

The Information Needs of Practicing Physicians in Northeastern New York State*

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ABSTRACT

The information needs of practicing physicians in seventeen counties of upstate New York were surveyed by questionnaire. A 45.6% response, or 258 usable replies, was obtained. Computer-aided market analysis indicated that the areas of greatest need for improved information were new developments in specialties and government regulations relating to health care. Sources most frequently used were journal papers, colleagues, and books, in that order. Specialty-related differences occurred with both specific information needs and source use. Degree date, geographical location, and type of practice (hospital, nonhospital, private, and so on), and involvement in research or education were also analyzed in relation to information needs and sources. Implications for library service are discussed.

IN the interest of improved health care delivery, federal legislation enacted in 1974 (National Health Planning and Resources Development Act) provided for the creation of a number of new Health Service Areas (HSAs), each to be served by a health systems agency. In order that health care information may keep pace with health care delivery, the Regional Medical Library Plan for New York and New Jersey designates a Health Service Area library for each of the new HSAs, to coordinate library services to health professionals. The Schaffer Library of the Health Sciences, Albany Medical College, is the designated HSA library for a seventeen-county region of upstate New York known as HSA V. Planning for the development of library services in this area has been hampered by a lack of data about the needs of health care professionals and their use of the in-

formation resources now available to them. This study is a first attempt to gather and interpret such data with respect to a broadly based population of practicing physicians, including both actual and potential library users. It is hoped that the study, begun at the request of the management of the Schaffer Library, will eventually be extended to include a variety of health professionals.

BACKGROUND

Most studies on clinician use of biomedical information which have appeared in the literature of the past decade are largely theoretical, or are limited to the users either of single libraries or of particular library services such as MEDLINE. Few library-initiated surveys have been undertaken with the express purpose of market analysis in its primary sense of determination of real need as distinct from promotion of resources or products. (Massey's discussion of this concept is helpful toward an understanding of marketing philosophy and techniques as applied to libraries [1].) Some reports approach the goals of market analysis in transcending the limitations of the typical "user survey." A study by Mayeda in 1969 [2] revealed that practicing health care professionals require information in forms and amounts which differ substantially from those desired by researchers and academicians. The author concludes that there should be some "innovative regrouping" of all types and sources of information, to allow practicing physicians to benefit from a national network as much as do non-practitioners. A Canadian survey in 1973 [3] indicated that practicing physicians in Ontario made little use of libraries because they had no time to search for information beyond what they could obtain quickly from colleagues or from reference material in their own collections. (These survey results may not apply to physicians in the United States, however, particularly in urban areas.) Analysis of follow-up interviews with thirteen phy-

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sicians in the Ontario study suggested that information needs should be classified according to type (such as drug, diagnosis, or treatment), urgency, reason for need (for a specific case or for current awareness), and ways to obtain information easily, with attention to preferred sources and forms.

Self-education patterns among 390 staff physicians, interns, and residents were investigated in Toronto [4,5]. A majority of respondents expressed a desire for instruction in coping with the flow of medical literature; fewer than half had been taught to use *Index Medicus*, and 25% reported that they had never heard of *Excerpta Medica*.

Harris's extensive review of studies on the medical communication sources available to physicians [6] demonstrated that although the average physician fifteen years ago was being inundated with a variety of information, he was nevertheless inadequately informed, because he was not using the sources. Currie reports on more recent media marketing research [7] which suggests that the flood of information from periodicals received by physicians may not be as severe a problem as it once was, though health science librarians are not likely to agree with this observation. Possible reasons advanced for improvement include both better presentation of material by periodicals and more sophisticated information retrieval by physicians. The function of libraries and computerized search services in reducing information overload was apparently not investigated.

PURPOSE OF STUDY

The present study was designed as a market survey of specific health care information needs throughout one Health Service Area, and it was intended to serve as a basis for reviewing library aims in that area, with respect both to what information is provided, and ways to reach those who need it. One assumption underlying the project was that health care practitioners actually do perceive a distinct need for improvement in the quality of their information in certain professional subject areas. We proposed to test that assumption. Other areas of investigation were: the use of various types of information sources as affected by professional specialty, recentness of training, geographic location, involvement in academic medicine (education or research), type of practice (hospital, nonhospital, private); the urgency with which most information needs must be met; and

the level of satisfaction of those practitioners who use library services.

