

Facilitating Physician Access to Medical Reference Information

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Abstract

Context: Computer-based medical reference information is augmenting—and in some cases, replacing—many traditional sources. For Kaiser Permanente (KP) physicians, this change presents both advantages and obstacles to finding medical reference information.

Objective: To improve understanding of physician information-seeking behavior and the barriers that limit use of both print-based and computer-based medical reference resources.

Design: During 2002 and 2003, two quality-improvement surveys were distributed to full-time KP physicians. Survey instruments sent by conventional mail and by e-mail were based on results of telephone interviews and focus groups, and were designed to be concise and easy to use. Participant response rates exceeded 83%.

Outcomes Measures: The surveys examined physician use of online medical reference information, medical libraries and services, self-directed learning resources, and continuing medical education (CME).

Results: Of the physicians who responded to the survey,

89% used online resources frequently to enhance care, to inform clinical decisions, to update knowledge, to educate patients, or for a combination of these purposes. Compared with responses from older physicians, responses from younger physicians showed a greater proclivity for using nearly all types of online information. Most physicians obtained CME credits primarily through in-person education programs; few physicians used self-directed electronic learning tools. Obstacles to effective access to information included lack of time, overly complex access methods, and lack of awareness about available resources.

Conclusions: A considerable gap exists between physicians' need for information and the resources currently available for delivering this information. Although we observed a clear shift from using printed medical references to using computer-based resources, many barriers prevent their effective use. Clinicians need easy-to-use, seamless systems of medical reference information that are accessible remotely anytime.

Introduction

Information technology is rapidly changing the way physicians access and use medical reference information. Traditional physician information-seeking behavior is evolving as a result of increased practice demands, rapidly expanding clinical evidence, and easier access to electronic information sources.^{1,2} In short, the clinician's trip to the health sciences library or to the printed medical journal or reference book is being replaced by computer-based resources.

To facilitate physician access to medical reference information in this changing environment, The Permanente Medical Group (TPMG) Physician Education and Development Department conducted two

internal physician surveys for quality improvement. The objective was to understand the spectrum of current physician information-seeking behavior within TPMG as well as to identify the barriers that limit use of both print and computer-based medical reference resources. The study findings provide an invaluable profile of physician users and nonusers of online medical reference information, Kaiser Permanente (KP) Health Sciences Library resources and services, and KP self-directed learning products. While delineating current obstacles to effective information use, these surveys also help us map a more effective strategy for future information delivery.

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Surveys of Physicians' Use of Information

The first survey, completed in November 2002, examined factors affecting physicians' use of electronic self-study resources for obtaining information and continuing medical education (CME) credit. Self-study media examined included online programs, compact discs (CDs), videotapes, and audiotapes. The study was distributed randomly to 421 full-time TPMG physicians—10% of the 4144-member physician staff of 37 KP Northern California medical centers and medical offices.

A second study, conducted from October 2003 through December 2003, examined physicians' use of medical reference information. In this study, a 17-question survey asked physicians about their use of KP on-site medical library collections and services as well as online reference resources. The survey was sent randomly to 520 full-time TPMG physicians—11% of 4791 clinicians practicing at 39 KP facilities.

In both surveys, the study samples reflected the overall mix of physicians practicing primary care medicine (45-47%) and specialty care medicine (53-55%) within TPMG. In many cases, the work of TPMG physicians involves a blend of primary care and specialty care roles. The distinction between these groups and their associated information-use behavior is not precise.

Methods

The process of surveying physicians has many potential pitfalls. Physician surveys commonly yield relatively low response rates as well as questionably representative results. A survey disseminated by mail or by e-mail frequently is likely to be ignored or given low priority in the course of a typical physician's busy, time-constrained schedule.³ Often, surveys do not appear important enough to warrant action. In soliciting self-reported data from physicians, an effective survey must communicate the value of participation, respect the clinician's limited time, and be highly convenient. A poorly designed survey that is difficult to use or seems only marginally important will probably yield a low response rate and thus produce weak or erroneous conclusions.

