
Information needs of the rural physician: a descriptive study*†

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The study was designed to describe the information needs and the information-seeking behavior of rural physicians. Data were collected from twelve rural physicians in Central Florida through face-to-face interviews and observation. From a review of 144 patient charts, 48 produced unique, factual patient care questions. Seventy-five percent of the questions were on treatment, 14.7% on diagnosis, 8.3% on etiology, and 2.1% on the psychological aspects of disease. All physicians in the survey relied on colleagues; eleven attended medical meetings; nine subscribed to medical journals, and nine owned medical textbooks. Of the physicians with access to a hospital library, two used the library frequently while ten seldom used the library. Lack of time due to heavy workloads was an obstacle to systematic information retrieval. Rural physicians need immediate access to high-quality, synthesized answers to specific patient care questions at the time of patient contact. Information must be concise and up-to-date, although not necessarily state-of-the-art. A database composed of selected textbooks with integrated keyword access would meet the criteria. In addition, a computerized expert system focused on rural physicians' information needs is a possible remedy for the existing problem.

Physicians face numerous challenges in keeping their practice current. They are inundated with information through the rapid emergence of new computer databases, which provide access to an increasing number of articles, reports, and monographs pertinent to both general and specialized practice [1]. Unfortunately, many physicians are reluctant to employ the latest technology, and, as a result, they may want for information in an information-rich environment [2]. Yet recent judicial decisions and legislative actions compel physicians to stay abreast of current information in their fields [3]. Furthermore, state laws

require continuing education classes, which demand that physicians acquire even more information [4].

The literature cites additional obstacles faced by rural physicians, due primarily to their isolation. Additional barriers are created by difficult conditions such as the demands of a strenuous practice [5] combined with the stress of a high morbidity and mortality rate among rural patients [6], the general shortage of rural physicians [7], and frequent hospital closings [8]. These scenarios are additionally constrained by inadequate information services [9].

Published research on physicians' information-seeking behavior includes studies on how physicians obtain information on new medical findings [10], new prescription drugs [11], and the contribution of information services to clinical care [12]. Research on the use of technology by physicians includes studies on computer use [13], end-user searching [14-15], and computerized information networking [16].

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Several significant studies examine the information needs of rural and nonrural physicians by exploring sources of medical information [17-24]. Researchers consistently cite physician colleagues and medical literature as the most frequently used sources of information; however, rankings vary in terms of which source the physicians consult first. Professional medical meetings, pharmaceutical representatives, and medical computerized searching programs also are common sources of clinical information.

The present study was designed to examine the information needs and the information-seeking behavior of rural physicians and to describe the questions and related issues that arise in daily clinical practice. The study describes the impact of a hospital library on the information needs of rural physicians in the workplace. The following questions were addressed: What are the major information needs of the rural physician with access to a hospital library, compared to those of the rural physician without access to a hospital library? What importance is placed on information sources by rural physicians with hospital library access, compared to rural physicians without such access? What are the obstacles to information gathering perceived by rural physicians with hospital library access, compared to rural physicians without such access? In addition to currently used information sources, what modes of information retrieval would the rural physician with hospital library access prefer, compared to rural physicians without such access? What is the impact of a hospital medical library on the information-seeking behavior of its rural physician users?

METHODOLOGY

The study utilized descriptive methodology through the application of a case study of a small sample of rural physicians. The sample was equally divided between individuals with access to a qualifying hospital library and those without such access, to provide comparative data on the information-seeking behaviors of both groups. The case study method is especially useful in furnishing insights and in-depth data for comprehensive research.

Sample communities and libraries

Six rural communities in Central Florida were used in the study. These communities have transient populations, ranging in size from 2,260 to 16,489 residents. The primary industries are winter tourism and agriculture.

Although five of the communities had hospitals, only three of the five hospital libraries met the study's minimum standards to qualify as comprehensive information resource centers. The three comprehensive

libraries met five of the selected standards enumerated in the library services section of the *Accreditation Manual for Hospitals, 1989*, published by the Joint Commission on Accreditation of Healthcare Organizations. These five standards concerned appropriate personnel, adequate information sources, networking, and written policies and procedures. The three hospitals with qualifying libraries all had more than fifty-one beds.

