

Optimising the use of general practice medical records to support preconception care: A qualitative study



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Background and objective

Preconception care (PCC) reduces preconception health risk factors and improves pregnancy outcomes. General practice electronic medical records (EMRs) contain valuable preconception health data. This study interviewed general practitioners (GPs) and practice nurses (PNs) to investigate their perceived acceptability and feasibility of using EMR data to identify, invite and improve PCC provision to reproductive-aged female patients at risk of adverse pregnancy outcomes.

Methods

Twenty semi-structured qualitative interviews were conducted with GPs and PNs and analysed using inductive reflexive thematic analysis.

Results

Identifying patients with preconception health risk factors using EMRs was mostly acceptable and feasible. Recommendations included directing invitations towards women with reproductive intent, using generic language to avoid stigmatising individuals and raising awareness of the importance and availability of PCC.

Discussion

As perceived by GPs and PNs, improving EMR data quality, currency of preconception health risk factors and recording reproductive intent would enhance the feasibility and acceptability of sending PCC invitations based on EMR-generated risk profiles.

PRECONCEPTION CARE (PCC) aims to optimise the health of reproductive-aged individuals before conception.¹ The core objective of PCC is to promote healthy lifestyle behaviours and manage or reduce preconception health risk factors such as vaccination status, alcohol consumption, smoking and various physical and mental health conditions, all of which can adversely affect the wellbeing of the mother and/or fetus.¹⁻³ PCC interventions have reduced the risk of adverse pregnancy outcomes in women with conditions including diabetes⁴ and epilepsy.⁵

There is evidence that PCC interventions provided within primary care settings are effective at improving women's health knowledge and reducing biomedical risk factors.⁶ In Australia, general practice is the first point of healthcare service contact for most people.⁷ Given that approximately 85% of the population consults a general practitioner (GP) annually,⁸ GPs in general practices are well-suited for providing PCC. However, few women present to GPs for prepregnancy advice and opportunistic PCC is difficult given the prioritisation of other presenting health issues.⁹

General practice electronic medical records (EMRs) are a rich data source,¹⁰ comprising preconception health risk factors including body mass index (BMI), blood pressure, medical history, alcohol consumption and smoking and prescription medication documented in structured fields. Retrieving data documented in structured fields is more feasible than accessing data documented using a narrative approach in the clinical notes of EMRs.¹¹ Previous Australian studies have used EMR data in structured fields to identify patients with osteoporosis,¹² type 2 diabetes,¹³ hypertension¹⁴ and cardiovascular disease,¹⁵ as well as those at risk of familial hypercholesterolaemia.¹⁶ The information in EMRs can also be used to send EMR-based invitations that deliver prompts for a recommended action at the point of care.¹⁷ EMR-based invitations have been effective in improving vaccination rates,¹⁸ cancer screening and drug monitoring.¹⁷ Existing literature about EMR use in general practice to identify, invite and provide care for patients with conditions such as hypertension have explored the acceptability and feasibility for such interventions among GPs, practice nurses (PNs) and patients.¹⁴ However, there are no qualitative studies among GPs and PNs

examining the acceptability and feasibility of using EMR data to identify and invite women of reproductive age with preconception health risk factors for PCC.

Ideally, PCC should be provided to all individuals of reproductive age. However, due to limited resources¹⁹ and more women visiting general practice,²⁰ there is a need to prioritise reproductive-aged females with underlying medical or lifestyle preconception health risk factors for PCC. Previous studies have focused on providing PCC for women with risk factors such as diabetes,²⁰ hypertension,²¹ obesity²² and current smoking.²³

Preconception health risk factors that might result in adverse pregnancy outcomes are present in a significant proportion of reproductive-aged female patients attending general practices. Our 2022 study reviewing preconception health risk factors documented in structured fields in general practice EMRs found that a significant proportion of reproductive-aged female patients had various risk factors: 14% were smokers, 24% had obesity, 7% had high blood pressure, 5% had diabetes, 28% had a mental health condition, 13% had asthma, 6% had thyroid disease and 17% had been prescribed teratogenic medication.²⁴ Given the high proportion of women with at least one of the potential risk factors, it is imperative to develop systematic processes that use EMR data to identify, invite and provide PCC to reproductive-aged female patients at risk of adverse pregnancy outcomes.