To avoid these hazards, both physician surveys described here were based on qualitative results of telephone interviews and on in-person focus groups, and were designed to be brief and easy to complete. The final instruments were also pretested and fine-tuned to enhance the clarity of the questions as well as the accuracy of responses. Surveys with personalized cover letters from the KPNC Regional Director of Clinical Education were distributed to the randomly selected physicians by both e-mail and interoffice mail. The mailed paper version included a thank-you card and a candy—a token incentive that also helped create the appearance of a lumpy, "must-open" envelope. Respon-

... nearly all TPMG respondents reported that a considerable gap remains between their needs and the information-delivery resources currently available.

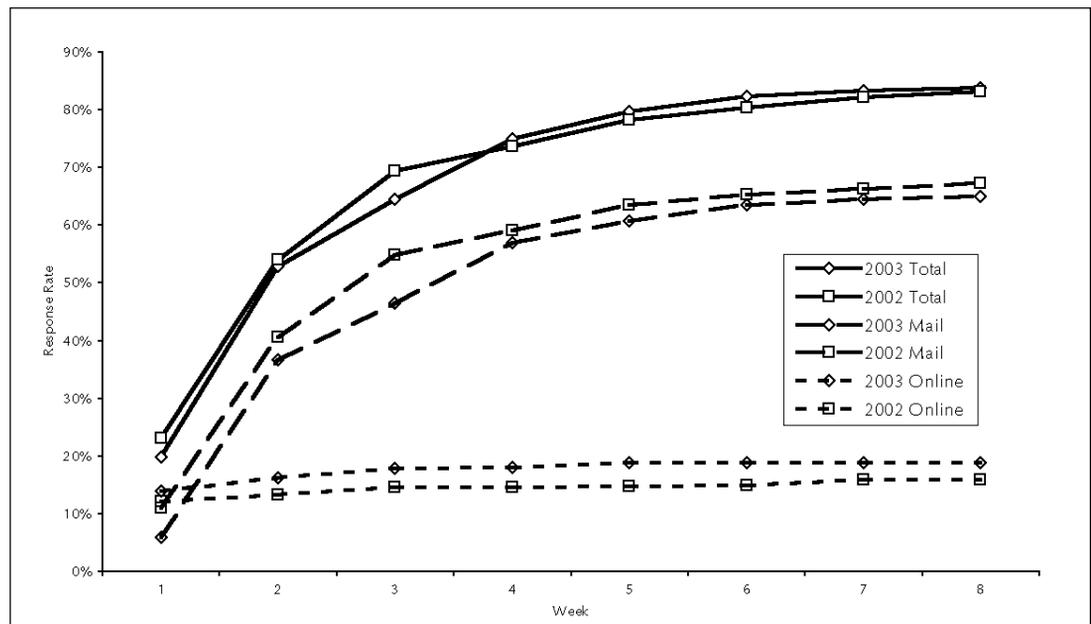


Figure 1. Mail, online, and total survey response rates for 2002 and 2003 TPMG physician surveys.

dents were asked to complete either the online or mailed paper versions. After two weeks, nonrespondents were sent a duplicate paper survey and an e-mail reminder.

The survey methodology proved very effective. In both surveys, the final response rate exceeded 83% (2002 survey n = 350, 83% response; 2003 survey n = 436, 84% response). Returned surveys were nearly always fully complete with few skipped questions, and 97% of survey participants responded within six weeks.

The mailed paper survey was completed by 78% of respondents; the online electronic survey, by 22%. Whereas most online surveys were completed in the first few days, the mailed responses took more than a month longer (Figure 1). Although digital information is permeating nearly every aspect of clinical care, many physicians still find paper processes efficient, convenient, and quick. As we shift toward computer-based resources, use of both paper and electronic methods of delivery will boost the response rates and validity of physician surveys.

Findings

The overall results of these two KP surveys suggest an important shift from use of on-site medical libraries and printed resources toward online, computer-based reference information. Drivers of this change include a need for more efficient, easier-to-use ways for physicians to access the wide range of information required to provide high-quality patient care in a decentralized, time-constrained work environment. This shift may also reflect the increased computer experience, skills, and preferences of younger physicians entering practice. However, nearly all TPMG respondents reported that a considerable gap remains between their needs and the information-delivery resources currently available.

