Integrated Information Management and Hospital Libraries

BY HOLLY SHIPP BUCHANAN, *Director, Medical Library and Information Resources*

NKC Hospitals, Inc.
P.O. Box 35070
Louisville, Kentucky 40232

NANCY FAZZONE, *Library Director*

Salem Hospital
81 Highland Avenue
Salem, Massachusetts 01970

ABSTRACT

It is demonstrated that hospitals are information-dependent and that there is need for integration of information generated and gathered through their subsystems. This paper discusses recommendations of the Matheson Report for an integrated information management system which would link these subsystems. The library's statement of mission, means for self-assessment, and analysis of information needs and uses are explored. Future directions with examples of new roles for the library are outlined.

HOSPITALS ARE, by nature, information-dependent. It has been estimated that information processing accounts for 25–40% of the cost of a hospital's total expenses [1, 2]. In the past, hospitals have often applied computer systems to a single purpose, such as patient billing or time and attendance systems. This absence of an overall plan has limited the development of a hospital-wide system. Two traditionally separate areas, the clinical and administrative management components, have rarely been integrated in the hospital.

Hospital administrators are now beginning to perceive the need to integrate certain information gathered through various subsystems, for example, patient management, billing, cost accounting, inventory, budgeting, marketing, productivity, quality assurance, and risk management. Today, few hospitals have begun, much less accomplished, this integration, and even fewer consider their libraries an active part of this process.

The power of information gives library service an inherent appeal. Information is a fundamental component of decision making, and members of both the medical and hospital staffs require it for issues ranging from patient management to facility expansion. Few of these information seekers have the time to ferret out needed information. The library can enhance its support throughout the institution by meeting these needs. The 17th-century observation by Francis Bacon that knowledge is power translates into the 20th-century reality that knowledge is sometimes obscured by massive quantities of information [3]. The meaning of the verb "to know" now extends beyond information stored in one's memory to the process of having information accessible, according to Nobel Prize–winner Herbert Simon [4]. The economic value of information reinforces its power. One need only look at the private-sector-versus-public-sector debate over the government's role in providing information to appreciate the potential economic gain surrounding it [5]. This form of power is marketable; it can be packaged and sold.

The pervasiveness of information is mentioned in *Megatrends,* which states that in 1950 only 17% of the work force held information-related jobs while today more than 60% do [6]. All practitioners in the clinical environment must update skills and keep abreast of new developments, as must administrators, in order to survive in the competitive environment of today's health care industry.

This paper discusses the Matheson Report's recommendations for an integrated information system that would link organizational and administrative information systems with the academic knowledge base. Examples of hospital library applications are presented and directions for the future are outlined.

CLINICAL DECISION MAKING

The typical hospital library has focused its efforts on information needs for clinical decision making, teaching, and research. Although this is the "bread and butter" of hospital library service,

documentation of use and of performance-benefit has been sparse. Data from a 1982 MEDLARS utilization study by the Northeastern Consortium for Health Information (NECHI) showed that 56% of MEDLARS searches in hospitals were initiated by physicians, 17% by nurses, 11% by allied health personnel. Of the MEDLARS requests received by hospitals, 49% were for patient care and 19% were for teaching [7]. These use patterns are consistent with those documented by the National Library of Medicine (NLM) through log-in procedures to its MEDLARS system [8]. Additionally, the one published evaluation of clinical librarian services indicated that "patient management was affected in 20% of the cases, and diagnostic thinking was influenced in an even greater percentage of instances." This clinical librarian relationship compares favorably with reports on information use in clinical laboratories and radiology services [9].

Corporate Decision Making

It has been said that giving information to the chief executive officer is like throwing water on a drowning man [10]. Today the hospital executive is inundated with information needed for managing in a complex and changing environment. Among the management tasks Austin and Carter cite as requiring information support are: quality assurance, cost control and productivity enhancement, utilization analysis and demand estimation, program planning and evaluation, internal and external reporting, and research and education [11]. For the executive, the Matheson Report identified two needs:

> a. An organized and compressed surveillance of the published literature; and b. Provision and analysis of background information that is pertinent and appropriate to policy development [12].

How have hospital libraries responded to managerial needs for information? Although the data are not extensive, they show that libraries have played a very minor role. The NECHI study found that in thirty-eight hospitals surveyed only 7% of the MEDLARS search requests were for support of administrators [13]. At NKC Hospitals, requests for administrative information over the past ten years have ranged from 4% to 14% (1983) of the total reference volume. Clearly there is a need for hospital library outreach programs to hospital management.

