

library for end-user assistance. Second, although some problems were encountered, the I.S. staff was able to implement and maintain the Internet connection with few interruptions. Connect time, page loading, and e-mail transfers were fast and reliable. Third, as a result of having novice users in the pilot, the library staff was able to identify and address training needs for both experienced and novice users and developed a hands-on curriculum. The most challenging aspect was developing training for users with few or no computer skills. Although most hospital employees had experience using a dumb terminal via the hospital's medical information system, very few had ever used a personal computer, Windows, or a mouse. Flexibility and patience proved essential for training. Fourth, the library and I.S. staffs learned to take advantage of the technology the Internet provided. The printed versions of the user guide and Internet bibliography were added to the Intranet home page, providing an easy means to update them, to avoid delays in their distribution, and to eliminate paper waste. Finally, the pilot project instilled a feeling of confidence in both the library and I.S. staffs that the Internet could be "tamed."

CONCLUSION

From the library's perspective, the pilot project was a success based on several factors. It enabled Rapid City Regional Hospital to have a smooth transition from implementation of Internet access on a small, restricted basis to hospital-wide Internet access. To be successful, a team effort was necessary. As a result of the collaborative efforts, turf battles and unnecessary duplication of efforts were avoided, and increased mutual respect and enhanced communication developed between the I.S. and library staffs. Each department was allowed to choose, follow through, and succeed at the tasks in which they were most skilled and comfortable.

The IAC worked as a team, using its strengths to offer the institution the necessary support to help it meet its business objectives. The IAC was now positioned to forge a new partnership with public relations and other hospital departments to develop an external Web presence for the institution.

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Clinical medical librarianship: the Vanderbilt experience*

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INTRODUCTION

Change is the prevailing idea in the literature of biomedical librarianship. There is a pressing need for librarians to respond to changes in health care and informatics with vigorous programs that put the library directly into the "critical path" of the medical center's business enterprise [1]. To meet this challenge, the Eskin Biomedical Library (EBL) at Vanderbilt University Medical Center (VUMC) has launched a clinical medical librarianship (CML) program. CML programs bring librarians directly into the clinical setting, where they can be most effective in tailoring information to a patient-specific context [2-4]. In keeping with the medical center-wide effort to improve service to patients and their families, the CML program at VUMC promotes the true integration of librarians into clinical

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teams. Just as caseworkers, nutritionists, pharmacists, and others are acknowledged as experts in vital areas that impact patient care, clinical librarians at VUMC are encouraged to establish themselves as legitimate partners in the provision of high-quality health care. This level of integration is successful only if librarians can gain clinicians' trust during rounds, by displaying a significant understanding of the clinical environment and individual clinical cases. Consequently, training for clinical librarians is targeted toward developing a high level of clinical knowledge that supports their ability to interact on rounds, to search effectively, and—crucially—to *interpret* the medical literature. This paper describes components of Eskind's CML service, including the process of evaluating the service and establishing CML as a scalable, library-wide strategy for participating in the medical center's "mission critical" functions.

TRAINING FOR CLINICAL ROUNDS

Some of the goals of library service at EBL are: to bring accurate, specific, and timely information to bear on patient care and research; to increase clinicians' knowledge through "just in time" interventions; and to promote the librarian's role as a partner in patient care. Clinical rounds have been identified as an ideal setting for achieving these goals. Eskind's CML program began in November 1996 with one librarian rounding on the Medical Intensive Care Unit (MICU). Currently, four librarians attend clinical rounds in the MICU, the Neonatal Intensive Care Unit (NICU), the Hematology/Oncology Myelosuppression Unit, and the Clinical Research Center (CRC). CML is not an auxiliary or supplemental program at EBL but rather a major strategy for aligning the library's mission with that of the medical center; a team effort also exists, with support from a program director and program coordinator in addition to four clinical librarians, all of whom participate in an institutional culture that fosters and supports continual learning. All EBL librarians—even those in areas not traditionally associated with CML, such as circulation and technical services—eventually will attend rounds. This constitutes a synergistic process, with feedback from clinical rounds impacting library routines at all levels and those routines in turn enhancing the quality of the CML program.

