Mounting evidence that librarians are essential for comprehensive literature searches for meta-analyses and Cochrane reports

The authors of the study ''Evidence-Based Retrieval in Evidence-Based Medicine'' in this issue of the *Journal of the Medical Library Association (JMLA)* examined the replicability of the literature search strategies provided in meta-analyses indexed in PubMed [1]. The authors found that only 6.7% of a random sample of articles with meta-analyses had ''both reported a retrieval strategy in sufficient detail such that it could be repeated *and* reported evidence of the effectiveness of that strategy.'' The authors concluded that ''[p]eer-review standards must be developed and applied that require authors of meta-analyses to report evidence for the effectiveness of the retrieval strategies they employ.'' They also concluded that ''[r]eports of bibliographic-based meta-analyses that do not report the retrieval strategy in sufficient detail to be repeated run counter to the basic tenets of meta-analysis research and evidence-based medicine.''

This study points to a shortcoming of meta-analysis that happily is easy to correct. Both conditions should be part of any literature review. It is important to know if the researchers' findings are generalizable to similar shortcomings in search strategies used for other purposes. For example, is there evidence that the literature reviews in Cochrane Collaboration reports have replicable and effective search strategies? A news story in *BMJ* in February 2003 by White [2] highlighted a Cochrane study on the effectiveness of editorial peer review. White's news story focused on the conclusion of the Cochrane review: ''the practice of peer review is based on faith in its effects, rather than on facts'' [3], which came from a review of 21 studies selected from a set of 135 studies that were identified through a ''comprehensive'' literature search.

A careful examination of data published in the Cochrane study [4] on the effectiveness of editorial peer review suggested that there, too, search strategies were not as rigorous as they might be. Even though the search strategy was replicable, the methodology for the literature search for this report was not comprehensive. In the Cochrane study, all searches of online databases used only the term ''peer review.'' Studies of peer review cover a range of subjects (e.g., rejection rates, reviewer agreement, reviewer bias, statistical review, blind or anonymous review); many of these terms would not be retrieved with only the term ''peer review.'' In addition, until fairly recently, the term ''refereeing'' was more commonly used.

The Cochrane authors searched a number of medically related online databases and provided the coverage years. However, the Cochrane authors did not provide criteria for database selection or for the years searched, and not all databases were searched fully. For example, Current Contents is available online from 1993 but was only searched from 1999 to 2000. ISI's Web of Science was not searched and is an excellent tool for retrieving cited references. The most recent amendment to the report was November 18, 2002. However, none of the databases were searched beyond 2000.

The Cochrane authors hand-searched a number of monographs and journals but did not explain their selection criteria. Some relevant reviews of the editorial peer-review process were not included: (1) Weller [5] undertook an analysis of studies of editorial peer review and identified, for example, 32 studies of reviewer agreement and 34 studies in the medical literature on statistical review; (2) Weeks and Kiner [6] published proceedings from a conference aimed at disseminating research on editorial peer review; and (3) Speck [7] annotated 780 publications on the subject of peer review. The Cochrane example is important, because editorial peer review is considered pivotal to the publication of solid scientific studies. The study of that process should be done with as much care and thoroughness as possible.

The Cochrane Reviewers' Handbook [8] gives explicit steps to follow for designing search strategies, and The Cochrane Manual [9] provides principles for searching. In an article in the *Bulletin of the Medical Library Association,* Helmer and colleagues [10] stated that ''guidelines [for search strategies] generally require that researchers and *librarians* search'' [emphasis added]. A search of both the Cochrane handbook and manual revealed that the Handbook twice (Appendix B and Appendix 5B) suggested that librarians be consulted for particularly complex searches. Neither the handbook nor the manual suggested that a librarian be a member of the team of researchers.

The findings of the *JMLA* researchers and the Cochrane example convincingly illustrate the need for librarians to be on any team that sets out to undertake meta-analyses or Cochrane reviews. Not only does the literature search strategy need to be reproducible, documentation should be provided that a comprehensive search was done, as pointed out by the *JMLA* authors. Had this been done with the peer review study, it might have drawn a different conclusion. The role of librarians in this process is essential.

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Connections between open access publishing and access to gray literature

The potential of open access publication to increase accessibility to peer-reviewed literature is cause for celebration. As we celebrate, we should not lose sight of the long-standing challenge of providing better access to the gray literature that provides an essential complement to peer-reviewed findings. We do not need to launch an open access movement to obtain this material, due to its lack of commercial significance. Instead, the challenge is to develop bibliographic resources of comparable depth as those available for the peer-reviewed literature.