Use of Internet-Based Medical Reference Information

In the 2003 survey, the vast majority of physicians (89%) reported frequent use of online medical information resources at work to enhance care, to inform clinical decisions, to update knowledge, to educate patients, or for a combination of these purposes (Table 1). The most commonly accessed information included peer-reviewed medical journals, drug information, and health care databases. Respondents reported using online information resources at least weekly (72%), daily (31%), and several times per day (9%) (Table 2). By comparison, a January 2003 study of 3347 American Medical Association physicians reported that 60% used the Internet for clinical information at least weekly and

Table 1. Typical uses for online medical reference information

| | |
|--|-----|
| Inform a clinical decision for a specific patient | 74% |
| Stay informed and update my clinical practice | 63% |
| Educate patients and their families | 40% |
| Prepare for presentations, talks, or teaching | 35% |
| Train or inform other clinicians | 20% |
| For research projects or authoring articles or books | 9% |
| For school, credentialing, or licensure | 5% |
| Don't use online medical information | 8% |

Medical Reference Information Use Survey (2003)

Table 2. Frequency of accessing online medical reference information in the past 12 months

| | |
|--------------------------------|-----|
| Very often (several times/day) | 9% |
| Often (daily) | 21% |
| Sometimes (weekly) | 41% |
| Rarely (monthly) | 20% |
| Almost never | 8% |

Medical Reference Information Use Survey (2003)

Table 3. Most frequent location and time of access to online medical reference information

| | |
|--|-----|
| At work – during scheduled hours | 72% |
| At work – before/after work, during breaks | 58% |
| At home – off hours or days | 30% |
| Away from work or home | 3% |
| Don't use online medical reference information | 7% |

Medical Reference Information Use Survey (2003)

that 23% did so daily.¹ The TPMG physicians also indicated that they accessed online information mainly at work (89%) compared with access at home (30%) or elsewhere (3%) (Table 3).

A generational shift toward using computer-based resources was clearly evident when we compared younger, newer physicians (≤ 5 years in practice) to older, more experienced physicians (> 10 years in practice). Survey responses from younger physicians showed a greater proclivity toward using nearly all types of online information sources, including peer-reviewed medical journals, medical textbooks, patient handouts, practice guidelines, and MEDLINE-type databases (Table 4). In addition, compared with older physicians, younger physicians accessed online resources more frequently and in greater percentages, both at work and home. Newer physicians were more familiar with available resources and with how to find full-text articles online; they also were more likely to use online information to inform their clinical decisions and to update their knowledge.

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Table 4. Comparison of medical reference information use by younger, newer physicians and by older, more experienced physicians

| | ≤ 5 years in practice | >10 years in practice |
|---|-----------------------|-----------------------|
| Accessed online reference information: | | |
| Weekly | 84% | 64% |
| Daily | 41% | 23% |
| Used online reference information: | | |
| At work | 92% | 88% |
| At home | 36% | 24% |
| Types of online reference information used: | | |
| Journals and articles | 67% | 55% |
| Medical books | 38% | 19% |
| Patient handouts | 34% | 25% |
| Practice guidelines | 36% | 31% |
| Medline and health care databases | 43% | 36% |
| Drug information | 46% | 56% |
| Physician unfamiliar with: | | |
| Resources available online | 17% | 29% |
| How to find full-text articles and resources online | 14% | 39% |

Medical Reference Information Use Survey (2003)

Use of Kaiser Permanente Health Sciences Libraries

In the past, one of the most common sources of medical reference information for KP physicians has been the on-site medical library. With expansion of medical campuses and with the addition of remote medical office buildings, this situation may now be less common. Although KP medical libraries measure number of users and frequency of providing service, historically we have not well understood the information-seeking needs and behavior of physicians who do not use on-site KP libraries.