The Library Within the Hospital System

To implement recommendations of the Matheson Report, it is necessary to understand how the hospital library relates to other systems within its environment. A system may be defined as a complex entity made up of diverse interacting units operating together under common influences. The hospital, the academic medical center, the data processing department, and the hospital library as interacting systems are discussed.

The hospital as a complex system undergoing rapid internal and external changes is well documented in *The Changing Role of the Hospital: Options For the Future* [14]. In this setting, there has been a tendency for system components to be isolated from each other, often competing for space, budget, and equipment. The library has often been lower among the hospital's priorities than medical affairs, marketing, and other departments.

Hospital librarians in the 1,300 U.S. teaching hospitals also relate to a second system: the academic health sciences center. Conflicts are inherent in this relationship due to "town-gown" issues, cost vs. education/research goals, and overlapping responsibilities and authorities. Butler and Petersdorf have documented the "typical" teaching hospital and described the types of governance functions encountered in an academic medical center structure [15, 16].

A third system to which the hospital librarian relates is the computer services or data processing department. Those departments which are still functioning as *data processing* departments are urged to become service-oriented hospital information systems departments. Since the early 1980s there has been a trend toward an information resources unit that groups departments as information coordinating departments, primary data source departments, and data processing departments. The University of Cincinnati Medical Center is a recent example of this trend. Although information resources divisions administered by a vice president do exist within hospitals (for example, at Community Hospital in Indianapolis), a review of the literature indicates that library departments are rarely placed within it.

Finally, the library system itself is complex. The library is composed of many subsystems—technical services, audiovisual services, purchasing, and others. With Living System Theory (Miller) [17] nineteen critical subsystems can be identified within the hospital library. As all of these nineteen

functions might be carried out by a single hospital librarian in the small department, it is important to be aware of how these subsystems relate to the success of the total department. The awareness of the library as a system is important as a hospital library's role in information management is explored.

Integrated Information Management in the Hospital

In 1983, the Association of American Medical Colleges issued a report of a study supported by the National Library of Medicine entitled "Academic information in the academic health sciences center: roles for the library in information management" [18]. The Matheson Report, named after its principal investigator, recommends that medical school libraries work toward what it calls the integrated academic information management system (IAIMS). IAIMS is applicable in large part to hospital libraries, whether they are separately administered or part of a large academic medical center.

In general, IAIMS is based upon the following assumptions:

1. Information is central to the functioning of all organizations and their survival, but it is also a commodity that has a price.
2. The knowledge database is shifting from paper to electronics.
3. Computers and communications technology can greatly enhance the research, teaching, patient care, and administrative functions of the medical center.
4. The library is the most logical site for information management in academic health sciences centers, but it is not yet prepared to assume a leadership role and to take advantage of new technologies; it is still semi-automated and plays a passive role in information transfer.

The Matheson Report projects the evolution of the library from a materials custodial facility to an information management center. Three stages that model those of technology adoption are identified: Stage 1 simply replaces old technology with new; Stage 2 allows things to be done differently; and in Stage 3 new behaviors are formed.

Over a twenty-one-year period, the report projects that academic health sciences libraries will evolve as follows:

1. *Stage 1* (5–10 years): A computer network ties together all departments in the medical center. All of the library's records, including the catalog, are accessible online. The library plays a central role in the management of information and is part of a national network of information systems. Most staff and students have their own computers.
2. *Stage 2* (10–20 years): The library is smaller, consisting of current books, journals, and publications in traditional format, but most of the collections are stored on videodisks. Much information is accessed through terminals. The library serves as a clearinghouse for and coordinator of information sources. Information specialists work with faculty and students to develop personal knowledge databases for teaching, clinical practice, research, and management.
3. *Stage 3* (20 years–): Libraries are management centers for a variety of computer-based files. Technology augments human information processing.

