

## VIEWPOINT

# Engaging Medical Librarians to Improve the Quality of Review Articles

**Melissa L. Rethlefsen,**  
MLS, AHIP

Spencer S. Eccles  
Health Sciences Library,  
Salt Lake City, Utah.

**M. Hassan Murad, MD,**  
MPH

Center for the Science  
of Healthcare Delivery,  
Knowledge Synthesis  
Program, Mayo Clinic,  
Rochester, Minnesota.

**Edward H. Livingston,**  
MD

Deputy Editor, Clinical  
Reviews and  
Education, *JAMA*,  
Chicago, Illinois.

**Review articles published** in *JAMA* summarize various aspects of medical practice and are written by known authorities. An expert's opinion about a topic has value, but often more can be learned by that expert's assessment of all the pertinent literature. When reading individual research articles, readers could miss subtle features of the studies that are more apparent to an expert clinician-researcher. Readers benefit from the expert's explanation of the validity and applicability of individual studies.

When authors summarize the literature, a natural tendency is to select articles supporting their views. To minimize this potential for bias, *JAMA* editors ask authors to systematically review the literature and comment on as much of it as is practical. Extensive literature searches can be difficult to perform, given the complexity of the search process and authors' time constraints. It is also unlikely that a content expert will be familiar with the intricacies of more than one database. Empirical evidence provides a strong rationale for searching multiple databases.<sup>1,2</sup> For this reason, collaborating with medical librarians is recommended when writing review articles. A general approach for this collaboration is presented in the **Box**.

Preliminary searches conducted by a librarian can help refine the question and determine its feasibility and scope. These initial screening searches can also inform the development of the review's prospective inclusion and exclusion criteria. The choice of database depends on several factors. Most important is the content (topic) of database. MEDLINE is produced by the US National Library of Medicine and focuses on articles in peer-reviewed journals of biomedicine and health. Embase includes broader coverage of drugs and pharmacology and conference abstracts. Of the 4800 journals indexed in Embase, 1800 are not indexed in MEDLINE. Similarly, of the 5200 journals indexed in MEDLINE, 1800 are not indexed in Embase.<sup>3</sup> CINAHL is an excellent source for research of nursing, allied health, or interprofessional areas. PsycINFO is the primary database for literature in psychology, psychiatry, counseling, addiction, and behavior. The Cochrane Collaboration's CENTRAL is a critical database for use by comparative effectiveness researchers because this database attempts to capture all the randomized clinical trials in medicine through extensive electronic and hand searching of journals and conference proceedings. Regional and national databases are important in searching for certain topics (eg, searching LILACS, a database from Latin America and the Caribbean, when evaluating a tropical disease; searching the Chinese Biomedical Literature Database when evaluating a complementary medicine topic). Searching trial registries (eg, ClinicalTrials.gov) reveals ongoing and as-yet unpublished trials.

The second consideration involves the database platform (ie, the vendor or interface/search engine). For example, MEDLINE is available without cost through PubMed but can also be accessed through a vendor such as Ovid. Embase is only accessible through an institutional subscription via 1 or more vendors (eg, Embase.com, OvidSP, ProQuest). Each of these platforms offers different algorithmic indexing and search capabilities. PubMed, for instance, does not search for all phrases, whereas OvidSP MEDLINE will search for any combination of words as a phrase, and can use sophisticated adjacency searching, identifying abstracts in which a word is mentioned within a certain number of words of another. PubMed, however, includes more up-to-date records and records from PubMed Central, such as manuscripts from National Institutes of Health-funded research published outside of the journals indexed by MEDLINE.

Once sources are selected, librarians reduce the research question to major concepts to determine appropriate subject headings or other controlled vocabulary terms for each database. Controlled vocabulary is the most valuable strength of databases like MEDLINE, Embase, CINAHL, and PsycINFO. It standardizes terminology and broadens a searcher's ability to find all relevant materials on a given topic. Many controlled vocabularies are arranged into hierarchical trees to allow searching for a broad term (eg, heart diseases) and retrieving articles about all narrower concepts (eg, myocardial infarction or cardiomegaly) without having to search for each term individually. An expert searcher looking for information on stress management methods for patients with cancer would most likely have more success with CINAHL's patient-centric controlled vocabulary terms than with MEDLINE's disease-focused Medical Subject Headings (MeSH terms). Embase has superior drug indexing via its Emtree vocabulary, allowing searchers to swiftly focus on drug administration routes as well as search more comprehensively for drugs overall. The unique terminology and controlled vocabulary structure give human-indexed databases their power, enabling faster, more comprehensive searching than that achieved through the use of solely computer algorithm-indexed databases like Scopus or even through the use of search engines that search full-text articles, like Google Scholar.

