Original Paper

The Use of Electronic Information Resources by General Practice Trainees During Consultations in Australia: Qualitative Analysis of Interview and Screen-Recording Data

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Abstract

Background: The proliferation of electronic clinical information resources has transformed how evidence is accessed during primary care consultations, particularly in community settings where clinicians must rapidly access reliable information at the point of care (POC). For general practice trainees, who are still developing clinical expertise and information-seeking skills, how these digital resources are used during real-time decision-making remains poorly understood.

Objective: This study aims to investigate the selection, use, and real-time interaction with electronic clinical information resources used by Australian general practice (GP) trainees (specialist vocational trainees in family medicine) during clinical decision-making.

Methods: Using a novel qualitative interview and screen-capture approach, this study combines semistructured interviews with a screen-recorded, think-aloud protocol capturing real-time interaction with digital information systems. In 2024, a total of 20 GP trainees (women: n=13; men: n=7) in their final 2 years of GP specialty training participated in the study, first discussing their general approaches to information seeking, followed by a live, video-recorded task session where participants engaged with hypothetical clinical vignettes using their usual information resources. Data were analyzed using reflexive thematic analysis. GP trainees from various community-based training practices across Australia were purposively sampled to capture diverse perspectives within primary care settings.

Results: GP trainees relied on a combination of personal knowledge, clinical guidelines, and electronic information resources during decision-making. Major themes included a desire to “do the right thing” while under constraints of other themes such as time limits and perceived patient perception. Think-aloud sessions revealed common patterns in information resource selection, and that trainees often struggled with the efficiency and accessibility of finding specific information. Trainees sometimes made errors in information synthesis and judgment. Trainees frequently used a stepped approach to choosing internet resources and preferred resources that provided quick, reliable answers, indicating a preference for accessible information resources over comprehensive but time-consuming evidence repositories.

Conclusions: Trainees used rapid, pragmatic strategies centered on trusted resources to support decision-making within significant time and contextual constraints. While trainees endorsed the principles of evidence-based medicine, the realities of POC practice limited direct engagement with the underlying evidence base. These findings suggest that current electronic clinical resources

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may require redesign to better integrate with clinical workflows and present clinically relevant evidence in ways that support timely, evidence-informed decision-making in primary care.

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KEYWORDS

general practice; evidence; qualitative; information seeking; information-seeking behavior; decision support systems; clinical; evidence-based practice; education; medical

Introduction

Evidence-based medicine (EBM) is a cornerstone of contemporary clinical practice, integrating the best available evidence, patient preferences, and clinician expertise to guide patient care decisions [1]. In primary care settings, general practitioners often encounter challenges due to the breadth of conditions treated and the variability in patient presentations [2-4]. For general practice (GP) trainees (specialist vocational trainees in family medicine who train in an apprenticeship-like model in community GPs), the ability to efficiently navigate a vast array of information resources to inform decision-making is particularly crucial, as they are likely still developing clinical expertise and information searching skills.

As the body of medical knowledge expands at a rate impossible for clinicians to keep up with [5,6], general practitioners, and specifically trainees, face the dual challenge of keeping their knowledge of common conditions up to date and seeking reliable answers to their point-of-care (POC) clinical questions [7]. Traditionally, general practitioners have relied on a mix of general knowledge, guidelines, and consultations with colleagues [8]. However, the proliferation of electronic resources, such as online databases, clinical decision support systems, and EBM platforms, has transformed information access in clinical practice and the capacity to find answers to many clinical questions [9]. While these resources hold the potential to enhance evidence-based decision-making, their usability and accessibility in the time-pressured primary care environment remain areas of concern, especially for trainees who may have less experience navigating these resources efficiently and who may be establishing long-lasting clinical behaviors [10,11].

Compared to hospital-based specialties, community GP, such as that practiced in Australia, is generally conducted in geographically dispersed health facilities in private practices and presents unique challenges, including no or limited access to on-site specialist consultations and a greater reliance on electronic information resources, which may affect decision-making. Additionally, the transition from hospital-based practice into community-based GP training in Australia is marked by rapid early changes in clinical behavior, means of seeking in-consultation information or advice, and test ordering, with the greatest changes occurring in the first stages of training [12]. Patterns of practice established in this process of change are likely to be long-lasting [10,11]. Previous studies have examined information-seeking behaviors among medical specialists, primarily in hospital settings [13,14], showing a preference for quickly accessible information resources such as colleague consultations or familiar electronic resources. Research specifically investigating how general practitioners in community environments use these resources is limited. Only 1 study (of 8 primary care doctors in Singapore) has investigated primary care clinicians' preferences for, barriers to, and facilitators of information seeking in clinical practice. This study found a preference for free, credible preappraised evidence sources, such as dedicated electronic point-of-care (ePOC) resources [15]. Studies of GP trainees' ePOC resource use are, to our knowledge, confined to our recent large quantitative study of Australian trainees [16]. The specific ePOC choices in this trainee population are different to those of the general practitioners in the qualitative Singaporean study. It is unknown if this is due to differences in consulting environment, clinical experience, ePOC availability in the practice, or other factors.

Our previous study of general practitioners' ePOC use showed that GP trainees used multiple sources frequently, including different drug compendiums and clinical practice guidelines, but rarely accessed PubMed or well-known evidence-based ePOC such as UpToDate and DynaMed [16]. This is despite evidence showing that these resources can answer up to 90% of clinical questions for general practitioners [9]. Trainees seemed to prefer preappraised evidence sources; those without financial barriers to access, yet avoided established sites such as The Cochrane Library. Understanding this may help inform both training and educational support during this formative stage of training, as well as the design of POC resources.

To address this gap, this study seeks to deepen understanding of the practical and cognitive strategies GP trainees use when seeking information during clinical consultations. We examine how trainees select, use, and interact in real time with electronic clinical information resources to support decision-making, with particular attention to how these tools are integrated into live consultations.

