Real-time Information-seeking Behavior of Residency Physicians

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**Background:** Practicing physicians rarely apply evidence-based medicine (EBM). Unlike their more-experienced counterparts, current residents probably participated in EBM curricula during medical school. The current study was designed to determine the extent to which they or their faculty spend time searching for evidence-based answers. This information will help guide the content and format of EBM curricula in residency programs. **Methods:** The method used was direct observation of 13 faculty and 25 residents combined with self-report. Number of clinical questions, sources consulted, search times, and satisfaction with answers were collected for clinical encounters. The setting was the University of California San Francisco-Fresno Family Practice Residency Program. **Results:** Participants asked 274 clinical questions over 215 patient encounters (1.3 per encounter). Residents generated 1.5 per encounter and faculty generated .8. The group sought immediate answers to 66% of questions, found satisfactory answers to 87% of these, and later pursued answers to only 6% of remaining questions. Most searches (66%) took less than 2 minutes. Physicians most commonly used another person or a pocket reference. **Conclusions:** residency physicians have clinical questions but rarely use evidence-based sources to answer them.

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Practicing evidence-based medicine (EBM) requires that clinicians formulate questions and find answers grounded in the best available clinical research. Despite the inherent logic of this approach, most physicians don’t practice this way. EBM emphasizes question-oriented and learner-centered education. This differs substantially from traditional medical education, in which students receive topical lectures with content determined by “experts” and are taught to apply pathophysiologic reasoning to clinical circumstances. Many medical schools and residency programs now teach EBM. For these reasons, one might anticipate that residency faculty and recent medical school graduates, such as those currently in residency training, would be likely to recognize and formulate focused questions and to use evidence-based sources for finding the answers.

This present study explored the assumption that current residents and their faculty frequently apply the principles of EBM. Specifically, we designed the study to assess (1) the number of questions this group asks per clinical encounter, (2) the proportion of questions for which they seek answers, and (3) sources used to answer questions. This information will help establish the target group (ie, residents, faculty, or both) and guide the content and format of EBM curricula in residency programs.

**Methods**

**Sample**

This study involved physicians associated with the University of California San Francisco-Fresno (UCSF-Fresno) Family Practice Residency Program, a community-based residency program affiliated with the University of California, San Francisco. The program has three affiliated clinics where residents see patients: an urban family health center, a suburban community health center, and a rural community health center. The patient population at all three sites is poor and largely Mexican-American.

We invited 40 physicians to participate. All agreed to do so, but we could not accommodate one resident.
and three faculty physicians due to scheduling conflicts. We spent 125 hours observing 11 faculty members and 25 residents, 8 in their third year, 11 in their second year, and 6 in their first year. The number of residents differs by year because of attrition from the residency, make-up time for third-year residents, and a residency size reduction between the first- and third-year groups. The resident group together was 84% male and the faculty 64% male. The mean age of residents was 36, and the mean age of faculty was 41.

**Procedures**

The observer, a second-year medical student, telephoned or approached eligible faculty and resident physicians prior to the scheduled day of observation, explained the nature of the study, and asked if they would be willing to participate. If possible, the observer accommodated all those who wished to reschedule the observation period. The observer then observed residents and faculty for either five patient encounters or one 4-hour clinic session if fewer than five patients were seen. She observed faculty in their private or residency-affiliated clinical practices during periods when they were not accompanied by residents or students.

Using an instrument designed specifically for this study, the observer recorded the physician identification, chief complaint, length of visit, and nature of visit (ie, physical exam, initial visit, follow-up). She also recorded every occurrence of information-seeking activity, including consulting with a person (such as a colleague, attending, or another specialist), consulting a text, consulting a secondary (pre-appraised) source of evidence (such as the Cochrane Library), or consulting primary literature (as via a MEDLINE search). After the clinical encounter, the observer asked, “Was there anything else from this clinical encounter related to diagnosis, treatment, or prognosis that you have questions about?” She recorded any additional questions identified by the physicians and asked the physicians where they might look for the answers to such questions. Finally, the observer contacted the physicians after 4 to 7 days had elapsed to remind them of any unanswered questions and to ask whether they had an opportunity to seek answers.