TARGET POPULATION

The group from which the physician sample was drawn consisted of those medical doctors in HSA V included in the machine-readable data files of the Northeastern New York Health Service Agency. Data in the files were collected from area hospital staff lists during the period from March 1974 to July 1975. The primary listing did not include administrators, residents, interns, or psychiatrists. Only physicians at least minimally engaged in practice and affiliated in some way with a hospital were listed. A systematic sample of approximately 40% was drawn from each of the seventeen counties included, the 592 names thus obtained representing about 28% of all licensed physicians in the area as of May 1975.

QUESTIONNAIRE

A four-page questionnaire was developed, the most important parts of which allowed respondents to evaluate their "need to know" and "quality of present information" in a list of given subject areas, and to rate the frequency with which they used a number of randomly ordered channels of information. Other questions solicited data about the respondent's background, involvement in educational programs, and use of libraries. The questionnaire was pretested on a small group of doctors at the Albany Medical Center Hospital, and after minor changes, it was distributed by mail during June 1976 to the 592 physicians in the sample. These first mailings, with each questionnaire assigned a unique code number, were addressed to the hospital of primary affiliation in an effort to cut costs. A second mailing to nonresponding physicians at their office addresses boosted a rather low initial return rate (28%) to over 45%. Final returns were calculated after adjusting the sample totals for undeliverable questionnaires and for those physicians who had retired or had died since the last hospital staff list update.

DATA PROCESSING

Returns were coded for seventy-eight separate data elements, which were then keypunched onto IBM cards and verified. Open questions were dealt with manually. The encoded data were processed by a Univac 1110 computer, using the "Frequencies" and "Crosstabs" subprograms of

the *Statistical Package for the Social Sciences (SPSS)* [8].

RESULTS

Characteristics of Respondents

The overall response rate was 45.6%, or 258 usable replies, representing about 12% of all licensed physicians in HSA V. Of these 258 physicians, 12.9% had received their medical degree from 1965 on, 32.9% from 1955 to 1964, 22.5% from 1945 to 1954, and 31.7% before 1945. Classified by type of practice: 53.3% were in private practice, 14.4% in group practice, 27.2% working in a hospital or clinic, and 4.3% "other," the last category including eight full-time medical college faculty members. Family practice (16.3%), internal medicine (13.2%), and pediatrics (10.5%) dominated the list of primary specialties (Table 1 gives a partial breakdown of this list). Another 27% fell into the "other" category, including twenty-three additional specialties with from one to six respondents in each category (for example, orthopedic surgery, six; pathology, five; rheumatology, four.) Thirty-nine percent of respondents listed a secondary specialty. Most of those (64%) fell into the narrow "other" categories, with the next largest group, some 15%, listing internal medicine as their secondary specialty.

Geographically, the respondents were 46.9% urban, 18.9% suburban, and 28% rural, with a small minority listing some combination of these.

Nearly 20% of the doctors were engaged in a medical research project; half of these doctors were hospital-based.

The average number of memberships in professional organizations for each physician was 3.6, with 34% claiming four or more memberships. Only three doctors said they belonged to no group. Respondents were asked to list up to three of the organizations of which they were members. Most frequently mentioned were: New York State Medical Society (43.4%), American Medical Association (39.1%), various county medical societies (38.4%), American Academy of Family Physicians (10%), American College of Surgeons (8%), American Academy of Pediatrics (8%), American College of Radiology (7%), and American Society of Anesthesiologists (5%). Another 130 professional organizations were mentioned, each by eleven or fewer respondents.