In-depth training for clinical librarians is the cornerstone of VUMC's CML program and is crucial to ensuring librarians' successful integration with clinical teams. Training begins when librarians join the staff at EBL and *does not end* for any clinical librarian, who is perpetually learning from colleagues and clinical activities. Librarians' initial training prepares them for work in the clinical culture by building a specific, in-depth medical knowledge base (a process described

more fully in a recent *Bulletin of the Medical Library Association* editorial) [5]. With guidance from the CML program director and a focus on evidence-based medicine, librarians choose a clinical specialty where they will attend rounds and study the terminology, practice, and treatments in that area. Concurrently, their filtering skills are evaluated and supported by senior librarians who are experts at searching and filtering the medical literature. Librarians' training incorporates both continuing medical education activities and formal medical courses, such as the anatomy and physiology course offered through the VUMC School of Nursing. Librarians who wish to join the CML team must possess a high level of professional interest in clinical librarianship and medicine, a strong desire to work in the clinical environment, and a demonstrated willingness to learn.

EXPANDING THE CONCEPT OF QUALITY FILTERING

Beyond the added value of their expanded medical knowledge base, clinical librarians at EBL have a non-traditional view of the concept of "quality-filtering" that enhances the service they provide on rounds. Traditionally, the word "filtering" is applied to the literature search itself and often involves the systematic, programmatic, and sometimes intuitive use of specialized controlled vocabularies and other search parameters [6]. Clinical librarians filter all of their CML searches in this way to retrieve an initial group of articles for review and then filter the results of the search, hand-picking the most relevant articles based on the question and the content of the article. EBL librarians then go beyond that step, and read and filter the full-text of the two or three articles judged most appropriate based on the type of study, highlighting passages that are relevant to the individual clinical case at hand. EBL librarians synthesize all of the highlighted information into a concise written summary that points out, for instance, conflicting recommendations in different articles, whether the treatment is based on controlled trials, or facts about a study that differ from the specifics of the clinical case for which the article is retrieved. If the result of a search shows more than one point of view on how to approach a patient-care question, librarians select the best article representing each point of view. As part of their ongoing learning process, clinical librarians attend monthly meetings, arranged by the team coordinator, where they participate in exercises for filtering and interpreting medical literature and discuss articles on meta-analysis, evidence-based medicine, and other relevant subjects.

This level of filtering is a crucial component of

clinical librarianship at VUMC and a concrete demonstration of the value librarians bring to the clinical environment. Rather than delivering simply a packet of articles—which in and of itself does not reveal the librarian's labor and specialized knowledge—EBL librarians provide a value-added document that solidifies their contribution to the rounding process—a document in which the librarian's labor, knowledge, and professionalism are revealed. The appendix shows a typical filtered summary prepared by one of the authors (KW), and illustrates the depth of clinical understanding expected of librarians who attend rounds.

THE ROUNDING EXPERIENCE

During a typical rounding experience, librarians work their way around the floor as part of a team that includes an attending physician, a fellow, residents, interns, nurses, case managers, a pharmacist, and sometimes a social worker and a nutritionist. Librarians receive questions as they move from patient to patient during rounds; they also receive questions, usually from attending physicians, after all patients have been seen. Librarians listen closely to the discussion at each bedside for indirectly articulated information needs: are the clinicians debating what treatment to use for a certain situation? Is the patient or a family member asking questions that the clinicians cannot completely answer? Is the attending physician trying to make a teaching point with the residents? For each question brought back from rounds, librarians read, filter, and summarize their findings in short abstracts. The summaries are attached to the full-text articles and the librarian delivers the entire package at rounds, verbally presenting the results to the group.

TO CHARGE OR NOT TO CHARGE?

The clinical librarianship program at EBL grew, in part, out of a desire to build librarians' skills in preparation for a future that is likely to lie outside the library's walls [7]. This was especially crucial at ESKIND, where there was no existing tradition of clinical librarianship, and where members of the medical center were largely unaware of the specialized services clinical librarians provide. To make demonstrating the benefits of these services to the medical community easier, EBL's administration made a conscious decision to absorb the cost of clinical librarianship. The impulse to charge for CML was further offset by the understanding that librarians learn a great deal from attending rounds, resulting in improvements to library services and operations [8].

