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Clinician perspectives on linked electronic health records for preventing type 2 diabetes after gestational diabetes in primary care—an Australian qualitative study

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ABSTRACT

Objectives The objective of this study was to understand primary care clinician perspectives on a novel linked health data system to facilitate diabetes prevention for individuals with a history of gestational diabetes mellitus (GDM). We used the conceptual example of linking the National Gestational Diabetes Register with primary care electronic health records to understand clinicians' views on potential implementation.

Design A qualitative study of semistructured interviews with primary care clinicians.

Setting Australian primary care.

Participants Primary care clinicians (n=14). Inclusion criteria were: general practitioners (GPs), practice nurses and/or diabetes educators working in primary care in Australia, and seeing individuals with a history of GDM; aged 18 years and over; and willing to voluntarily contribute to the project. There were no exclusion criteria.

Results Clinicians' views on acceptability, feasibility and utility were characterised by realistic optimism for a linked data system to improve GP workflow and patient outcomes. Clinicians noted existing pressures on primary care and patient concerns regarding confidentiality and privacy, and that these factors should be considered in the development process. Clinicians envisaged three functions for their clinical management systems: (1) automatically updating a patient's past history; (2) generating actionable alerts and (3) generating recall lists.

Discussion Primary care clinicians were unanimously supportive of a linked health data system to facilitate diabetes prevention. Consistent with previous studies, we identified the key clinician-related enabler as the integration into existing GP workflows to facilitate proactive clinical care. Point-of-care tools and preventative care consultations could increase the uptake of screening and provide opportunities for patient education post partum.

Conclusion In combination with effective prevention programmes, and health policy and system supports, linked health data systems could be part of the equation for type 2 diabetes prevention for individuals with a history of GDM. Larger acceptability, feasibility, co-design and implementation studies are recommended.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study is one of the first to report clinician perspectives on linked health data systems to facilitate diabetes prevention using qualitative interviews.
- ⇒ The small sample size and self-selection of participants raised potential bias, however, was appropriate for conducting detailed qualitative interviews in the available time.
- ⇒ The standardised, semistructured interview guide provided comprehensive insights on clinician perspectives while still ensuring consistency across interviews.

INTRODUCTION

Preventing type 2 diabetes after gestational diabetes

Gestational diabetes mellitus (GDM) affects 11–15% of pregnancies globally.[1] Individuals with GDM have an approximately 10-fold higher risk of developing type 2 diabetes mellitus (T2DM) compared to those without GDM.[2] The health and socioeconomic burden of T2DM is high, so prevention is key.[3] Australian guidelines recommend blood glucose screening at 6–12 weeks post partum. If normal, screening is repeated every 3 years, and if contemplating another pregnancy, screening is repeated yearly.[4] Behavioural interventions including nutrition and exercise for T2DM prevention are advised and supported. T2DM prevention programmes are effective; however, there are barriers to screening including lack of knowledge and low risk perception, fear of diabetes diagnosis, low prioritisation of personal health and fatalism.[5 6] Primary care is ideally situated to address these barriers, and to reduce the incidence and socio-economic burden of T2DM.

The Australian context

Perinatal care of patients with GDM is shared between multiple healthcare providers in primary care and tertiary care settings. Diagnosis of GDM may not be documented in the primary care electronic health record (EHR), making it difficult to identify individuals with a history of GDM requiring preventive care. Australia introduced a National Diabetes Register in 1999,[3] a National Gestational Diabetes Register (NGDR) in 2011[6] and a national EHR, *My Health Record*, in 2012.[7] *My Health* Record is a secure online summary of patient health information (eg, immunisations, diagnostic imaging and pathology reports, prescriptions and hospital discharge summaries). These data repositories are not linked, and while clinicians access and upload health information to *My Health Record*, depending on clinical system data quality and general practitioner (GP) familiarity with the system, it is not well integrated into primary care.[8] Results of the first recorded evaluation of the NGDR, where individuals received a letter at the time of registration, and a reminder for diabetes screening at 8–16 weeks and 10 months post partum, reported unsatisfactory uptake of screening.[6] This ranged from 43% in South Australia in 2012 to 58% in Victoria in 2013, which was notably less than uptake of screening for breast, cervical or bowel cancer.[6] This missed opportunity for diabetes screening is observed in health systems globally.[9] Given the near universal use of EHRs among GPs in Australia,[10] a linked NGDR-EHR system may make it easier to identify individuals with a history of GDM requiring preventative care.

Linked health data systems in primary care

There is growing interest in data repositories and data-linkage for quality improvement in primary care and population health research. The use of electronic patient registers, and patient or clinician reminders are associated with quality improvement in T2DM management.[11] Figure 1 depicts the potential of a linked NGDR-EHR system to facilitate pro-active clinical care, identifying individuals with a history of GDM for recalls and reminders for preventative care consultations. Understanding and addressing clinician and patient concerns about data-linkage for clinical care is foundational before linked health data systems are designed and implemented.

