illness takes priority over diabetes management, and lack of time and knowledge are main barriers to optimising diabetes care.

CONCLUSIONS: A visiting diabetes registrar intervention was successful in initiating guideline medications for T2D in primary care. It remains to be evaluated whether this leads to practice-wide improvements in prescribing gaps in the short or longer term.

Type 2 diabetes (T2D) is a chronic condition that currently affects more than 258,000 New Zealanders (4.7% of the population).[1] Within the next 20 years, this number is projected to increase by 70–90% to 390,000–430,000 people (6.6–7.4% of the population) as the population ages and becomes more ethnically diverse.[1] T2D is associated with increased morbidity, mortality and healthcare cost, primarily through diabetes-induced cardiovascular disease (CVD) and renal disease.[2] Publicly funded treatment of diabetes and its complications now costs Aotearoa New Zealand 0.67% of its GDP, and 10% of the total health budget, or $2.1 billion NZD per annum.[3]

Chronic kidney disease (CKD) is a major microvascular complication of T2D that affects between 25% to 40% of all patients, and is typically characterised by initial albuminuria, accelerated by persistent uncontrolled hyperglycaemia and hypertension towards end-stage kidney disease requiring renal replacement therapy.[4] Māori and Pasifika in Aotearoa New Zealand are disproportionately affected by T2D and they are significantly more likely to experience cardiovascular and renal complications.[5]

In patients with T2D, screening for nephropathy and treatment with renoprotective antihypertensive agents such as angiotensin-converting enzyme inhibitor/angiotensin receptor blocker (ACEi/ARB) are known to improve outcomes.[6] Empagliflozin, a sodium-glucose cotransporter-2 inhibitor (SGLT2i), and dulaglutide, a glucagon-like peptide-1 receptor agonist (GLP1RA), have been shown to improve cardiorenal outcomes[7,8] as add-on therapies, and hence are recommended to be included early in the treatment

algorithm in people with cardiorenal risk factors.[9] Empagliflozin and dulaglutide have been funded for T2D indication (from 1 February 2021 and from 1 September 2021 respectively) under special access criteria, with prioritisation for those of Māori and Pacific ethnicity, requirement for some signs of renal disease (at least micro-albuminuria/or reduced estimated glomerular filtration rate [eGFR]) or estimated cardiovascular risk of >15% or young-adult onset of T2D.[10] Despite national and international guidelines for optimal T2D and cardiorenal risk management, many studies indicate that these medications are under-prescribed in many countries, including Aotearoa New Zealand.[11–15]

As per the Manatū Hauora – Ministry of Health virtual diabetes register, there are over 80,000 patients with T2D in the metro Auckland Tāmaki Makaurau Region, across seven primary healthcare organisations (PHOs). Several of these PHOs report anonymised practice-level data showing excellent coverage of CVD risk factor and diabetes screening measurements (~95% of adults with diabetes). However, quality indicators for processes undertaken and treatment targets achieved are much lower and have not changed over the past 5 years. As per the metro Auckland Clinical Governance Forum on diabetes and CVD Clinical Indicators report, (Quarter Three 2022/23), the proportion with glycated haemoglobin (HbA1c) <64mmol/mol ranges from 68% to 45%, with lowest attainment of glycaemic control noted in Pasifika. The proportion with systolic blood pressure <140mmHg ranges between 53–58%. Only 72–76% of people with diabetes and micro-albuminuria are on ACEI/ARB. As per the same report, treatment quality indicators have been noted to be lowest in Māori, followed by Pasifika.

Failure to achieve these glycaemic goals and other cardiovascular targets, at least in part, can be attributable to lack of timely commencement and treatment intensification.[16]

Inappropriate delays in commencement and treatment intensification by healthcare professionals is referred to as clinical or therapeutic inertia.[17] A number of factors including time constraints, lack of support (for example, limited nursing staff), lack of information or understanding of new treatment options and fear of causing harm, such as hypoglycaemia, are known to contribute to clinical inertia and force practitioners to provide reactive rather than proactive care.[18]