In addition to controlled vocabulary terms, librarians also can determine what terms to use as free-text keywords, such as words in article titles or abstracts. These must be carefully considered because they can generate extensive search results that are difficult to manage. Keywords may be truncated, used as wild-

#### Corresponding

**Author:** Edward H. Livingston, MD, Clinical Reviews and Education, *JAMA*, 330 N Wabash Ave, Room 41410, Chicago, IL 60611 (edward.livingston@jamanetwork.org).

### Box. Proposed Approach to Enhance the Quality of Review Articles Through Collaboration With Medical Librarians

1. Define search question(s) and prospective inclusion and exclusion criteria
2. Conduct preliminary search to further clarify its scope
3. Choose data sources based on
  - a. Database content
  - b. Database platform (vendor, interface)
  - c. Search terms
  - d. The need for nonindexed (gray) literature
4. Reduce the research question into major concepts
5. Develop search terms and synonyms (controlled vocabulary and textwords)
6. Execute search
7. Optimize the output
8. Document the search procedure
9. Document the search results

cards, or used in varying combinations of adjacency for maximum sensitivity.

Gray literature is a term used to describe materials published outside traditional journals, such as conference proceedings, government reports, working papers, patents, websites, and dissertations. Gray literature is searched using Internet search engines (eg, Google) and website-specific engines (eg, FDA website). Some gray literature search tools also exist (eg, OpenSIGLE, Grey Literature Report). Public health, health policy, and health service research reviews will find gray literature especially valuable.

All of the search terms representing each concept in the research question are combined using complex Boolean logic. Librarians will test the draft search against known articles on the topic and make iterative modifications until the search is optimized. Searching multiple databases yields overlapping reference lists. Librarians can use bibliographic management tools to remove duplicate references, help manage and organize search results, work with investigators to develop a schema for determining what papers to include in the final reference list, and write the literature search methods and results sections in the review.

When a manuscript is being drafted for publication, the medical librarian is encouraged to write the methods and results of the search. Basic information about the search methodology should be in the main manuscript, whereas the complete search strategy should be in a supplementary document. The main manuscript should include the databases and platforms used, the dates covered by the search, the date the search was first performed, any limits or search filters used in the search strategy, the update methods and dates performed, and the qualifications of the searcher. If the strategy was peer-reviewed by another librarian, that should also be stated. The method also should specify if no search limits were used.

When nontraditional sources are searched, the searches may not be comprehensive or easily reproducible. Nevertheless, search terms and strategies should be reported in the Methods section or in online supplemental material accompanying the article. Examples of nontraditional sources are bibliographies of papers or review articles identified in standard searches, hand searches of certain key journals or conferences, clinical trial registries, general search engines, or other specific websites. If citation indexes (ie, Google Scholar, Web of Science, or Scopus) are used to capture articles citing key sources, the key articles should also be listed in the supplement along with the information about the citation index used.

Librarians assisting with the review process should draft the portion of the Results section of a manuscript that relates to the search results. Results should include the total number of materials found before and after removal of duplicates and the number of materials retained at each stage of the review process. Flow diagrams depicting the materials found, included, or excluded should be reported in the manuscript.

Medical librarians play a central role in assisting clinicians access medical literature needed to provide patient care.<sup>4</sup> They also can play an important role in developing high-quality narrative and systematic reviews, constructing search strategies, managing references, reviewing references for inclusion, documenting the search methodology, and contributing to the drafting of the final manuscript. Having a medical librarian closely involved ensures that the review will be thorough and its methodology reproducible. Medical librarians bring expertise to the review process based on their understanding of the medical literature, search methods, and review guidelines and standards. Their neutrality and expertise can help minimize bias in the review process, leading to more robust and unbiased review articles.

#### ARTICLE INFORMATION

**Conflict of Interest Disclosures:** All authors have completed and submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest and none were reported.

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