Objectives

As diabetes screening and preventative care is predominantly conducted by primary care clinicians, our objective was to explore clinician perspectives on linking data from external repositories or registries with primary care EHRs. We used the conceptual example of linking the NGDR with primary care EHRs to understand clinicians' views on:

- Acceptability, feasibility and potential utility.
- Potential risks, benefits, barriers and enablers.

We intend for this work to inform a general practice-based trial of a quality improvement collaborative programme for the prevention of T2DM after GDM (The GooD4Mum Study).

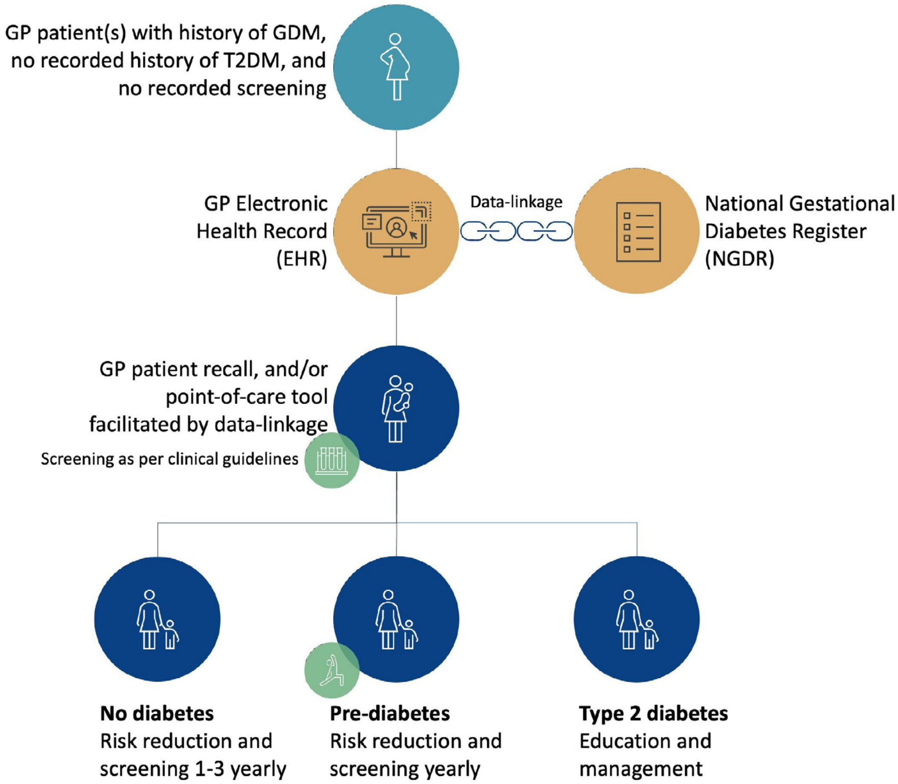

Figure 1 An example of a linked health data system in general practice to facilitate diabetes prevention for individuals with a history of GDM. GDM, gestational diabetes mellitus; GP, general practitioner; T2DM, type 2 diabetes mellitus.

METHODS

Our qualitative study design[12] was underpinned by Health Policy and Systems Research methods.[13] Consolidated criteria for reporting qualitative research[14] and consensus reporting items for studies in primary care[15] are summarised in online supplemental file 1. The study was undertaken for the 12-month Australian General Practice Training Academic Post Program, led by a GP registrar with an interest in data-driven diabetes prevention. University of Melbourne Ethics Committee approval was received in May 2023 (ID 26517-40905-4).

Recruitment

Notices were posted in newsletters of the University of Melbourne Department of General Practice and Primary Care's Victorian primary care practice-based Research and Education Network (VicREN) and on research recruitment e-noticeboards of the Royal Australian College of General Practitioners' (RACGP) website. Participants self-selected by responding to notices. Participants were provided with a Plain Language Statement and consent form, and informed consent was received prior to interviews. Inclusion criteria were: GPs, practice nurses and/or diabetes educators working in primary care in Australia, and seeing individuals with a history of GDM; aged 18 years and over; and willing to voluntarily contribute to the project. There were no exclusion criteria. Purposive sampling was used to include participants of varied sociodemographic populations. An honorarium of $50 was provided to participants to thank them for their time.

