

*Original Article*

## Information-Seeking Behaviors and Reflective Practice

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### Abstract

**Introduction:** *As they care for patients, physicians raise questions, but they pursue only a portion of them. Without the best information and evidence, care and patient safety may be compromised. Understanding when and why problems prompt physicians to look for information and integrate results into their knowledge base is critical and shapes one part of reflection about care. This study explores the role of the Internet in gathering medical information as one step in that reflective practice, the barriers to its use, and changes in utilization over time.*

**Methods:** *A questionnaire with 18 items adapted from previous studies was sent by facsimile to a randomly selected sample of U.S. physicians in all specialties and active in practice.*

**Results:** *Specific patient problems and latest research in a specific topic most often prompt physicians to search on the Internet. Younger physicians and female physicians were most likely to seek information on a specific patient problem. Only 9% of all respondents (n = 2,500) searched for information during a patient encounter. When unsure about diagnostic and management issues for a complex case, 41.3% chose to consult with a colleague or read from a text (22.8%). Searching most often occurred at home after work (38.2%) or during breaks in the day (35.7%). Most (68.7%) found the information they were looking for more than 51% of the time. Searching was facilitated by knowing preferred sites and access in the clinical setting. The greatest barriers to answering clinical questions included a lack of specific information and too much information to scan.*

**Discussion:** *Although physicians are increasingly successful and confident in their Internet searching to answer questions raised in patient care, few choose to seek medical information during a patient encounter. Internet information access may facilitate overall reflection on practice; physicians do not yet use this access in a just-in-time manner for immediately solving difficult patient problems but instead continue to rely on consultation with colleagues. Professional association Web sites and point-of-care databases are helpful. From physicians' use of the Internet, professionals in continuing medical education must learn which search engines and sites are trusted and preferred.*

**Key Words:** information seeking, reflective practice, Internet searching, continuing professional development, online CME

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### Introduction

We assume that best evidence and information helps physicians think about how to provide best care. However, little is known about problems that prompt physicians to reflect on their work or to look for information, and we know less about how they integrate what they find into their actions. Continuously acquiring and applying

knowledge is challenging in an environment where new information is available at an increasingly rapid rate, and its use may be inconsistent.<sup>1,2</sup> The literature defines reflective practice as thoughtful knowledge acquisition and application developing from the way physicians pose problems, raise questions, gather information, integrate relevant ideas, and evaluate results to incorporate them into their practice. As described by Schön,<sup>3</sup> the concept of a reflective practitioner imagines a knowledgeable professional faced with unexpected phenomena, who must experiment with solutions to the problem, apply them in practice, and learn from the results. Being able to reflect on one's practice is essential to developing expertise.<sup>4</sup> It encompasses multiple components related to reasoning, information synthesis, openness to reflection, and meta-reasoning. The relationship between reflective practice and the development of medical expertise is not understood clearly, which creates interesting questions.<sup>4</sup>

Practitioners frame specific questions as they care for patients but seek answers to only some of them. One recent study found that 50% of such questions were pursued by primary care physicians.<sup>5</sup> For many questions not pursued, reflecting would seem to demand an input of information to frame experimentation. Some of the barriers to searching for information include a sense that an answer does not exist, that there is too much information, or that the information is not sufficiently specific.<sup>6-8</sup> When questions are pursued, answers may not be easy to find. In a test of evidence-based databases for use in primary care, 40% of complex questions and 30% of general care management questions could not be answered.<sup>9</sup> The practice setting does not seem to matter. Primary care physicians in rural and nonrural settings had similar information needs, information seeking, and resource use and were equally effective at finding answers to their questions.<sup>9-11</sup>

If one part of reflective practice requires thoughtful knowledge acquisition and applica-

tion in practice, there is a need to be expert in information seeking. Provided with electronic resources for clinical information, medical students reported heavy use that favored those with a quick response time.<sup>12</sup> However, residents were not confident in their search skills and found lack of time to be among the problems in searching for evidence to support management decisions or to review their practice patterns.<sup>13,14</sup> When primary care practitioners included medical students in their work, the number of questions resulting from patient care decreased, pointing to another kind of time constraint.<sup>15</sup> If best evidence is necessary for good care, practitioners' skills in searching for it must be adequate to address the constraints of time. Easy and convenient access and support services are important to success.<sup>16,17</sup>