The 2003 survey showed that physicians who use KP medical libraries are highly satisfied with the quality of available services and collections. However, the findings also show that many physicians “rarely” or “never” use KP medical libraries: 54% never requested a resource or service in person, and of those who did, 87% requested a resource or service four or fewer times per year (Table 5). Similarly, 47% never used the library collections on their own, and of those who did, 86% used them four or fewer times per year. Only 5% requested a resource or service in person more than once per month, and only 7% requested such services by telephone, fax, or e-mail more than once per month. The services most commonly sought were help obtaining full-text articles, other information, and literature searches. Examination of generational differences showed that newer physicians were less familiar with (and therefore less likely to use) library services or collections than were older, more experienced physicians.

Concerns about time and convenience imply that most physicians would prefer to access library resources remotely from their office, clinical workplace, or from home by telephone, fax, or computer. Of those who described their medical library location as “inconvenient,” 62% were located at facilities associated with on-site libraries. This suggests that for some physicians, even a short distance—a block, building, or floor away—may be an obstacle to using a facility’s on-site medical library.

This trend is not inconsequential and may reflect changes in the demographics, training, computer skills, and increased receptivity of new physicians to using computer-based information and applications.² In part, the overall shift in information use within TPMG may be due to an influx of new physicians. In the 2003 survey, 29% of respondents had been practicing for five years or less, and 44% had been employed with TPMG for five years or less.

Overall use of online medical information did not differ substantially between primary care and specialty care physicians. When the analysis was adjusted for number of years in practice, a similar proportion of each group was observed to access and use a broad range of online resources. Primary care and specialist physicians probably seek different kinds of information from very different sources at different points in the cycle of care. This difference could be examined in future studies.

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Table 5. Frequency of accessing medical reference information through a Kaiser Permanente medical library in the past 12 months

| | Very often (once per week) | Often (twice per month) | Sometimes (once per month) | Rarely (once to four times per year) | Never |
|--|----------------------------|-------------------------|----------------------------|--------------------------------------|-------|
| Requested a resource or service in person | 1% | 4% | 8% | 33% | 54% |
| Requested a resource or service by phone, fax, or e-mail | 2% | 5% | 8% | 35% | 51% |
| Used the library’s journals and books on my own | 2% | 9% | 16% | 27% | 47% |
| Used library’s computer on my own | 1% | 3% | 4% | 15% | 76% |

Medical Reference Information Use Survey (2003)

Use of Computer-Based Media for Self-Study and CME

As KP physicians migrate toward using the Internet for medical reference and for just-in-time information, one might assume that they are also using electronic media for education and self-study. However, this assumption may not accurately describe most TPMG physicians. Our 2002 survey indicates that relatively few used the Internet, interactive CDs, videotapes, or audiotapes for formal self-study or to obtain CME credit. Instead, most physicians obtained most of their CME credits through a broad variety of in-person education programs and conferences. Primary care physicians were more likely than specialists to obtain CME credit through KP-sponsored programs.

CME credit alone does not appear to be a primary motivator for seeking clinical reference information or for completing self-directed education programs. Survey respondents said that the key factors affecting their choice of CME are “convenience,” inclusion of “evidence-based information,” and “cost.” Our 2002 survey also found that only 13% of TPMG physicians reported that they have difficulty obtaining sufficient annual CME credits. These few were disproportionately newer physicians, who probably were preoccupied with new clinical responsibilities and lacked familiarity with the CME process and local CME program offerings.

Barriers to Improved Information Access

Clearly, many Permanente physicians, if not most, are ready to incorporate computer-based reference information into daily patient care. But TPMG physicians reported that their access and use of online resources were limited by several key factors: lack of time during work hours, overly complex access, and lack of awareness of what is available (Table 6). When asked in the 2003 survey how often they were able to access medical reference information they needed “quickly or efficiently,” 43% said “never,” “rarely,” or “sometimes,” and 57% indicated “often” or “very often.” Regardless of current level of use, nearly all physicians in the study supported increased awareness of resources, easier remote access, greater convenience, ongoing training delivered more frequently, and online availability of more full-text journals and books (Table 7). Similarly, many clinicians indicated in the 2002 survey that they would use self-directed learning resources more often if they were more convenient, accessible, and user-friendly.