Semistructured interviews

A survey of demographic data was included with the consent form and confirmed prior to interviews. Interview questions were developed with input from all coauthors with research and clinical experience in linked health data systems and diabetes prevention (see online supplemental file 2. Semistructured interview guide). Semistructured telephone or video-conferencing interviews were conducted by author RS. Interviews were recorded and transcribed verbatim. Data were collected as audio, video and text files, de-identified and stored in restricted access folders in the University of Melbourne's secure research environments. Transcribed text files were cross-checked with audio files and amended for accuracy by RS. Files and research findings were not returned to participants for feedback as ethics approval was not sought for these steps.

Analysis

All text files were uploaded into NVivo 12 qualitative data analysis software[16] and thematic analysis was conducted.[17] The first transcript was coded by authors RS and RC with inconsistencies resolved by discussion, and the remaining transcripts were coded by RS with findings discussed by all authors.

Table 1 Participant characteristics

		Number of participants
Years in clinical role	0–5	6
	6–10	2
	11–20	3
	20+	3
Practice billing structure	Bulk-billing (no out-of-pocket fee for service)	4
	Mixed billing	5
	Private billing (out-of-pocket fee for service)	5
Index of Relative Socio-economic Disadvantage quantile*	2	4
	5	10

*5=the most advantaged and 1=the most disadvantaged.[29]

RESULTS

Recruitment ceased at 14 participants, at data saturation, and ensuring the study remained manageable for a 12-month registrar-led project. No participants dropped out and three participants were professionally known to the author RS, who conducted the interviews. One telephone interview and 13 video-conference interviews were conducted with 13 GPs and 1 practice nurse who was also a diabetes educator between June and September 2023. Interview length was 18–34 min (average=26 min). Clinician characteristics are summarised in table 1. Research findings and a representation of the coding tree, derived from the data, are summarised in figure 2.

Clinician experiences of GDM diagnosis and management

Clinician experiences were shaped by a health service model where perinatal care of patients was fragmented and led to 'missing data' from the second and third trimesters of patients' pregnancies. Clinicians referred to shared care of patients with multiple healthcare providers. This was between GP, obstetrician, midwife, endocrinologist and diabetes educator in the public or private hospital system, or between multiple GPs in the same or different clinic (eg, where patients see one clinician for women's health concerns and another clinician for general health concerns).

Clinicians reported awareness of a patient's GDM diagnosis at the 6-week postpartum check, when they receive and read either printed or electronic correspondence from the hospital, or from the NGDR. This correspondence prompts them to manually add the GDM diagnosis to a patient's past history, request either an oral glucose tolerance test (OGTT), fasting blood glucose level (BGL) or HbA1c and educate patients on nutrition and exercise. Manually adding recalls and reminders for 1–3 yearly diabetes screening was repeatedly noted as a tool for follow-up, which dependent on practice software, is easily

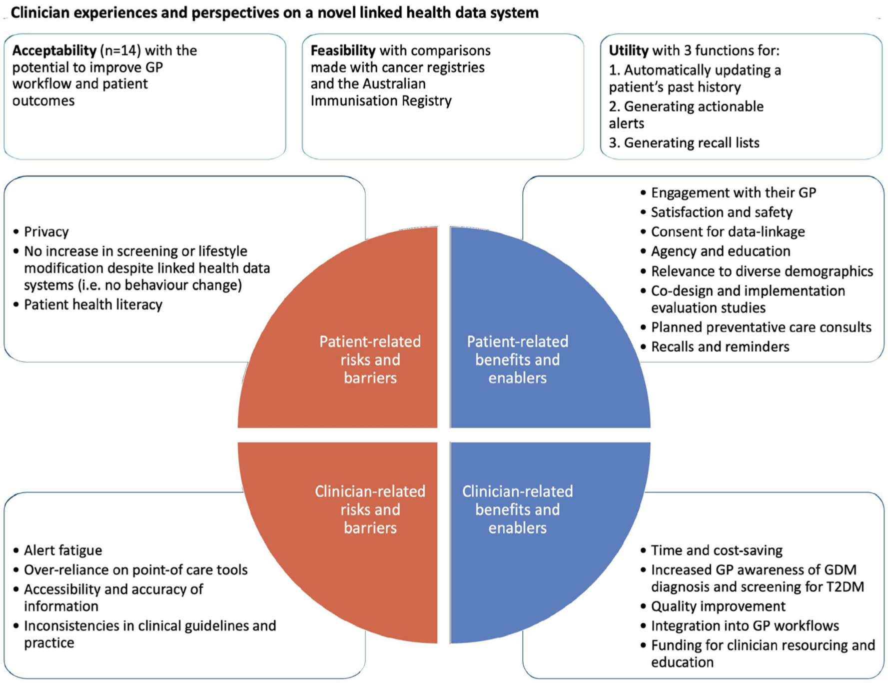

Figure 2 Summary of findings: clinician experiences and perspectives on a novel linked health data system, n=14. GDM, gestational diabetes mellitus; GP, general practitioner; T2DM, type 2 diabetes mellitus.

visible on a patient's file. Despite this, clinicians noted loss to follow-up.

