
Library instruction in the medical school curriculum: a survey of medical college libraries*

By Martha F. Earl
Head of Reference and Instructional Services

James H. Quillen College of Medicine Library
East Tennessee State University
P.O. Box 70693
Johnson City, Tennessee 37614

Future physicians must learn to cope with continuing changes in access to medical information. New instructional techniques, such as problem-based learning, emphasize the importance of research skills to medical students. To investigate the feasibility of establishing library instruction as a required part of the East Tennessee State University College of Medicine curriculum for undergraduates, the university's medical library surveyed 123 medical school libraries to determine the level of instruction offered by other academic medical libraries. The survey asked whether formal instruction was offered or required, and which courses were taught at each level of undergraduate training. Analysis of the fifty-five responses revealed that 75% offered formal library instruction, and that 49% of these respondents (36% of the total sample) required all students to take such courses. The courses offered most often were library tours, online catalog instruction, and MEDLINE-on-CD-ROM classes. Overall, thirty-three different course titles were offered by responding libraries. The majority of classes involved second- and third-year students. The survey responses reveal the prevalence of required library instruction in medical school curricula, and a broad-scale commitment to the development of lifelong learning skills among future health professionals.

INTRODUCTION

Future physicians must learn to cope with continuing changes in access to medical information. Vast national and international computer networks allow physicians to investigate almost any topic and will eventually enable them to retrieve patient records using personal computers. Yet, according to an article in the *New England Journal of Medicine*, medical students read little aside from assigned material [1]. Thus, medical educators are challenged to train young minds to gather information and filter out significant data. New instructional techniques, such as problem-based learning, emphasize the importance of information-seeking skills and require the learner to search the

literature. The need for bibliographic instruction links the library to the clinic, the patient bedside, and the lab. Osheroff et al. studied information requests made by physicians and medical students during teaching rounds and counted an average of five questions per patient, of which 23% potentially could be answered by a library, a textbook, a journal, or MEDLINE [2]. In such an information-intensive environment, an increasing number of medical schools have made library instruction a required part of the curriculum.

To investigate the feasibility of establishing library instruction as a required part of the East Tennessee State University (ETSU) James H. Quillen College of Medicine curriculum for undergraduates, the medical library surveyed 123 medical school libraries to determine the level of instruction offered by other academic medical libraries. A similar survey was undertaken in 1975 by librarians at the University of Tennessee-Memphis School of Medicine, who sought

* This paper was presented at the Forty-Third Annual Meeting of the Southern Chapter, Medical Library Association, October 8-12, 1993, Birmingham, Alabama.

to determine the level of bibliographic instruction at other medical college libraries [3]. In the eighteen years since that survey, technology has advanced rapidly and information has continued to proliferate.

The information-seeking habits of physicians change more slowly. When a question arises, physicians turn first to their colleagues and office resources [4]. It is the office resources that have changed. No longer limited to textbooks and back-copies of *JAMA*, the *Journal of the American Medical Association*, physicians can easily dial into MEDLINE or other information networks. While the Rochester study proved that all medical library services have a positive impact on clinical decision making [5], researchers at the National Library of Medicine focused on the use of MEDLINE by physicians for clinical problem solving. Lindberg et al. surveyed 552 physicians, scientists, and other professionals working in a variety of clinical care and other settings. Although 35% requested librarian-mediated searches, 65% were direct users of MEDLINE. Many of the physicians interviewed indicated that the acquisition of skills that gave them direct access to MEDLINE made such a difference in their practice as to convince them that all medical students should receive similar training [6]. Because, according to DaRosa, the information-seeking habits of physicians are formed by the fourth year of medical school [7], medical students must become familiar with the new information sources in earlier years. Yet in a recent survey by the Association of American Medical Colleges (AAMC), 50% of graduating medical students believed that the amount of time devoted to instruction in the use of computers was inadequate [8].

THE SURVEY

The ETSU Medical Library staff wanted to incorporate library instruction into the required curriculum. The library director and the head of reference had submitted a proposal to the Medical Student Education Committee of the College of Medicine, outlining potential goals and objectives for such a program for undergraduate medical students. The committee asked the library to find out whether other medical schools included library instruction as part of their curricula. The head of reference then designed a survey to ascertain whether formal library instruction was offered or required by other U.S. medical schools, and which courses were taught at each level of undergraduate training. The survey was also designed to determine how bibliographic instruction within the medical information environment has changed since 1975.