Before implementing interventions in general practice settings, determining acceptability to healthcare providers, including GPs and PNs, is important.^{25,26} Previous studies have explored online tools to assess preconception health risk factors to improve accessibility and uptake of PCC in primary care settings.^{1,27,28} However, the acceptability and feasibility of these tools for providers and their integration into primary care remains unclear.¹ This highlights that any new tools or approaches to assess and address preconception health risk factors in general practice need feasibility and acceptability testing. We undertook a qualitative study to explore acceptability and feasibility for GPs and PNs to use EMR data to identify, invite and improve PCC provision to reproductive-aged female patients with underlying preconception health risk factors.

Methods

Design, participants and recruitment

We conducted a qualitative descriptive study with GPs and PNs to gain broader insights²⁹ into their perspectives on using EMR data to enhance PCC for reproductive-aged women with preconception health risks. The Standards for Reporting Qualitative Research checklist³⁰ guided the reporting of our results.

GPs and PNs working in general practice were recruited using convenience, purposive and snowball methods³¹ through the SPHERE Centre of Research Excellence in Sexual and Reproductive Health for Women GP and PN Advisory Circles, PN Facebook groups, research team professional networks and general practices that participated in a previous study conducted by the research team.²⁴ Convenience sampling involved selecting GPs and PNs based on easy accessibility. Purposive sampling was used to obtain a diverse sample of GPs and PNs working in Australian general practices. Snowball sampling relied on participants sharing details of the study among their networks.³¹ Only participants registered with the Australian Health Practitioner Regulation Agency and working in Australia were eligible to participate. Prospective participants were given an explanatory statement outlining the aims of the study.

Data collection

We conducted interviews using a semi-structured interview guide (Box 1), developed and piloted by the research team, which comprised clinicians and researchers with experience in women's sexual and reproductive health in primary care. This guide was developed based on acceptability and feasibility frameworks used in the implementation of healthcare services.^{32,33} Acceptability, reflecting the extent to which people delivering a healthcare intervention consider it to be appropriate, has seven constructs: affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs and self-efficacy.³³ Feasibility interview questions were informed by eight constructs: acceptability, demand, implementation, practicality, adaptation, integration, expansion and limited-efficacy testing.³² During interviews, participants were briefed on the results from a previous study that

investigated the extent to which medical and lifestyle preconception health risk factors are documented in general practice EMRs.²⁴

Written and verbal informed consent was obtained prior to data collection. Interviews were conducted by the lead researcher (NNW), a female higher-degree research student, between May and August 2023 over Zoom at a time convenient for the participants. To aid in transcription, field notes were taken during the interview, relating to participant responses and observations about the interview. Following the audio recording, deidentified data were professionally transcribed verbatim. Transcripts were quality checked for accuracy by the lead researcher (NNW). The transcripts were not returned to the participants for review, as done in similar qualitative studies in the Australian general practice studies context.^{34,35} There were no dropouts, and repeat interviews were not necessary. The interviewer had no prior relationship with the participants. GPs and PNs received

Box 1. Semi-structured interview guide prompts

- If you were to identify female patients for preconception care (PCC), which preconception health risk factors would you prioritise?
- If you were to identify and invite female patients at high risk of adverse pregnancy outcomes to receive PCC, how would you go about this process? How would you search for these patients?
- Do you/the practice have a process/system in place to send invites for patients to come into the clinic to receive other services?
- How do you think a process/system that identifies and sends invites to patients can be used to identify and invite patients for PCC?
- How acceptable is using electronic medical record (EMR) data to identify female patients who might most benefit from PCC to you?
- What do you think would be the challenges/barriers of using EMRs to identify patients who might most benefit from PCC?
- In your opinion, how do you think women would respond to being invited to receive PCC because they've been classified as possibly being at risk of adverse pregnancy outcomes?