Methods

Study Design and Rationale

Our qualitative interview study is conducted from a critical realist perspective, that is, a single reality exists but is interpreted through subjective experience [17]. This paradigm fits the research goal of studying and interpreting both the thoughts and decisions of GP trainees as well as their behavior in the context of real constraints in clinical practice. We used a mix of semistructured interviews and think-aloud protocols to capture and explore experiences, preferences, and reasoning as well as real-time decision-making and reflection. Clinical vignettes were used as a stimulus for various clinical scenarios, allowing richness in data collection. Vignettes can be an effective means

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of eliciting in-depth responses and exploring difficult topics in qualitative research [18,19]. In our study, we decided to use clinical vignettes as a further stimulus for participants to demonstrate information-seeking behavior while thinking aloud. This approach allows the participants to engage in reflection beyond that prompted by standard interview methods and provides direct examples to clarify meaning. It also allows the researchers to integrate the data between the interaction of an electronic system and its users, with the ongoing reflections of participants, generating a richer dataset than interviews alone. While they were written from clinical experience and can provide useful reflections on practice [20], we do not claim this is a study of direct observed clinical performance.

Setting

In Australia, GP trainees are vocationally registered medical practitioners, undertaking specialist training to become fully qualified general practitioners. This recognized specialty training commences after obtaining their medical degree and hospital internship. GP trainees then complete several years of training. Initial training is at least 2 years of hospital-based practice. Typically, the final 2 years of training is in community GP, where they practice independently with access to supervisory advice and assistance (including in-consultation advice or assistance) by an experienced general practitioner via an apprenticeship-like training model. Generally, community training is largely experiential—conducted in geographically dispersed, small, private practices—but there are regular formal away-from-practice education sessions and workshops. Community training terms are divided into 6-month full-time blocks, named general practice term 1 (first 6 months community training) to general practice term 4 (final 6 months community training).

Participant Recruitment and Selection

We recruited GP trainees undertaking community-based vocational training at any stage in accredited training practices across Australia. We recruited from May to June 2024, and interviews were conducted from June to August 2024. Nearly all expressions of interest were received in response to advertisements in an electronic newsletter by the Royal Australian College of General Practitioners (RACGP), with a small number responding to advertising flyers at training practices and through word-of-mouth snowballing techniques. From the pool of interested participants, we used purposive sampling to ensure a diverse range of perspectives: stage in training, location, and particularly seeking to include some participants who self-identified as less confident in EBM techniques. Purposive recruitment proceeded based on meeting these trainee characteristics with the aim of achieving a maximum variation sample. Toward the later stages of data collection, however, we specifically sought participants identifying as men to achieve a more representative gender mix.

Data adequacy was assessed iteratively during recruitment and analysis. We aimed to recruit and interview participants until we judged that the dataset provided adequate information to answer our research question [21]. This was evidenced by agreeing that the dataset provided sufficient depth and variation to develop a coherent conceptual and explanatory understanding of the salient themes and contextual factors shaping trainees' information-seeking behaviors [22]. In later interviews, additional data largely provided individual variation and contextual detail rather than introducing new salient concepts to the developing analysis. However, we continued recruitment briefly to meet gender representation as described earlier. Participant demographics are presented in Multimedia Appendix 1.

Sample size was therefore guided by pragmatic, contextual, and analytical considerations, rather than by the achievement of thematic redundancy [21]. Each participant received an Aus $150 (Aus $1=US $0.66 as of May 2024) gift card as a gesture of appreciation for their time.

Data Collection

Data collection consisted of 2 phases collected in a single session with participants, all video-recorded via online videoconferencing software (Zoom; Zoom Video Communications). The first phase was a semistructured interview; the second phase consisted of the "think aloud" section of the interview. This phase used clinical vignettes as prompts for participants to think aloud to the researcher, followed by a discussion of this afterward.

The semistructured interview section followed questions from an interview guide approved by the research team and developed to elicit both semantic and latent data, using a flexible, semistructured format. The broad topics of questions were developed based on BM's experience as a practicing general practitioner and influenced by experiences teaching medical education sessions with GP trainees in EBM. The interview guide began with questions about participants' typical use of ePOC resources and asking them to explain their preferences for these, including how they made decisions around when to search for information, how to do so, and how they felt about doing so.

One pilot interview was conducted to evaluate the guide's effectiveness. We decided to include this in the final analysis (Participant 1), as no substantial changes were made following the pilot, apart from adding a fourth clinical vignette to elucidate an example seeking information about the efficacy of a therapeutic intervention (Multimedia Appendix 2).

In the think-aloud portion of the interview, participants were instructed to share their computer screens while the researcher recorded their actions and screen activity in real time. A series of 4 hypothetical clinical vignettes were presented in text form in the chat function of the videoconferencing software. The case vignettes were designed to encompass clinical topics that represent a mix of "easy" and more "difficult" questions, based on our previous work with GP trainees [16]. Vignettes were also designed to assess various facets of clinical information seeking and shared decision-making skills, namely, (1) identifying disease severity and drug dosing for a case of pediatric pneumonia, (2) finding prognostic information and natural history of ganglion of the hand, (3) identifying next investigation and/or referral pathways for hematospermia, and (4) finding effectiveness data for probiotics for the prevention

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of antibiotic-associated diarrhea. The vignettes are provided in Multimedia Appendix 2.

During this task, participants engaged in a "think aloud" protocol [23], originally popularized by Ericsson and Simon [24], wherein they were instructed to verbalize their thought processes as they occurred, without filtering or structuring their speech for coherence. The researcher remained silent throughout, interjecting only with minimal prompts such as "keep talking" to encourage continuous narration. This process allowed insight into participants' real-time decision-making and information-seeking strategies. Conducting this process after the semistructured interview phase allowed the participants to feel more relaxed during this phase.

All data were collected using videoconferencing software (Zoom) with audio and video recording. Participants could opt to conduct the interview at a time or place of their convenience. All chose either to be alone in a room at their residence or their consulting room. The semistructured interview was conducted first after a brief exchange to confirm demographic data, reaffirm confidentiality, and provide assurance that there are no right or wrong answers. This included reassurance that their performance as a clinician was not a subject of interest, rather, that their thoughts and experience would be sought. These assurances were repeated prior to the "think aloud" section of the interview.