The survey asked two questions. First, it asked whether the library offered formal library instruction for medical students either as part of the medical

school curriculum, as an elective, in some other fashion, or not at all. The second question inquired about the types of courses taught and the level—freshman, sophomore, junior, or senior—of students enrolled in them. A copy of the survey was sent to the reference departments of 123 medical school libraries.

RESULTS

The medical library received fifty-five completed surveys (a response rate of 45%) accompanied by copies of instructional material from various institutions. Table 1 summarizes the number of schools offering formal library instruction to medical students (Question 1) and the number of schools supplying each course title (Question 2). Some schools checked more than one response for Question 1 on the survey form. Analysis of the fifty-five responses revealed that 75% offered formal library instruction. For 49% of those respondents, and 36% of the overall sample, library instruction was a required part of the curriculum.

Question 2 elicited multiple responses on numerous survey forms. The number to the left of a course title indicates the total number of schools offering that course to undergraduate medical students. The courses offered most often were library tours, online catalog instruction, and MEDLINE-on-CD-ROM classes (see Table 1). Overall, thirty-three different course titles were offered by responding libraries. The majority of classes involved second- and third-year medical students.

Table 1 illustrates the breakdown of course titles offered at each academic level, the number of times each course title was offered overall, and the number of courses offered to each grade level overall.

DISCUSSION

The number of schools offering formal instruction for medical students has increased in recent years. In 1975, Martin et al. reported that of 100 libraries responding to a survey on teaching of formal course work by medical libraries, only eighteen offered formal course work and nineteen others had plans to do so [9]. Of the fifty-five libraries responding to the ETSU survey, forty-one offered formal library instruction of some sort, and in almost half of those schools, library instruction was a required part of the curriculum.

The survey confirmed earlier studies showing that librarians are rising to meet the challenges of the changing medical school curriculum. As Braude has remarked, the teaching of information-seeking skills strengthens the role of libraries in the curriculum [10]. University of Nebraska librarians, in conjunction

Table 1
Library instruction programs in order of frequency

Program	Rank	Total*	Year of medical school			
			1st	2d	3d	4th
MEDLINE on CD-ROM	1	50	15	13	12	6
Tour of the library	2	48	33	5	3	3
Online catalog	3	47	24	9	6	5
DOS or Macintosh basics	4	32	7	7	6	6
Basic reference sources	5	31	17	5	3	3
Word processing	6	30	7	6	5	6
<i>Index Medicus</i>	7	26	15	4	3	1
Other MEDLARS databases	8	24	4	4	8	5
GRATEFUL MED	9	23	3	3	8	5
<i>Science Citation Index</i>	10	17	5	4	2	2
MEDLINE (other)	10	17	6	4	4	2
Advanced online searching	10	17	2	2	3	5
Reference manager	11	16	2	2	3	4
Harvard Graphics	12	15	3	3	3	3
File management software	12	15	1	2	4	3
<i>Current Contents</i>	13	14	3	4	3	2
Buying a personal computer	13	14	3	3	3	3
Internet/BITNET	14	13	3	3	3	2
BRS Colleague	15	12	3	2	2	3
miniMEDLINE	15	12	3	1	1	1
MEDLINE on OPAC	16	9	6	1	0	1
Critical evaluation	17	7	3	2	1	0
PsycLIT	18	6	1	0	3	1
Dbase	19	5	1	1	1	1
<i>Biological Abstracts</i>	20	2	0	0	0	1
Writing scientific papers	20	2	1	0	0	0
ERIC	21	1	0	0	1	0
Statistical software	21	1	0	1	0	0
MEDLARS	22	0	0	0	0	0

* The total represents the number of all respondents offering a particular course. Some respondents did not specify which grade levels received instruction, so the total may not match the sum of the courses offered at each level (the four columns to the right).

with nonlibrarian faculty, trained incoming medical students in a three-day seminar [11]. University of Minnesota librarians trained third- and fourth-year students through their Didactic/Selective curriculum [12]. At the University of Tennessee Center for the Health Sciences, library instruction is presented at scheduled times during the four-year curriculum [13].

At McMaster University in Canada, librarians noted the increased use of library resources by students in a problem-based curriculum [14]. Haynes et al. emphasized the importance of using the journal literature for clinical problem solving [15] and reported that more than 50% of medical students entering McMaster said they would take courses in the use of information technology to assist with patient management [16]. At the University of Illinois, Dorsch et al. developed a ten-week critical appraisal course for third-year students that was taught cooperatively by library and internal medicine faculty. They used a problem-based format, part of a compulsory medical

curriculum, to stress the formulation of clinical decisions based on evidence [17].