There was diversity in clinicians' women's health training, and therefore their experience in GDM. There was also diversity in their patients' demographics. Clinicians had therefore adopted approaches to suit their patients' health literacy, cultural, linguistic and socioeconomic background.

Clinician perspectives on a novel linked health data system

When asked about the acceptability of a linked health data system, using the verbal conceptual example of linking the NGDR with primary care EHRs for diabetes prevention for individuals with a history of GDM (participants were not provided; figure 1), all participants responded positively (n=14). Clinicians noted the potential to improve GP workflow and to improve patient outcomes.

> I'd say that the value of the registry would be actually for future visits, not really during the immediate postpartum period, but for say, a year later, when things just get lost to follow up and patients forget, and if they get sent a letter and they bring it in, then it prompts both the doctor and the patient, that something needs to be done. GP 13

When extended to other disease screening for prevention, or for early detection, comparisons were made with cancer screening registries and the Australian Immunisation Register (AIR).

> I think it's a really great idea, because in the last couple of years…the cervical screening registry, the bowel cancer screening registry, were linked into GP practice software to good effect. So, I actually utilise that quite a lot to keep on top of screening. GP 6

When asked about the feasibility of a linked health data system, participants responded cautiously, noting the existing pressures on primary care that should be considered in the development process. Preventative healthcare activities are lower priorities and are often overtaken by other presenting complaints. Again, comparisons were made with cancer screening registries and the AIR.

> Grateful [for the health information] when I've got the person in front of me, but if you want to make change, you can't expect it to happen on an individual basis. It has to be systematic…it has to be a very deliberate process. So, if you want to capture all the people with GDM, making sure that they've had the [screening] test and been referred to [a diabetes prevention] program, you really need to have someone pull out all the data, work out who hasn't been recalled, recall them in and make sure all things get done. Expecting a GP systematically every time a patient comes in to quickly check for cervical cancer screening test, GDM, hypertension, ADHD, depression, breastfeeding difficulties, it's not going to happen. Those sorts of preventive things get pushed towards the bottom unless people have come in specifically for something that's fairly straightforward. GP 8

When asked about what functions they would like the linked health data system to deliver, noting uncertainty about Information Technology (IT) infrastructures,

Table 2 Functions for a linked health data system

1	Automatically add the GDM diagnosis to a patient's prior history (±My Health Record)	Enable a visible timeline of date of GDM diagnosis and date(s) of subsequent T2DM screening. Some clinicians included in this a request for automatic inclusion of patients' GDM management (diet-controlled/insulin-controlled), most recent pathology results and most recent endocrinology recommendations.
2	Design point-of-care tools (eg, pop-ups or on-screen alerts)	Actionable alerts for GPs and practice nurses, some less and others more intrusive/attention-demanding. Some clinicians included in this a request for a clinical decision-making algorithm or a risk stratification tool (eg, the Australian Type 2 Diabetes Risk (AUSDRISK) assessment tool).
3	Design recall list (population) tools	Actionable recall lists for practice nurses (eg, to contact individuals with a history of GDM who have not had recommended screening).

participant responses can be grouped into three functions for their clinical management systems (see table 2).

When compared to other disease screening or other applications, one respondent raised the potential to improve the fragmentation of primary and tertiary healthcare more broadly:

> I'm just thinking with that data-linkage, why stop with GP practices? You could link to state hospital databases. GP 12

Clinicians discussed concepts related to themselves (clinician-related themes) or as they perceived would be related to their patients (patient-related themes).

Clinician-related risks and barriers

Clinicians were concerned about the risk of 'alert fatigue' and point-of-care tools becoming 'background noise'.

> I can already see that that's going to be annoying to me every time…and that potentially one could sort of, just dismiss those. GP 1

In addition, two clinicians were concerned regarding the over-reliance on point-of-care tools. One also considered the associated negative impact of inappropriately relying on point-of-care tools over clinical judgement on the doctor–patient relationship.

Clinicians noted the accessibility of health information, or the number of 'clicks' and 'logins' and accuracy of information, as barriers to implementation. Some participants asked questions or made assumptions about the maintenance of the NGDR and EHRs (eg, 'who is entering and reviewing the data at the registry end?'), and the ability to quickly distinguish if an alert had been actioned or not.

Clinicians also noted inconsistencies in clinical guidelines and clinical practice as being barriers to implementation, not only for GDM and T2DM, but also for other preventable conditions in primary care. Although one clinician identified point-of-care tools that are regularly updated to reflect current clinical guidelines as being an enabler to providing best-practice and evidence-based medicine.