Interviews were recorded in a single session. Recordings, transcripts, and anonymized data were used in the analysis. Transcripts were anonymized to protect confidentiality and were not returned to participants for review or correction. All interviews were conducted in English by BM, a male, general practitioner, educator, and researcher trained in qualitative methods as part of a larger project about how GP trainees find evidence during consultations.

Data Analysis

We analyzed the interview transcripts using reflexive thematic analysis as described by Braun and Clarke [25,26]. This approach views themes as actively constructed through the researcher's interpretive engagement with the data, rather than passively discovered. We adopted an inductive approach, focusing on the meanings conveyed by participants in their verbalized thought processes and reflections.

Analysis proceeded through Braun and Clarke's 6-phase framework. BM first read each transcript repeatedly while reviewing the accompanying screen recordings and notes taken during the data collection to become familiar with the data. Initial semantic codes were then generated inductively in NVivo (version 14; Lumivero) across the entire dataset. As coding progressed, earlier transcripts were revisited, and codes were iteratively refined, merged, or divided, as new insights emerged. Related codes were then grouped into candidate themes, which were reviewed against both the coded extracts and the full dataset to ensure that they captured coherent patterns while remaining grounded in participants' accounts. Themes were subsequently refined, defined, and named through iterative discussion within the research team. GS independently analyzed 4 interviews, contributing to the development and refinement of the coding framework. The final interpretive themes were developed to address the research question while preserving conceptual distinctions discerned from the data.

BM addressed reflexivity by acknowledging that his professional background, research interests, and personal experiences inevitably shaped both the design of the study and the interpretation of the data. BM's familiarity with the clinical environment in which participants were working facilitated rapport during interviews but also required ongoing self-reflection to ensure that assumptions were questioned rather than taken for granted. The themes developed in this study reflect both participants' accounts and BM's interpretive lens, informed by his dual roles as practitioner and researcher. GS, as BM's supervisor, brought his own expertise as a general practitioner and experienced qualitative researcher to the study. His familiarity with the clinical environment and understanding of the experiences of health care professionals helped inform his initial readings of the transcripts and video data. In his discussions with BM, GS drew upon his academic background and research experience to provide valuable insights and challenge BM's assumptions. BM maintained an audit trail of coding decisions and theme development to facilitate reflexivity.

Ethical Considerations

Ethics approval for this study was granted by the University of Queensland Human Research Ethics Committee (2024/HE00108). Informed consent was obtained from all participants, including seeking permission for anonymized quotes from qualitative interviews to be used in presentations and manuscripts.

Reporting Standards

This study is reported in accordance with the SRQR (Standards for Reporting Qualitative Research; Multimedia Appendix 3).

Results

Overview

In total, 20 participants completed the study, 13 identified as women, 7 as men. Participants came from all states, all 9 GP training regions of Australia, and from all 4 (6-month duration) community training terms in GP. Interview duration varied from 57 to 85 minutes (Multimedia Appendix 1).

All participants took part in both a semistructured interview and all 4 clinical case scenarios for think-aloud real-time information-seeking sections, except Participant 1, a pilot interview who completed 3 clinical case scenarios before a fourth was added.

All participants felt the process a good reflection on their usual habits in information seeking, as they used the same websites and clinical tools as in practice. Many participants used the same computer and software in their consulting rooms. Some participants did describe that the think-aloud section differed to usual in-practice behavior in that they would normally be talking to the patient rather than themselves.

We constructed four major themes from the data, each with subthemes: (1) overall search strategies, (2) doing the right

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thing, (3) constraints, and (4) search as a clinical skill. Together, these describe the cognitive processes that GP trainees take, how they see different constraints in trying to meet their ideals, as well as their perceived limitations and solutions to overcome these (outlined in Table 1).

Table 1. Themes and subthemes.

Theme	Interpretive focus or description	Related subthemes
1. Overall search strategies	General practice trainees demonstrated a context-driven strategy choice of information resources, determined by the specific type of information needed, their existing knowledge, and their confidence in finding reliable data. This overall strategy is determined by resource access or availability together with the usability of the service. Resources shape the clinical cognitive processes intentionally or sometimes unexpectedly.	• Access and usability • Cognitive scaffolding
2. Doing the right thing	Participants framed information seeking as part of moral and professional responsibility—seeking trustworthy sources to ensure safe, defensible clinical decisions.	• Trust
3. Constraints	External and internal pressures limited information seeking, including time scarcity, concern about patient impressions, and the need to preserve professional credibility.	• Time • Perceived patient perception • Maintaining professional regard
4. Search as a clinical skill	Trainees viewed searching as a core clinical competency, learned implicitly. Limited engagement with evidence-based or shared decision-making information seeking.	• Information seeking as an essential but unmet clinical skill • Evidence-based decision-making • Information seeking for patient-centered care or shared decision-making

Theme 1: Overall Search Strategies

Overview

GP trainees demonstrated a clear, context-driven strategy in their choice of information resources, determined by the specific type of information needed, their existing knowledge, and their confidence in finding reliable data. Trainees frequently reported using different sites for distinct purposes, such as Therapeutic Guidelines (TG, formerly eTG) for treatment protocols and the Australian Medicines Handbook to check for a drug's side effects and interactions. This strategy was highly individualized and iterative, adjusted based on time constraints and the context of patient care.

Participants described having 1 or 2 preferred dedicated tools, such as TG, logged in and ready to go as part of their daily routine to begin their workday. However, participants used many other resources accessible on the internet, such as clinical pathways or specific sites, depending again on the type of content they needed. While some users did describe using browser bookmarks, all used popular search engines to navigate to these sites rapidly (as bookmark links could be broken) or to find guidance in a resource they have previously used. For example, when given a problem about a pediatric case of pneumonia, participants used Google to search for "RCH pneumonia" to rapidly navigate to the correct clinical guideline published by the Royal Children's Hospital, taking only a few seconds. Similarly, many users independently found the strategy to search on Google for "condition" and the Royal Australian College of General Practitioners abbreviation (eg, "hematospermia RACGP") to find an article on the condition published by the RACGP, usually in the college journal. Users preferred to then quickly navigate to a diagnostic or management algorithm diagram, as this rapidly provided next steps in diagnosis or management.