Introducing multi-disciplinary strategies for the management of diabetes (e.g., healthcare teams comprised of general practitioners, diabetes specialists, nurses and educators) tends to target causes of therapeutic inertia at multiple levels.[19–20] Shared care provided by the diabetes specialist nurses, dieticians, podiatrists and pharmacists is cost effective and efficient in managing patients, including more timely treatment intensification.[21] Due to their inter-disciplinary and collaborative nature, these interventions often aim to improve the decision-making process across healthcare professionals.[22]

Specialist outreach clinics in general practices have been shown to increase accessibility and improve health outcomes, as has case conferencing with virtual and face-to-face consultations, with and without patients being present.[23] Over the years, the Auckland Diabetes Centre has carried out a number of initiatives for improved integration of primary and secondary care for diabetes management. These initiatives have included diabetes shared medical appointments, a visiting specialist nurse at primary care, specialist mentoring for primary care staff and community podiatry services. However, this is the first study to evaluate whether providing a visiting diabetes registrar in primary care practices helps to optimise diabetes medication prescribing.

The aim of this study was to implement a 12-week diabetes registrar clinic intervention to review patients with prescribing gaps in guideline diabetes medications according to routine practice data on diabetes treatment gaps.

Methods

Setting

Several primary care practices in the Tāmaki Makaurau Auckland Region were invited to take part in the study, of whom two primary care practices—expected to have a high proportion of enrolled Māori and Pasifika—were selected for the registrar-based intervention. Each practice manager provided informed consent for the practice to take part in the intervention. Ethics approval was granted by Auckland Health Research Ethics Committee (AH24752).

Eligibility for diabetes registrar clinic

Patients with T2D aged ≥16 years to 80 years with confirmed albuminuria (defined as urine albumin creatinine ratio (ACR) more than 3mg/mmol) who were not prescribed on ACEi/ARB or SGLT2i/GLP1RA within the selected general practice (as per their routine diabetes care quality practice reports) were

requested to be booked into the registrar clinic.

Intervention

One diabetes registrar (AN) visited each of the intervention practices on a fortnightly basis over a 3-month period between September 2022 to January 2023 to conduct diabetes clinics and opportunistic diabetes education sessions with staff at each practice. All patients were assessed within an allocated time slot of 15–30 minutes for diabetes management, together with cardiovascular risk factor assessment. All were evaluated for eligibility for initiation with ACEi/ARBs and SGLT2i/GLP1RA as per clinical guidelines.

Registrar clinic booking process

At Intervention Practice 1, all patients were selected by the lead general practitioner (GP), according to the diabetes dashboard, to identify the patients with already developed albuminuria who were not on either ACEi/ARB or SGLT2i/GLP1RA. The nurse in charge individually contacted the patients via phone or text messages and booked patients to the clinic as per usual practice scheduling processes. Electronic referrals were made by the lead GP to secondary care specialty diabetes services, as per usual referral process, identifying the registrar clinic. At Intervention Practice 2, eligible patients were identified by individual GPs and were referred to the diabetes registrar clinic. The centre manager and the booking team at the practice scheduled the patients after contacting them via phone or text messages following the usual process in booking patients to clinics.

Data collection

Out of the people booked to these dedicated diabetes registrar clinics, the proportion suitable for prescribing additional medications, the proportion who did not attend or those who declined these additional medications were summarised.

A brief questionnaire designed to assess primary care prescribers' understanding and confidence of commencing new diabetes medications (SGLT2i/ GLP1RA) and to identify the factors that could contribute to clinical inertia as well as staff perception of registrar-assisted workflow intervention was sent to prescribers through the practice managers at each practice. The questionnaire was comprised of 17 multiple choice questions (out of which five were ranking type, as order of importance) and one free-text question (see Appendix).

Results

A total of six clinics were conducted by the registrar at Practice 1 and five clinics at Practice 2. Baseline characteristics of each practice at baseline is shown in Table 1.

A total of 125 patients were booked into the diabetes registrar over the period of 12 weeks. The proportion of patients with diabetes who had prescribing gaps in management of albuminuria (defined as UACR >3mmol/l and not on ACEi/ARB/SGLT2i/GLP1RA ascertained by practice-level data) were 38% in Practice 1 and 37% in Practice 2. According to routine practice reports, out of the total patients eligible for SGLT2i/GLP1RA, including other special authority criteria, 34% and 52% were not on these medications at each practice at the beginning of diabetes registrar intervention.