When Rankin, at Mercer University, surveyed second-year students in four medical schools (two problem-based and two conventional curricula), her results suggested significant differences between the formats. In comparison to the conventional group, students in problem-based curricula appeared to use libraries more frequently, to use information resources that supported the independent learning process, to acquire information-seeking skills at an earlier stage in their medical education, and to use those skills more easily [18]. Marshall et al. reported similar findings [19].

In a survey of the characteristics of services and educational programs in libraries serving problem-based curricula, Watkins found that librarians must take responsibility for student knowledge and outcome, and that user education must be proactive, abundant, and closely tied to the curriculum [20]. Eldridge at the University of New Mexico emphasized that librarians responding to a problem-based curriculum should make a commitment to participate in the curriculum-development process in all possible and appropriate ways. He remarked that simply attending medical faculty meetings can bring the librarian into the process by demonstrating to other faculty the library's commitment to and interest in medical education. Above all, Eldridge stressed, library education programs should be linked to the curriculum [21].

Libraries involved in formal training of medical students are heeding the recommendations of the AAMC, which has said that medical students must be prepared for lifelong, independent learning to meet future information challenges [22]. Libraries offer more formal instruction than ever before. The ETSU survey confirmed the increases in teaching activities, required library instruction, and the variety of lifelong learning skills encompassed in the scope of instruction.

Table 1 lists the programs in order of most to least common. The three programs offered most frequently were MEDLINE on CD-ROM, tour of the library, and online catalog instruction. It is interesting that WordPerfect (number 6) was offered more often than *Index Medicus* (number 7). The programs offered least often were MEDLINE through MEDLARS, ERIC, statistical analysis software, writing the scientific paper and abstract, and *Biological Abstracts*. In addition to classes listed in Table 1, one school offered a class in using spreadsheets, another offered Micromedex database instruction, and Mercer University trained students to use the Georgia Area Information Network.

A comparison of courses offered at each level of medical school revealed significant differences (Table 2). First-year students were offered 176 courses. The course offered most often (at least fifteen times) was

Table 2
Courses offered most often, listed by student level

First year	176 courses
1. Tour of the library	
2. Online catalog	
3. Basic reference and research methods	
4. <i>Index Medicus</i> , or MEDLINE on CD-ROM	
Second year	94 courses
1. MEDLINE on CD-ROM	
2. Online catalog	
3. DOS or Macintosh basics	
4. WordPerfect or other word processing	
Third year	91 courses
1. MEDLINE on CD-ROM	
2. MEDLINE through GRATEFUL MED, or other MEDLARS databases	
3. Online catalog, DOS or Macintosh basics, or WordPerfect or other word processing	
Fourth year	74 courses
1. MEDLINE on CD-ROM, WordPerfect or other word processing, or DOS or Macintosh basics	
2. Online catalog, GRATEFUL MED, other MEDLARS databases, or advanced online searching techniques	
3. Reference manager	

the tour of the library. Second-year students were offered ninety-four courses. The course offered most often (at least five times) was MEDLINE on CD-ROM. The online catalog was the second most common course for both first- and second-year students. Third-year students, who were offered ninety-one courses, took MEDLINE on CD-ROM most often, followed by MEDLINE through GRATEFUL MED, or other MEDLARS databases. Fourth-year students, who were offered seventy-four courses, most often took MEDLINE on CD-ROM, WordPerfect or other word processing, or DOS or Macintosh basics.

The table shows that first-year students were offered more than twice as many courses as were more advanced students. Second- and third-year students were offered approximately the same number of courses, but third- and fourth-year students were offered more specialized training related to clinical needs with GRATEFUL MED and specialty MEDLARS databases. Word processing, DOS or Macintosh basics, and GRATEFUL MED were among the courses offered most frequently to second-, third-, and fourth-year students. Interest in such programs may indicate that the physicians of the future consider computers to be tools for their personal use. If 50% of graduating medical students considered their instruction in the use of computers to be inadequate [23], then perhaps the other 50% attended medical schools with libraries offering such training.

CONCLUSION

The physicians of tomorrow must adapt to continuing changes in access to medical information today. Prob-

lem-based learning techniques, which are gaining popularity in more and more medical school curricula, emphasize the importance of research skills and require the learner to search the literature. The ETSU survey of 123 medical school libraries found that 75% of fifty-five respondents offered formal library instruction, of which 49% (36% of the overall sample) identified library instruction as a required part of the curriculum. The courses offered most often were library tours, online catalog instruction, and MEDLINE on CD-ROM.

The numbers of classes on computer basics, word processing, and GRATEFUL MED point to the increasing computer literacy of U.S. medical students. There is a need for more research regarding the structure of courses, types of assignments, and role of the library in teaching computer-literacy skills. In particular, the methods used by schools in which library instruction is a required part of the curriculum could provide beneficial guidelines.