This overall approach was the result of several different forces that promote or constrain information-seeking behavior, such as speed and trustworthiness of the resource, which emerged as important themes.

Access and Usability

Access, including financial (resources requiring fees or subscriptions) and usability (user interface and search difficulties), emerged early as a key theme.

Accessibility was frequently linked to participants' high perceived need for electronic resources. Despite reliance on resources like TG (where access is funded by the training college), few trainees used other dedicated ePOC resources, many citing financial barriers. Some expressed a deep concern if access to certain resources were removed (eg, funded resources removed from GP trainee access), often citing their claim to access as fundamental akin to a right.

This reflects how important participants found use of ePOC resources to be. However, importance does not equate with ease of use, and many participants cited usability problems, which emerged as another theme. Within this theme, participants either accepted the limitations of various resources, including user interface difficulties (eg, a poor search function), or found these too difficult to use, and avoided them altogether. Long paragraphs of words rather than bullet point summaries, poor bookmarking or headings, and lack of algorithmic decision diagrams were often cited as negative features.

> *Yeah, I find this one [HealthPathways] with the dropdowns—it is good when you've got time to read it properly, but that as you probably saw in there*

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> *there's no way I'm doing all that with something I've not seen before and not having to tell the patient what I'm doing. So, it does take a bit to look through all that. I find things like RCH where they have a flow chart a lot prettier and easier to use than this. But it's still decent. You just maybe need a little bit more time. Therapeutic guidelines as I said, I find often not that quick to read. You just jump to the highlights when you're in a rush.* [Participant 1, metropolitan location, term 3]

> *I mean sometimes Health Pathways does have things, but sometimes I just want to look at it, like in a flow chart, or a different sort of presentation of the information, um, that Health Pathways doesn't have.* [Participant 8, metropolitan location, term 1]

Cognitive Scaffolding

Despite limitations, trainees experienced positive shifts in their clinical thinking after consulting resources. When looking for information, the resource may prompt the trainee to consider identifying red-flag symptoms, alternative diagnoses, or clinical investigations. This sometimes occurred via happenstance: while looking for specific information on a page, the trainee comes across other related information such as prudent questions to check in the history or physical examination, which helps with diagnosis. Other times, a trainee may deliberately use the resource for this function explicitly. For example, if feeling cognitively overwhelmed, or aware that their own thinking is too narrow, a trainee may opt to read a resource for a list of differentials as a safety check of their own performance.

> *Um, if it's a scenario where I'm going, woah, the initial bit of history I've taken, I feel like we almost need to take a step back, or I'm feeling like I don't trust the initial differentials I've got, then, yes, I will actively utilize that occasionally to help me check that my history taking has been appropriately thorough or broad. Especially, with some of those bits of this, bit of that multisystem presenting complaints where you're like, oh, this could be one of those weird rheumatological or functional things.* [Participant 10, regional location, term 3]

Trainees often reported that resources confirmed their thinking about management decisions and gave them reassurance. Some would even take the strategy to search 2 or more resources for the same problem, looking for congruence, as they felt they needed a higher level of reassurance about their decisions. Much of information seeking is confirming existing knowledge or finding specific gaps (eg, a drug dose) rather than learning an altogether new concept (which is often deferred to later).

POC resources can act therefore as external cognitive supports to help, or hinder, clinical thinking. Tasks, such as holding diagnostic lists, organizing reasoning, or improving completeness of history taking, can all be augmented with ePOC resources, especially when under external pressures.

Theme 2: Doing the Right Thing

Overview

When explaining their underlying drive for seeking information, many expressed the desire to do what is expected of them—a concept tied up in the need to take the "correct" course of action, to provide effective care to the patient, and to meet standards of themselves and peers.

> *I want to be right. I don't like being wrong, and I don't like being off the standard, and I don't like having any reason for my practice to be called into question. If somebody was to then look at my notes 10 days later, I don't want that GP to be, "Oh, that's ridiculous," because I often think that.* [Participant 14, metropolitan location, term 2]

Some trainees explicitly stated that choosing reliable, trusted information to help with clinical decisions would help protect themselves medicolegally. Others described that their drive for information seeking exists because of a need for reassurance, or checking, to reduce uncertainty. While background clinical knowledge gave them some level of confidence in a drug choice or dose, for example, they wanted to check that this was the right course of action and would seek a trusted source to confirm this, some even seeking 2 resources to meet this internal assurance need.

> *I think that's probably my bigger fear is just not having a bad outcome for the patient, less I don't want to get sued, so to speak. If that makes sense ...* [Participant 16, outer metropolitan location, term 1]

> *I'm reflecting now. I'm like, it's because I am now medical legally responsible that I now care so much and check so hard, because it's my licence on the line and my name and everything. Whereas before, I was never legally responsible as long as I did what they told me to do and which I always did.* [Participant 14, metropolitan location, term 2]

Trust

These stated reasons for finding information are closely related to the theme of trust. All participants described needing resources that they could trust. Trust in this context refers to the trainee's confidence in a resource. Resources developed by or affiliated with government bodies were routinely regarded as reliable, as were those officially sanctioned by state health departments. Likewise, trainees placed weight on resources they had witnessed specialist colleagues using during their own previous hospital placements. Due to inherent consultation time pressures, trainees described needing to find information quickly for clinical decisions and wanted to minimize time needed to evaluate the quality of a resource. All participants would prefer to use resources well known and well trusted to them, only seeking new resources when existing resources failed to provide the information needed.

> *I think they're both government websites [laughs], so I feel like if it—it should be pretty trustworthy and I've been using Therapeutic Guidelines while I've been in hospital for so many years and it's been*

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> *working well.* [Participant 11, metropolitan location, term 1]

> *Yeah, so I suppose the Therapeutic Guidelines are sort of, you know Australian specific and it is evidence-based so I sort of, you know trust that it is, you know, like peer reviewed evidence and that, you know if you were to ever get, you know, called up to court "why did you do this?" Well, its accepted practice, you know, um, they're going to have that at the current guidelines in Australia, and I suppose the same thing for the Australian Journal of General Practice, it is sort of, you know peer reviewed evidence-based articles.* [Participant 19, metropolitan location, term 1]

Generative AI resources were regarded skeptically, though some openness was expressed toward AI systems if they were trained on their "trusted" resources. Trust in the resource was of universal importance.