Table 6. Obstacles to obtaining online medical reference information

| | |
|---|-----|
| I don't have enough time | 66% |
| I don't know how to find full-text articles and other resources online | 30% |
| I don't know what resources are available online | 28% |
| The information I need is not available online (eg, full-text journals) | 24% |
| I have limited access to a computer or high-quality Internet connection | 11% |

Medical Reference Information Use Survey (2003)

Table 7. Opportunities for improving access to medical reference information

| | |
|--|-----|
| Increase my awareness of resources and services available through the KP library | 58% |
| Training in online information access and searches | 52% |
| Improve user-friendly ways to access and use online information | 52% |
| More full-text journals and books available online | 45% |
| Better computer or Internet access at work or at home | 30% |
| More journals and books available in the library | 20% |
| Improve service or turnaround time at the library | 10% |

Medical Reference Information Use Survey (2003)

Implications

The way in which physicians seek and access medical reference information is undergoing major change. The key driver of this change is a need for up-to-date, evidence-based information systems that support immediate clinical decisions and patient care yet accommodate geographically dispersed services as well as the schedules of busy physicians.^{4,7} The need is amplified by an influx of young, computer-savvy physicians.² Reference resource systems must deliver information that helps physicians to both update their knowledge base continuously and improve care while facilitating navigation and management of an increasing volume of new reference literature.^{4,5}

While many physicians lack sufficient time to use on-site medical libraries, they also are having difficulty using online reference resources effectively. These physicians report a range of barriers: online information is too voluminous to sort through, information is not specific enough, and search tools and interfaces are too complex and confusing.^{1,6} Frequently, physicians are hindered because they are not aware of what is available or how to locate a specific resource most efficiently.^{1,6,8} A clear gap exists between the needs of physicians for information and our current ability to deliver it.^{2,4}

Clinicians need computer-based medical reference information to be more accessible through simple, easy-

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to-use applications available anytime at the point of care, in the office, and at home.^{4,7} The information and services available through KP Internet reference sites and KP Health Sciences Libraries must be effectively integrated into a more seamless resource that can be used on-site or remotely. Physicians' chronic shortage of time is unlikely to change, but we can make essential reference information easier for them to access and use.

Although physicians express a desire for more sophisticated online information resources, they also need greater awareness of—and more help in using—computer-based tools and on-site library resources.⁵ Medical librarians play a critical role in bridging physician information needs, inadequacies of online information, and limitations of on-site libraries. Librarians can help to raise physicians' awareness of available resources and can provide training in their effective use. As long as the web of disparate information sources remains complex, confusing, and poorly integrated, the skills of medical librarians will be essential for helping physicians to navigate, search for, and obtain pertinent clinical reference information. Like online resources, on-site medical library resources and services also must be conveniently available to clinicians in remote locations.

Investment in training physicians and other types of clinicians to use medical information resources and library services will ultimately enhance clinician education, quality of care, patient education, and clinical outcomes.³ Considering the percentage of newer and younger physicians entering the KP system, an opportunity also exists to enhance and benefit from their increased computer skills and orientation.²

As we move toward new and expanded digital systems of information and clinical care, we need more accurate views of physicians' preferences and information-seeking behavior.⁴ We can no longer presume that we know how physicians seek or use medical reference information or what barriers prevent physicians from efficiently gaining access to this information. A simple solution is to ask physicians about their needs and behavior by using methods that are unbiased, representative, and scientifically sound. We simply cannot continue to create vast, data-dense networks of information while not fully understanding or accommodating physicians' desires and needs for effectively accessing and applying it to patient care.⁹

Within KP's integrated system of health care, many diverse opportunities exist for linking clinicians to needed, just-in-time medical reference information. Online tools must be simplified, easier-to-use, and augmented by coordinated, systemwide library services. Information must be readily available anytime from physicians' offices and homes to points of care. Physicians also will benefit from ongoing training opportunities and from increased awareness of information sources and tools. In addition, the skills of younger, more computer-oriented physicians should be leveraged to assist and mentor more clinically experienced physicians in accessing computer-based resources. ❖

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