> As long as there's a very well-established guideline on screening. So probably your top-priority…conditions that you'd want to data-link, would be things that have dedicated screening tests. Data-linkage with regards to…smoking and alcohol, those sorts of reminders that pop-up on our screen are the sorts of things that directly lead to reminder fatigue. So, I wouldn't recommend those. But on the whole, data-linkage would be really good for those things that require specific screening tests, as long as the previous results are easily accessible through our same software, the less clicks the better, and also you need to figure out a way to present those reminders, without it getting buried under all the other reminders on the screen at the same time. GP 6

Patient-related risks and barriers

Reflecting on their respective patient populations, clinicians anticipated patient concerns regarding confidentiality and privacy, particularly relating to sensitive or potentially stigmatising health information.

> I guess there's always the concern that you're going to have a privacy breach with any of your medical information. But I think that risk exists with having medical data stored anywhere. GP 11

In addition, clinicians anticipated a linked health data system would not easily translate to increased screening or lifestyle modification for women with a history of GDM. Perceived patient-related barriers to screening or lifestyle modification included perceived low risk of T2DM, distress or anxiety relating to T2DM or lifestyle modification and lack of time for screening or lifestyle modification.

Although there were no stated concerns about the acceptability of a linked health data system to patients, health literacy was a proposed social factor for why such a system would not directly and easily translate to T2DM prevention. Alongside other social determinants of health, health literacy was perceived to be a barrier to patient response to recalls and reminders, and engagement in screening or lifestyle modification.

Clinician-related benefits and enablers

Clinicians stated a linked health data system would be time and cost-saving. They provided examples of timely access to required health information (eg, pathology results), timely communication and collaboration with colleagues (eg, obstetricians), and as a result, avoidance of chasing results or repeating tests. These were recurring themes when asked about the applicability of a linked health data system to preventative care for conditions other than GDM and T2DM.

Most clinicians either explicitly stated or implied that a linked health data system would increase GP awareness of a GDM diagnosis and therefore increase GP screening for T2DM, without repeating tests and possibly distressing the patient. It was stated that such a system would increase GP awareness and screening particularly for patients with multiple healthcare providers, except for one clinician who considered this a risk, not a benefit, with concern regarding receiving reminders for patients who may not be known to them.

> It's very difficult in general practice to keep abreast of patients, what screening is required for them, what monitoring, keeping on top of that and keeping an up-to-date EHR, is very difficult, within the time limitations of general practice. So having a national registry that is then linked or embedded in the EHR, it makes sense. And I think the evidence for that from my other experiences with the cervical cancer screening registry and the AIR is it makes your work so much more seamless. It allows you to have much more complete records and then it makes the quality of the care better. GP 10

Clinical audits and quality improvement were stated by one clinician with a special interest in diabetes research as being a benefit of data-linkage for clinicians as well as for practices and health systems. This was also applied to other preventable conditions in primary care.

Integration into, and utilising existing IT infrastructures, GP workflows, clinical guidelines and patient resources, was a key enabler for implementation. Clinicians stated the importance of the ability to edit or switch point-of-care tools on or off, and for tools to provide practical and actionable health information (eg, pathology results). This also relates to the aforementioned importance of consistencies in clinical guidelines.

> And the other [enabler] would be, treatment recommendations. So for instance, right now if we look up the registry for cervical screening, it will have the recommendation for what's going to happen, and that's a simple algorithm of what happens, and a flow chart is sort of followed. It may not be as clear cut in terms of what do you do if a sugar level is this compared to that. Simply because I think there's a number of different ways to manage elevated sugar levels. Compared to a slightly abnormal cervical screening result for instance where you have a clearly defined algorithm. GP 11

Funding for (1) clinician resourcing (eg, involvement of practice nurse/diabetes educator/aboriginal health worker), and (2) clinician education on linked health data systems or 'digital health literacy', was also an enabler for implementation.

> …we are the ones who are going to field those questions [from patients about linked health data systems]….If we can't explain how the data is stored and how the data is used, if we can't explain that satisfactorily to the patient, I wouldn't expect them to accept being part of the program. So, I think we probably would need some education in, it's not even so much about our own health data literacy, it's about disclosure, from the registry or from this system, about how the data is used so that we can communicate that. Because I think in general doctors have a good understanding of health data and what it's used for broadly in terms of research and record keeping and registries like this. But it would be good to know specifically so that we can reassure the patient what their data may and may not be used for. I guess questions might come up like: "can any doctor or any practice nurse access this?" Or "do I have to keep my consent for specific clinics?" Or can they withdraw their consent? Or would that be shared with any third parties? If there's something sensitive that they don't want shared. For instance, if it might affect an insurance premium….So I think if it came with some sort of proforma about frequently asked questions or even just something brief about how the data is stored, what it's used for and what it's definitely not used for. GP 10

Patient-related benefits and enablers

Clinicians anticipated increasing patient acceptability and expectation of data use and linked health data systems, with patients expecting their health information to be readily available to their primary healthcare providers.