> *So, if there was ChatGPT and they only used Cochrane, I'd think that's very good. So I would use it.* [Participant 13, metropolitan location, awaiting fellowship]

Theme 3: Constraints

Time

Time pressures and perceived patient perception emerged early as dominant themes.

Time pressure was a pervasive factor in decision-making, influencing how quickly trainees switched between resources. Trainees felt that taking longer to search for information reflected poorly on their competence and could adversely affect patients' perceptions of them.

> *Um, I guess factors in terms of choosing what resource am I going to use right now would be things like how quickly do I need this information? Um, as well as, um, my current ability to [laughs] navigate an impossible website. So if I'm busy and rushing and stressed and, you know, three patients in the waiting room, that will also influence which resource I go to. Because some will be more user friendly than others.* [Participant 10, regional location, term 3]

Time is a pressure because it is also inherently linked to how participants felt they are perceived by their patients.

> *Time? Time is really important and I have difficulties keeping my—I'm pretty chatty, so I probably have difficulties keeping my appointments within time. So yeah, it's really important and I also think the longer you spend looking for the resource that you want to find and the patient can see me doing it, I don't know if it reflects poorly on me because it probably makes me look like I don't know what I'm doing. So my perception of what the patient thinks of me I think is important.* [Participant 4, metropolitan location, term 3]

Perceived Patient Perception

The visibility of the computer screen to patients was another key consideration, with some trainees expressing discomfort or perceived judgment from patients when using specific electronic resources (eg, some resources that had advertisements made the resource look less professional or trustworthy). Trainees with screen setups hidden from patient view felt less inhibited, indicating that physical and contextual factors, including room layout, could impact their comfort with information-seeking behaviors. A sense of vulnerability or perceived "shame" when looking up information was noted, mitigated in some cases by rehearsed phrases to justify their information seeking to the patient, or the use of patient-friendly information sheets as a ruse to quickly find information for their own use.

> *So yes, I would say I often try and do it without them noticing. And that affects which one I use or what parts of it I look at because therapeutic guidelines are very wordy if you read it all, but you can get the highlights quite easily. But if it was looking up a medication dose, I would be very happy just to say to the patient, we'll just double check the dose.* [Participant 1, metropolitan location, term 3]

This fear of professional exposure—an anticipatory sense of shame and embarrassment if discovered—is driven by concerns about what patients might think. In some cases, participants worried that patients would perceive them as "just Googling" rather than skillfully using professional resources, particularly when they used the Google search engine as a rapid pathway to trusted sources of information.

> *Um, I just don't want patient to think I'm the doctor who Googles everything, even though it's not Googling. But they don't really—they don't know the difference between eTG and Googling.* [Participant 11, metropolitan location, term 1]

> *Well, part of medicine is they need to feel like they are being treated, and they need to feel like that the doctor is someone they can trust to protect them and to heal them. And part of that is that the doctor knows what they're doing, and that, I believe, helps with the patient experience. And so, I would not want them to get a false sense of worry from the checking of the guidelines, because I actually believe that represents good care. Whereas they might not get the impression that it represents good care, whereas I believe that me doing that might be better care than the GP who looks at no resources, prescribes them that Augmentin I was telling about for their viral URTI, and maybe gives them toxic megacolon in the future. But they might not know that, so I try to maintain some sense of wisdom and efficiency, and I guess someone who can be trusted to the patient.* [Participant 14, metropolitan location, term 2]

Some participants expressed concern dealing with a scenario where the patient might expect them to know something that they do not know, and therefore not reveal this type of information seeking.

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> *Because I feel like if—if you don't know what resources you can refer to them, that's pretty fair because not everyone is familiar with what's happening or what's been changing around you. But for—in terms of medication, if you are not familiar with the medication, they tend to think you're probably not familiar with my condition. So that's why I tend not to tell them.* [Participant 11, metropolitan location, term 1]

> *So you might not want them to know like if it's like something that seems really basic. Um, so yeah, I do have that in the back of my mind that like you kind of obviously appear as competent as you can to instill confidence to them. Um, so yeah, it's a bit of a balance of communicating most of it and then just letting, you know the—the research you're doing, just finish that off and hopefully support what I'm saying at the start.* [Participant 15, metropolitan location, term 2]

Screen visibility was another example of how perceived patient perception affected information seeking. Some trainees often involved the patient in information seeking, sometimes because they felt they had no choice, as their screen was visible, or that it was an integral part of the consultation process. This sometimes means careful consideration of what resource to use, as they felt that information resources needed to look professional to keep patient confidence high in them as their doctor.

> *So, it's becoming an active part of the consult, um, in terms of time taken and steps taken. So, it doesn't really feel like it integrates with the way I like to practice if I'm doing an entire step without the patient.* [Participant 10, regional location, term 3]

Maintaining Professional Regard

Participants want to maintain a professional regard. Choosing an unprofessional site or looking up what may be considered "basic" or expected-to-know information risked this.

> *Like, uh, because eTG, you know, the name therapeutic guidelines, you know, 100 percent sounds, uh, much more, uh, professional than Google. Uh, so if there was a search engine, uh, that sounded, you know, something like eTG, uh, then I'd be very comfortable in using it, you know, in front of, uh, my patients.* [Participant 17, regional location, term 4]

> *Uh, so for DermNet I will kind of decide with how—how badly I want to use DermNet. So for example, if I really want those pictures, I'll say, look, this rash or the rash I've got in mind can really change over time. I'm just going to pull up some pictures to show you what they look like. Um, please excuse the clutter or the ads on the website, but this is produced by doctors and it's the best we've got at the moment.* [Participant 10, regional location l, term 3]

If confident of maintaining patient regard, some embraced the practice of information seeking as something patients appreciated.