\$150 and \$100 gift cards, respectively, as compensation for their time.

Data analysis

Interview analysis was informed by the inductive reflexive thematic analysis approach involving: (1) familiarisation with the data; (2) generating initial codes; (3) generating themes; (4) reviewing potential themes; (5) defining and naming themes; and (6) producing the report.³⁶ The lead researcher (NNW) and a second researcher (JW), another female higher-degree research student, independently coded five transcripts. After data familiarisation by listening to the audio recordings, reading and rereading the transcripts, analysis was supported by NVivo 14³⁷ software to extract relevant data. The preliminary codes were compared, discussed and arranged with another researcher (JW). Any discrepancies were discussed and resolved with a third researcher (SJ). The coding process was open and not driven by a pre-existing framework.

Results

Altogether, 10 GPs and 10 PNs participated in an interview. Male (n=4) and female (n=16) participants from the states of Victoria (n=14), New South Wales (n=3), Tasmania (n=1), Queensland (n=1) and Western Australia (n=1) participated. The interview duration varied from 15.4 to 33.6 minutes, with a mean time of 24.4 minutes.

Six main themes were constructed: (1) factors affecting the feasibility and acceptability of identifying patients for PCC; (2) patients with significant health issues should be prioritised; (3) GPs decide who receives the invitations; (4) adapting current reminder systems for PCC invites is feasible and acceptable; (5) stigmatising patients needs to be avoided; and (6) enhance patient awareness of the importance and availability of PCC.

Factors affecting the feasibility and acceptability of identifying patients for PCC

Using EMRs to identify patients at risk of adverse pregnancy outcomes and sending PCC invitations to those patients was found to be acceptable and feasible for most participants. However, there were concerns about data gaps and currency.

Some participants emphasised that the information in the EMR might be out of date:

We don't fill it out all that often unless the patient mentions something like 'I've taken up smoking.' (GP1)

Well I think it is acceptable, but ... some people will be missed because of their records not being current. (PN1)

People do lose weight, people do stop smoking, so EMRs really do need to be revised. (PN4)

The absence of information relating to reproductive intention in the EMR was also of concern. Some participants were reluctant to send PCC invitations to all reproductive-aged women: some women might not want to have children, might have completed their families or might not be able to have children. Participants emphasised the importance of knowing a patient's reproductive intention before sending PCC invites:

I speak to some women and they say I never want a child. (PN1)

You need to know their intention to fall pregnant rather than just the risk factor. (GP4)

I guess you will need to consider if that patient is ready to be considering pregnancy. (PN9)

Patients with significant health issues should be prioritised

Most participants suggested prioritising PCC invitations for patients with specific risk factors, such as high BMI, smoking and alcohol consumption. Participants highlighted that it was also important to prioritise patients with significant health issues such as diabetes and mental health conditions:

If you are concentrating on alcohol and smoking, then with a smaller target it will be very possible. (GP3)

Let's sort of get a holistic picture of their health if we don't already and make sure other conditions are under control. (PN2)

I would ask the nurse to extract reproductive-age females with medical conditions like diabetes, thyroid, mental health or others,

just to see if they have any medical conditions attached to them in their file, and then that would make them higher risk. (GP6)

GPs decide who receives the invitations

Most participants were comfortable with involving the receptionist, practice manager and/or PN to identify patients for PCC using the EMR. They felt that it was best to discuss the list of patients identified as potentially being at high risk of adverse pregnancy outcomes with the GP before sending out invitations. This was favoured by most participants because GPs 'ask patients about family planning intentions' (GP2), they 'know the person, their family and their requirements much better' (GP1) and GPs might 'write patient reproductive intentions in clinical notes' (GP8). This might help ensure that invitations are not sent inappropriately, for example to those dealing with infertility:

It's good to have a screen by the GP just in case because it could be something sensitive. It could be some people that are on this list, for example, are people who have suffered infertility and failed IVF or something like that. You don't want to recall that particular person. (GP1)