We analyzed and categorized sources consulted for answers to questions into four main subsets: (1) another person, (2) a text, (3) a pre-appraised source of evidence, or (4) primary medical literature. We grouped texts into two categories: pocket and comprehensive texts. We considered pocket references to be small guides that physicians could carry easily with them, such as a handheld computer, pocket prescribing booklet, or other quick guides. Comprehensive texts included classic textbooks, desk references such as the Physicians Desk Reference: PDR or Griffith’s 5-minute Clinical Consult, and on-line texts (eg, MD Consult). Pre-appraised evidence included databases such as The Cochrane Library. If a physician looked at a print journal or reviewed an on-line abstract or full-text article via a MEDLINE search, we defined either of these activities as a use of primary medical literature.

Prior to implementation of the study procedures, the University of California, San Francisco Committee on Human Research approved the protocol.

**Analysis**

We entered and analyzed data with SPSS (SPSS Inc, Version 9, Chicago). We calculated summary statistics (means with ranges for continuous variables, simple proportions for categorical variables) for all descriptive variables of interest (eg, characteristics of participating physicians and number of questions asked).

**Results**

**Questions**

The observer observed an average of six patient encounters for each physician. A total of 274 clinical questions arose over 215 encounters, with a mean of 1.3 questions (range=0–5, standard deviation [SD]=1.2) per patient encounter (Table 1). For residents, 213 questions arose over 139 patient encounters (1.5 per encounter), and 61 clinical questions arose over 76 encounters for faculty (.8 per encounter). Seventy-eight percent of patient encounters with a resident and 58% of faculty patient encounters generated at least one question.

Residents immediately sought answers to 74% of their questions, while faculty sought immediate answers to only 39% of theirs. The amount of time spent on immediate searches ranged from 5 seconds to 15 minutes, and the majority (66%) took less than 2 minutes each. Observed physicians were satisfied with the answer they found for 87% of the questions for which they sought answers. Residents believed that only 16% of their questions were “important enough to look up later” while faculty believed that of 41% of their questions. Combined, however, residents and faculty later pursued only a few of these questions (see Table 1). They left the remainder of “important” answers not pursued because they did not feel that the questions were of immediate importance to the patient’s health, the patient was referred to another specialist, there wasn’t enough time to look, or the physician planned further observation of the patient before pursuing an answer.

**Sources**

Table 2 lists the sources most commonly used by residents and faculty to answer their clinical questions while being observed for this study. Residents most commonly consulted another person (the attending physician) or referred to a pocket reference. Faculty, not having an attending physician to ask, used pocket
references, comprehensive texts, and, less commonly, consultants from other specialties. The use of handheld computers, considered a form of a pocket reference, did not include the use of any of the EBM databases currently available. No one from either group referred to a preappraised evidence-based source. Reference to original literature was rare.

Discussion

Family physicians in the UCSF-Fresno program, when directly observed, asked more than one clinical question per encounter while seeing patients. It was rare for a resident or faculty member to spend more than 2 minutes looking for an answer to these questions or to use any source other than a pocket reference or another person (such as an attending or colleague). Physicians almost never sought answers to questions after the clinic session ended, even those they, themselves, identified as important questions.

We counted more questions than the .24 to .66 questions per patient reported by earlier investigators in similar studies. This may be because of the setting (ie, a residency program where residents are expected to present their cases and ask questions), the methods (ie, direct observation), the observer (ie, a medical student who may induce pedagogic instincts in the physicians), or even the increased prominence of problem-based learning and EBM that encourages self-directed, question-oriented learning.

We found that these residency physicians ordinarily spent less than 2 minutes looking for answers to their clinical questions. Moreover, they do not use “evidence-based” sources, such as original literature and associated abstracts or pre-appraised literature such as POEMs (Patient-oriented Evidence That Matters) published in the Journal of Family Practice, the American College of Physicians Journal Club, Clinical Evidence, or The Cochrane Library. While one might have anticipated that recent medical school graduates would frequently use such sources, our results for residents are similar to earlier investigators who found that practicing physicians rarely seek answers from evidence-based sources.