Respondents personally subscribed to an average of 4.1 professional journals, with nearly 40% claiming five or more subscriptions. This presumably did not include freely distributed "throwaway" journals. At the head of this list was the *Journal of the American Medical Association* (26%), closely followed by the *New England Journal of Medicine* (24.4%). Next came *Annals of Internal Medicine* (13.6%), the *New York State Journal of Medicine* (12.8%), *Pediatrics* (8.9%), *Obstetrics and Gynecology* (7.4%), *Journal of Pediatrics* (7.0%), *American Journal of Roentgenology* (6.6%), *Radiology* (6.6%), *Sur-*

TABLE 1
RANKED SUBJECT AREAS ACCORDING TO "NEED TO KNOW": MEAN RESPONSES*

	All re- spondents (N = 258)	Family pract. (N = 42)	Intern- ists (N = 34)	Pedia- tric. (N = 27)	General surgeons (N = 24)	Ob/Gyn (N = 23)	Radiol- ogists (N = 19)	Anesthesi- ologists (N = 12)
1. New developments in area of specialization	1.6	2.6	1.4	1.4	1.4	1.6	1.5	2.0
2. Drug information	2.1	2.0	1.8	2.1	2.1	2.0	3.4	1.5
3. Cancer	2.2	2.1	2.3	3.4	1.5	1.7	1.8	3.3
4. Routine patient care	2.4	2.6	2.2	2.2	2.0	2.5	3.0	2.2
5. New medical equipment	2.4	3.1	2.4	3.1	2.1	2.5	2.3	2.0
6. Government regulations relating to health care	2.5	2.7	2.6	2.5	2.7	2.4	2.1	2.6
7. Cardiovascular disease	2.6	2.1	1.9	3.2	2.5	3.6	2.5	1.5
8. Psychological aspects of disease	2.9	2.4	2.8	2.4	3.0	2.7	4.2	3.2
9. Health care agencies	3.1	2.9	3.0	2.9	3.4	3.2	3.4	3.3
10. Forensic medicine	3.2	3.2	3.4	3.4	3.3	3.3	3.9	3.2
11. Office organization	3.4	3.8	3.5	3.6	3.3	2.6	3.8	3.9

*On a scale of 1 to 5, 1 is "vital need to know," and 5 is "no need to know." Deviations from the mean in a negative direction indicate a greater need to know. Subjects are ranked in order of greatest need to know by all respondents.



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gery, *Gynecology and Obstetrics* (6.2%), *Annals of Surgery* (5%), and *Postgraduate Medicine* (5%). Another 128 verified journal titles were mentioned, each by twelve or fewer physicians. Seven respondents listed *Audio Digest* tapes here. Seventeen titles, all listed once, could not be verified either as written or as reconstructed.

Nearly 59% of all respondents were engaged in a program of professional education, 52% of these as teachers, 21% as students, 5% as consultants, and the others as some combination of these. Fifteen percent of physicians engaged educationally were taking correspondence courses.

Need for Improved Information

The first area of investigation concerns the perceived need of health care practitioners for improvement in the quality of their professional information. This was tested by analysis of "need to know" and "quality of present information" as rated by physicians for eleven subject areas, followed by construction of an "index of perceived need" (mean value of "quality of present information" ratings minus mean value of "need to know" ratings). In interpreting this index, it is important to remember this distinction between "need to know" and "perceived need for improved information"; these are two different needs. For example: the average "need to know" rating for cancer is 2.2 (moderately strong); the average "quality of present information" rating is 2.1 (moderately good); $2.1 - 2.2 = -0.1$, a negative index interpreted as "no perceived need for improved information." It is, of course, unrealistic to attach too much importance to the precise numerical values of these indexes and ratings. However, they do serve as a basis for comparing certain essentially subjective dimensions of information.

Table 1 displays "need to know" as rated by all respondents, and by certain selected respondents grouped according to branch of medicine. Differences of 0.4 or more are considered noteworthy, in view of the general similarity of response patterns. The greatest need to know was, predictably, about new developments in an area of specialization, with only two groups rating another subject as more important: drug information ranked highest with both family practitioners and anesthesiologists. Family practitioners demonstrated considerably less than the average need to know about new developments in an area of specialization, possibly because of varying interpretations of "specialization." A word of caution about this group: the questionnaire did not distinguish adequately between family physicians

who were board-certified as specialists and those who were not. Hence, all responses attributed to family practitioners must be interpreted with the possibility in mind that two separate subgroups are involved. Specialty-related responses appeared in many areas. Ratings for cancer, for example, showed greater than average interest on the part of general surgeons, obstetricians and gynecologists, and radiologists, while pediatricians and anesthesiologists had less than average interest. Surgeons had greater than average interest in routine patient care; radiologists had less. Both pediatricians and family practitioners had greater than average interest in psychological aspects of disease; radiologists, again, had much less. The obstetricians and gynecologists in the study showed a marked need for information about office organization. This is probably related to the finding that a large number of them (39.1%) are in group practice. Other specialty-related differences are shown by anesthesiologists' interest in new medical equipment, radiologists' interest in government regulations relating to health care, and the concern of family practitioners, internists, and anesthesiologists with cardiovascular disease.