The number of journal subscriptions in the three hospital libraries ranged from four to seventy, the number of books from 65 to 500. These figures reflect the disparity and diversity among medical collections in rural communities.

All three libraries had a part-time manager. Each manager maintained minimal library bookkeeping, ordered and processed books and journals, and organized and shelved the materials. Only one of the three hospitals designated an area for exclusive use as a library; in the other two, the library shared space with another department. All three libraries provided photo duplication and interlibrary loan, and one provided on-site bibliographic searching. The two hospitals without on-site bibliographic search capabilities had access to external search services.

Sample population

The study targeted physicians serving rural communities (i.e., less than 25,000 people) as defined by Bernard Vavrek for work done at the Center for the Study of Rural Librarianship, Clarion State College, Clarion, Pennsylvania [25]. Twelve physicians in Central Florida served as the sample group. Six of these physicians had access to a qualifying medical library in their vicinity, while six did not. The sample was chosen after an extensive search to identify physicians who agreed to participate. Producing this small sample took considerable effort, patience, and accommodation.

The ages of the physicians in the sample ranged from mid-twenties to older than sixty. Six physicians were in individual practice, while the remaining six engaged in group practice. Nine of the physicians were in family practice or internal medicine, while the other three specialized in obstetrics and gynecology, gastroenterology, and radiology. They attended ten different medical schools, three located outside the United States.

The physicians' reports revealed that the average number of patients was thirty-five to forty per day, while the range was six to sixty per day. The average work day was ten to twelve hours of office practice, hospital rounds, and hospital committee work.

The physicians expressed diverse reasons for choosing a rural community. The reasons included an expectation of lucrative practice, family commit-

ments to rural communities, dissatisfaction with academia, interest in older patients, interest in a diversified medical practice, fulfillment of a requirement for permanent residence in the United States, and fulfillment of a government obligation as repayment for medical school tuition.

Data collection procedures

The semistructured interview technique was used to collect information from each physician, because this approach is flexible and places few restrictions on respondents' answers. The interview and data-gathering process for each physician consisted of four parts:

- The information sources in the physician's office were tabulated through observation and compared to sources available for immediate answers to clinical questions.
- Sources of information in the local hospital library were recorded and tabulated.
- The charts of patients seen by the physician following half a day of office practice were reviewed and discussed with the physician to identify questions resulting from patient visits.
- Further interviewing elicited the general feelings of the physicians regarding their information needs in the rural clinical setting.

RESULTS

Question 1: information needs

Patient care questions were determined through a review of 144 patient charts. Forty-eight charts (33.4%) each produced one unique, factual patient care question; 75% of the forty-eight questions concerned treatment. Table 1 presents the data. The questions make it clear that this sample of rural physicians needed information for patient care.

The six physicians with access to a hospital library had twenty-two patient care questions in half a patient day. The six physicians without access to a hospital library had twenty-six questions. Types of questions varied somewhat between groups, but frequency rankings of categories were the same.

Question 2: information sources

The leading sources of information for rural physicians in this study were, in order of frequency: colleagues, medical meetings, journals, books, and libraries. The emphasis was similar among physicians with and without hospital library access.

Colleagues. All physicians in this study communicated with colleagues because this method could provide an immediate, accurate, and reliable answer to

Table 1
Patient care questions

Unique questions	Physicians with library (%)	Physicians with no library (%)	Total (%)
Treatment	15 (68.2)	21 (80.8)	36 (75.0)
Diagnosis	4 (18.2)	3 (11.5)	7 (14.7)
Etiology	2 (9.1)	2 (7.7)	4 (8.3)
Psychological	1 (4.5)	0	1 (2.1)
Total	22 (100)	26 (100)	48 (100)

a patient care question while the patient was still in the office. Physicians communicated informally with colleagues on a regular basis to discuss patient care questions. Although some calls were long-distance, most physicians preferred to talk to colleagues with whom they were in practice or who resided in the same town. For formal referrals, rural physicians referred patients with formidable medical problems to a medical specialist in the same city when available; more frequently, the specialist was in a larger, neighboring city. The transfer of patient care information occurred through discussion of the patient's medical problems and the receiving physician's review of the referral report.