Adapting current reminder systems for PCC invites is feasible and acceptable

Most participants suggested that adapting current reminder systems for PCC is acceptable and feasible. Participants stated that general practices currently have systems that send electronic reminders to patients to attend the clinic for 'cervical screening' (GP10), 'immunisations' (GP1) and chronic disease 'care plans' (GP5). It was highlighted that these systems send a text message and might involve follow-up by practice staff, including PNs. Some practices also use data extraction software to identify patients based on specific criteria; for example 'diabetic and over 65' (GP5) or 'over 70 and haven't had a shingles vaccination' (PN4), and then send text message reminders through medical software.³⁸ GPs mentioned that patients 'respond quite well' (GP5) and were likely to attend the practice following these text message reminders. Patients were more responsive to reminders for diagnosed conditions, such as heart failure or kidney

disease, than for generic preventative health assessment reminders:

For heart failure and chronic kidney disease, a lot of patients attended. Eye health was sent to anyone over 40 years, but very few people attended, as it was a very general screen and it's probably not something that people think about very often. It's different to you already having the disease. (GP1)

Once we've identified the women, we have software that helps us recall patients. (GP2)

We have tools ... to access information. So I think we are relatively prepared. (PN1)

Stigmatising patients needs to be avoided

Participants felt that informing patients about the availability of PCC as a service, rather than directly inviting patients for PCC, would help avoid stigmatising the patient. This approach was seen as more sensitive, because inviting patients for PCC based on potential risk factors might potentially be 'confronting' (PN7), 'offensive' (GP2, GP8, PN1), 'invasive' (GP5) and 'very upsetting' (GP7) to those who might not want to have children, those who have 'finished having children' (GP3, GP4) or those who have fertility issues. Concerns were also raised about the invitations potentially reinforcing 'stereotypes ... potentially pressuring women to have children' (GP2). Participants suggested using more generic terminology in the invitation to avoid stigmatisation:

We have a software that can send a bulk email ... to every patient ... it can go more generic that if anyone's planning family, they are more than welcome to come for a pre-pregnancy counselling to identify any medical issues or non-medical issues. (GP4)

I'm sure it will work. So same way with health assessment, you send a letter out 'You're eligible' and most of the patients come and say 'Yeah, I received a letter, I would like to have this done.' So I'm sure it will work. (PN3)

Enhance patient awareness of the importance and availability of PCC

Participants proposed other strategies for patient identification and improving PCC

provision, such as adapting current EMR software, raising awareness about the availability and importance of PCC and task-sharing PCC with PNs, as discussed in Table 1.

Discussion

Summary of main findings and comparison with existing literature

Our study demonstrates that the identification of patients with preconception health risk factors using data from EMRs was deemed acceptable and feasible by most participants. However, the acceptability of inviting women with preconception health risk factors to participate in PCC could be increased by targeting women with reproductive intent, mentioning only generic risk in the invitation to avoid stigma or by emphasising the importance and availability of PCC rather than issuing a direct invitation to attend for PCC. Key strategies for enhancing PCC provision in general practice encompass integrating PCC reminders and templates into EMR software, documenting patient reproductive intentions in EMRs and task-sharing PCC with PNs.

Although our research illustrated that the identification of patients with preconception health risk factors using data from EMRs was both acceptable and feasible to most participants, as reported in prior studies, missing and outdated data in EMRs limits its utility in patient identification.^{10,39-41} This underscores the necessity for more accurate and comprehensive recording of preconception health risk factors in EMRs. Missing preconception health data,²⁴ infrequent software updates and reliance on patient-initiated updates contribute to outdated preconception health information in EMRs.⁴² Patient lifestyle factors such as alcohol consumption, smoking, medical conditions and family history change over time. This might result in some patients at risk of adverse pregnancy outcomes being missed. Therefore, initiatives such as auditing and providing feedback on preconception data quality and population-level health indicators, as done for individual general practices in Australia, might improve data quality and completeness.^{43,44} This might then enhance the acceptability to GPs and PNs of using EMRs to identify

reproductive-aged female patients who might most benefit from PCC.

