June 2015

Responsible and Efficient Literature Searching

This guide was prepared by Ruth Lewis at Washington University Libraries and Cathy Sarli at Becker Medical Library, Washington University in St. Louis. Availability of some resources and services varies depending on your campus location or affiliation. If you need assistance, please do not hesitate to contact us or your campus library:

Becker Library | Ask-A-Librarian
Washington University Libraries | Ask Us!

Searching the literature is an essential component of the scholarly research process that involves a review of the literature on a specific topic or clinical question. The ability to conduct a quality literature search is crucial for academic study and professional development in order to create and publish secondary analysis on a specific topic, often built on analysis of original research, and to be able to locate the best evidence to answer clinical questions.

This document provides guidance on literature searching involving a review of the literature on a specific topic or clinical question.

WHAT IS A QUALITY LITERATURE SEARCH?

It is a systematic survey of the literature, (published and unpublished), on a specific topic or clinical question. It goes beyond a cursory search of the literature to selecting appropriate databases, creating a series of search queries using relevant keywords including controlled vocabulary keywords, reviewing each result, filtering out non-relevant results based on specific criteria, reading the full-text content of the selected results and performing a critical appraisal of the literature to understand the context of a topic or to answer a clinical question. Components of a quality literature search include:

- Use of more than one database or resource including the Web
- Use of appropriate databases
- Locating references that provide a clear chain of evidence in demonstrating the accumulation of knowledge on a particular topic or clinical question
- Identification of appropriate keywords including controlled vocabulary keywords
- Develop queries using controlled vocabularies and keywords based on natural language for each database or resource used
- Formulating a structured question using a PICO analysis if the topic is based on a clinical question
- Applying specified criteria for inclusion or exclusion before executing a search to reduce selection bias
- Testing of various search queries on multiple databases
- Use of applicable search limits
- Use of applicable search tags
- Refining search queries as needed
- Identification of what is known
- Identification of gaps or flaws

- Use of primary sources including peer-reviewed materials
- Use of secondary and unpublished materials
- Reading the full-text content of materials
- Following up on relevant cited references to track subsequent research related to a specific publication
- Performing critical appraisal of the literature for quality and relevance
- Checking references for errata or retractions
- Identification of possible adverse events or potential harm for human subjects
- Awareness of the validity of the methods used for a particular study
- Documentation of resources consulted, search strategies, and search queries as used
- Documentation of findings for proper attribution and to prevent plagiarism

After completing a quality literature search, the user should have a thorough understanding of the topic, be able to demonstrate knowledge of the topic, provide original concepts to supplement or expand on the topic, and for clinical questions, be able to locate the best evidence for answering the question.

WHAT IS COMPREHENSIVE LITERATURE SEARCH?

It is a search that identifies the first recorded research or descriptions on a particular topic or clinical question. This is done by an iterative search of the literature to locate developments and trends on a particular topic or clinical question over an extended period of time.

How to know when you've exhausted the literature?

- Do your research results provide a clear chain of evidence in demonstrating the accumulation of knowledge on a particular topic?
- Did you find the first description or research of a particular topic?
- Do scholarly books or monographs verify the first description or research on your particular topic?
- Do your research results using more than one resource continually refer to the same core group of authors and papers?
- Do your research results using more than one resource refer to the same person or research group as being the first to identify or describe a particular topic?
- You have followed up on relevant references and synonyms that you discover in your searching.
- You have located the most current information on the topic.
- Did you consult with your professor or recognized experts in the field to ask if they are aware of research you may have missed?
- You have checked all your references for errata or retractions.
- You have used a search engine to search the Web to locate materials not indexed by databases.

DATABASES AND RESOURCES

Databases used for searching the literature include citations and/or abstracts to content such as peer-reviewed journal articles, dissertations, meeting abstracts, reviews, newspapers, and other works. Databases vary depending on subject coverage, indexed content, date coverage and other features. Consult the user's guide or select the help icon in each database for more information.