> *Ah, and I think on the whole patients have appreciated that I'm looking up stuff instead of just saying things. Um, and they've commented on that as well, so I'd rather look up stuff than not.* [Participant 15, metropolitan location, term 2]

Theme 4: Search as a Clinical Skill

Information Seeking as an Essential but Unmet Clinical Skill

The ability to source information needed for clinical decision-making was universally recognized as an essential clinical skill. Participants described this as a fundamental activity, especially as a trainee, as they recognized the scope of GP is vast. Other aspects of the GP environment presented key differences to their formative training. Trainees recognize they make far more decisions themselves (as opposed to being a member of a treating team in the hospital system).

> *Because that is what I found the scariest about GP compared with hospital work is that you are on your own in a room managing it as opposed to having three levels of people above you that basically check your work before you do it. So, I'm just trying to cover all bases and say my supervisor wasn't there, I'd probably ultimately—especially since sitting my exams—trust therapeutic guidelines as my gold standard. And I'm probably just to make myself feel better.* [Participant 1, metropolitan location, term 3]

Other differences include the shorter time pressure to make these decisions and the requirement to search for information in front of the patient (it cannot be delayed to leave the ward and find a computer). Some trainees reported that they would make an excuse to leave the room (and search in relative privacy) to overcome these barriers.

Yet, most participants had learned their information-seeking strategies informally, often from hospital rotations, with little or mostly no structured teaching in community practice settings. Trainees witnessed what a hospital-based specialist would use, and then "trust" that resource as something they use for similar types of problems. This often-meant trainees were familiar with some evidence-based comprehensive ePOC resources (UpToDate was familiar to all) but were unaware of others that they had subscription access to, provided by their training college (eg, DynaMed). UpToDate, as an example, was cited as being so wordy and long, as to be unusable for in-consultation seeking. This example shows that the informal, existing experience of ePOC use from hospital settings does not translate well to their community GP training environment and represents a gap for training.

> *In the hospital, I would just be checking that I did not make a data input error, right? And whereas here, I'm not just worried about data input error. I still am, but I'm worried about the knowledge, the correct diagnosis, correct knowledge, correct management.*

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> *And so, but yeah, in the hospital, I would just triple check that I copied from the plan correctly. But here I've got to make sure that the decision was right, yeah, not just data entry.* [Participant 14, metropolitan location, term 2]

> *And I don't think I've seen very many formal discussions say in a teaching session at practice or college, um, or resources that I've read about, how do you utilise these? How do you decide a resource is appropriate and useful?* [Participant 10, regional location, term 3]

Evidence-Based Decision-Making

As described earlier, trainees expressed a strong motivation to "do what is right" by following trusted protocols and algorithms. However, a limited engagement of the evidence base behind these protocols was observed, even if some participants stated that they wanted to follow EBM. When asked if they read journal articles, trainees reported that they never did because of the length of time it would take.

Trainees navigate expected practices as EBM ideals but operate within real-world constraints by adopting rapid, pragmatic information-seeking strategies, with some resulting internal conflict. Internal dissonance expressed as embarrassment or discomfort—sometimes framed as being "not proud" of their actions—emerged when acknowledging that their real-world information seeking did not reflect the EBM processes they had been taught. Specifically, not performing a comprehensive search, performing a critical appraisal of the paper, and looking for biases/confounders involved. Some felt guilt about deviating from expected professional standards.

> *I'm not proud of saying that I went to Google first ... because we're taught that you have to do the systematic review ... go to a reputable search engine first.* [Participant 13, metropolitan location, awaiting fellowship]

This is not consistent with their practice of taking most resources at face value, expecting it to have been subject to such critical appraisal by others more equipped to do so. Registrars never checked this was the case, trusting rather on reputation. Sometimes the process of determining trust in a resource was stretched in some circumstances. For example, one trainee searched for a blog site from any orthopedic surgeon, as they felt these sites often contained good information, such was the trainee's need to meet their information requirements quickly.

> *I—I can find this with the patient in front of me, but all my strategies for EBM, um, are very much doing it in my own time out of session without the patient there.* [Participant 10, regional location, term 3]

> *I mean it is a good question, but it's kind of like going to the supermarket, like you're not checking that every food is not poisonous, [laughter]. Like you accept to a degree the fact that there's a regulatory body and they check food and, you know, like—like you have to. Like there needs to be a level of trust. I think, when you're looking at articles just in PubMed, uh, even though there are many, many, many, obviously, really good, uh, things. But you do have—you do have to be a little bit more discriminatory, because you're the ones doing the assessment of the value of the study that is in that database.* [Participant 18, regional location, term 3]

The effectiveness of participants to find resources that provide some types of content varied; many trainees reported difficulty finding nuanced data, such as recurrence rates of specific conditions, which could hinder shared decision-making efforts. None of the participants relied on PubMed, journal articles, or UpToDate during POC consultations. Instead, some deferred deeper research for later learning.

> *Or do I want to take a bit more time and save that page and come back later because it's costing really information—sorry, really useful information that I want to, uh, approach for my own study later as opposed to just—you have to read the entire page right here, right now to be able to get anything useful out of it.* [Participant 10, regional location, term 3]

Information Seeking for Patient-Centered Care or Shared Decision-Making

The 4 hypothetical clinical case prompts provided to GP trainees had increasing requirements for specific patient-centered care or information needed to help take a shared decision-making approach (see Multimedia Appendix 2 for summary of vignettes). In general, participants found the case regarding the management of community-acquired pneumonia in a child relatively easy, as it relied much on their previous experience, and most participants could quickly navigate to a reliable resource (such as the Royal Children's Hospital Melbourne clinical practice guideline) and find diagnostic and treatment information to meet their clinical needs. Other cases, such as the recurrence rate for different treatments of a ganglion or the efficacy of probiotics in a child to prevent antibiotic-associated diarrhea, were not as "easy." Participants would often convey their immediate sense that these were "EBM questions" or at least not likely to be found in their usual resources. Strategies to try to overcome this were often to quickly try a usual or familiar resource that they felt would have the information, sometimes with erroneous results (eg, using data from a trusted resource on vasectomy complications to help inform management decisions about a middle-aged man presenting with hematospermia), or to try search engines and scroll results to find resources that met their criteria for "trustworthy," often with poor results (eg, using a surgical blog site as a reliable source of recurrence rates of ganglions).