Mean responses for the quality of information available to the physicians from all sources, regarding these same subjects, are shown in Table 2. In general, ratings indicate fairly adequate information in most areas and better than adequate information in many. However, when these ratings are related to those for "need to know" in formulating the "index of perceived need for improved information," it becomes apparent that certain physician groups see room for improvement in several areas. Results are shown in Table 3. The largest positive indexes (showing the most need) for most groups are found with new developments in the area of specialization and with government regulations relating to health care. Both indexes were positive for all groups with these exceptions: family practitioners with respect to new developments in the area of specialization, and family practitioners and general surgeons with respect to government regulations. Specialty-related differences also appear here. Family practitioners, surgeons, and obstetricians/gynecologists produce the only positive indexes for cancer; the latter group also shows some need for more information about office organization. Anesthesiologists produce the greatest number of positive indexes, in seven of the eleven subjects. Two of these are especially large, namely, those for drug information and cardiovascular disease.

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TABLE 2
RANKED SUBJECT AREAS ACCORDING TO "QUALITY OF PRESENT INFORMATION": MEAN RESPONSES*

	All re- spondents (N = 258)	Family pract. (N = 42)	Intern- ists (N = 34)	Pedia- tric. (N = 27)	General surgeons (N = 24)	Ob/Gyn (N = 23)	Radiol- ogists (N = 19)	Anesthesi- ologists (N = 12)
1. New developments in area of specialization	2.0	2.6	1.9	1.9	1.9	1.9	2.1	2.1
2. Cancer	2.1	2.2	1.9	2.3	2.0	2.0	1.6	2.8
3. Routine patient care	2.2	2.3	2.0	2.5	1.9	2.4	2.4	2.3
4. Drug information	2.2	2.2	2.0	2.2	2.1	2.2	2.5	2.3
5. Cardiovascular disease	2.2	2.2	1.7	2.4	2.3	2.7	2.1	2.4
6. New medical equipment	2.6	3.0	2.6	2.7	2.5	2.4	1.9	2.3
7. Psychological aspects of disease	2.8	2.5	2.6	2.6	2.8	2.7	3.2	3.0
8. Government regulations relating to health care	2.8	2.5	3.0	3.0	2.7	2.5	2.7	2.9
9. Health care agencies	3.0	2.9	2.9	3.2	3.0	2.8	2.7	3.4
10. Forensic medicine	3.1	3.0	3.2	3.3	3.2	3.2	3.2	3.0
11. Office organization	3.1	2.9	3.0	3.1	3.0	2.8	3.4	3.2

*On a scale of 1 to 5, 1 is "most adequate" and 5 is "totally inadequate." Deviations from the mean in a positive direction indicate greater perceived inadequacy in the quality of information available. Subjects are ranked in order of best quality of information perceived by all respondents.

When responding physicians were regrouped according to recentness of degree, and location and organization of practice, some interesting variations in information needs appeared. A comparatively large index (0.9) was produced for physicians having received their M.D.'s since 1965, in the subject area of government regulations. And when rural physicians in private practice were compared to urban physicians in private practice,

the former group was found to have positive indexes in seven out of eleven subjects (numbers 1, 2, 4, 5, 7, 8, and 11 on Table 3) while the latter group produced positive indexes for only two areas (numbers 1 and 7). However, these indexes did not differ markedly from the mean for all physicians, except for rural practitioners with the subject area of cardiovascular disease, where a measurable need for improved information was evident.