The library's role in information transfer and management has been poorly recognized within hospitals. As recently as 1980, an author writing in *Hospital & Health Services Administration* seemed oblivious to the existence and roles of professional hospital libraries. The author suggests that the "medical records librarian" should expand outside the role of compiler of clinical records and should be "of great assistance to the CEO in keeping up with the literature" [19]. A comprehensive literature review published in 1982 on hospital information systems applications made no mention of hospital library systems and only in passing mentioned the National Library of Medicine's Hepatitis Data Base [20]. One article in the premiere issue of *Healthcare Computing and Communications* presents an excellent chart depicting the relationship among hospital information resources. Although a "library" does appear on the chart, discussions with the author reveal it to be a collection of books about microcomputers housed in the Information Center, separate from the data processing department [21].

However, in a March 1983 letter to hospital chief executives, Alex McMahon, president of the American Hospital Association, wrote: "Up-to-date standards on medical libraries must reflect recent methods of information storage and retrieval—a move from the traditional concept of a library as so many square feet and so many books to one incorporating computers and information services" [22].

This approach calls for hospital libraries to convert from data management to information management. Information management roles may encompass technical skills as well as managerial/coordinating skills. Today's hospital needs an integrated information management system; in some hospitals the library manager may serve as a facilitator in the system's design or even the coordinator of the system itself.

Implementing the Recommendations of the Matheson Report

The critical foundation for implementing the Matheson Report's recommendations rests on their inclusion in the library's mission statement. A library mission statement compatible with that of its parent institution is an essential and logical starting point, as accomplishing any goal depends on the philosophical and financial support of the sponsoring organization.

Self-Assessment

Self-analysis of both the librarian and the library is the next step. The librarian must identify essential skills and address educational deficiencies. Computer literacy has been cited as the next great crisis in American education [23]. Courses, workshops, or readings related to automation, management, and health care financing will help librarians understand the expanding role of technology in an increasingly sophisticated managerial environment with changing financial dynamics. The computer-literate library patron will look also to the library staff for information literacy—an area covering computer-associated needs. It may include keeping users informed of database content or availability, telecommunication services, electronic mail, and hardware and software options [24].

Educational concerns also extend to traditional areas of expertise. As the hospital library's success is directly proportionate to the degree it anticipates and meets the needs of its clientele, familiar reference tools must include those offering access to business and automation literature. The hospital library's informational demand extends beyond the traditional scope of biomedical literature to support such positions as director of marketing, coordinator of management development and director of clinical computer systems.

Hospital librarians need to look closely at their willingness to support their own informational needs. The collection provides books and journals for everyone else, but often acquisitions reflect a timidity in meeting the library staff's needs. In a decade of database proliferation for online retrieval, it is reflective of librarians' inattention to their own needs that the index Library Literature is not automated.

When assessing the library, the librarian should review each system and service to determine what to continue, change, or implement. When a system or service is functioning very efficiently but is of questionable value, it must be judged ineffective. Such a system detracts from overall productivity, which demands the efficient handling of effective functions [25]. In other cases, a very valuable function may need to be refined for more efficient management. For example, converting cataloging to a machine-readable format prepares the hospital library for collective holdings lists. Through the establishment of standard formats, even the smallest library can participate in networks for the efficient handling and dissemination of information. This will ease the ultimate exchange of resources. Upgrading an online search service from 300 to 1,200 baud can save considerable staff time at the terminal; the use of a microcomputer for compiling statistics, handling acquisitions data, or printing interlibrary loan forms may be logical for improved productivity.

The Informational Flow Analysis

The librarian, as an information manager, has been concerned traditionally with the flow of information related to library holdings. But an information manager needs to view information on a broader scope within the institution. By mapping the informational flow required within the institution for both clinical and administrative decision making, the librarian can identify needs and responsibilities. This may reveal new areas that could be addressed by the library.

Roles the Library Can Assume

In expanding its role, the library can build upon its traditions. It has long been user/service oriented. In recent years, it has acquired a computer-associated image and the expertise to organize and retrieve large quantities of information. All of these associations lend themselves to expanded roles for the library and the librarian.

The librarian may assume a position that encompasses the informational flow throughout the institution—inside and outside of the library. An administratively supported committee may plan an integrated information system while a steering

committee on information resources coordinates all information within the institution—both published literature and hospital-generated data. A strong relationship between the library and the data processing department has been suggested by Koenig in a *Datamation* article [26]. Many hospital data processing departments have small staffs and suffer from a lack of service orientation. In those hospitals the library can assume a leadership role in providing access to personal computer use, training in the use of systems, and specialist support in developing personal databases.