Of those who attended the registrar clinic, 91% were represented by Pacific and Māori ethnicities. (59% and 32% respectively). Attending patients' ages ranged from 22–74 years, with HbA1c ranging from 35–127mmol/L.

GP survey and education sessions

A total of 18 GPs were invited to participate in the prescribing survey, and 12 returned completed surveys. Out of the 12 GPs who completed the survey, eight were trained in Aotearoa New Zealand and four were trained overseas. Eight of them had more than 10 years of experience in primary care, and the rest had experience ranged between 1 to 10 years. Out of the responders, nine out of 12 confirmed that they review their patient's diabetes medications every 3 months. Only two indicated that they reviewed diabetes medications every visit and only one did opportunistic review of these medications. Nine of the GPs found health pathways their most useful guideline in management of diabetes.

Regarding level of confidence in starting newly funded medications, eight out of 12 GPs indicated that they were confident or very confident in starting empagliflozin, as opposed to starting dulaglutide where only five GPs felt confident.

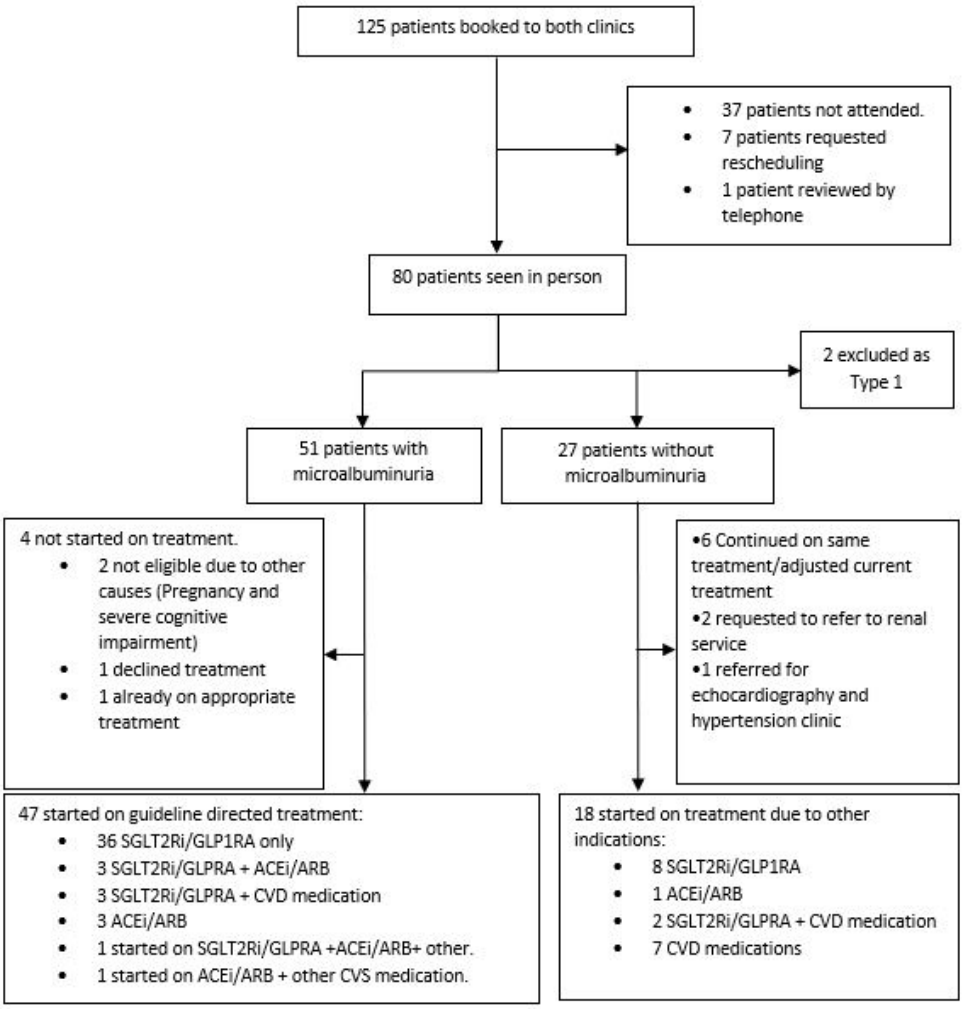
The main barriers in prescribing new diabetes medications included acute illness or comorbidities that took priority, lack of time and lack of knowledge. The majority of the practitioners indicated having poor glycaemic control as the main reason to initiate additional therapy, rather than guideline recommendations for cardiorenal indications.