We did observe some differences between faculty and resident physicians. Residents asked more questions, looked for answers more often, and were more likely to take longer than 2 minutes searching. Faculty were more likely to report that a question was important enough to look up the answer later; however, they rarely did so. Perhaps one might interpret these findings to suggest that younger physicians have been more influenced by EBM. However, there are a number of more- plausible alternative explanations, including the possibility that residents would have more questions and require more time to look things up because they are simply not as clinically experienced. Also, in the training environment, faculty expect residents to present cases, which may inflate the number of questions recorded by an observer.

Implications for Training

While these new physicians and their teaching faculty have ample clinical questions and were in training as EBM was incorporated into medical education, they spend very little time looking for evidence-based answers and use only traditional sources of information. After a decade of EBM educational efforts, our findings suggest that physicians continue to strongly prioritize the speed and convenience of information resources in the clinical setting, and it seems unlikely and impractical to expect physicians to extend their average search times. Therefore, if our goal is to induce physicians to use evidence-based sources during clinical sessions, we must continue to identify and introduce

<table>
<thead>
<tr>
<th>Source</th>
<th>Resident (n=165)</th>
<th>Faculty (n=26)</th>
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<tbody>
<tr>
<td>Person—colleague</td>
<td>3 (2)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Person—attending or specialty consultant</td>
<td>64 (39)</td>
<td>3 (12)</td>
</tr>
<tr>
<td>Person—office staff</td>
<td>13 (8)</td>
<td>3 (12)</td>
</tr>
<tr>
<td>Text—pocket reference</td>
<td>66 (40)</td>
<td>9 (35)</td>
</tr>
<tr>
<td>Text—comprehensive text</td>
<td>16 (10)</td>
<td>9 (35)</td>
</tr>
<tr>
<td>Pre-appraised source</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Primary medical literature</td>
<td>1 (&lt;1)</td>
<td>1 (&lt;1)</td>
</tr>
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them to sources that are rapidly accessible, brief, and as ubiquitous as the pocket references carried by nearly all residents and faculty physicians. The evidence-based textbook Clinical Evidence, The Cochrane Database of Systematic Reviews, and POEMS published in the Journal of Family Practice are attempts to create such material. A recent survey of British general practitioners suggests that physicians will seek and apply evidence-based summaries such as these and prefer this approach over learning critical appraisal of original research.\(^\text{14}\) Intelligent, computerized patient records with evidence-based prompts are another means to bring evidence-based information to the clinical encounter.\(^\text{15}\)

One systematic review suggests that interactive educational processes can effectively promote physician behavioral change, such as the move from opinion-based to evidence-based clinical practice.\(^\text{16}\) We have found some success with an interactive process to promote evidence-based practice by placing a dry erase question board in each clinic. Residents and faculty write their clinical questions on the board, and residents are assigned to answer questions by working with a faculty member experienced in searching for evidence. We hold a brief weekly session during which we discuss abstracts of the best available evidence to answer the questions. Even though most physicians will probably not routinely undertake such activities in subsequent practice, these exercises introduce trainees to essential principles of asking focused questions, effectively searching on-line databases, and critically appraising answers that they need for effective use of information from any source.\(^\text{17}\)

Another approach to dealing with time restrictions is to teach residents to search MEDLINE quickly when answers are not available elsewhere. One can accomplish this by use of built-in search strategies such as “Clinical Queries” provided by PubMed. Educators should link this strategy with instruction in ways to quickly screen articles by reading the abstract, as full text is ordinarily not immediately available. Guidance should also be provided about what sort of information physicians can derive from an abstract alone.

### Limitations

This study was an observational study of physician behavior conducted at one location. The extent to which one can generalize our findings to other settings is unknown.

The presence of the research assistant in the clinic may have influenced the number of questions the physicians asked or their search for answers. They might have asked more questions than usual to meet their perceptions of the researcher’s expectations or fewer because they felt self-conscious.

### Conclusions

Resident and faculty family physicians have many clinical questions but rarely use evidence-based information sources to answer these questions. EBM curricula should acknowledge the time limitations of the clinical setting, help physicians become familiar with convenient and available evidence-based sources that yield speedy answers, and explore systematic methods of resolving unanswered questions.

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### References