As new responsibilities arise, new skills must be acquired. These skills may be reflected in new titles, as suggested by Blair in a 1983 presentation at the MLA Annual Meeting in Houston: 1) software applications librarian, 2) hardware applications librarian, 3) telecommunications librarian, 4) library information network specialist, 5) library information publications specialist, and 6) library information database specialist [27].

Many hospital libraries have formed alliances with other hospital libraries, but there has been little exploration of relationships with other types of libraries or associations, with the exception of resource sharing. Especially in the area of technological applications, hospital librarians should look to other types of libraries. Size rather than type of library is crucial in the successful transfer of technological applications.

The traditional boundaries by which libraries were grouped collapse further as service functions are shared. Consider the role of the public library in community health education. The public library staff looks to the hospital librarian for support in providing a health-related reference service, and the hospital librarian relies on the public library to add basic volumes to its collection for public use.

Professional library associations as well as other health-related professional associations can also help hospital libraries to expand and accomplish potential goals. Politically, professional associations offer lobby power; organizationally they represent an established forum for action; and financially they may assist with projects that benefit their members. The Massachusetts Medical Society (MMS) recently contributed $15,000 to the Massachusetts Health Sciences Library Information Network (MaHSLiN) to update its statewide computerized union list of serials, a tool for the delivery of the interlibrary loan service to all members of the MMS. Professional groups can satisfy mutual needs. This untapped potential should be explored and nurtured.

Historically, librarians have not been trained to analyze, synthesize, or evaluate information provided to clients. These functions are essential for an information management role. Dr. DeBakey, in her keynote address to the 1983 MLA Annual Meeting in Houston, called medical librarians to take up a synthesizing and evaluating role [28]. Special librarians and many hospital librarians have long recognized and practiced these roles.

These suggested roles appear to be vague and undeveloped, as they are as yet untried. As Dr. Estelle Brodman said in a speech to the MLA Midwest Chapter, librarians must use their imagination to think of things they don't know [29]. It is a time for innovation; innovation comes from the creative energy of the individual [30].

Evidence of Change

Evidence of change is already present in hospital libraries. Many libraries have already expanded into educating patrons and implementing new forms of technology.

The librarian at Hollywood Presbyterian Medical Center in Los Angeles has anticipated the need to educate patrons to changes in medical information handling and access. She contributed an article on the Matheson Report called "The care and nurture of biomedical information for the good of the patient" to the hospital's in-house journal [31]. Other libraries have expanded educational horizons and taken part in designing or sponsoring courses or training programs related to microcomputers. At Riverside Hospital in Columbus, Ohio, the library has sponsored courses in computer programming [32]. In Cedar Rapids, Iowa, at St. Luke's Methodist Hospital, the health sciences library was a pioneer in using the in-house mainframe to produce a book catalog in the early seventies and in experimenting with innovative approaches with microcomputers as early as 1979. The librarian at Luther Hospital in Eau Claire, Wisconsin, has sponsored courses related to computer literacy. At Salem Hospital in Salem, Massachusetts, the library staff developed courses on microcomputer applications in libraries, seminars in specific software, and workshops in end-user online searching for physicians.

The library has always been a center for information, but it is expanding its traditional function to become an information center. Some libraries have adopted the name Information Center; others reflect the data processing interpretation developed by IBM. This new mission "... promotes and

supports end-user computer use by providing tools, both hardware and software, and training in the use of these tools, so that the user can produce his own reports without involving the data processing staff" [33]. The hospital library at NKC Hospitals in Louisville, Kentucky, is beginning with a microcomputer packet. It distributes packets with summaries of microcomputers and end-user vendor options. The same library experimented with an in-depth current awareness project for administrators that suggested a $40,000 per year savings in administrators' time. At St. Joseph's Hospital in Alton, Illinois, the library produces a weekly current awareness update for administrators. It supplies to administrators annotated lists of key titles from tables of contents of some fifty journals. The publication is available to other libraries through subscription.

The application of technology to formerly manual tasks is now well documented. The proliferation of MEDLARS online centers reflects this trend for literature searching. As of November 1983, 1,023 of the 2,120 billed domestic institutional MEDLINE users were hospitals. The use of simultaneous remote searching gives libraries without trained online searchers immediate access to MEDLARS [34]. At the beginning of 1984, seventy-one hospitals were OCLC members. In the first edition of the *Directory of Microcomputers in Hospital Libraries* (1984, published by the Hospital Library Section of MLA), forty-nine hospital librarians registered hardware and software being used for hospital libraries. Applications included telecommunications for online searching and electronic mail, database management, word processing, budgeting, graphics, and printing interlibrary loan forms.