> So, when I do immunizations and I say, "oh, where are you up to on your COVID vaccinations?…Here, let me have a look." [I] go to my immunizations and click on the AIR, it takes me straight there and I can say, "oh, you're up to date." They love it! You know, they see the sense of that.…have a patient who comes from hospital and they say, "oh, I was recently in the Emergency Department with this and this. Did you get the information?" and I say "no, I didn't even know you were there."…they can't believe that in this day and age, that sort of information doesn't follow them around…but the most are actually comfortable and most of them expect it. They expect it to follow them. GP 8

Patient education and engagement with their GP was perceived to be a benefit of data-linkage and related point-of-care tools. These tools were considered ‘conversation starters’ between patients and clinicians to address the aforementioned perceived low risk of T2DM and diabetes stigma. Patient reassurance, satisfaction and safety were also perceived to be benefits of data-linkage.

> And I think,…for some patients that don't have a [regular] GP,…it might trigger that feeling of,…the healthcare system is looking out for them. I think when many, not all patients, some just get really annoyed by recalls from the GP, but some, many, really appreciate and feel quite supported that I reminded them they were due something or that I wanted to check in on them about something else. I think they just feel supported. GP 9

Patient consent for data-linkage at time of registration, and the ability to ‘opt in’ or ‘opt out’ at a later date, were enablers to implementation.

Patient agency and education were also enablers to implementation. Clinicians proposed that linked health data systems and point-of-care tools do not replace the communication from the NGDR to the patient (eg, letters), and patient awareness of T2DM risk. Relevance to diverse demographics, and co-design and implementation evaluation studies were also perceived to be enablers.

> …I guess we do want the patient to be linking in with someone to check their lifestyle and how things are tracking periodically.…Just as a reminder that I did have this condition and yes, it was all fine in the pregnancy and you might not have needed insulin in the pregnancy but doesn't mean, [pause] do you know some women will say, “oh, it was only mild.” So, I guess we want that it’s not just the testing, I understand the testing is important, and that being prompted for a test might remind them that they need to be careful with their lifestyle…because they're at an increased risk. But that’s I think the more important thing, that they're actually reminded periodically: “remember you’re at increased risk of developing diabetes so remember you need to be doing ABC.” Not so much the sugar testing, because…if we're picking up diabetes,…the horse has bolted, hasn't it? GP 9

A final enabler was planned preventative care consults, and appropriately timed recalls and reminders from a single source that is, the NGDR or the GP (vs letters or text messages from multiple sources).

> …let’s say someone comes in, let’s say that they're, acutely unwell, febrile, and you're trying to work out what it is. And then a pop-up comes, oh, they’re due for a GTT or a GDM screen. At that point in time, I'm not going to do it because I've got too much on my plate to sort through. And so, this is where I think separating out what I call planned care from acute care is important. So, for my nurses to turn around and say, right, we've got 10 patients this month who are due for their GDM screen,…let’s call them in,… we can even do a pathology slip, send it to them and then once they've got the result, they come in for an appointment. I love that planned deliberate approach. GP 8

DISCUSSION

We conducted 14 interviews with primary care clinicians. While we explored clinician perspectives on linking the NGDR with primary care EHRs for diabetes screening for individuals with a history of GDM, emergent themes were evidently relevant to other disease screening or other applications in primary care. Clinicians’ views on acceptability, feasibility and utility were characterised by realistic optimism for a linked data system to improve GP workflow and patient outcomes. Clinicians noted existing pressures on primary care and patient concerns regarding confidentiality and privacy, and that these factors should be considered in the development process. Clinicians envisaged three functions for their clinical management systems: (1) automatically updating a patient’s past history; (2) generating actionable alerts and (3) generating recall lists.

There are currently major limitations to using primary care datasets for linked health data systems, including the lack of information on the clinical management of patients in general practice, and obstacles to research using data from multiple sectors, making research capturing the patients journey through the health system challenging.[18] Previous qualitative research-identified barriers and enablers to data-linkage for the secondary use of GP datasets were: technical issues (need for reliable IDs for data-linkage), governance, capacity, trust and knowledge building (eg, lack of stakeholder agreement and education).[19] Our work builds on this by consulting with clinicians and synthesising their views on the primary and secondary use of GP datasets and the conceptual example of linking the NGDR with primary care EHRs for diabetes prevention. It offers an application for linked health data systems, to address the missed opportunity to identify individuals with a history of GDM requiring preventative care.

