Barriers and Decisions When Answering Clinical Questions at the Point of Care
A Grounded Theory Study

David A. Cook, MD, MHPE; Kristi J. Sorensen, MSED; John M. Wilkinson, MD; Richard A. Berger, MD, PhD

IMPORTANCE Answering clinical questions affects patient-care decisions and is important to continuous professional development. The process of point-of-care learning is incompletely understood.

OBJECTIVE To understand what barriers and enabling factors influence physician point-of-care learning and what decisions physicians face during this process.

DESIGN Focus groups with grounded theory analysis. Focus group discussions were transcribed and then analyzed using a constant comparative approach to identify barriers, enabling factors, and key decisions related to physician information-seeking activities.

SETTING Academic medical center and outlying community sites.

PARTICIPANTS Purposive sample of 50 primary care and subspecialist internal medicine and family medicine physicians, interviewed in 11 focus groups.

RESULTS Insufficient time was the main barrier to point-of-care learning. Other barriers included the patient comorbidities and contexts, the volume of available information, not knowing which resource to search, doubt that the search would yield an answer, difficulty remembering questions for later study, and inconvenient access to computers. Key decisions were whether to search (reasons to search included infrequently seen conditions, practice updates, complex questions, and patient education), when to search (before, during, or after the clinical encounter), where to search (with the patient present or in a separate room), what type of resource to use (colleague or computer), what specific resource to use (influenced first by efficiency and second by credibility), and when to stop. Participants noted that key features of efficiency (completeness, brevity, and searchability) are often in conflict.

CONCLUSIONS AND RELEVANCE Physicians perceive that insufficient time is the greatest barrier to point-of-care learning, and efficiency is the most important determinant in selecting an information source. Designing knowledge resources and systems to target key decisions may improve learning and patient care.
Evolving models for health care delivery and reimbursement will demand that primary care physicians independently care for patients with more complex comorbidities and contexts (hereinafter, complex patients), while specialists provide support for evidence-based, locally delivered care. Consequently, it is expected that physicians will increasingly ask and answer clinical questions at the point of care (POC learning). Computer-based knowledge resources and clinical information should contribute much-needed support to the collaborative management of complex patients and may also play an important role in physician continuous professional development and lifelong learning. Although electronic medical records, decision support, and ordering systems have received much study, little is known about electronic medical records, decision support, and ordering systems including POC learning. Computer-based knowledge resources and clinical information should contribute much-needed support to the collaborative management of complex patients and may also play an important role in physician continuous professional development and lifelong learning.7-9 Although electronic medical records, decision support, and ordering systems have received much study,4,5,10,11 little is known about their optimal design and implementation.5,12 Levinson’s statement from 30 years ago still applies: “Part of today’s problems of high costs, quality of care, physician burnout, and patient dissatisfaction reflect the inefficient information management methods on which much of the health care process depends.” The realization of design improvements demands that we better understand the nature of clinical work including POC learning.

Physicians frequently ask questions in clinical practice16,17 but elect to answer only a minority of these questions,18-20 and inquiries are frequently unsuccessful.17,20 In theory, ready access to information will lead to fewer and more appropriate referrals and tests and more efficient and evidence-based treatments. Yet, many barriers limit searches, including insufficient time, inadequate search skills, lack of reliable resources, excessive information, and belief that an answer is not available.21-25 Other than determining knowledge resource preferences, few studies21,22 have investigated the decisions physicians make as they work around these barriers. Likewise, existing conceptual models for physician learning in practice describe the process in general terms but do not elaborate on specific activities and decisions.

Clinicians, educators, administrators, and technologists responsible for POC learning systems would benefit from a deeper understanding of how physicians learn in practice. To better understand this process, we conducted a qualitative study focused on the questions: what barriers and enabling factors influence physician POC learning, and what decisions do physicians face during this process?

**Methods**

We conducted a grounded theory study among practicing internal medicine and family medicine physicians in a large, multisite health system. From October 2011 through February 2012 we conducted 7 focus groups at an academic medical center and 4 at primary care sites up to 70 miles away. Fifty board-certified physicians participated (Table 1).

**Context: Accessible Resources**

In addition to publicly available Internet resources, all health care providers in our health system have free and unlimited access to online knowledge resources, including UpToDate (an evidence-based, physician-authored resource), MD Consult (a compilation of full-text journal articles and medical references), and Micromedex (a collection of databases focused on drugs and toxicology). Participants also have access to a locally developed resource, AskMayoExpert, that contains evidence-based content, including care process models, concise answers to frequently asked questions, and names and contact information for topic experts.