- **Subject Coverage**

The first step is to determine which databases to consult to locate the material related to the topic or clinical question. Where to start? It depends on the nature of the topic or clinical question. Many databases are subject or discipline specific. For example, to locate a systematic review related to a clinical question, the *Cochrane Library* database or the *PubMed/MEDLINE* database would be good starting points. For a topic related to engineering,

Engineering Index (*Compendex*) would be recommended. For education-related topics, consider *ERIC* or *Education Full-text.* For best results, use multiple resources.

- **Date Coverage**

Most databases have complete files of citations to publications dating from the 1990s with some containing incomplete files of citations dating from the 1800s or earlier; date coverage varies. Online databases are often produced from their print counterparts, called periodical indexes. Unlike their printed versions, online databases cover multiple years within a single search. However, online databases may not cover all the years the printed periodical index was available, so it may be necessary to consult the printed indexes for access to older citations.

- **Indexed Content**

Content types and subject focuses vary among databases. The *PubMed/MEDLINE* database is a highly specialized database that indexes peer-reviewed journal articles from a very select list of approximately 5,400 biomedical journals, using a controlled vocabulary, Medical Subject Headings (MeSH) for indexing of content. Another example of specialized database is *Dissertation and Theses* which indexes only dissertations and theses, worldwide, dating from 1637 to current.

Databases index content types ranging from citations/abstracts to peer-reviewed journal articles, trade publications, conference abstracts, dissertations, books, book chapters, book reviews, clinical guidelines, patents, and other works. For example, *PsycINFO* includes peer-reviewed journal articles, trade publications, books, book reviews, dissertations, and encyclopedias. The *Cochrane Library* includes citations to systematic reviews, peer-reviewed journal articles, books, conference abstracts, and unpublished literature.

Many electronic full-text journal articles are linked from Washington University Libraries' and Becker Medical Library's databases. This allows you to search, then link from a citation in a database directly to the full-text article without exiting the database. Databases have different ways of noting full-text availability depending on the publisher or vendor. Some databases display a link to the Journal on the results page; others display the link in the abstract of the citation. Some links are icons; others are text based. Some databases include the full-text that they are indexing. Consult the user's guide or select the help icon for each database to determine the subject coverage, date coverage, indexed content and availability of full-text content.

Becker Medical Library

- Find a Database
- Classes and Consulting at Becker

Washington University Libraries

- Research Help
- Recommended Databases by Subject

SEARCHING THE LITERATURE

How to Formulate a Query

When constructing a search query based on a topic or clinical question for a quality literature search, search using the keyword terms such as controlled vocabularies/thesauri, keywords that appear in the record of the work, i.e., natural language keywords, and author-supplied keywords are highly recommended. There is no right or wrong method to start the process of formulating search queries. Many databases allow flexible combinations of multiple single keyword queries into a single search string. If you are not familiar with your topic or clinical question, try a search engine such as Google or Google Scholar to help identify key terms related to the subject.

The idea is to experiment and "get your hands dirty" with various queries on different databases, using keywords from controlled vocabularies and natural language. Review the list of keywords identified for the research question and think about ways to combine some of these keywords in a search query. No two databases will produce identical

results based on the same search query; for best results use multiple databases and a variety of terms/keywords. As each new query is tested out, review the results, and document the query and database used.

Controlled Vocabularies and Thesauri

Controlled vocabularies and thesauri include lists of keywords which are "authorized terms" or descriptors used to organize subjects in a defined and standardized methodology to describe the contents of a work. There are multiple terms or synonyms applicable to a subject and controlled vocabularies and thesauri serve as a means of standardizing subjects into keywords that represent the concepts of that subject. This reduces ambiguity among subjects with multiple terms or synonyms and ensures that, most if not all works on the same topic will be indexed using the same keyword. Use of controlled vocabularies and thesauri enhances standardization of how works are described and indexed, promotes consistency of search results and allows for replication of search results using the same query.