Table 1: Key characteristics of each practice at baseline.

Key characteristics	Case practice 1	Case practice 2
Number (N) of patients total	N=14,249 (Māori = 14.8%, Pasifika = 38.2%)	N=5,254 (Māori = 9 %, Pasifika = 82%)
N with diabetes (and proportion Māori/Pasifika)	N=1,249 (Māori = 10.4%, Pasifika = 51%)	N=745 (Māori = 5.6%, Pasifika = 88.7%)
N with prescribing gaps in management of albuminuria*	N=478	N=277
N patients with diabetes and new medication prescribed	N=115	N=65
N still eligible for SGLT2i/GLP1RA according to routine practice reports	N=699	N=376
N not on SGLT2i/GLP1RA despite being eligible	N=244	N=196
N patients with systolic BP >140mmHg	N=534	N=386
Fees	$15 fee for a consultation and $20 for after-hours	Free consultation for all enrolled patients
Staff (note health coach)	6 registered GPs 4.5 FTE nurses 0 nurse prescribers/pharmacists 0 health coaches (at present)	8 registered GPs 8 nurses 0 nurse prescribers/pharmacists 0 health coaches
Hours	8 am–8 pm	8:30 am–5 pm
Additional features	Operates 7 days a week, serving a large community on a walk-in basis	Primary healthcare, accident and medical services and Whānau Ora services to Pasifika patients and whānau

*Defined as UACR >3mg/mmol and not on ACEi/ARB/SGLT2i/GLP1RA ascertained by practice-level data pulled from GP prescribing and routine laboratory data.

Figure 1: Summary of diabetes registrar intervention.



Weekly administration and improved adherence were the most popular reasons to start dulaglutide compared to empagliflozin.

Having more time allocated for complex patients was ranked high with regard to medication initiation and up-titration, as well as having planned reviews. Educational meetings, webinars, local education, clinical practice guidelines/materials and computer-based reminders/alerts had similar ratings on decision making and prescribing. Out of 12 GPs, six reported that having Special Authority (SA) criteria for prescribing SGLT2i (empagliflozin) or GLP1RA (dulaglutide) to Māori and Pasifika patients would likely reduce the health inequity in Aotearoa New Zealand. Having access to a diabetes registrar in clinics was reported as being highly beneficial to all. Having patient pamphlets in different languages to improve patient acceptance for new medications was also recommended.

During the practice visits, two formal discussions/educational sessions for 1 hour were conducted with the staff regarding the use of new medications and included discussions of complex patients and management options. Multiple opportunistic discussions were held in between patients during the clinics or during lunchtime.

Discussion

In this paper we discuss a diabetes registrar intervention to enhance diabetes management in primary care, in a more local and convenient setting to patients. It also emphasises that such a

model of care not only benefits patients but also benefits primary care practitioners, as well as trainee registrars, in number of ways.

A key feature of our study was the excellent success rate in prescribing new medications to eligible patients. SGLT2i/GLP1RA was successfully initiated in 92% and ACEi/ARB was initiated in 89% of the patients. In addition, 16% of the patients were initiated on additional cardiorenal and diabetes medications. This emphasises that most patients accepted the recommended medical treatment if these were discussed in an appropriate setting. Another advantage in this study was creating an opportunity to reach patients who had not attended appointments in secondary care clinics. While there was still a significant proportion (29% and 54% at each practice) of patients who did not attend the diabetes registrar clinic in primary care, approximately 10% of patients who had previous multiple non-attendances to secondary care managed to attend the registrar clinic in primary care and were successfully initiated on treatment. Our study also highlights the efficient use of diabetes practice reports or dashboards to help early recognition of patients requiring clinical review for initiation of appropriate treatment.

All GPs indicated having a diabetes registrar onsite would help them to improve guideline diabetes medication prescribing through formal and informal education sessions and discussions around complex patients. We suggest having allocated training for diabetes education would benefit most GPs and could be integrated into the GP registrar training programme.