Physicians on the academic campus can call one another directly and be immediately connected to ask a question. Physicians at other sites enjoy this same access (although it remains underutilized) and can also access various local subspecialists.

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<th>Table 1. Session and Participant Demographics</th>
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<td><strong>Session</strong></td>
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* Cities 1 to 4 were 30 to 70 miles from the academic medical center.

**Subspecialties included adolescent medicine, allergy, cardiology, critical care, endocrinology, gastroenterology, geriatrics, hematology, hospital medicine, nephrology, pulmonaryology, and rheumatology. In session 2, one person held board certification in internal medicine and family medicine, and another held certification in internal medicine and pediatrics.**
Table 2. Additional Quotes in Support of Identified Themes

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<th>Theme: Subtheme</th>
<th>Quote(s)</th>
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<td>Barriers: Time</td>
<td>Time. [Other participants murmur in agreement] The patient’s waiting, the next patient is roomed, and I need someone to guide therapy on this patient before I can get to the next one. … That’s probably the first barrier. (Session 10) The amount of resource we have is just huge, online, you know, just open your desk you can find all kinds of stuff but you need the time to go looking for it. So time is really the issue. (Session 7) Time is the biggest barrier. (Sessions 3, 4, and 7)</td>
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<td>Barriers: Complexity of co-morbidities and contexts</td>
<td>Patients are so much more complex than they were 20 years ago. … There’s actually less time and more pressure. (Session 2) It’s not that I don’t know what to do with them. … It’s because there are complex decisions about, “Oh my gosh, what am I going to do with Roger’s blood pressure? His platelet count is 47 000. Just what he needs is one more problem. How am I doing to address that?” (Session 4)</td>
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<td>Barriers: Constantly changing resources</td>
<td>I’m not accessing the same information that I used to. … I don’t think I’m holding onto it as well as I used to. … Cause now if I go to UpToDate, the article has been changed. Or if I go to the literature there is a more recent article and now I’m reading about that, which is good. It’s updating me, but it’s not as hardened in my brain. (Session 9)</td>
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<td>Enablers: Barriers: Time</td>
<td>Quick… We’ve all said we don’t have a lot of time so if you can find, “Is there or not there?” in the least amount of time that’d be great. If it’s complete information or [a] comprehensive list of topics … the more user-useable it becomes. Credible. So I think just by being developed by [a] reputable institution we assume that there’s a level of credibility that goes along with whatever answers are in there, and I think that’s probably a fair assumption. And then Current. It wouldn’t help me much to have a page that’s 2 years old. So it’s got to be something that’s regularly updated and fresh. (Session 8)</td>
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<td>Whether to look: Keep up with practice changes</td>
<td>Really, it’s a refresher of things that—whether we remembered or not—we did learn at some point. (Session 3) As we get older, we realize, “Oh boy, all that information that I once knew is now obsolete and I’ve got to look it all up and learn it all new again.” (Session 9) In cases where you think, “You know, I’m sure I’ve heard that there’s a change in guidelines [other participant: “Yeah”] or recommendations 2 weeks ago and I can’t remember exactly what it is.” (Session 7)</td>
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<td>Whether to look: Patient education</td>
<td>A lot of times people are wondering if they have medication problems or if it’s a side effect. I’ll look up, you know, in the room; we’ll look up Micromedex and look at the side effects and “Oh look, 20% of the time your dizziness, that is a side effect of your medicines.” (Session 4) I use Google Images all the time for rashes or an as an illustration. Cardiac problems—pull an image to use to try to explain things about that. Google Images is a great tool to use. (Session 7)</td>
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<td>Whether to look: Management in the setting of complexity</td>
<td>It’s not a knowledge thing so much, it’s more of a management thing about how are you going to make that compete with multiple competing issues. (Session 4) If I have a question it’s usually there are nuances or it’s not really straightforward; it’s a lot intuition … It’s not precise medicine, it’s, you know… it’s not sure, it’s not clear, and it could be multiple ways of doing things. (Session 8)</td>
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<td>When to look: Learning before</td>
<td>I’d rather be 5 minutes late, look it up in my office, kind of mill it through, have a plan in place. And then if they ask you a specific question you can’t answer, then look it up. (Session 2)</td>
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<td>When to look: Learning after</td>
<td>I would sometimes kind of defer and say I’m going to check something and get back to you … but I really dislike doing that because there really isn’t time set aside to look up stuff and get back to them either. (Session 4)</td>