Clinician-related risks and barriers were alert fatigue, over-reliance on point-of-care tools, accessibility and accuracy of information, and inconsistencies in clinical guidelines and practice. Previous co-design of an electronic chronic disease quality improvement tool for use in primary care similarly identified that successful implementation may be supported by accuracy of the algorithms in tools and data held in the practice, the platform supporting planned and spontaneous interactions with patients, the ability to hide tools, links to Medicare Benefits Schedule and prefilled management plans.[20] Linking the NGDR with primary care EHRs has the potential to maintain accuracy of data held in the practice and optimise clinical decision support tools.

Patient-related risks and barriers were privacy, no increase in screening or lifestyle modification despite linked health data systems (ie, no behaviour change), and patient health literacy. This risk of privacy breach could be alleviated by available mechanisms to collect EHRs in ethical and secure ways.[21] The risk of no behaviour change is consistent with health system determinants and barriers to postpartum screening and lifestyle modification: loss of follow-up, loss of requisition, lack of time, sense of self-efficacy and social support.[22] A narrative review of prevention of T2DM after GDM similarly identified that health literacy, and perceptions of health and disease risk, may modify barriers to maintaining a healthy lifestyle post partum.[23]

Clinician-related benefits and enablers were time and cost-saving, increased GP awareness of a GDM diagnosis and increased GP screening for T2DM, quality improvement, integration into GP workflows and funding for clinician resourcing and education. This is consistent with previous qualitative research that identified that clinical decision support tools need to work within existing GP workflows to facilitate automated patient recall, and track patients with or at risk of specific conditions, and to facilitate quality improvement activities.[20 24] Clinicians have also reported feeling that they had little understanding of long-term maintenance of lifestyle modification, exacerbated by fragmentation of follow-up care.[25] While linking the NGDR with primary care EHRs does not directly translate to behaviour change, it could address the ‘missing data’ related to the shared care of patients with multiple healthcare providers.

Patient-related benefits and enablers were patient engagement with their GP, satisfaction and safety, consent for data-linkage, agency and education, relevance to diverse demographics, co-design and implementation evaluation studies, planned preventative care consults and recalls and reminders. A systematic review of clinicians’ views and knowledge regarding healthcare seeking for GDM in the post-partum period similarly identified the need for effective communication and education.[26] Reminders have the potential to increase uptake of screening, and importantly the opportunity for risk communication and shared decision-making to empower patients post partum.[27]

Strengths and limitations

Recruitment from VicREN and the RACGP provided access to a large network of general practices and a relatively diverse cohort of clinicians. However, exploration of how practitioner and practice sociodemographic characteristics relate to their perspectives on a novel linked health data system was outside of the scope of our study. Exploration of patient experiences and perspectives was also outside of the scope and will be important for successful implementation. A small sample size and self-selection of participants raised potential bias, as clinicians were predominantly GPs with pre-existing interest in the prevention of T2DM after GDM. Semistructured interviews provided comprehensive insights on clinician perspectives; however, findings are most applicable to Australian or comparable healthcare systems, in which perinatal care of patients with GDM is shared between multiple healthcare providers, and there is use of EHRs and electronic patient registers.

Conclusions and recommendations

In combination with effective prevention programmes, and health policy and system supports, linked health data systems could be part of the equation for T2DM prevention in individuals with a history of GDM. This study builds on other work to demonstrate a potential mechanism for improved recall in Australian practices using quality improvement collaborative mechanisms.[28] Among a selection of primary care clinicians, linked health data systems are a highly acceptable tool for clinical transitions of care and disease prevention. Larger acceptability, feasibility, co-design and implementation studies are required to ensure linking external repositories with primary care EHRs confers value to end-users.

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Contributors RS: writing, draft editing, thematic analysis, participant recruitment, qualitative design, guarantor. RC: draft editing, thematic analysis, qualitative design. J-AM-N: draft editing, participant recruitment, qualitative design. DB: draft editing, qualitative design.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by University of Melbourne Ethics Committee (ID: 26517-40905-4). Participants gave informed consent to participate in the study before taking part.