A colleague thus served as an easily accessible source, usually saving the time and effort required to consult books and journals (even those in the inquiring physician's private collection). Physicians said they knew whom they could trust to give reliable information and to maintain confidentiality.

Medical meetings. Most physicians attended local medical meetings (91.7%) and national meetings (83.3%). There were no real differences related to access to a qualifying hospital library. Physicians attended meetings to exchange ideas with colleagues, to take educational courses, to stay up-to-date on current medical practices, to view new medical equipment, and to purchase books from vendors. Although not a primary source of answers to specific patient care questions, medical meetings served as a valuable source of general medical information.

Journal subscriptions. Journals served as a source of information for most physicians; however, three physicians did not subscribe to any journals (25%). Five physicians (41%) had one to eight subscriptions, and three had more than nine.

Of the six physicians with access to a hospital library, three purchased fewer than four subscriptions; of those without access, only one purchased fewer than four subscriptions. The reverse was true regarding purchase of six or more journal subscriptions. Three of the physicians without access to a hospital library purchased at least six subscriptions, compared

Table 2
Journal subscriptions

No. of subscriptions	Physicians with library (%)	Physicians with no library (%)
0-3	3 (50.0)	1 (33.4)
4-5	2 (16.7)	2 (16.7)
6-9	1 (33.4)	3 (50.0)
Total	6 (100)	6 (100)

to only one of the doctors who had access. Table 2 displays these results.

Library access did not account for the differences in subscriptions, because the physicians said they used the library infrequently. Stated another way, it appears that, although physicians with access to a hospital library had fewer subscriptions, they did not compensate by using the library.

Books. The number of books owned by physicians was based on either an estimate of the number of books on display in offices or the number provided by the physicians. The numbers varied widely among the doctors. The number of books ranged from zero for three physicians to more than 200 each displayed by two physicians. The number of books clusters at the extremes: eight physicians owned fewer than eleven books each, while the remaining four owned more than thirty-one books each. Table 3 displays this data.

None of the physicians with access to a hospital library owned more than ten books. The other group had considerably more. All physicians without access to hospital libraries owned more than five books each; four of these physicians (66.7%) had more than thirty-one books. However, library access probably did not influence book ownership, because physicians with access do not use the library regularly.

Library. Very few physicians used a medical library. Of the six physicians with access to a hospital library,

Table 3
Books

No. of books	Physicians with library (%)	Physicians with no library (%)
0	3 (50.0)	0
1-5	0	0
6-10	3 (50.0)	2 (33.00)
11-20	0	0
21-30	0	0
31-40	0	2 (33.30)
200+	0	2 (33.30)
Total	6 (100)	6 (100)

only one used the library frequently, while three almost never used it. Thus, any differences in characteristics such as book ownership most likely were due to individual choice. This kind of result is not unusual in a small sample.

Summary. This research shows several similarities in the two groups' use of information sources. All physicians seem to rely heavily on colleagues for information. Eleven of the twelve physicians attended medical meetings, and all said they usually attend some continuing education program at those meetings. In addition, nine physicians subscribed to medical journals, and nine owned medical textbooks. Almost none of the physicians used the hospital library when it was available.

Question 3: obstacles to information retrieval

Although colleagues, medical meetings, journals, and books provided information for rural physicians, there were obstacles to the retrieval of information from these sources. For example, doctors sometimes were hesitant to contact colleagues regarding patients, medical meetings usually were not productive in answering on-the-spot patient care questions, answers to questions were difficult to locate in journals, and books were frequently out-of-date or not owned.

Physicians cited lack of time as an underlying obstacle to all information retrieval for patient care. They explained that when they worked ten to twelve hours a day, they did not have time or energy to locate answers in books and journals or to seek help in the hospital library. Even if the physician were convinced of the value of library information, lack of time was a major deterrent. This phenomenon reflects how priorities change regarding information needs when answers are not easily accessible.

Question 4: preference for additional services

Physicians expressed a desire for immediate, easily accessible, concise, organized, and high-quality information. Although the computer can deliver such results directly to the physician's office, doctors in this sample were not inclined toward its use. The general level of interest in computers was gauged during the interview and results are reported in Table 4.