Participants would often abandon information seeking if a trustworthy answer could not be found in a few minutes, reflecting their internal clock of what is able to be tolerated by a patient without losing rapport. In this scenario, trainees would cite other courses of action (such as seeking supervisory input) or explanations to negotiate a safe or satisfactory outcome for the consultation, based on their clinical experience, even if the information needed was still unknown.

> *So again, uh, similar to the previous one, like I said, you know, eTG, Health Pathway is not very good in*

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> *giving statistics or numbers of, you know, how—what's—what's the chance of this treatment being successful. It just gives you—this is the treatment, this is, uh, you know, the guidelines.* [Participant 17, regional location, term 4]

Discussion

Summary of the Main Study Findings

GP trainees cite the efficient and effective seeking and application of clinical information as an important, fundamental clinical skill for their work, particularly given the multiple demands of the clinical setting, time pressures, breadth of clinical work, and number of decisions they need to make. Clinical information seeking occurring during the consultation is a time of pressure and uncertainty. This time is used to seek reassurance on existing knowledge or to fill a specific contained knowledge gap. However, trainees will not seek to fill large knowledge gaps, or time-consuming smaller ones, and defer this activity.

The process of clinical information seeking can change the direction of the consultation. In this study, we witnessed episodes where information found incidentally improved a diagnostic or management process, but also times when resources failed to provide needed information, less trustworthy resources were used, or incorrect comprehension (likely due to time pressures) of a source led to erroneous consultation outcomes.

The information-seeking needs of GP trainees, including trustworthiness and speed, as well as the clinical pressures, were present in all participant interviews, reflecting the common clinical context that GP trainees work in Australia. We found no relation to stage of training, rurality, ethnicity, or other participant trait to our findings.

Comparisons With Existing Literature, and Interpretation and Implications of Findings

Our findings are consistent with previous published research that GP trainees preferred preappraised evidence resources for in-consultation information seeking that were credible [27] and accessible (low or no cost) [27].

Recently, Weller et al [13] reported on the information resources of Dutch medical specialists (surgeons and internal medicine physicians) and found that when seeking information to answer POC clinical questions, consulting a colleague (either within or across specialties) or "active search in online scientific literature" was most common. However, the cited resources for these included either primary or secondary literature sources such as PubMed or the Cochrane Library, which participants in our study avoided, citing the time taken to use these, including the need to critically appraise the findings. Our participants preferred preappraised evidence. We believe this likely reflects differences in scope of practice (specialist vs generalist), experience (established doctors vs trainees), and context. The findings by Weller et al [13] differ, in that specialists would also ask others (such as medical students or residents) to search for the answer for them as the other main option for information seeking, which did not appear as an option in any of our data.

Lee et al [15] interviewed 8 primary care doctors in Singapore and similarly found a preference for clinical practice guidelines, which are comparable to HealthPathways in the Australian context. However, their participants had different organizational-level access to POC resources, including UpToDate, which was a preferred source in their study but was rarely used by participants in our study. In contrast, access to general internet searches was restricted, leading participants to use their personal phones to seek information.

In their review of the online health information needs of family physicians, van der Keylen et al [27] found that lack of time is the major obstacle to information retrieval, and that family physicians need concise secondary, credible, free, and simple information to meet their needs. Our findings are largely consistent with this, although we offer further insights into how these are being met and why. First, time pressures still apply for our participants; however, we find other demands such as perceived patient expectations, maintaining rapport, and the need for assuring safety as other priorities that GP trainees must meet under such time constraints. Second, we also find that some ePOCs can provide information to help facilitate clinical decision-making of GP trainees at least some of the time, although future work on a broader sample of clinical scenarios should look at how well these needs might be met.

A recent Australian qualitative study into the uptake of an online clinical pathway resource (HealthPathways) found that while older general practitioners may not be aware of their existence, or use them regularly, trainee general practitioners do find this a useful tool to help manage clinical problems [28], aligning with our findings in this study. The results of our study, which is not limited to a single resource, also provide a broader understanding of the cognitive processes and consultation pressures that GP trainees operate in. We therefore would argue that while lack of awareness may be a barrier to their use, and that training may be worthwhile [28], the uptake of any single provided resource may not be the correct measure of the success of an ePOC resource's utility. Rather, meeting patient and doctor information needs to execute high-quality, evidence-based, patient-centered decisions is paramount. This implies understanding how these resources play a role in the rich milieu of GP consultations. We found that doctors used different resources to meet each of these needs where possible, sometimes in duplicate, because no single resource covers all scenarios. We also found instances where ePOC resources failed to provide the information necessary, more so in times where treatment effect sizes were needed.

We recently explored the frequency of use of, and factors associated with, GP trainees' use of ePOC resources in Australia and found that trainees use 14 different resources to cover 80% of the problems they encounter [16]. This work can help explain much of these previous results, including the high frequency of use of TGs, which in this study was cited as high in trustworthiness, as well as no-cost to access (training provider funded) and familiar, as participants have experience using it and seeing it used in hospital training. Other frequently used resources such as drug compendiums provide specific information not found in guidelines or clinical pathways, such

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as drug interactions and side effects, explaining their frequent use alongside other ePOC resources.

This research has implications for both medical education and resource development. Our findings highlight lessons for GP-specific resources (which include trustworthiness, a patient focus, and time awareness) and lessons for GP training (which include navigating skills and how to integrate searching in a consultation while navigating the patient-doctor relationship). First, we find that there is a transition for GP trainees from hospital-based use of ePOC resources to their use in primary care, as both the clinical questions and environment are different enough to warrant specific training. This should include how searching could be done in a way acceptable to patients [29], particularly as information seeking and sharing may be positively correlated to patients' trust in their GP [30]. Second, we expect that GP trainees with both access to a variety of reliable, purposefully designed ePOCs and the skills to use them may be better equipped to handle clinical questions arising in primary care clinical practice, although this question remains unanswered. Third, trainees revealed factors leading to their preference for some resources more than others, which include user interface and design-related barriers (eg, how professional the resource appears to patients). Therefore, ePOC providers should prioritize this in design and presentation considerations. Fourth, we found that information encountered during searches by trainees—whether deliberately sought or incidentally discovered—influenced their clinical decision-making.