Our findings highlight the importance of identifying patients with certain preconception health risk factors for PCC, while accounting for those that particularly require prioritisation due to comorbidities.⁴⁵ High BMI, alcohol consumption and smoking were identified as key preconception health risk factors that are acceptable and feasible to prioritise when identifying and inviting patients for PCC. Concerningly, teratogenic medication was not prioritised as a preconception health risk factor that could be used to identify reproductive-aged female patients who might benefit most from PCC, despite evidence that 10–15% of preventable congenital anomalies result from maternal exposure to teratogenic medication.^{46,47} A recent study revealed that 17% of general practice reproductive-aged women visiting general practice were prescribed Category C or D medications,²⁴ known for their potential harm to the fetus.⁴⁸ A systematic approach to identify and provide PCC to these patients, who might benefit most from PCC, is crucial, similar to that used to identify patients for cardiovascular disease using EMR data.⁴⁹ This approach must also consider other comorbidities, such as mental health conditions, diabetes and hypertension,⁴⁵ which contribute significantly to maternal mortality.⁴⁵ Developing a systematic approach that considers patient comorbidities and preconception health risk factors is crucial to improving the acceptability and feasibility of using EMRs to identify and invite patients for PCC.

Our study also suggests that changes to EMR software could improve the acceptability and feasibility of using EMRs to identify and invite patients for PCC. Integrating a preconception health risk factor template into the EMR, similar to care plans for diabetes management⁵⁰ and the Kessler Psychological Distress Scale (K10) for depression or anxiety,⁵¹ could facilitate the collection of comprehensive preconception health data. In addition, integrating prompts in EMRs for preventive actions and sending electronic reminders, such as for mammograms,⁵² diabetes management,⁵³ tetanus immunisation,⁵⁴ heart health checks⁵⁵ and colorectal cancer screening,⁵² effectively alerts clinicians to initiate discussions with

Table 1. Perceived strategies for patient identification and the provision of preconception care

Perceived strategy	Description	Supporting quotes
Adapting current EMR software	Integrate 'a preconception care template' (GP2) into medical software to enhance preconception risk factor data collection	... if it was kind of a premade auto fill that you could put into your notes as a reminder that would be the safest way to do it. (GP8) ... a PCC template perhaps that prompted us to do things like checking blood pressure recording, alcohol use and smoking. (GP2)
	Incorporate prompts as a reminder to discuss PCC with patients	Software providers could set up a prompt; for example, for all women between 18 (and) 44 who are not on contraceptive with a BMI over 25 (get) a preconception prompt on the screen when the GP opens the file. (GP5)
Raise awareness about the importance and availability of PCC	Display PCC posters in the 'waiting room' (GP3, GP5, GP6, GP10, PN7, PN10) and 'bathroom' (GP8)	I think we need to advertise more on the practice website. (PN3)
	Provide brochures (GP4, GP7, PN5)	... putting posters up in the waiting room. (PN7)
	Advertise on the 'clinic website' (GP6, GP10, PN3) and 'waiting room TV' (GP6, PN8)	
	Incorporate a question to assess reproductive intention on the new patient form	I would love a tick box in our new patient forms, 'Are you interested in, you know, preconception planning or preconception counselling?'. (PN4)
Task-sharing PCC with PNs	Routinely discuss PCC when patients present for other reasons, such as 'contraception, pap smears' (GP1, GP2 PN7), 'if it is appropriate for the patient' (GP2)	... it could be coupled with cervical screening. (PN4) You could tie it with something else related to women's health. (GP1)
	A team-based PCC approach, as already implemented in some general practices, involving PNs 'spending the initial 5–10 minutes working through the risk factors ... then sending patients to the GP' (GP4) for further discussion was recommended An approach where the PN gets the bulk of the consultation time, during which they would 'identify some patient high risk factors for the GP to tackle' (GP10) was suggested	Practice nurse honestly can do a very good job with this. (GP4) Patients don't like admitting things like smoking and drinking to the doctor, but they'll say it to the nurse. (PN7)

EMR, electronic medical record; GP, general practitioner; PCC, preconception care; PNs, practice nurses.

patients, potentially increasing preventive care in general practice.⁵⁴ Similarly, integrating PCC prompts for patients with preconception health indicators could serve as a reminder for timely PCC discussions. A similar approach⁵² could be undertaken to send PCC invitations. However, care must be taken to use more generic terminology to prevent stigmatising people. Including a structured field to record responses to questions like the One Key Question ('Would you like to become pregnant in the next year?')⁵⁶ could identify patients with preconception health risks who intend to conceive. This enhances the acceptability and feasibility for GPs/PNs to invite these patients for PCC.