TABLE 3
RANKED SUBJECT AREAS ACCORDING TO INDEX OF PERCEIVED NEED FOR IMPROVED INFORMATION*

	All re- spondents (N = 258)	Family pract. (N = 42)	Intern- ists (N = 34)	Pedia- tric. (N = 27)	General surgeons (N = 24)	Ob/Gyn (N = 23)	Radiol- ogists (N = 19)	Anesthesi- ologists (N = 12)
1. New developments in area of specialization	0.4	0.0	0.5	0.5	0.5	0.3	0.6	0.1
2. Government regulations relating to health care	0.3	-0.2	0.4	0.5	0.0	0.1	0.6	0.3
3. New medical equipment	0.2	-0.1	0.2	-0.4	0.4	-0.1	-0.4	0.3
4. Drug information	0.1	0.2	0.2	0.1	0.0	0.2	-0.9	0.8
5. Forensic medicine	-0.1	-0.2	-0.2	-0.1	-0.1	-0.1	-0.7	-0.2
6. Psychological aspects of disease	-0.1	0.1	-0.2	0.2	-0.2	0.0	-1.0	-0.2
7. Cancer	-0.1	0.1	-0.4	-1.1	0.5	0.3	-0.2	-0.5
8. Health care agencies	-0.1	0.0	-0.1	0.3	-0.4	-0.4	-0.7	0.1
9. Routine patient care	-0.2	-0.3	-0.2	0.3	-0.1	-0.1	-0.6	0.1
10. Office organization	-0.3	-0.9	-0.5	-0.5	-0.3	0.2	-0.4	-0.7
11. Cardiovascular disease	-0.4	0.1	-0.2	-0.8	-0.2	-0.9	-0.4	0.9

*Where "need to know" exceeds "quality of present information," a positive index is produced. Subjects are ranked according to greatest perceived need for improved information by all respondents.

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Fifteen physicians specified additional areas of interest to themselves, producing an average "perceived need" index of 1.7. Economics of practice, private foundations for clinical care delivery, regional health planning, and various research topics were among those mentioned.

Use of Information Sources

There is, as might be expected, a good deal of variation among physicians in the use of information sources. Table 4 displays the mean ratings for frequency of use of nineteen channels of information. Papers in professional journals were by far the most frequently used source of information among respondents as a whole, followed by personal contact with colleagues, and books. Family practitioners and obstetricians/gynecologists, however, used colleagues more frequently than journal papers. The use of sales representatives such as drug detail men was also marked among these two groups. Although some writers have concluded that practitioners of clinical medicine

are "inordinately dependent" on nonwritten sources [9], that finding is only partly borne out by the results here, which, moreover, involve only certain types of practitioners. It should be noted that when respondents were given the opportunity to indicate which of the given sources they would use more frequently if those sources were more readily available to them, 46.5% of the ninety-nine physicians who checked at least one source checked seminars, workshops, and conferences; 38.4% checked computerized information services; 34.3%, library reference services; 33.3%, video, slide, and tape programs; and 28%, current awareness services. The order of priorities, however, differed somewhat among the youngest doctors and among rural and urban physicians in private practice. Those who had received their M.D.'s since 1965 favored video, slide, and tape programs; computerized information services; exhibitions; and current awareness services, in that order. Rural physicians in private practice selected seminars, workshops, and conferences; li-