As of September 2003, BioMed Central (BMC) had 322 institutional members from thirty-three countries [1]. An additional approach began in October 2003 with the launch of *PLoS Biology* by the Public Library of Science (PLoS), followed by *PLoS Medicine* in 2004. BMC has begun the work of motivating tenure-driven scholars to publish in open access journals; the advent of PLoS represents an effort to increase movement in this direction. One positive effect of PLoS, even before it began publishing, has been to draw increased media attention to the open access movement. The *Washington Post* published a front-page story about PLoS in early August [2], and, a few days later, an editorial in the *New York Times* lauded this effort [3].

Although stalled in Congress at the time of this writing, the recently introduced Public Access to Science Act is another sign of changes ahead. It seeks an exemption from copyright protection for the results of federally funded scientific research [4]. This act would apply to a high majority of medical research in the United States, which is funded through the National Institutes of Heath (NIH). Research findings would become part of the public domain and thus available without charge.

Although scholars in all disciplines would benefit from barrier-free access to the latest research, this benefit is especially true in the arena of medical publishing. Information in medical journals is often, quite literally, of life and death importance. Moral logic argues that such information should be freely available; market logic has turned it into a valuable commodity. In consequence, medical libraries consistently face exorbitant subscription costs [5].

The library community has responded vigorously to this challenge. One example is the Association of Research Libraries' Scholarly Publishing and Academic Resources Coalition (SPARC), which is a broad-based effort to increase competition in the scholarly publishing market. A more localized approach is the effort of librarians at the University of Virginia's Claude Moore Health Sciences Library (CMHSL) to encourage faculty to consider publishing in a BMC journal [6].

Not surprisingly, these efforts face resistance from publishing companies. For example, Elsevier argues that open access publishing is an untenable business model that threatens the viability of niche journals [7]. The ongoing tussle between libraries and publishing companies foreshadows a difficult road ahead.

In addition to for-profit publishers, scholarly societies are currently hesitant to endorse open access publishing. In contrast to for-profit publishers, these societies often support the principle of open access, however, their publishing revenues underwrite other activities of their societies [8]. It is important for librarians to be sensitive to these realities; challenging the motives of all publishers may inadvertently alienate the scholars who should be natural allies.

Despite the challenges ahead, open access will inevitably become the norm for scholarly communication. In the print-only era, publishers provided the indispensable function of distribution. In an electronic age, this indispensability is no longer true. Once a critical mass of scholars publishes in open access journals, their colleagues will fol-

low. This is the time when viable business models for open access publishing will emerge.

As open access publishing becomes more prominent, it is likely to be well integrated into the bibliographic infrastructure already in place for locating peer-reviewed literature. For example, as part of their campaign to encourage faculty to consider open access publishing, the librarians at CMHSL highlighted the fact that articles published in BMC received immediate citation in PubMed [9]. In contrast, the tools for locating gray literature are much less developed. This material is available to anyone today, if only it can be found.

One definition of gray literature is, ''that which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers'' [10]. In general, gray literature does not undergo peer review. A major benefit of reading gray literature, which seems counter-intuitive, is that it is more likely to report studies with non-significant results than peer-reviewed literature. This likelihood may balance against the tendency of authors to publish only statistically significant findings, which inadvertently inflates the perceived value of these findings [11]. Other benefits are that gray literature is more likely to report studies that ceased prematurely, as well as innovative pilot projects [12]. In short, gray literature provides invaluable context for understanding and critiquing the peer-reviewed work found in MEDLINE.

Because there is no MEDLINE for gray literature, health sciences librarians must devote extensive time to identifying these documents. The New York Academy of Medicine's *Grey Literature Report* is a useful resource as are email alerting services from various foundations [13]. The dexterity required to locate gray literature highlights the value of having citations in one place. Even after gray literature is identified, the documents can be expensive to obtain [14], not due to exorbitant subscription costs but rather due to poor distribution mechanisms. The unsettling result is that much valuable research becomes relatively inaccessible [15].

Accessing gray literature is a challenge in all fields of scholarship. In the medical arena, it is a particular challenge to locate results of population-based interventions. The NIH budget continues to prioritize clinical interventions [16], which benefit individuals more than populations. Because the researchers who depend upon NIH grants are more likely to publish in mainstream journals [17], obtaining information about clinical interventions is easier than obtaining information about population-based interventions. This is true despite strong evidence that cultural and social factors are major contributors to premature death and disease [18].

Although it is tempting to pit clinical and population-based approaches against each other, the more productive course is to view them as complementary tools for improving health. (This is also the best way to understand the relationship between peer-reviewed and gray literature.) With this in mind, the challenge for health sciences librarians is to determine how to funnel more population-based work into the system that has served clinical literature well.

There are several indications that now is the time for strong movement in this direction. One is the increased societal attention to the public health infrastructure following the September 11, 2001, terrorist attacks. This attention has focused on how to respond to incidents of bioterrorism, and both librarians and members of the public health workforce have done excellent work in improving access to relevant resources.