Importantly, when needing to find information about the efficacy of an intervention, or the natural history of a condition, participants were not immediately confident in finding the necessary information, and often subsequently struggled to do so in our study. This type of clinical information seeking is often important to facilitate shared decision-making between patient and their clinician. Our results highlight that participants' experiences in using ePOC tools suggest that such information is not readily available or likely to be found from commonly used ePOC resources. This requires further study to determine if this is a widespread problem in ePOC tools.

All participants were familiar with and used AI and large language models (LLMs), but all were reluctant to use them in a clinical context, primarily citing trustworthiness as a limitation. Since data collection in 2024, substantial steps have been made in LLM hallucination rates [31], as well as the emergence of dedicated LLM-based clinical information products [32]. As these tools develop, confidence in them may change. However, we suspect trust is a fundamental element in GP trainee information seeking, such that it is likely to continue to be a significant theme, and no less of an issue for LLMs [33,34]. Providers of ePOC should evaluate both the usability and utility of their products with clinicians in their specific clinical settings, with a view to facilitating patient-centered care and shared decision-making. Finally, providers of EBM training should also address the clinical skill of using preappraised ePOC evidence during consultations alongside more traditional teaching of answering clinical questions via searching databases for primary literature and critical appraisal. Indeed, searching for evidence at the POC is the predominant method of EBM, and our research here suggests that EBM training was a source of guilt rather than liberation in GP trainee in-consultation clinical information seeking.

Limitations

Our study has several limitations. Study participants were all from Australia. While transferability to Australian GP training will be strong (participants were from all states, all training regions, all levels of training seniority, and from rural as well as metropolitan areas), transferability to other GP training programs will be less straightforward. This will be especially so if these programs do not resemble the Australian decentralized apprenticeship-like model of training, with central educational support [35], or where there are different sociocultural norms around patient expectations and clinical knowledge. These sociocultural norms may relate to perceptions of supervisory responsibility for conveying expert knowledge, as opposed to facilitating learners' competence in accessing and applying evidence in training programs internationally [36].

Additionally, specific resources described here may change over time, or new ones will become available. While 2 authors (BM and GS) met and discussed themes and subthemes, the majority of data analysis was conducted by 1 author (BM) only. Finally, we note that our method of using clinical vignettes as a source of data collection possibly introduces some level of observer-induced behavior change, even though participants reported feeling comfortable and that the process a good reflection of their usual behavior.

In addition to these limitations, the study has several strengths. First, the qualitative study design alongside analysis of screen recordings of participants solving clinical scenarios allows in-depth insight into the use of information sources by GP trainees augmented by observed interactions with digital tools. Data from the answering of questions arising from clinical vignettes provided a rich source of information that extended the understanding from interviews and subsequent participant reflection on their experience, allowing a deeper and nuanced understanding beyond interviews alone. Second, this study further adds to the evidence base in this area, particularly for general practitioners, as existing work is either older when the landscape of ePOC was substantially different or more recent but in a different context (Singapore primary care) [15].

Conclusions

GP trainees' ability to use evidence in consultations depends not only on their knowledge of EBM but also on whether reliable information can be found, interpreted, and incorporated into care within the practical and interpersonal constraints of the consultation. Information seeking should therefore be recognized as a core clinical skill; yet, these skills appear to be developed largely implicitly through experience rather than through an established curriculum. Explicit training in the use of POC resources may improve trainee confidence and reduce uncertainty while also supporting safer and higher-quality patient care. This need is particularly important in broad-scope specialties such as GP, where clinicians encounter a wide diversity of conditions and cannot remain familiar with the continually expanding evidence base. ePOC resources may be especially important for shared decision-making, where

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clinicians need rapid access not only to guidelines and pathways but also to information about prognosis, treatment benefits and harms, and outcomes that matter to patients.

The responsibility for effective evidence use therefore cannot rest with clinicians alone. Developers of ePOC resources must also consider how evidence is presented and accessed, and whether resources function effectively within real clinical workflows. Real-world evaluation of these tools in consultations remains an important priority and is likely to become increasingly important, as AI-enabled clinical information systems proliferate, particularly where clinicians must judge the trustworthiness of their outputs. Established methods for evaluating the effectiveness of clinical information seeking are also needed, both to assess POC resources and to evaluate educational interventions. Ultimately, ePOC resources may represent an underexamined but critical link in translating research into practice by making evidence usable at the point where clinicians need it most.

Generative AI Use

No generative AI tools were used for writing, data analysis, figure production, or editing of this manuscript.

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Data Availability

Deidentified qualitative data are not publicly available due to ethical restrictions.

Authors' Contributions

BM conceived the study and formulated the research question. BM, GS, PM, and MVD contributed to the study methodology. BM and GS developed the interview guide. BM conducted participant recruitment, data collection, data curation, and formal analysis. GS contributed to the analysis and interpretation of the data. PM and MVD supervised the study and contributed to the validation of the findings. BM wrote the first draft of the manuscript. GS, PM, and MVD critically reviewed and edited the manuscript. All authors reviewed and approved the final manuscript.

Conflicts of Interest

None declared.

Multimedia Appendix 1

Interview respondent demographics (N=20).
[DOCX File , 19 KB-Multimedia Appendix 1]

Multimedia Appendix 2

Case vignettes.
[DOCX File , 15 KB-Multimedia Appendix 2]

Multimedia Appendix 3

SRQR checklist.
[DOCX File , 21 KB-Multimedia Appendix 3]

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Abbreviations

EBM: evidence-based medicine
ePOC: electronic point-of-care
GP: general practice
LLM: large language model
POC: point-of-care
RACGP: Royal Australian College of General Practitioners
SRQR: Standards for Reporting Qualitative Research
TG: therapeutic guidelines

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