There is also a crucial point to be made about the

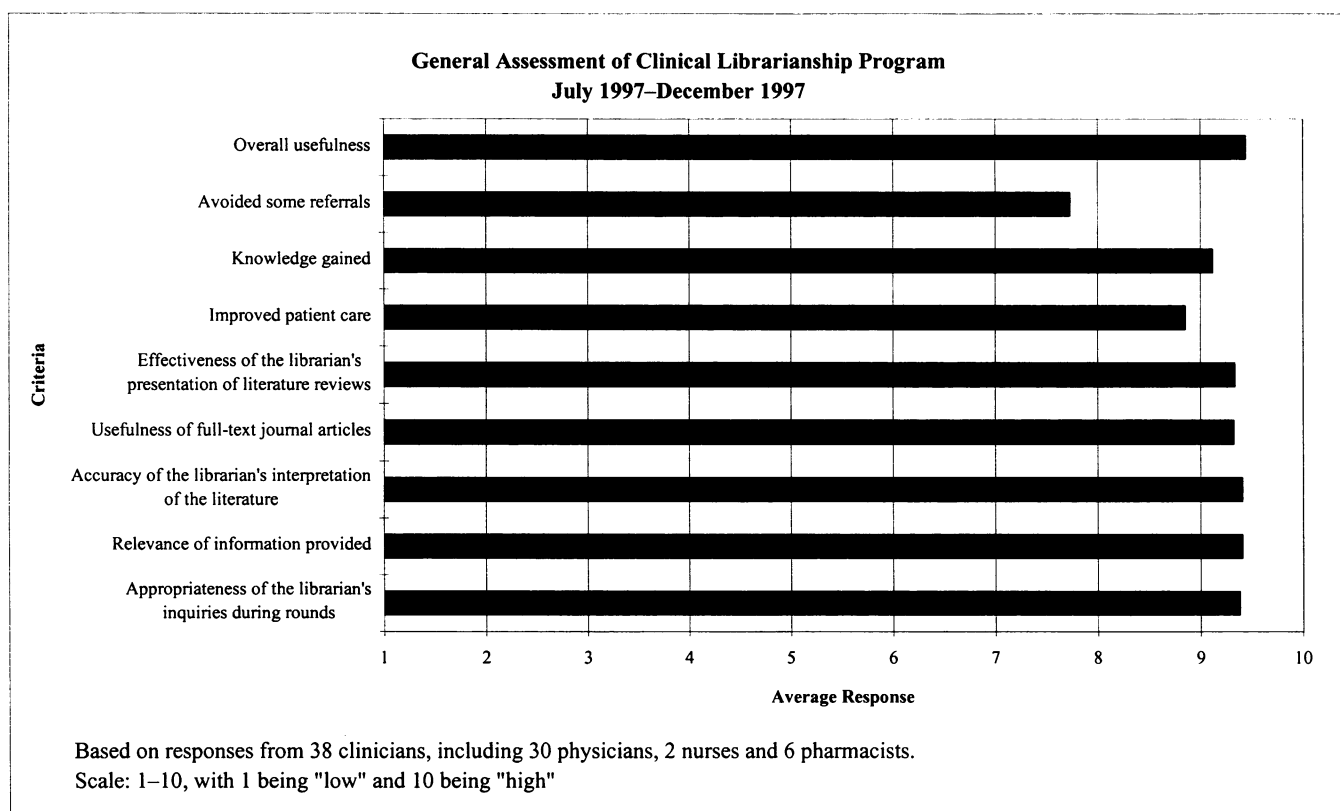
need to elevate the level of service the library provides to its constituents. Librarians must show that they can contribute significant added value to the process of finding information, not only by constructing highly efficient searches, but by inhabiting the intersection between a knowledge of information-seeking strategies and an understanding of the nuances of individual clinical cases. Providing CML services at no cost makes demonstrating librarians' full potential in the clinical environment easier, while charging for these services could be detrimental both to patient care and to the librarian's ability to learn from the clinical encounter. EBL will continue to re-evaluate this issue periodically, especially with regard to plans for scaling up the CML program in the future.

EVALUATION

In July 1997, clinical librarians on three units began an ongoing data-collection process for evaluating the CML service; the fourth unit became active and began collecting data in September 1997. Clinical librarians use a dual survey mechanism for evaluation. After delivering a packet of articles and summaries, the librarian asks the attending physician to rate the relevance and usefulness of the material provided and records the physician's response on a standard form. The second mechanism is a blinded, ten-question survey distributed by a research assistant to all clinicians on the team at the end of each monthly rotation. Both mechanisms use a 1-to-10 Likert-type rating scale. The survey questions were formulated by the clinical librarian team in consultation with colleagues in the VUMC Division of Biomedical Informatics. The data included in Figure 1, which reflects responses to the ten-question blinded survey from July 1997 through December 1997, shows that clinicians routinely rate librarians' ability to function in the clinical environment, as well as the utility of the information furnished, at the highest margins.