Several factors need consideration to increase the proportion of patients receiving

PCC in general practice. First, it is crucial to establish a process for identifying and inviting patients. Second, it is important to raise awareness of PCC availability through general practices. Third, increased provision of PCC by PNs is beneficial. Given that one-third of pregnancies in Australia are unintended⁵⁷ and not all women are aware of the importance of PCC,⁵⁸ efforts should be directed at improving awareness, as done previously through waiting room posters,^{59,60} clinic websites⁶¹ and incorporating PCC during routine patient visits.⁶² In addition, increased provision of PCC by PNs can improve PCC provision in primary care settings, as done in the US.^{3,63} Although GPs are currently the key providers of PCC in Australia, time constraints and competing health priorities

during consultations might limit their PCC discussions.⁹ Women, PNs and GPs are receptive of increased provision of PCC by PNs.^{3,63,64} However, overcoming barriers, such as providing training support, developing appropriate funding models and establishing a model of care involving PNs as PCC providers, is essential to improve PCC provision.³

Strengths and limitations of the study

This is the first study to report on the acceptability and feasibility, as perceived by GPs and PNs, of using general practice EMRs to identify and invite patients for PCC and improve PCC provision. Both GPs and PNs are adept users of EMRs; hence, it is important to investigate their views prior to developing strategies that identify patients

for PCC. However, although our study has many important findings, there are some limitations. First, we had a small sample size. Second, the participating GPs and PNs might have had a particular interest in PCC, which might have led to selection bias, similar to that reported in other qualitative studies.^{65–67} Third, providing incentives to participants might potentially have led to bias, even though these incentives align with similar work conducted in Australia.^{66,68}

Implications for clinical practice and future research

If the quality of EMRs can be improved, GPs and PNs might find it feasible to use EMRs to identify and invite women at risk of adverse pregnancy outcomes for PCC. Future studies could explore the acceptability of this approach from patients' perspectives. Future research could pilot the integration of a preconception health risk factor template into EMR software and evaluate its utility in collecting data to identify and invite patients with preconception health risk factors for PCC. Similarly piloting 'preconception/prepregnancy care/women's health assessment' as a specific type of appointment on appointment booking platforms³⁸ might improve women's awareness and further assist in improving PCC provision through general practices. These findings might then be extended to other primary care settings that have EMRs and provide PCC.⁶⁹ Given a 2024 study revealed that the spermatozoa of men living with obesity have genetic changes that increase the risk of obesity in the offspring,⁷⁰ future research should also investigate strategies to enhance PCC provision to reproductive-aged male patients.

In conclusion, the findings of this study provide important contributions to improving the quality of preconception health data recorded in general practice EMRs and developing a systematic process for identifying and inviting female patients who might benefit most from PCC. The findings also reveal key strategies to optimise the routine provision of PCC in general practice settings, such as increasing awareness about the importance and availability of PCC among women, integrating PCC reminders and templates into EMR software, documenting patient reproductive intentions in EMRs and increased provision of PCC by PNs.

Key points

- EMRs are a rich data source. They document preconception health risk factors, including BMI, blood pressure, medical history, alcohol consumption, smoking and prescription medication.
- Identifying patients with preconception health risk factors based on EMR data was deemed acceptable and feasible by most GPs and PNs.
- There are several strategies that might enhance the provision of PCC. These strategies include raising awareness about the importance and availability of PCC among women, integrating PCC reminders and templates into EMR software, documenting patients' reproductive intentions in EMRs and increasing the involvement of PNs in PCC.

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