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<td>Where to look: Reasons to leave the room</td>
<td>I think patients know we do this kind of stuff, but I don’t think that they like seeing their physician do it. (Session 3) If I recall of a place where I can find the information relatively expeditiously, I’ll go ahead and do that. Where might that be? My office. … Even though it’s a walk…sometimes that’s quicker than the computer. (Session 4) When someone’s reading me, I don’t read efficiently. I would not retain anything looking at that. … I think I’m much more efficient if I’m doing that outside the room, away from the patient. … I don’t feel like I can get the information in front of the patient without feeling very inhibited. (Session 3) A great time is when the patient is getting ready for a physical exam…step out, furiously type on the computer, check a mobile device whatever it is. Come back and sound more intelligent. (Session 8)</td>
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<td>Where to look: Reasons to stay in the room</td>
<td>I don’t want them to expect that I’m gonna know everything. I’m pretty up-front with people about that. Just say, “You know, I haven’t seen this in a while.” I haven’t experienced people seeming you off by that. But I guess if they are put off by that, then I may not be a good match for them as a provider. I think it’s really important they know [that] I don’t know everything. (Session 6) To be honest, something that practically affects me is the speed of walking out and going to some other room, and logging in again. You know, some of our computers take forever to get going, and if I want to look something up I will do it in the room. (Session 9) One conversation (Session 10) explored this in some detail: Physician A: I’m looking at the latest guideline, the latest recommendation, so they understand that things change over time. But they’re OK if you’re looking for the newest and latest stuff. Physician B: They’re pleased. I mean, they’ll like to think you’re going the extra mile for them generally, I think. Physician C: Because I look really young. I think it gives me credibility because sometimes they won’t believe my word. I’m like, “Look, let’s look at this together.” And it’s nice to have it in the room.</td>
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<td>What type of resource</td>
<td>There are problems which I’m pretty sure there is no answer to, and it’s better to talk to someone who is a respected authority or who I trust. … But there are plenty of [problems] when I believe there is a lot of data on it. … Then I’m liable to go to UpToDate or PubMed, or one of these other tools. (Session 9) If it’s the latest therapy for Helicobacter, AskMayoExpert is great. If it’s kind of a complex management issue, it’s better [to contact a colleague by phone]. (Session 1) [Academic medical center] If I have someone [in the room] right now I would call someone…and ask for their advice, because it’s quicker that way. The online devices or electronic searches are helpful. The problem is they rarely answer the direct question you need to answer the question right now. You find that they take longer than you’ve got. (Session 8) [Primary care clinic] It’s generally much faster to research on my own then to try to get information from someone, you know, … it’s just the process. You know, by the time you call and have someone paged and then they get back to you, it’s taken 10 to 15 minutes. Whereas if I can find the answer on my own, it’s a 2-minute deal and I’m done. (Session 6)</td>
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<td>What specific resource: Likelihood of finding an answer</td>
<td>The thing I like about AskMayoExpert is that it’s very, very concise and very small. … It’s faster because UpToDate is really quite expansive. (Session 3) UpToDate—the search engine—is more efficient, spot on. You can type something and you can find it, it’ll be at the top of the list. (Session 2) The reason I used UpToDate is because it’s reliable. I know that typically it will be well populated, the information will be there and if the information is not there, then it’s unlikely to be in other places. (Session 8)</td>
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Focus Groups
Each focus group lasted about 1 hour and comprised 3 to 5 physicians selected through purposive sampling (see the next subsection). At the start of the session the moderator (K.J.S.) presented a brief clinical scenario (reproduced in the eAppendix in the Supplement) featuring a diagnostic uncertainty and asked the question, “What barriers do you face in finding timely answers to clinical questions as you care for patients?” (For the last 5 groups, to encourage discussion of evolving themes, the question was changed to, “How do you go about finding an answer to your clinical question?”) The moderator used an interview guide (see eAppendix in the Supplement) listing potential follow-up questions but did not ask all questions of a given group.

Participants and Sample Size
We used purposive sampling to include physicians representing a wide range of specialties (aiming for similar numbers of internal medicine [both specialists and generalists] and family medicine physicians), ages, and times until next board recertification. Participants were recruited via e-mail. Sample size was determined using thematic saturation: after the first 6 sessions, and after every 1 or 2 thereafter, transcripts and moderator notes were analyzed for newly emergent themes. We stopped scheduling group sessions when no new themes emerged.