This study was undertaken to understand more about the role that information seeking plays in reflective practice, an essential core skill.<sup>18</sup> If information is more effectively available at the time questions are posed, will those questions more frequently be answered and actions taken? The study objectives were to investigate (1) how and when physicians pose problems and raise questions that require information as one step in reflective practice, (2) whether setting influences patterns of that Internet information seeking, (3) how barriers to information seeking influence reflection, and (4) how information-seeking behaviors of U.S. practitioners have changed compared with those documented in comparable samples from 2001 and 2003.

## Method

A questionnaire of 18 items was adapted from 2 previous studies in 2001 and 2003, continuing this series.<sup>7,8</sup> Using a survey method allowed access to a large sample of practicing physicians. The survey was conducted by facsimile (fax) transmission during April through June 2005. Studies have found that fax broadcast surveying is effective in eliciting survey responses

from community-based practicing physicians.<sup>19</sup> Delivery of the survey by fax rather than the Internet was chosen to avoid the bias of surveying only active Internet users.

The population for the study was defined as U.S. physicians in all specialties in active practice according to the most current American Medical Association (AMA) physician listing. The AMA physician listing provided the most comprehensive listing of U.S. physicians. A power calculation determined that a sample size of 2,200 surveys was necessary to generalize results for the total population. Cochran's sampling technique determined the power required for the study, with a margin of error of 5% and 95% confidence.<sup>20</sup> Fax numbers were available for greater than 95% of the identified population. Random samples were repeatedly drawn in blocks of 1,000 from the total pool of available fax numbers and responses solicited until the usable sample size was obtained.

Each survey was personalized with the individual physician's name and fax number. Surveys were returned to the 800 number of a designated fax broadcaster and sent by electronic mail to the Division of Continuing Medical Education, University of Alabama School of Medicine in Birmingham for data entry.

Survey responses were entered into an ACCESS database and analyzed using SPSS software with the level of statistical significance as a *p* of less than .05, where the *p* value is the measured probability of a finding occurring by chance. Frequency distributions and means were calculated for each survey item. The demographic characteristics of the sample were tested against those of the whole population to determine differences between the respondents and the defined population. Demographic items were also cross-tabulated with survey items and analyzed using Pearson  $\chi^2$  correlations to assess the significance of association between variables. General linear model analysis was used to compare the 2003 and 2005 survey data.

## Results

A total of 2,500 completed surveys were returned by fax. Respondents included 68.1% male and 31.9% female physicians. Practice locations were in urban areas (40.2%), suburban areas (41.5%), and rural areas (18.3%). Most respondents (63.6%) were based in group practices with a smaller group in solo practice (19.7%) or in an academic setting (12.3%). The sample included 43.3% of physicians in primary care (family practice, general internal medicine, general practice, pediatrics), 36.0% in medical specialties, and 20.8% in surgical specialties. The largest group in the study included those who graduated from medical school more than 20 years ago (40.8%), followed by those who graduated 6 to 10 years ago (16.9%), 11 to 15 years ago (16.1%), and 16 to 20 years ago (15.4%). There were no significant differences in demographic characteristics between the defined population and the sample of respondents when compared with AMA physician demographics.<sup>21,22</sup>

A specific patient problem most often prompted a search for medical information on the Internet (33.7%). Other searches resulted from a desire for the latest research in a specific topic (27.0%) and new information in a disease area (20.4%) (Table 1). Searching most often occurred

**Table 1 Primary Motivation for Medical Information Searching on the Internet**

	n = 2,385	%
Specific patient problem	803	(33.7)
Latest research in specific topic	645	(27.0)
New information in a disease area	487	(20.4)
New therapy or product information	210	(8.8)
Drug dosing information	134	(5.6)

at home after work (38.2%) or during breaks in the day (35.7%). A small group of physicians (9.2%) indicated that they searched for information during a patient encounter. Most (68.7%) found the information they were looking for most of the time (more than 51% of the time) and were confident (41.0%) or very confident (20.7%) that they would find the information they sought. A few physicians (4.0%) were not confident about searching.