In sum, the survey responses reveal that instruction in library skills is required by many medical schools, and that participating academic librarians and their schools are committed to the development of lifelong learning skills for future health professionals.

REFERENCES

1. TAYLOR CR. Great expectations: the reading habits of year ii medical students. *N Engl J Med* 1992 May 21;326(21):1436-40.
2. OSHEROFF JA, FORSYTHE DE, BUCHANAN BG, BANKOWITZ RA, ET AL. Physicians' information needs: analysis of questions posed during clinical teaching. *Ann Intern Med* 1991 Apr 1;114(7):576-81.
3. MARTIN JA, HOUSE DL JR, CHANDLER HR. Teaching of formal courses by medical librarians. *J Med Educ* 1975 Sept;50(9):883-7.
4. NORTHROP DE, MOORE-WEST M. Characteristics of clinical information-searching; investigation using critical incident technique. *J Med Educ* 1983 Nov;58(11):873-81.
5. MARSHALL JG. The impact of the hospital library on clinical decision making: the Rochester study. *Bull Med Libr Assoc* 1992 Apr;80(2):169-78.
6. LINDBERG DAB, SIEGEL ER, RAPP BA, WALLINGFORD KT, ET AL. Use of MEDLINE by physicians for clinical problem solving. *JAMA* 1993 June 23/30;269(24):3124-9.
7. DAROSA DA, MAST TA, DAWSON-SAUNDERS B, MAZUR J, ET AL. A study of the information-seeking skills of medical students and physician faculty. *J Med Educ* 1983 Jan;58(1):45-50.
8. ASSOCIATION OF AMERICAN MEDICAL COLLEGES. Medical student graduation questionnaire results summary. Washington, DC: Association of American Medical Colleges, 1990.
9. MARTIN, op. cit., 886.
10. BRAUDE RM. Role of libraries in medical education. *Bull N Y Acad Med* 1989 Jul/Aug;65(6):704-27.
11. REIDELBACH MA, WILLIS DB, KONECKY JI, RASMUSSEN RJ, ET AL. An introduction to independent learning skills for

- incoming medical students. *Bull Med Libr Assoc* 1988 Apr;76(2):159-63.
12. MUELLER MH, FOREMAN G. Library instruction for medical students during a curriculum elective. *Bull Med Libr Assoc* 1987 Jul;75(3):253-6.
13. GRAVES KJ, SELIG SA. Library instruction for medical students. *Bull Med Libr Assoc* 1986 Apr;74(2):126-30.
14. MARSHALL JG, FITZGERALD D, BUSBY L, HEATON G. A study of library use in problem-based and traditional medical curricula. *Bull Med Libr Assoc* 1993 Jul;81(3):299-305.
15. HAYNES RB, MCKIBBON KA, FITZGERALD D, GUYATT GH, ET AL. How to keep up with the medical literature: iv. Using the literature to solve clinical problems. *Ann Intern Med* 1986 Oct;105(4):636-40.
16. HAYNES RB, MCKIBBON KA, BAYLEY E, WALKER CJ, ET AL. Increases in knowledge and use of information technology by entering medical students at McMaster University in successive annual surveys. In: Firesse ME, ed. Sixteenth Annual Symposium on Computer Applications in Medical Care: supporting collaboration. New York: McGraw-Hill, 1992:560-3.
17. DORSCH JI, FRASCA MA, WILSON MI, TOMSIC ML. A multidisciplinary approach to information and critical appraisal instruction. *Bull Med Libr Assoc* 1990 Jan;78(1):38-44.
18. RANKIN JA. Problem-based medical education: effect on library use. *Bull Med Libr Assoc* 1992 Jan;80(1):36-43.
19. MARSHALL, FITZGERALD, op. cit., 304.
20. WATKINS MC. Characteristics of services and educational programs in libraries serving problem-based curricula: a group self-study. *Bull Med Libr Assoc* 1993 Jul;81(3):306-9.
21. ELDREDGE JD. A problem-based learning curriculum in transition: the emerging role of the library. *Bull Med Libr Assoc* 1993 Jul;81(3):310-5.
22. ASSOCIATION OF AMERICAN MEDICAL COLLEGES. Physicians for the twenty-first century: Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine. *J Med Educ* 1984 Nov;59(11, pt.2):1-200.
23. ASSOCIATION OF AMERICAN MEDICAL COLLEGES, op. cit., 2.

Received November 1994; accepted May 1995