Resource sharing is a long-established tradition among libraries. Operational sharing is now a collateral development. Some hospitals have extended their services to include microcomputer/word processing hospital-wide. Framingham Union Hospital in Framingham, Massachusetts, offers a microcomputer for circulation along with a collection of software. At Cedars-Sinai Medical Center in Los Angeles, the library has installed the National Library of Medicine's Integrated Library System for both its extramural and intramural networking capabilities [35]. In Detroit, a group of hospitals has been exploring joint implementation of an integrated library system (ILS) for early 1985.

In addition to automating various functions or expanding operational organization, technology enables libraries to do things differently. Electronic mail is growing in use. Hospital libraries in the Pacific Northwest Regional Chapter (PNRC) of the Medical Library Association subscribe to ONTYME II for interlibrary loan and communication exchange [36]. BRS subscribers in Maine have also initiated an electronic request network for interlibrary loans. In Portland, Oregon, Sacred Heart General Hospital maintains a permanent duplicate journals "bulletin board" on the ONTYME system [37]. Since 1982 the Board of Directors of the Medical Library Association has been using electronic mail. The Executive Board of the Hospital Library Section initiated its use in 1984.

End-user searching has been available through Beth Israel (Boston) Hospital's Paper Chase system since 1979. The program, which became commercially available through CompuServe in 1984, has also been used at Mount Auburn's Hospital Library since 1979 and recently at the Maine Medical Center Library in Portland. Many libraries are starting to make self-service online searching options (BRS After Dark or Colleague, Knowledge Index, or Empires) available to patrons. In 1984 Massachusetts General Hospital (MGH) in Boston implemented BRS Colleague and Paper Chase for its library patrons. MGH's computer-assisted instruction programs are also available in its Treadwell Library and to other institutions through subscription to AMA/NET.

Technology also permits new library functions and activities. The library at Children's Hospital Medical Center in Cincinnati, Ohio, participates in an intrainstitutional network of microcomputers for communication. The librarian at Bethesda Memorial Hospital in Boynton Beach, Florida, has expanded her role in continuing medical education by assuming the responsibilities for implementing and coordinating satellite teleconferencing for the entire hospital. A satellite service called Voluntary Health Network is being designed by the Voluntary Hospitals of America (VHA). It will link the seventy-seven shareholders via satellite and will focus on timely business communication and professional education for the VHA system. The librarian in the VHA system should take advantage of the opportunity to manage this service. Several years ago MLA used teleconferencing as an alternative mode for continuing education in Wisconsin [38]. As hospitals explore the use of teleconferencing, librarians should consider its application as well.

At least two hospital libraries have developed

and marketed library specific software for expediting the interlibrary loan service. At MacNeal Memorial Hospital in Berwyn, Illinois, the librarian and data processing departments have completed a program for the IBM/PC called FILLS (Fast Interlibrary Loans and Statistics). At Salem Hospital in Salem, Massachusetts, the Director of Clinical Computer Systems has written a program called ILL FORMS PRINTER for the Apple II+ or Apple IIe.

At MacNeal Memorial Hospital, the librarian also participated in testing a professionally developed drug database by identifying key users in the hospital and instructing them in the use of the product. She presented a paper entitled "DRUGDEX, EMERGINDEX AND POISINDEX online" at MLA in Denver about this experience [39].

Summary

The dynamic status of hospitals and health care delivery will continue to affect hospital libraries. The managers of hospital libraries, like hospital administrators, must plan for the future of their departments or institutions. Within the hospital setting, the creative library manager will be able to activate the Matheson Report recommendations. However, information management in hospitals is approaching a critical crossroads. This "market window" will be open for only a few more years—in some hospitals it may already have closed. If the librarian does not begin immediately to pursue new roles, the hospital library may well lose the ground gained since the 1970s. Ongoing change is the only certainty of the future. Whether it becomes a challenge or a threat depends on one's attitude and response.