A 1993 University of Pittsburgh study has found that clinical librarians can recognize and select articles that are at least as useful as those clinicians select on their own [9]. Such comparative evaluations support the notion of CML as primarily a time-saving convenience for clinicians, and reinforce the idea of the clinical librarian as someone who can effectively replace the clinician in searching the medical literature for information about specific cases. The CML program at EBL is designed to expand this notion by promoting librarians as specialists who inhabit the intersection between an understanding of controlled vocabularies and a knowledge of medical concepts, and who provide a unique, value-added service which clinicians cannot necessarily duplicate on their own. The program's evaluation, therefore, seeks to de-

Figure 1
Survey Responses



termine the extent to which clinicians trust the librarian's ability to evaluate, interpret, and synthesize the medical literature. In effect, this evaluation asks as much about the clinician's perception of the *librarian* as it does about the utility of the information the librarian delivers.

FUTURE DIRECTIONS

Critics have pointed out that clinical medical librarianship can be labor intensive and expensive [10]. To capture the expertise, time, and effort librarians put into answering each clinical question received on rounds, VUMC's CML program incorporates the ongoing creation of a searchable electronic database of clinical questions. Librarians enter each of their clinical questions, references, and filtered summaries into a relational database; a Perl common gateway interface (CGI) script is used to implement a Web interface to the database. In the near future, this Web-based database will be made available to the rounding teams, helping to bring evidence-based learning directly into

the settings where clinical teaching occurs. This tool is expected to be especially useful in areas like MICU and NICU, which receive many repeated questions at each new rounding cycle.

As the library prepares to scale up its services in the future, the architects of EBL's CML program are considering using clinical rotations as a training vehicle for librarians. As they become proficient in clinical specialties, librarians will move toward providing expert consultation in medical specialties and evidence-based reasoning, just as cardiologists and nephrologists provide specialized consultation in their areas. CML is an important strategy for carrying the library successfully into the next century, and involves everyone directly or indirectly in the library, from researchers to library assistants to managers. Thus, the CML program's success lies in a sustained, library-wide effort to build the *people*—the clinical librarians, their mentors, and other professionals—who understand the library's vital role in improving the medical center's service to patients and their families.

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APPENDIX

Clinical Question: Are there any methods of preventing aspergillosis in myelosuppressed patients?

Reference #1: UZUN O, ANAISSIE EJ: Antifungal prophylaxis in patients with hematologic malignancies: a reappraisal. *Blood* 86:2063-72, 1995.

This review article includes a section examining the prevention of aspergillosis by reduction of environmental exposure, chemoprophylaxis, and locally administered or systemic antifungal agents. The authors conclude that HEPA air filtering is the only strategy proven effective against aspergillosis and that such basic environmental measures as preventing exposure to air from construction areas and prohibiting plants in the rooms of severely neutropenic patients may offer some benefit and are cost-effective. Such approaches as aerosolized or intravenous amphotericin B, lipid amphotericin B, and itraconazole should, according to this review, be considered "investigational" until additional data appears.

Reference #2: MYERS SE et al: A pilot study of prophylactic aerosolized amphotericin B in patients at risk for prolonged neutropenia. *Leukemia and Lymphoma* 8:229-33, 1992.

According to the results reported in this pilot study, prophylactic aerosolized amphotericin B appears safe for use in neutropenic patients. Twenty-six patients receiving either intensive chemotherapy for acute leukemia or bone marrow transplantation (either autologous or allogeneic) were included. No side effects were reported, although one patient was taken off the study upon developing cardiogenic pulmonary edema. Although no patient developed asper-

gillosis, the authors note that this is a small, non-randomized clinical trial.

The Indiana University School of Dentistry Archives: back to the future

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The Indiana University School of Dentistry (IUSD) Library has become more visible and valuable through its stewardship of the school's archives collection. Faculty, administrators, potential donors, and dental history scholars have recently discovered the depth, diversity, and richness of our collection and reference questions requiring the use of the archives have increased markedly, particularly from alumni and their family members. The experiences, techniques, and policies used by our library in developing the archives are applicable to other libraries that find themselves needing to organize and manage the records and memorabilia from their institutions. Although the discovery of this historical treasure may seem sudden to our patrons, the efforts of building the collection have taken place over several years. This paper will discuss the evolution of the archives, describe unique strengths of the collection, highlight its increasingly important role within IUSD, and offer plans for the future.

EVOLUTION OF THE ARCHIVES COLLECTION

Ten years ago, the archives collection of IUSD was in shambles. The majority of the collection was housed in the library, but deplorable storage conditions were causing rampant damage and misplaced materials. Boxes of disorganized and deteriorating materials were stacked in wooden cabinets without order or inventory. Other artifacts were scattered throughout the dental school and in the home of a former dean. Clearly, the collection was unusable and there was a significant danger that it would be taken out of the school and integrated into the general archives on campus. At that time, the head librarian decided that the collection was worth fighting to save and should be kept within the school, particularly because a number of IUSD's faculty were engaged in historical research.