All participants enrolled voluntarily after the e-mail invitation and provided verbal consent at the start of each session. The institutional review board deemed this study exempt.

Data Collection and Analysis
Each session was recorded and transcribed verbatim, with name substitution to mask participant identity. Transcripts were reviewed using the constant comparative method to identify emergent themes. Three investigators (D.A.C., K.J.S., and R.A.B.) independently derived initial themes (open coding), then iteratively revised these through successive in-depth discussions to explore interrelationships among these themes (axial coding). We used Dedoose (www.dedoose.com) to facilitate this analysis.

We asked 4 focus group participants, reflecting diverse specialties and practices, to critique our main findings (member check); they agreed with the themes and model without modification.

Results
We discuss main themes with supportive quotes. Table 2 contains additional quotes.

Barriers and Enablers
Each focus group identified insufficient time as the main barrier to finding answers to clinical questions, often deferring even straightforward questions for lack of time. Many physicians mentioned time per se, while others reported surrogates, such as having the next patient waiting in the room or increased productivity targets.

Sometimes it’s easier to refer the patient … than to take the time to look up the information, even if it’s something that I know I could manage, but I just don’t have the time to deal with it. (Session 7)

Physicians frequently noted patient complexity as another barrier. This influences information seeking in at least 2 ways: First, complex patients require more time, leaving less time for learning. Second, the questions generated by complex patients are themselves more complex, making it harder to search for and find answers to clinical questions since most clinical guidelines and research studies do not generalize to patients with multiple comorbidities.

The sheer volume of information was identified as a barrier: rather than facilitating learning, abundant information sometimes makes learning more difficult. Physicians also expressed concern that constantly changing electronic resources may be less effective for durable learning than print resources or colleagues.

It used to be the case where we had difficulty finding the information. Well, now we have difficulty finding the information but it’s for a little bit of a different reason. There’s so much...
out there it’s like, “Where’s Waldo?”...Where is the information buried? (Session 4)

Additional barriers mentioned by only a few physicians included not knowing which resource to search, belief that the search would not yield an answer, difficulty remembering questions for later study if not answered immediately, and inconvenient access to computers (at community sites only).

Physicians mentioned few features that specifically enabled or facilitated POC learning, although many of the themes discussed herein could be interpreted as enablers. Readily accessible electronic resources and resources that are quick, credible, and current were specifically mentioned.

Several physicians noted that they learn best during a POC encounter, and most physicians seemed to equate learning with finding the desired information.

I prefer learning at the time. I think it just stays with me better for one thing, and I can use it immediately. (Session 7)

Whether to Look
Although not part of our main study focus, several participants spontaneously discussed factors that prompted them to search for information (rather than relying on what they already knew): (1) as a refresher for situations they encounter infrequently, such as the details of diagnostic criteria or the indications for specific therapy; (2) to keep up with practice changes; (3) for use in patient education (eg, to illustrate or explain anatomy, a diagnostic workup, treatment side effects, or procedural steps) and to respond to difficult patient questions; and (4) to guide management in the setting of complexity, uncertainty, and multiple competing priorities.

People say, “Have you heard of this before?” or “Do you know about this condition?” [I respond] “No, I don’t, but let’s go find out.” (Session 11)

It’s not so much, you know, “Here’s a condition, what’s the drug?” or “Here’s a condition, what’s the test?” It’s, “Here’s a specific nuance” or “Here’s a test result.”... It’s interpreting that next level, which again is tough to find in a textbook. (Session 8)

These factors were reflected across a variety of topics, including diagnostic strategies, treatment decisions, drug-specific information (dosing, interactions, pill identification), procedural steps, and online tools (eg, a body mass index calculator).

When to Look
Participants noted that POC learning extends beyond the face-to-face patient encounter to include learning both before and after the visit.

Learning Before: An Extra Coat of Paint
Physicians often seek information before entering the room, particularly if they know that a specific question will come up during the encounter. Several physicians noted that this pre-visit learning usually focuses on details such as specific thresholds and diagnostic criteria.

I have to remind myself about, “OK, I know lupus has these 11 criteria, but what are the thresholds within each of those?”...Sometimes that extra coat of paint can help as you go into the room. (Session 3)

Learning After: One More Thing to Do
Another option is to learn after the patient leaves. However, physicians were nearly universal in their disfavor of this option:

If you’re not able to find the answer at that time then... that adds one more thing on your to-do list. (Session 1)

They also expressed concern about remembering to answer deferred questions and described at least 4 methods to ensure follow-up: (1) making a note on paper, (2) sending themselves an electronic message, (3) not finalizing the electronic record until the question was answered, and (4) asking the patient to call if they haven’t received an answer after several days.