In 2003, the National Library of Medicine's (NLM's) Medical Subject Headings (MeSH) Section incorporated several terms related to public health into the vocabulary, including the identification of ''public health informatics'' as a distinct type of medical informatics [19]. As MeSH has traditionally been much stronger in the clinical domain, this is an exciting harbinger of improved indexing of public health literature.

Along the same vein, the Robert Wood Johnson Foundation has funded a groundbreaking study at the Center for Natural Language Processing (CNLP) of Syracuse University. Currently in its second year, this project has identified key elements from the gray literature in public health [20]. These elements—which are extracted and synthesized into automatically generated abstracts—include the health issue addressed, a description of the intervention, the document type, the target population, and the geographic location. The principal investigators are currently conducting focus groups and surveys to gauge the sufficiency of these summaries. As one of the investigators, Anne Turner of Oregon Health & Science University, says, ''It would be great if our automatically generated abstracts could be used in an indexing scheme to better organize this broad and diverse literature'' [21].

Just as open access to clinical literature is only possible in an online era, the CNLP's research highlights the power of computers to improve access to gray literature. Health sciences librarians should perceive these challenges as opposite sides of the same coin: open access removes economic barriers, and improved indexing of gray literature removes bibliographic barriers. We have made great strides in the open access movement, which should continue. Now is the time to renew our attention to improving access to population-based gray literature.

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Why the Joint Commission on Accreditation of Healthcare Organizations should add new regulations regarding libraries

The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has released its 2004 standards for hospitals [1]. The complexity of modern information management points to the increased importance of the medical library and the need for leadership by the medical librarian. Recent trends in information sciences and the demand for current, authoritative information throughout the hospital necessitates a new appreciation of the medical library. ''The increasing use of the Internet and new information technologies by medical, nursing, and allied health staffs; patients; and the community require new strategies, strategic planning, allocation of adequate resources, and selection and evaluation of appropriate information resources and technologies. To assess the quality of a hospital the library should be evaluated for resources and technologies'' [2]. With the future promising even more aspects of virtual libraries, the librarian remains the gatekeeper to cataloging vast amounts of raw information into the knowledge-based products needed by patrons. The librarian's role may change to accommodate future trends, but the need for quality information management remains strong.

In recent years, JCAHO has made patient safety a major issue in its assessment of hospitals. It has been looking at sentinel events that it describes as occurring when ''The event has resulted in an unanticipated death or major permanent loss of function, not related to the natural course of the patient's illness or underlying condition'' [3]. One such sentinel event took place in June 2001 at Johns Hopkins University. Ellen Roche, a healthy twenty-four-year-old patient, was participating in a clinical study on asthma. She was given a drug, hexamethonium, which caused irreversible lung damage, and she died. When medical librarians looked at this case, it became apparent that this drug had a history of causing lung damage: ''medical librarians around the country immediately searched various sources and by using just online resources discovered disturbing information on problems associated with this drug'' [4]. If a librarian had done a comprehensive search on hexamethonium, articles published in the 1950s would have warned about possible lung damage. Even if a librarian had done a quick current PubMed search of the literature, reports pointing to the older articles would have been found. The conclusion seems obvious: ''This kind of tragedy offers a terrible lesson in the importance of using professional searchers and medical librarians in critical searching situations'' [5]. Other factors may have contributed

to this tragedy, but clearly in this case, the lack of a librarian's search was an essential factor.

Medical librarians provide the knowledge-based information resources to patrons in the hospital library. Knowledge-based information is ''a new term for an old concept: information provided from in-house collections combined with that from external databases in order to enable evidence-based medicine'' [6]. Hospital libraries house the resources that librarians use to ensure that the information is up to date and readily available. Although managing information is librarians' main job, they are often involved in other duties in the hospital. With hospital budgets being cut, librarians take on other duties, as needed. Some librarians run the audiovisual department, some are in charge of continuing education departments, and some provide resources for patient education. Librarians attend department head meetings and often get involved in many other committees in the hospital. They are also involved in professional organizations outside the hospital. For patient care, librarians provide most of the background information that enables health care workers to make wise decisions based on evidence found in the literature. It is not a highly visible function, but it is essential to quality of care.

Most hospitals strive to meet the standards set forth by JCAHO, and library services are covered in the Management of Information (IM) section in the *Comprehensive Accreditation Manual for Hospitals.* The standards were updated in 1994 to ''shift the emphases away from standards for individual departments to standards for hospital-wide functions'' [7]. The latest standards make no provision that the hospital should have a library or a librarian. Instead, they focus on the functions the library provides to the hospital. In section IM 4.10, we find ''The information management system provides information for use in decision making'' [8] and, in IM 5.10, ''Knowledge-based information resources are readily available, current, and authoritative'' [9]. The only mention of libraries is found in ''Elements of Performance for IM 5.10. Library services are provided by cooperative or contractual arrangement with other institutions, if not available on site'' [10]. This is hardly a ringing endorsement of libraries and librarians in the hospital.