TABLE 4
FREQUENCY OF USE OF INFORMATION SOURCES: MEAN RESPONSES*

	All respondents (N = 258)	Family pract. (N = 42)	Internists (N = 34)	Pediatric. (N = 27)	General surgeons (N = 24)	Ob/Gyn (N = 23)	Radiologists (N = 19)	Anesthesiologists (N = 12)
1. Papers in journals	1.7	2.3	1.6	1.7	1.8	2.1	1.3	1.5
2. Personal contact with colleagues	2.0	2.1	2.0	2.0	2.2	1.7	1.7	2.0
3. Books	2.1	2.1	2.1	2.3	2.1	2.0	1.9	2.0
4. Seminars, workshops, conferences	2.3	2.6	2.1	2.4	2.1	2.5	1.9	2.3
5. Private information files	2.3	2.6	2.1	2.3	2.5	2.5	1.6	2.9
6. Abstracts	2.9	3.2	2.7	3.0	3.0	2.9	2.7	3.0
7. Library reference services	3.0	3.6	3.1	3.3	3.2	3.1	2.9	3.2
8. Exhibitions	3.1	3.4	3.3	3.2	3.2	3.4	2.5	3.0
9. Video, slide, and tape programs	3.1	3.1	3.4	3.0	3.1	2.8	2.8	3.2
10. Journal and newspaper articles	3.2	3.2	3.2	3.1	3.4	2.8	3.2	3.2
11. Bibliographies	3.3	3.9	3.0	3.5	3.5	3.3	3.5	3.2
12. Catalogs	3.4	3.7	3.5	3.7	3.6	3.1	3.7	2.8
13. Indexing services	3.4	4.2	2.9	3.8	3.7	3.8	3.2	3.5
14. Directories/registries	3.6	3.7	3.7	3.7	3.5	3.9	3.8	3.6
15. Current awareness services	3.7	4.5	3.5	3.8	4.0	3.3	3.9	4.1
16. Sales reps. (detail men)	3.9	2.9	3.5	3.6	3.7	2.7	3.7	3.4
17. Radio and TV programs	4.0	3.9	3.9	3.7	4.3	3.5	4.2	4.0
18. Computerized information services	4.1	4.5	4.1	4.3	4.3	3.9	4.1	4.3
19. Correspondence courses	4.2	4.2	4.2	4.3	4.7	4.3	2.9	4.2

*On a scale of 1 to 5, 1 is "use very frequently" and 5 is "never use." Deviations from the mean in a negative direction indicate more frequent use of the source. Sources are ranked by overall respondent use.

brary reference services; and exhibitions; with video, slide, and tape programs and computerized information services tied for fourth place. Urban physicians in private practice wanted current awareness services; seminars, workshops, and conferences; computerized information services; with video, slide, and tape programs, personal contact with colleagues, and exhibitions all tied for fourth place. It must be pointed out, though, that only a minority of physicians in any of the groups studied separately checked any source in response to this question.

The use of certain sources was found to be affected by professional specialty. Results are shown in Table 4. Radiologists seem to be the most avid information seekers among the groups studied. For thirteen of the nineteen sources listed, their frequency of use ratings were better than or equal to the mean, and they were significantly better in five sources. Unlike most of the respondents, they often used correspondence courses. This group also differed from other physicians in ranking private information (personal library) files in second place. Anesthesiologists used catalogs of books, equipment, and materials much more often than did other physicians, and internists made marked use of indexing services. Interestingly, in the light of Harris's comments [6], family practitioners' use of information sources was less frequent than average for thirteen of the nineteen sources listed.

The data suggest that use of library-related information sources increases with recentness of training. Thirty-three physicians in the study (12.9%) had received their M.D. since 1965, and their ratings of information source use showed a clearly defined tendency toward more frequent than average use of most printed sources, including those which are library related. For bibliographies, this difference was marked (group mean = 2.9). These doctors also used library reference services somewhat more frequently than average (group mean = 2.8). Seventy-five percent of the group had asked a medical librarian for work-related information in the past year, compared to 60.5% of respondents as a whole. Thirty-one percent had used MEDLARS at least once, compared to 27% of all respondents. Cross-tabulations over the entire range of respondents, however, revealed no statistically significant relationship between degree date and use of journal papers, library reference services, or books. Use of colleagues, however, was found to be significant at the 0.05 level. The oldest doctors (M.D. obtained prior to 1945) used colleagues for

professional information less frequently than average, and the youngest doctors (M.D. obtained since 1965) consulted them more frequently.

With regard to geographic location, it might be theorized that rural physicians in private practice depend on printed sources of information more than do urban doctors, since they are relatively isolated from other sources such as colleagues. The responses of forty-two rural physicians in private practice were compared to mean responses for all physicians. In no case did their use of printed sources exceed the mean, and in most instances printed sources were used with less than average frequency. When these doctors were compared directly to their urban counterparts in private practice, marked differences were noted in source use. This group of rural physicians is still somewhat involved with sales representatives as information sources, this being the only channel which the rural doctors used more often than the urban private practitioners. Notably less frequent use by rural doctors occurs with six of the nineteen items: bibliographies, indexing services, library reference services, computerized information services, seminars, and catalogs. Most other sources are only somewhat less frequently used by them than by the urban doctors.