We next discuss the third option: learning during the patient visit.

Where to Look: The Health Care Provider’s Physical Location
When learning during the encounter, several groups discussed whether to do this in front of the patient or in another location (eg, a nearby office). Participants seemed about evenly split in their preferences.

Reasons to Leave the Examination Room
By far the most common reason for leaving the examination room was that physicians feel rushed, awkward, or constrained when seeking answers in front of patients, and this impedes the process of searching and learning. They also worry that searching for information in front of the patient might damage the patient-physician relationship or make some patients uncomfortable. Others feel more efficient using familiar resources not available in the examination room.

I might be seen as stumbling or bumbling around for a few minutes, if I don’t know exactly where I’m going or if I don’t know the best source of the information. ... Sometimes it’s just easier to step out and do that. (Session 5)

Several physicians create opportunities to leave the room to answer a question:

I would leave the exam room sometimes, find a reason to leave, and I would contact one of my colleagues or go to UpToDate. ... I leave my stethoscope in my [office], so after every time I get a history, I always leave to go get my stethoscope just in case I need a break. (Session 3)

Reasons to Stay in the Examination Room
The most common reason for staying in the examination room was the same as that used by others to justify leaving the room—namely, that this strengthens the physician-patient relationship. Many also viewed this as an opportunity for the physician and patient to learn together and a chance to promote patient engagement. Several physicians noted that they are more likely to stay if the question is not one to which they should already know the answer. Finally, several physicians noted that staying in the room is simply more efficient.
It sends several really important messages: one, you’re transparent, you’re honest, so it really builds trust; and second, “Wow, that person really went out of his way to do something for me.” (Session 1)

Sometimes, if it’s something that I should know and I just need to refresh my brain, I might scoot out, because I don’t want them to think I’m completely stupid. But if it’s something that I really don’t see that often, I explain to them that I don’t, and then I go in and I’ll read it in the room with them. (Session 11)

Just as some physicians created excuses or opportunities to leave the room, others had adopted scripts that enable them to search for information in the room without damaging the relationship:

“I’ll almost always stay within the room and ... I’ll just be very candid and say, “I don’t know how to approach this situation. Would you mind if I just took a moment to read something?” (Session 9)

What Type of Resource: Phone a Friend or Look It Up?
All groups discussed the options of contacting a more knowledgeable colleague or searching for the answer on their own using resources, such as computers and textbooks. Each option has advantages and disadvantages, and the choice is highly dependent on the situation. Participants agreed that human authorities are best for complex patients and obscure topics, whereas for management of a defined, common problem a reference source is sufficient and preferred over inconveniencing a colleague.

Usually it’s not just the one question; it’s in the context of other things that the book doesn’t know. ... So, it is more helpful to [contact someone], but weighing that against the fact that sometimes you can’t get them and you know it’s an imposition. (Session 8)

Several physicians mentioned timeliness of response as a key factor, but this seemed primarily determined by local systems features. Physicians working at the academic center or larger multispeciality community sites indicated that contacting a human expert is usually faster, while physicians working at smaller primary care clinics indicated that searching books or online resources typically saves time.

What Specific Resource
A full analysis of all factors influencing how physicians select a specific resource is beyond the scope of this study. However, we will summarize 2 dominant themes that may apply to both human and computer sources.

First, and in keeping with the chief barrier of time, physicians desire efficiency. Many physicians explicitly identified both the likelihood of finding their answer (ie, comprehensive topical coverage and sufficiently detailed content) and the speed with which the answer can be found as the driving forces behind their decisions. The latter condition (speed) involved at least 3 considerations: (1) the organization and search functionality, (2) the length of content, and (3) familiarity with the resource. A poor search function was often cited as a reason not to use a given resource. Excessively long content was likewise cited as a barrier. Familiarity with a resource enhances speed and efficiency. Physicians noted that these features (completeness, brevity, and searchability) were often in conflict, and no single resource was superior on all considerations.