Once every three years most hospitals in the United States endure a three-day long inspection by JCAHO. JCAHO is not the only accreditation agency, but it is by far the largest and most prestigious. For 2004, the inspection visit is not officially announced ahead of time, but word usually gets out. (This hospital is tentatively scheduled for a visit in March or April 2004.) Anyone who has spent any time in a hospital knows that this visit is highly anticipated and very important. ''The JCAHO survey agenda includes an interview for Management of Information and suggests that at least the chief information officer, the director of the library, and the director of medical records attend that meeting'' [11]. In my experience, this usually consists of several general questions being asked, with the bulk of time spent on concerns about medical records. Questions for the librarian may include: ''How are library patrons needs' assessed?'' ''With everything on the Internet, how do you decide what to collect?'' ''How do you deal with pornography on the computers?'' The wise librarian knows to get in as many points as possible while answering these questions. The Medical Library Association (MLA) assures us that ''Librarians bring. . . skills in organizing, retrieving, analyzing and disseminating information; a focus on providing access; and a strong background in networking and resource sharing'' [12]. Librarians should mention that. Sometimes there is a review of the library itself, but this seems to depend on the surveyor. I have found this meeting mostly either not scheduled or canceled due to time concerns. Other librarians have assured me that I am not alone in that observation.

Clearly, there is a danger that, if JCAHO does not specify that a hospital should have a librarian, and only mentions that library services must be at least by contractual arrangement, hospital administrators might decide that libraries and librarians are expendable. When added to the promise of the virtual library (i.e., a library wholly dependent on the resources available and accessible online), the hospital library could become a hard sell. ''The system of balancing virtual services with traditional services seems destined to continue for the foreseeable future. . . . However, it is likely that the virtual library will become the gateway that integrates access to most, if not all, of the library's resources and services, both traditional and virtual'' [13]. Could a computer and fax machine become the library of the future? What effect would that have on patient care?

If the effect of JCAHO regulations leads hospital administrators to go without a librarian or to close the library and rely on contracts with other libraries, then the quality of care in the hospital will suffer. This could lead to other sentinel events like the one at Johns Hopkins. JCAHO regulations are taken very seriously by hospital administrators, and JCAHO could take the lead in adding a few more regulations regarding librarians and library services. As a template for these regulations, JCAHO could consider the standards published in 2002 by the Standards Committee of the Hospital Libraries Section of MLA. ''The Medical Library Association 'Standards for Hospital Libraries 2002' have been developed as a guide for hospital administrators, librarians, and accrediting bodies to ensure that hospitals have the resources and services to effectively meet their needs for knowledge-based information'' [14]. This article goes on to list in great detail the standards that should be used in evaluating hospital libraries. The medical librarian is an essential part. ''Knowl-

edge-based information in the library should be directed by a qualified librarian who functions as a department head'' [15]. The library itself is described: ''The physical library will be large enough to accommodate the library staff, the in-house collection, an appropriate amount and selection of personal computers and other information technology hardware, and seating for an appropriate number of users. A separate office will be provided for at least the professional library staff'' [16].

Suggesting that JCAHO actually add more regulations to their already quite large manual, to protect libraries and librarians, might be seen as unnecessary. Why should library services be more defined? There is a perception that hospitals, particularly small hospitals, have been cutting costs by eliminating librarians and libraries. If hospitals are eliminating library services, the effect on patient care could jeopardize patient safety. As information sources continue to grow with no end in sight, librarians are best suited to organize, evaluate, and disseminate the information necessary to provide quality health care services. The library houses not just books and journals but a vast collection of virtual resources, all of which must be maintained, so that the information is both relevant and current. Clear library guidelines would ensure that hospitals continue to provide quality care to their patients.

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LETTER TO THE EDITOR

PubMed automatic term mapping

The brief communication by Smith, published in the January 2004 issue of the *Journal of the Medical Library Association* [1], overlooks changes that were made to PubMed automatic term mapping prior to final acceptance and publication of the article. Smith states that PubMed employs ''four vocabulary-controlled mapping tables: MeSH Translation Table, Journals Translation Table, Phrase List, and Author Index.'' [2]. However, as announced in the March–April 2003 NLM Technical Bulletin, the phrase list was removed from automatic term mapping [3].

Automatic term mapping now includes only the Medical Subject Headings (MeSH) translation table, the journals translation table, and the author index. Phrase search occurs only under these conditions: the phrase is entered with a search tag, enclosed in double quotes; the term is hyphenated; or the term is truncated. As Smith suggests, searchers should use caution when entering unqualified journal titles in PubMed.

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