Ten of the twelve physicians said they did not use computer-produced bibliographic searches from any source. All physicians expressed a need for answers to patient care questions, not just bibliographic citations and the subsequent delivery of reprints. Because answers to specific questions were needed when the patient was in the office, bibliographic citations were not considered useful for patient care questions.

Nine physicians (75%) indicated they were not interested in personally searching bibliographic databases. They declined a hypothetical offer of personal instruction in the use of the computer and in searching. The lack of interest in computer searching was attributed to its expected failure to provide answers, as well as time limitations.

Physicians expressed an intellectual curiosity in online searching and some interest in having search results provided if available in a timely fashion at minimum cost. Bibliographic citations were considered far less desirable, however, than were direct answers to patient care questions.

Question 5: impact of the library

The study found that a medical library had little impact on the information-seeking behavior of rural physicians. All six of the physicians with access to a qualifying hospital library were aware of the library's existence; however, five said they used it infrequently at most.

Although more journals and books were purchased by physicians without access to a qualifying library, the reasons were not clear. The minimal library use indicates that differences in purchase of resource materials likely are attributable to individual differences in personality, intellectual curiosity, and desire.

CONCLUSION

The results of this small-scale study indicate that rural physicians need immediate access to high-quality answers to patient care questions at the time of patient contact. They need factual material to answer questions that exceed the scope of their routine practice. Physicians have very little time to pursue information; therefore, information must be immediately accessible, concise, high quality, presynthesized, and up-to-date (although not at the experimental state-of-the-art level).

This study confirms that colleagues remain the primary source of answers to patient care questions. Colleagues are familiar, reliable, immediately available, and inexpensive; they give concise, organized answers that synthesize available information.

The study also shows that physicians have many unanswered questions and that the information sources currently used are not sufficient; therefore, additional sources of patient information and new modes of information delivery need to be investigated and implemented.

These results suggest that the medical library profession might consider the positive factors associated with the colleague during the development of alternative information retrieval systems designed for the rural physician. Specifically, the information source

Table 4
General interest in computers

Level of interest	Physicians with library (%)	Physicians with no library (%)
Very interested	1 (16.7)	1 (16.7)
Moderately interested	3 (50.0)	5 (83.3)
Not interested	2 (33.4)	0
Total	6 (100)	6 (100)

must provide the answers to specific questions. Additionally, the information must be concise, relevant, and synthesized for rapid comprehension and immediate use by the physician. The information must be verified as quality filtered and its cost must remain reasonable.

Textbooks in internal medicine and family practice contain information that meets the criteria of reliability, familiarity, and brevity; unfortunately, most rural physicians do not have the current editions of any of these textbooks. Therefore, to meet the needs of the rural physician, the authors recommend that the full text of several internal medicine textbooks, family practice textbooks, and ten to fifteen broad specialty textbooks be placed online with integrated keyword access. Full-text searching of textbooks already is available online and on CD-ROM; however, the focus is on individual textbooks (e.g., the *Oxford Textbook of Medicine* on CD-ROM) or a combination of specialty textbooks not relevant to the broad information needs of rural physicians. Because the technology is available, adapting it to the needs of rural physicians is feasible, although the issues of copyright and royalties would need to be addressed.

The authors also recommend that the National Library of Medicine (NLM) develop a computerized expert system containing concise, synthesized medical information to answer patient care questions while the patient is in the office. This expert system could be directed specifically at rural physicians. Because rural physicians refer outpatients with complicated medical problems, specialized areas of medicine need not be included in this database. The intent of the system would be to supplement the existing National Library of Medicine databases.

Recommendations for further study

Further research should be undertaken to determine if physicians would be willing to access a database from a personal computer if the database provided a synthesized answer to a patient care question while the patient was in the office. It is important to determine the mode of delivery that would meet the needs of the busy physician. The examination should explore the use of clerical personnel to retrieve infor-

mation. Physicians typically delegate all clerical work and might delegate information retrieval.

Future study also should investigate more carefully the role of the hospital library. There appears to be a role or potential for influence that has gone unused in the rural environment.

As this topic is explored further, medical librarians will begin to comprehend the nature of the alternatives they have. Serving the needs of rural physicians by providing them with up-to-date, relevant information represents an enormous challenge, but it is one that must not be avoided.

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