Use of certain information sources and involvement in academic medicine (research or education) are correlated. Cross-tabulations relating engagement in both medical research and in educational programs to use of selected sources are summarized in Table 5. Significant relationships occur in every case but one, use of colleagues. This highly rated information source seems to cut across academic/nonacademic lines, although teachers in professional education programs are somewhat more likely to consult colleagues than are nonteachers (that is, students or consultants). Use of library services was noticeably greater among these doctors. Sixty-nine percent of those engaged in a medical research project and 47% of teachers had used MEDLARS at least once, compared to 27% of all respondents. Fully 82% of teachers had recourse to a medical librarian for work-related information within the past year, compared to 61% of all respondents.

The relation between information source use and hospital-based practice was analyzed. Hospital-based practitioners tend to use many sources of information somewhat more frequently than average, but the difference is especially marked with indexing services. Cross-tabulations of hospital practice by frequency of selected source use are summarized in Table 5. The variables are

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TABLE 5
CROSS-TABULATION OF SOURCE USE FREQUENCY BY THREE VARIABLES

Selected sources	Significance levels*		
	Engagement in medical research project	Engagement in medical education program	Hospital-based medical practice
1. Papers in journals	0.0001	0.0001	0.05
2. Colleagues	not significantly associated	not significantly associated	not significantly associated
3. Seminars, workshops, conferences	0.05	0.05	0.05
4. Library reference services	0.0001	0.0005	0.01
5. MEDLARS (used at least once)	0.0001	0.0001	0.0001
6. Request for information from medical librarian at least once in past year	0.001	0.0001	0.05

*By convention, a statistically significant relationship has a probability of occurring by chance 5% of the time or less, such as in 5 out of 100 samples, or a significance level of 0.05.

significantly associated in five of six cases, except, as noted above, with frequency of use of colleagues (that is, nonhospital practitioners employ this source about as often as do hospital practitioners). Hospital-based physicians, who are rather more likely than other doctors to be involved both in medical research (36%, compared to 20% of all respondents) and in professional educational programs (73%, compared to 59% of all respondents), were also somewhat more likely than the others to have asked a medical librarian for information during the past year (76%, compared to 61% of all respondents). Forty-one percent of this group had used MEDLARS at least once.

Urgency of Information Needs

We asked respondents about the speed with which their information needs had to be met. While a substantial minority of physicians (39%) did indicate that most of their professional information requirements had to be met within twenty-four hours (5% of these said "immediately"), a majority (54%) answered that they could usually wait up to a week, and 7% were willing to wait even longer.

Satisfaction of Library Users

Health care practitioners in this study who used libraries were generally satisfied with their service. Nearly 61% of respondents had asked a medical librarian for work-related information within the past year. Of these, 61.8% rated the information received as "adequate," 28.9% as "more than adequate," and 9.2% as "less than

adequate." Most physicians had requested this information personally (84.9%), with 15.1% using an intermediary such as a secretary or assistant. Overall use of library reference services ranked seventh out of nineteen possible sources of information, and, as shown in Table 5, when this source was cross-tabulated with involvement in an educational program, significant positive association was obtained. As demonstrated, requests for information from a medical librarian within the preceding year were also positively correlated with both involvement in an educational program and with medical research activity. Teachers were more likely to have asked for such information than were students or consultants. However, no significant association was found between involvement in research or education and the rating of the requested information; that is, the distribution of "adequate," "more than adequate," or "less than adequate" responses remained about the same as that for the entire sample. When frequency of use of library reference services was cross-tabulated with the rating of the requested information, a positive association was revealed (significant at 0.05 level). The relationship was not a straightforward one, however. It appears that the more frequent users of the services had the strongest feelings, one way or the other, about the quality of their information, with fully 21.1% rating it "less than adequate," 42.1% "adequate," and 36.8% "more than adequate." Less frequent users were more likely to choose the middle ground, the "adequate" rating.

Of those physicians engaged in professional education programs, 75.6% said that the library

they used was located in the same institution that offered the programs. A variety of library materials was needed: journals, books, and audiovisual programs and equipment were all frequently mentioned, with 10% of respondents using computer-assisted instruction (CAI). When asked to rate the ease with which the library materials could be obtained, on a scale of 1 (very easy) to 5 (very difficult), the mean response was 1.8.