References

1. Hodge M. Health planning reviews of medical information systems. Springfield, Va.: National Center for Health Services Research, 1981.
2. Childs BW. Hospital computer information systems for today and tomorrow. Comput Healthc 1980 July/Aug;1:41+.
3. Matheson NW, Cooper JAD. Academic information in the academic health sciences center: roles for the library in information management. J Med Educ 1982 Oct;57 Part 2.
4. Simon HA. Designing organizations for an information rich world. In: Computers, communications and the public interest. M. Greenberger, ed. Baltimore: The Johns Hopkins Press, 1971.
5. National Commission on Libraries and Information Science. Public Sector/Private Sector Task Force. Public sector/private sector interaction in providing information services. Washington, D.C.: Government Printing Office, 1982.
6. Naisbitt J. Megatrends. New York: Warner Books, 1982:14.
7. Fazzone N, DeSimone MG. MEDLARS utilization profile in New England. Bull Med Libr Assoc 1984 Jan;72:6–11.
8. NLM Technical Bulletin 1984 May;181:5–9.
9. Scura G, Davidoff F. Case-related use of the medical literature. JAMA 1981 Jan 2;245:50–2.
10. Simon HA. Administrative behavior. 3rd ed. New York: Free Press, 1976.
11. Austin CJ, Carter HS. National hospital information resource center: a model. Inquiry 1981 Winter;18:300–10.
12. Matheson NW, Cooper JAD. Academic information.
13. Fazzone N, DeSimone MG. MEDLARS utilization.
14. Minnesota Hospital Association. The changing role of the hospital: options for the future. Chicago: American Hospital Association, 1980.
15. Butler PW, et al. Today's teaching hospitals: old stereotypes and new realities. Ann Intern Med 1980 Oct;93:614–8.
16. Petersdorf RG, Wilson MP. The four horsemen of the Apocalypse: study of academic medical center governance. JAMA 1982 Feb 26;247:1153–61.
17. Miller JG. Living systems. New York: McGraw-Hill, 1978.
18. Matheson NW, Cooper JAD. Academic information.
19. Allison RF. How to keep up with the literature. Hosp Health Serv Admin 1980 Fall;25:73–9.
20. Abdelbak M. Hospital information systems applications and potential: a literature review. Top Health Rec Manage 1982 Sept;3:8–18.
21. Balgrosky JA. Hospital information management: creating an information resource. Healthc Comput Commun 1984 Jan/Feb 1:16–9.
22. McMahon JA. President's letter. Chicago: American Hospital Association, March 1983.
23. Association of American Medical Colleges. The management of information in academic medicine, v. I. Washington, D.C.: 1982:50.
24. Horton FW, Jr. Information literacy vs computer literacy. ASIS Bull 1983 April;14–6.
25. Kanter RM. The change masters. New York: Simon and Schuster, 1983:63.
26. Koenig MED. Librarians: the untapped resource. Datamation 1983 Sept;29:243–4.
27. Blair JC. Local area networks for microsystems—partial implementation. Paper presented at 83rd Annual Meeting, Medical Library Association. Houston, June 2, 1983.
28. DeBakey L. Such labour'd nothings, in so strange a style. Presentation at the 83rd Annual Meeting of the Medical Library Association. Houston, May 30, 1983.
29. Brodman E. Excellence reconsidered. Presentation at the Annual Meeting of the Midwest Chapter of the Medical Library Association. Cincinnati, September 26, 1983.
30. Kanter RM. The change masters.
31. Hanson EM. The care and nurture of biomedical information for the good of the patient. HPMC Med J 1983 Spring;23–6.

32. Yeoh JW. Microcomputer applications. Bull Med Libr Assoc 1983 April;71:221.
33. Rhodes WL, Jr. The information center extends a helping hand. Info Sys 1983 Jan;30:27.
34. Graham GL. Simultaneous remote search: a technique of providing MEDLARS services to remote locations. Bull Med Libr Assoc 1980 Oct;68:370–1.
35. Green EW. Implications for hospital libraries. Bull Med Libr Assoc 1983 Oct;71:415–6.
36. Schardt CM. Electronic mail service: applications in the Pacific Northwest Region. Bull Med Libr Assoc 1983 Oct;71:437–8.
37. Electronic serials exchange. MLA News 1984 May;165:7.
38. Berk RA. The delivery of continuing education: teleconferencing, an alternative mode. Bull Med Libr Assoc 1982 Jan;70:21–7.
39. Ben-Shir R, Kliethermes MA. Drugdex, Emergindex, and Poisindex online. Paper presented at 84th Annual Meeting, Medical Library Association, Denver, May 31, 1984.

Received July 1984; accepted September 1984.