Having an opportunity for endocrinology trainees to move out of the secondary care environment could make them sensitive to the wider health needs of the local population. Working collaboratively with GPs allows the trainees to establish meaningful partnerships, which could further improve working practices across traditional professional boundaries. It also allows them to incorporate a population perspective of specialist care and would help design care pathways for chronic illnesses such as diabetes, and provide an opportunity to assist with quality improvement processes for diabetes management in primary care. Having the benefit of closer communication with GPs, who are generally much more familiar with the context of their patient and their whānau background, culture and beliefs, is most likely to produce more favourable outcomes. Formal and informal discussions with GPs suggested mutual gains on exposure and experience on new medications as well as overall management of diabetes. Furthermore, this process enables training registrars to work closely with novel workforce resources in primary care, such as health coaches and wellness advisors, sharing more experience and knowledge among the team.

In Australasia, advanced training in endocrinology requires 36 months of fulltime-equivalent training. However, it is not mandated for trainees to have a primary care placement or to participate in outreach clinics as per current Royal Australasian College of Physicians training requirements. We suggest having such an opportunity would benefit trainees as well as patients.

In Aotearoa New Zealand, there is growing demand on primary care for people with diabetes.[3] Manatū Hauora – Ministry of Health emphasise a "closer to home" approach, with a focus on integrating primary and secondary health services for chronic conditions such as diabetes.[24] Two such models of specialist outreach care that have been described in literature include a shifted outpatient model and a liaison-attachment model. In the shifted outpatient model, the specialist outreach clinic is much the same, except for location, as a hospital clinic. On the other hand, the liaison-attachment model is based on collaboration between consultants and GPs, aiming to provide more effective joint care.[25] An Australian study that integrated a primary/specialist model of community care for complex T2D management at an outpatient department in a tertiary hospital showed significantly better glycaemic control and improvement in blood pressure and total cholesterol compared with those in the usual care group.[26] A similar approach in the United Kingdom with specialist outreach clinics for multiple specialities including cardiology, general medicine, rheumatology, ENT, general surgery and gynaecology concluded in better patient satisfaction compared to routine outpatient clinics.[27] Fifteen joint consultation models between specialists and GPs have been shown to reduce waiting lists for rheumatology in secondary care in a Dutch randomised trial.[28]

Most importantly, these partnership models have advantages for patients, such as shortened waiting times,[29] better communication and educational exchange between primary and secondary care professionals[30] and improved patient satisfaction. They are also found to have greater efficiency resulting from a reduction in unnecessary follow-up attendances and lower non-

attendance rates.[31]

Overall, the success of such a diabetes registrar initiative requires the commitment of both primary and secondary care professionals. It remains to be seen whether the educational component of the registrar intervention could lead to long-term improvement of overall prescribing of cardiorenal medications at these practices. The cost effectiveness of such an intervention needs to be evaluated before scaling up to other practices with future diabetes registrar placements.

Conclusion

A visiting diabetes registrar intervention was successful in improving guideline diabetes medication prescribing in primary care. It remains to be evaluated whether this intervention contributed to a practice-wide decrease in prescribing gaps in the short or longer term.

COMPETING INTERESTS
Nil.

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Appendix

Survey for Healthcare Professionals

Thank you for taking part in our survey. This survey is a part of a study designed to help overcome clinical inertia in the management of type 2 diabetes at general practices in Auckland.

This is a quality improvement study involving diabetes registrar-assisted clinics at general practice to improve systematic initiation of ACEi/ARB and SGLT2i/GLP1RA for patients with microalbuminuria and to codesign resources and practice workflow solutions to support ongoing systematic medication commencement and titration at each practice.

We are keen to understand the factors of what works in your practice and how we can improve overall prescribing rates of these medications.

Please note that all answers are confidential and anonymous and you may choose to not answer all questions.

Your involvement in this survey is completely optional. The information and contents of this document could be translated to te reo on your request, if required.

Please note that informed consent is assumed upon submission of this survey.