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REFERENCES

1 Saeedi M, Cao Y, Fadl H, *et al*. Increasing prevalence of gestational diabetes mellitus when implementing the IADPSG criteria: A systematic review and meta-analysis. *Diabetes Res Clin Pract* 2021;172:S0168-8227(20)30899-8.
2 Vounzoulaki E, Khunti K, Abner SC, *et al*. Progression to type 2 diabetes in women with a known history of gestational diabetes: systematic review and meta-analysis. *BMJ* 2020;369:m1361.
3 Australian Institute of Health and Welfare (AIHW). Diabetes. 2023.
4 Royal Australian College of General Practitioners (RACGP). Management of type 2 diabetes: a handbook for general practice. 2020.
5 Lake AJ, Williams A, Neven ACH, *et al*. Barriers to and enablers of type 2 diabetes screening among women with prior gestational diabetes: A qualitative study applying the Theoretical Domains Framework. *Front Clin Diabetes Healthc* 2023;4:1086186.
6 Boyle DIR, Versace VL, Dunbar JA, *et al*. Results of the first recorded evaluation of a national gestational diabetes mellitus register: Challenges in screening, registration, and follow-up for diabetes risk. *PLoS One* 2018;13:e0200832.
7 Australian Government Department of Health and Aged Care. My Health Records Act. 2012.
8 Raza Khan U, Zia TA, Pearce C, *et al*. The MyHealthRecord System Impacts on Patient Workflow in General Practices. *Stud Health Technol Inform* 2019;266:162–7.
9 D'Amico R, Dalmacy D, Akinduro JA, *et al*. Patterns of Postpartum Primary Care Follow-up and Diabetes-Related Care After Diagnosis of Gestational Diabetes. *JAMA Netw Open* 2023;6:e2254765.
10 Jha AK, Doolan D, Grandt D, *et al*. The use of health information technology in seven nations. *Int J Med Inform* 2008;77:848–54.
11 Tricco AC, Ivers NM, Grimshaw JM, *et al*. Effectiveness of quality improvement strategies on the management of diabetes: a systematic review and meta-analysis. *Lancet* 2012;379:2252–61.
12 DeJonckheere M, Vaughn LM. Semistructured interviewing in primary care research: a balance of relationship and rigour. *Fam Med Community Health* 2019;7:e000057.
13 Gilson L. *Health policy and systems research: a methodology reader*. Alliance for Health Policy and Systems Research & World Health Organization, 2012.
14 Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349–57.
15 Phillips WR, Sturgiss E, Glasziou P, *et al*. Improving the Reporting of Primary Care Research: Consensus Reporting Items for Studies in Primary Care-the CRISP Statement. *Ann Fam Med* 2023;21:549–55.
16 QIP Ltd. *NVivo. Release 1.7.1 (4844) Ed, 1999-2022*.
17 Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;3:77–101.
18 Youens D, Moorin R, Harrison A, *et al*. Using general practice clinical information system data for research: the case in Australia. *Int J Popul Data Sci* 2020;5:1099.
19 Canaway R, Boyle D, Manski-Nankervis J-A, *et al*. Identifying primary care datasets and perspectives on their secondary use: a survey of Australian data users and custodians. *BMC Med Inform Decis Mak* 2022;22:94.
20 Hunter B, Biezen R, Alexander K, *et al*. Future Health Today: codesign of an electronic chronic disease quality improvement tool for use in general practice using a service design approach. *BMJ Open* 2020;10:e040228.
21 Canaway R, Boyle DI, Manski-Nankervis J-AE, *et al*. Gathering data for decisions: best practice use of primary care electronic records for research. *Med J Aust* 2019;210 Suppl 6:S12–6.
22 Nielsen KK, Kapur A, Damm P, *et al*. From screening to postpartum follow-up - the determinants and barriers for gestational diabetes mellitus (GDM) services, a systematic review. *BMC Pregnancy Childbirth* 2014;14:41.
23 Kragelund Nielsen K, Groth Grunnet L, Terkildsen Maindal H, *et al*. Prevention of Type 2 diabetes after gestational diabetes directed at the family context: a narrative review from the Danish Diabetes Academy symposium. *Diabet Med* 2018;35:714–20.
24 Hunter B, Alexander K, Biezen R, *et al*. The development of Future Health Today: piloting a new platform for identification and management of chronic disease in general practice. *Aust J Prim Health* 2023;29:8–15.
25 Hewage SS, Singh SR, Chi C, *et al*. Health Care Providers' Perceptions of Responsibilities and Resources to Reduce Type 2 Diabetes Risk After Gestational Diabetes Mellitus. *Clin Diabetes* 2018;36:160–7.
26 Van Ryswyk E, Middleton P, Hague W, *et al*. Clinician views and knowledge regarding healthcare provision in the postpartum period for women with recent gestational diabetes: a systematic review of qualitative/survey studies. *Diabetes Res Clin Pract* 2014;106:401–11.
27 Nielsen JH, Melendez-Torres GJ, Rotevatn TA, *et al*. How do reminder systems in follow-up screening for women with previous gestational diabetes work? - a realist review. *BMC Health Serv Res* 2021;21:535.
28 O'Reilly SL, Dunbar JA, Best JD, *et al*. GooD4Mum: A general practice-based quality improvement collaborative for diabetes prevention in women with previous gestational diabetes. *Prim Care Diabetes* 2019;13:134–41.
29 Australian Bureau of Statistics. Socio-Economic Indexes for Areas (SEIFA). 2021.