When you have a choice of multiple resources to go to, what you want to know is, very quickly, (1) Is the answer here? (And you want to spend as little energy possible finding out is the answer here or not.) and ... (2) How quickly can I get to it through reliable search? (Session 8)

Second, but mentioned far less often than efficiency, physicians sought a credible information source. It seems that physicians decide on a resource’s credibility during their initial encounter and thereafter continue to trust an approved resource on subsequent use. They identified 4 approaches to determining the credibility of an unfamiliar resource: (1) agreement with the physician’s expectations, (2) triangulation (finding the same answer in another resource), (3) reference to the literature or presentation of actual evidence (study data), and (4) credible sponsor (university or government source).

If it corroborates what I already think the answer’s supposed to be, I can stop. (Session 3)

If you find the same thing on a couple different sites, 2 or 3 sites, then you’re pretty sure it’s replicable. So, ... you look through 3 or 4 or 5 sources and if 4 of them say the same thing, then you can tell who’s an outlier. (Session 10)

When to Stop (Sufficiency)
To determine sufficiency (when to stop), physicians apply the credibility criteria described in the previous subsection—in particular, corroboration of expectations and triangulation. Indeed, consulting multiple sources to answer 1 question seems uncommon. Sometimes, however, available resources cannot provide a quick answer, and physicians have no choice but to defer learning.

Discussion
We sought to understand the barriers, enabling factors, and key decisions that influence physician POC learning. We found that time is the greatest barrier, with patient complexity and information overload also interfering. We also inductively identified 6 key decisions (Figure): whether, when, and where to search; what resource type and what specific resource to use; and when to stop. Each decision represents an opportunity for educators and systems engineers to optimize the clinical environment to support learning and patient care. Features that seem to be particularly important include quick and accurate search, brevity, comprehensiveness, familiarity, assistance in identifying and contacting colleagues, and reference to evidence.

Integration With Prior Work
Several of these themes, such as time being a key barrier, efficiency being of critical importance, and health care practitioners commonly seeking advice from colleagues rather...
In contrast to research suggesting that inadequate search skills are an important barrier, this theme did not emerge in our analysis. Rather, participants focused on shortcomings of the knowledge resource, such as nonintuitive search features. This could reflect evolving expectations for knowledge resources, failure to recognize personal skill deficiencies, or preference for secondary sources (e.g., UpToDate) rather than primary sources (e.g., PubMed).

**Study Limitations and Strengths**

As with many qualitative studies, generalizability may be limited. However, within our geographic region we included physicians representing primary care, academia, and multiple medical specialties. Although our participants’ experiences with a locally developed knowledge resource (AskMayoExpert) are unique, these experiences permitted insightful contrasts with other widely used resources. Our model does not provide quantitative evidence to support specific solutions, but it does advance our understanding of clinical work and indicates areas for attention in designing new resources.

**Implications**

Our findings have important implications for practice and research in POC learning and knowledge resource development. First, time is the greatest barrier to POC learning, and efficiency is the strongest determinant in the selection of a knowledge resource. This suggests that shorter answers may be appropriate, but these must be accompanied by intuitive search capability that yields a correct answer quickly and on the first query. Moreover, failure to identify an answer discourages future use of that resource, suggesting that comprehensiveness is a critical element. Addressing the competing demands of brevity and comprehensiveness may require a user-adaptive (e.g., short answer and long answer) format. Finally, reducing practice demands (e.g., patient volumes) might paradoxically improve overall efficiency if this provides time to answer important questions.

Much POC learning actually occurs outside the room—ideally before the patient visit; often during the visit but not necessarily with the patient; and least preferably after the patient leaves. Information seeking and physician learning will be enhanced to the degree that information systems anticipate physician needs, or make it easier (and more comfortable) for physicians to find information while in the room.

Many clinical questions, particularly those involving complex patients or situations, are difficult to answer using existing knowledge resources. Answering such questions will require better evidence and better search functions. In the meantime, such questions may be best answered through discussion with a colleague. Efforts to improve “curbside consultations” could reduce costs and enhance patient care.

Information seeking, information application, and learning are related yet not synonymous. Learning suggests that newly acquired knowledge can be recalled and applied to novel, related future problems (“transfer”). A busy clinician might successfully find and apply information to solve a specific problem but not learn the knowledge required to improve clinical efficiency and enhance subsequent question recognition and
formulation.42 We suggest further research to understand and optimize the conditions and processes that transform POC information to learned knowledge. Research to understand how physicians recognize knowledge gaps and select questions to answer is also needed.

Finally, limited evidence suggests that computer-based knowledge resources may improve patient care and practice efficiencies.5,43-44 Further research evaluating the clinical impact of interventions to support POC learning would be useful.

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REFERENCES