The 2 factors that facilitated Internet searching for clinical information were knowing preferred sites (59.8%) and having access in the clinical setting (53.2%) (Table 2). The greatest barriers were lack of specific information (53.4%) and too much information to scan (48.0%) (Table 3). As a group, physicians most frequently searched online (full text) journals (35.5%), professional association Web sites (27.3%), and point-of-care (database access used during the patient encounter) sites (25.1%) (Table 4).

When presented with clinical vignettes, physicians most often cited a consultation with a colleague as their first approach to problem solving. When asked about a need for therapeutic options beyond the usual choices that a physician had developed in practice, most (63.9%) chose to consult with a colleague. If using the Internet for this problem, most (57.0%) looked for medical

**Table 2 Facilitators of Internet Searching**

	<b>n = 2,414</b>	<b>(%)</b>
Knowing the sites I prefer	1,494	(59.8)
Access in my clinical setting	1,330	(53.2)
Having refined my searching skills	921	(36.8)
Available technical help	313	(12.5)
Designated time on my calendar for searching	185	(7.4)

**Table 3 Internet Barriers**

	<b>n = 2,364</b>	<b>(%)</b>
Specific information not available	1,335	(53.4)
Too much information to scan	1,201	(48.0)
Difficulty downloading information	606	(24.2)
Too slow	455	(18.2)
Software incompatibilities	301	(12.0)

literature. When unsure about diagnostic and management issues for a complex case, many chose to consult with a colleague (41.3%) or read from a text (22.8%). If using the Internet for this problem, physicians looked for medical literature (23.9%) or a guideline (14.5%). When asked about unfamiliar information from the Internet brought by a patient, the largest group (33.3%) would search on the Internet, looking primarily for medical literature (59.2%).

Male physicians were more apt to search for new information in a disease area ( $p = .01$ ) whereas female physicians more often sought information about a specific patient problem ( $p < .0001$ ). Physicians with more than 20 years

**Table 4 Sources Most Frequently Searched on the Internet**

	<b>n = 2,311</b>	<b>(%)</b>
Online journals	820	(35.5)
Professional association Web sites	630	(27.3)
Medical point-of-care databases	581	(25.1)
CME programs	212	(9.2)
Colleagues via e-mail	68	(2.9)

of experience more often sought new information in a disease area when compared to their younger colleagues ( $p < .0001$ ), and younger physicians more often sought information for a specific patient problem ( $p < .0001$ ). Compared with physicians practicing in rural areas, urban and suburban physicians searched online journals more often ( $p = .0004$ ).

Although there were significant increases ( $p < .001$ ) for barriers in 2003 compared with 2001,<sup>6</sup> the results have changed for 2005 (Table 5). The technical problems (difficulty downloading, slowness of the system, software incompatibilities) have decreased, but the specificity of available information continues to be a barrier ( $p < .0001$ ).

### Discussion

Patients present their physicians with questions and problems that are not readily answered. Although the structure of medical knowledge may not be supportive of answering specific patient questions, physicians most frequently turn to the Internet for just that reason, to search for information related to a specific patient problem. Previous studies have found that physicians seek comprehensive resources to answer questions that are likely to occur in

practice, with a focus on treatment and specific advice. They have asked for information that can be located quickly using strategies such as lists, tables, bolded subheadings, and algorithms and by avoiding lengthy prose.<sup>5</sup> For example, simply posting lengthy prose guidelines on Web sites designed for physicians is unlikely to meet these needs. Results of the present study point to colleagues remaining a vital source of information, perhaps in part because they may provide specific information quickly without extraneous material. As physicians pose questions, they gather new information to reflect and respond. While information gathering is only one part of reflection, managing those questions that require new information may be built into the workday more systematically. When they turn to the Internet for medical information, most respondents report that they find what they are looking for by using preferred sites, decreasing the time needed to find specific information by searching efficiently. Accessibility of Internet information in the clinical setting appears to reduce barriers to pursuing answers to questions posed in clinical practice. However, only 9% of physicians reported searching for information during a patient encounter. To date, the only information-seeking behavior that has widely penetrated the physician-patient encounter is palm