Despite this general satisfaction, commentary by physicians revealed some problems. For example, a radiologist rated his information as less than adequate with the remark that the illustrations important to his work do not lend themselves well to photoreproduction. A rural practitioner complained that most of the material he requested had to be sent away for; another said that he hadn't been able to establish a satisfactory association with the library. Several physicians flatly declared their libraries to be marginal in quality, and that they usually went elsewhere for information.

DISCUSSION: IMPLICATIONS FOR LIBRARY SERVICE

The goal of bringing the latest and best of health care information to all practitioners has given rise to many experiments in information provision. Mounting evidence indicates that the sophisticated information retrieval systems and services which have been developed in health sciences libraries over the past several years are used primarily by researchers and educators, and that the practicing physicians for whom, ostensibly, these systems were designed, remain either unaware of them or reluctant to make use of them. While the physicians in this study are all practicing physicians in the strict sense of the term, significant use of library services, including computerized literature searches, is definitely correlated with involvement in research and educational programs, and, to a somewhat lesser degree, with hospital-based practice. MEDLARS and MEDLINE are theoretically available to all physicians throughout the state. Urban physicians in private practice, although making somewhat greater than average use of library reference services, have not used MEDLARS much (13.5% of urban private practitioners had done so, compared to 26.5% of all doctors), and this despite their declared willingness to use various computer services more often were such services more available. It is readily apparent, though, that both the greatest information needs and the most

difficulty in answering them are felt by rural physicians (not necessarily family physicians) in private practice. And, concerning library services, this points not only to lack of publicity, but also to lack of dependable access.

One finding which deserves further investigation, in the light of the rapidity with which medical knowledge becomes obsolescent, is that family practitioners in general indicate few unfilled information needs as measured by the "perceived need" index, despite their below-average use of sources. Most physicians, however, had at least some unfilled information needs in two or more areas.

It may be of some interest to compare the results with physicians to those of the same study as conducted by the author with registered nurses in the same HSA. Nurses in general tended to have more and greater perceived information needs than doctors, although the same two subjects headed both lists: new developments in area of specialization, and government regulations relating to health care. Nurses expressed more need than doctors for improved information about psychological aspects of disease; doctors more than nurses about routine patient care (which may raise the question of interpretation of "routine"). Like nonhospital doctors, nonhospital nurses had greater information needs than those who were hospital-based. The relative precedence given to frequently used sources differed. Nurses used colleagues, newspaper and magazine articles, books, and journal papers, in that order; doctors used journal papers, colleagues, books, and seminars, workshops, and conferences. Both doctors and nurses indicated a striking preference for seminars, workshops, and conferences as a type of source they would like to use more often. From their comments, it is possible that a seminar on modern library services and techniques of information handling would be well received.

For purposes of library market segmentation, however, it is clearly not sufficient to categorize health care practitioners along the broad lines of nurse, physician, and so on. Within these groups are many subgroups, each with its own needs and means of satisfying them. Regarding physicians, it is also misleading to classify all practitioners of clinical medicine together, for even among primary care physicians, information needs may be quite different.

All this lends weight to Mayeda's suggestion about "innovative regrouping" of information types and sources [2]. The editor of the *New York State Journal of Medicine*, A. A. Angrist, added

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his voice in 1974 in a plea for "selective library service" to the average practicing physician [10]. Tailoring information to suit individual requirements, and not necessarily through conventional library services, is obviously what the practitioners want. More active promotion of existing local selective dissemination of information programs would seem to be called for. Another possibility is the establishment of a library-based information and referral service, aimed primarily at rural nonhospital practitioners, which would serve as a switching center for toll-free telephone requests. One version of this, a successful federally funded service involving two medical school libraries in Wisconsin, was described briefly in 1975 [11]. Straightforward reference questions may be channeled into the normal reference processes, either at the central library or at the medical library nearest the practitioner, depending on access. Well publicized, a central service like this could do much to make physicians and other practitioners aware of all the other information resources available to them.

Nearly 42% of all physicians in this study signed their questionnaires, indicating their willingness to be interviewed. This is clearly the next step in formulating answers to the questions raised here, and in maintaining the communications channel between library and practitioner that this study has opened.

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