1. Which primary health organisation (PHO) are you affiliated with?		
A	ProCare	
B	Total Health Care	
C	East Health Trust	
D	Alliance Health Plus Trust	
E	Other	
2. Are you (as the person completing this survey) a?		
A	General practitioner (GP)	
B	Nurse practitioner/prescriber	
C	Practice manager	
D	Health coach	
E	Other	
3. If a GP or nurse, where were you trained?		
A	In New Zealand	
B	Overseas	
4. For how many years have you been working in primary care?		
A	0–1 y	
B	2–3 y	
C	4–5 y	
D	6–10 y	
E	More than 10 y	

5. How often do you review their diabetes medication/glycaemic control on a standard visit?		
A	Every visit	
B	Every 3 months	
C	Every 6 months	
D	Every 12 months	
E	If the time permits/opportunistic	
6. What proportion of your patients with diabetes do you screen for eligibility for prescribing new medications, SLT2 inhibitor (empagliflozin) or GLPA1 agonist (dulaglutide) on a usual visit on average?		
A	100%	
B	80–100%	
C	60–80%	
D	50–60%	
E	<50%	
7. What would be the most useful guideline that you would refer to when starting on empagliflozin or dulaglutide?		
A	Health pathways	
B	NZSSD guidelines	
C	BPAC guidelines	
D	Medsafe	
E	Other/practice-based	
8. How do you find navigating New Zealand Society for the Study of Diabetes (NZSSD)/health pathways to check recent guidelines for management of diabetes?		
A	Very difficult/never accessed	
B	Difficult	
C	Average	
D	Easy	
E	Very easy	
9. How confident are you in prescribing and educating your patient on newly funded medication, empagliflozin(SGLT-i)?		
A	Not confident at all	
B	Less confident	
C	Average	
D	Confident	
E	Very confident	

10. How confident are you in prescribing and educating your patient about using dulaglutide (GLP1 agonists)?		
A	Not confident at all	
B	Less confident	
C	Average	
D	Confident	
E	Very confident	
11. In your opinion what is the main reason you would initiate empagliflozin to a patient? Please rank your order of importance 1–5 (1 most important reason to 5 least important).		
A	Fulfils special authority criteria	
B	Improved cardiovascular and renal outcomes	
C	Poor glycaemic control	
D	Less adverse effects than GLP1 agonists	
E	Other/PHO providing lists of eligible patients	
12. In your opinion what is the main reason you would initiate dulaglutide to a patient? Please rank your order of importance 1–5 (1 most important reason to 5 least important).		
A	Fulfils special authority criteria	
B	Weekly administration/improved adherence	
C	Weight loss effect	
D	Fewer adverse effects than SGLT2i	
E	Guidelines	
13. In your opinion what are the main barriers that prevent you from prescribing empagliflozin/dulaglutide to a suitable patient?		
A	Lack of information/knowledge	
B	Lack of support from practice/staff	
C	Comorbidities or acute illness took priority	
D	Lack of time	
E	Fear of harm/adverse effects	
14. In your opinion, what is the best method that will improve you as a clinician to prescribe and up-titrate diabetes medications? Please rank your order of importance 1–5 (1 most important reason to 5 least important).		
A	Better availability of written information/knowledge	
B	Having more support from practice/staff	
C	Planned reviews	

D	Having more time allocated for complex patients	
E	Involving family/whānau	
15. What would influence you most as a clinician to prescribe a new medication such as empagliflozin or dulaglutide? Please rank your order of importance 1–5 (1 most important reason to 5 least important).		
A	Educational meetings/webinars/local education	
B	Clinical practice guidelines/materials	
C	Computer-based reminders/alerts	
D	Patient requesting the medication	
E	Having a diabetes registrar on site	
16. In your opinion, would having SA criteria for prescribing empagliflozin or dulaglutide to Māori and Pacific Island patient be likely to reduce the health inequity in New Zealand?		
A	Very unlikely	
B	Unlikely	
C	Average	
D	Likely	
E	Very likely	
17. In your opinion what would be most beneficial approach to improve diabetes-related health outcomes in the New Zealand healthcare system? Please rank your order of importance 1–5 (1 most important reason to 5 least important).		
A	Enhanced primary care	
B	Improved links between primary and secondary (specialist) care such as registrar-assisted clinics	
C	Nurse-led approach	
D	Improve funding	
E	Patient-centred approach	
18. Any other suggestions to improve diabetes-related health outcomes in the New Zealand healthcare system? (Free text.)		

Thank you for your time with this survey!
For any questions about this survey or the study please contact Prof Rinki Murphy (r.murphy@auckland.ac.nz) or Dr Anjana Niyagama (AnjanaN@adhb.govt.nz).