**Table 5 Comparison of Barriers in Internet Searching, 2003 and 2005**

Which of the following are barriers you experience on the Internet looking for clinical information?	2005		2003		$X^2$	$df$	$p$
	No.	(%)	No.	(%)			
Difficulty downloading information	606	(24.2)	1,900	(56.7)	616.1	1	<.0001
Specific information not available	1,335	(53.4)	1,516	(45.3)	37.6	1	<.0001
Software incompatibilities	301	(12.0)	648	(19.4)	56.9	1	<.0001
Too slow	455	(18.2)	965	(28.8)	87.6	1	<.0001



technology, most frequently used for drug dosage and drug interaction information.<sup>23</sup>

Difficulty finding material has been an important problem in answering questions about patient problems. Respondents in this study, as in studies using a similar sample,<sup>7,8</sup> continue to note “too much information to scan” as a barrier to Internet information seeking. However, strategies that physicians are using to access the Internet for medical information, particularly through preferred sites and in clinical settings, overcome 2 key barriers noted in previous studies: the lack of understanding of resources and poorly organized personal libraries.<sup>24</sup>

The key variable associated with motivation to seek medical information appears to be the knowledge explosion in the broad knowledge base required to practice primary care, rather than the setting itself (rural versus urban).<sup>7-10</sup> A strength of the Internet is equal access, not dependent on geography. However, the increase in barriers such as too much information to scan and lack of specific information may interfere with knowledge access.

Confidence has increased, with physicians more convinced they will find the information they seek; in fact, most reported that they were successful and experienced fewer technical problems. This is a major difference from what was reported in 2003 and suggests more efficient access to information through the Internet. However, a recent report that residents were not confident in their search skills and could not find time to review their performance<sup>13,14</sup> would argue for teaching competence in searching and self-assessment as core skills throughout the medical education continuum.

The limitations to the present study include lack of in-depth qualitative findings to more fully understand exactly which sources were consulted, the level of evidence sought, and the actual processes used to search. The role of new information in reflection is not yet clear. Reflection itself is a largely theoretical process that further study may help us more fully understand.

Future studies might include smaller samples that do not rely on self-report in looking at the strategies physicians use to search and a more in-depth study of the role of information gathering as one aspect of reflective practice.

Several barriers to information seeking may affect reflective practice. One study from 1985 reported that physicians overestimate their information seeking, underestimate their need for information, and misperceive their use of resources.<sup>24</sup> Likewise, lack of time, lack of understanding of appropriate resources, difficulty finding material, and poorly organized personal libraries all create obstacles.<sup>24</sup> As a delivery system for medical information and continuing medical education (CME) that has not previously existed, the Internet is beginning to address these issues. However, requests for increased specificity in response to practice-based questions without extraneous information have not resulted in major shifts in the way sites are designed for physicians or in the kinds of CME programs found on the Internet. Many CME Internet sites persist in using lengthy prose, with few concrete points for application.

Physicians are increasingly skillful in using the Internet to find clinical information, most often searching a specific patient problem. Fewer technical problems present barriers to information seeking, and knowing preferred sites makes searching more efficient. Professional association Web sites and medical point-of-care databases are noted as increasingly valuable. Physicians have made gains in their information-searching skills; CME providers must match those gains with programs that provide the kind of information that is important to physicians as they practice. The findings point to strategies for Internet CME development that will support physician learning. Further study will help us understand the relationship between reflective practice, information seeking, and the development of expertise. We must continue to assess practitioners' skills as information managers, identify the barriers they encounter in

### Lessons for Practice

- The most common reason a physician seeks medical information on the Internet is a specific patient problem, and younger physicians and female physicians seek specific patient information most frequently.
- Access in the clinical setting and previous experience enhance use of the Internet for clinical information seeking.
- Knowing preferred sites facilitates Internet searching.
- Training for residents and practitioners in identifying preferred sites may increase the success of finding medical information through the Internet.
- Skillful searching on the Internet is and will continue to be critical to gathering information as part of reflection on practice.

using resources like the Internet, and examine the role the Internet plays in facilitating reflective practice.

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