A controlled vocabulary or thesaurus often includes a definition and some include scope notes to provide context for the keyword or descriptor including the year the keyword was added as well as qualifiers or subheadings to allow for more precise searching. Some controlled vocabularies and thesauri offer additional keywords for searching in order to refine a search strategy.

Most major databases utilize controlled vocabularies and thesauri for indexing of their works; with some using multiple controlled vocabularies and thesauri. Some controlled vocabularies and thesauri are available only through a subscription or are included as part of a database; others are publicly available such as the Education Resources Information Center Thesaurus or Medical Subject Headings (MeSH). Other examples of controlled vocabularies and thesauri include the following:

- **Cumulative Index to Nursing and Allied Health Literature** (CINAHL) **Headings:** produced by CINAHL Information Systems, are subject headings used to index works in the *CINAHL* database to reflect the terminology used in nursing and allied health. *CINAHL* has a "Suggest Subject Terms" feature that allows for suggestion of CINAHL Headings that have the same meaning as natural language keywords entered into a query. CINAHL Headings also include subheadings which allow narrowing of search results.
- **Ei Thesaurus:** produced by Elsevier Engineering Information, as thesaurus for the *Compendex* database. It is hierarchical in nature with a focus on engineering subjects. The keywords are organized by broader, narrower or related concepts. Indexing in *Compendex* uses the most specific controlled vocabulary terms available so it is highly recommended to review the thesauri before constructing a search query in *Compendex*.
- **Emtree Thesaurus:** produced by Elsevier Science, is a life science-based thesaurus used for works indexed in the *EMBASE* database and also for some records in the *SCOPUS* database. Emtree is polyhierarchically structured and provides keywords for biomedical terminology including drugs and diseases. Emtree supports use of natural language and will provide suggestions for Emtree keywords that map to the natural language keywords as used in the query.
- **Education Resources Information Center Thesaurus (ERIC):** a freely available listing of education-related keywords used to index works in the *ERIC* database. The keywords are organized by broader, narrower or related concepts.
- **Getty Thesaurus of Geographic Names:** produced and maintained by the Getty Vocabulary Program. It contains terms, names, and other information about people, places, things, and concepts relating to art, architecture, and material culture.

- **Inspec Thesaurus:** produced by the Institution of Electrical Engineers (IEEE), is used to index scientific and technical literature covering electrical engineering, electronics and communications. It also displays related terms.
- **Library of Congress Subject Headings (LCSH):** freely available controlled vocabulary of subject headings used for describing books, prints, photographs and other materials in the Library of Congress catalog.
- **Medical Subject Headings (MeSH)**: produced by the U. S. National Library of Medicine, is a freely available a hierarchical controlled vocabulary that is used for indexing in *MEDLINE/PubMed*, a biomedical database. MeSH records include scope notes, annotations, history notes, supplementary concepts and allowable qualifiers.
- **Thesaurus of Psychological Index Terms:** produced by the American Psychological Association is a thesaurus for vocabulary used in the psychological literature. It includes definitions, scope notes, the year added, related terms, narrower terms and broader terms.

Keywords That Appear in a Work

Many databases allow for searching words that appear in the title or abstract or sometimes full-text. These types of keywords are usually referred to as natural language keywords. Words from titles and abstracts may be more precise than controlled vocabulary keywords but may also include abbreviations and variant spellings. Natural language keywords supplement keywords from controlled vocabularies to allow for enhanced retrieval.

Author Keywords

Some journal publishers request that authors include keywords to describe the content of their articles. These keywords can be from controlled vocabularies, thesauri, classification schemes, or based on natural language words, phrases, or abbreviations from the article. Author keywords are usually searched with the abstract section of a work. They are also used by some database vendors as a supplement to the controlled vocabularies used by database vendors. This is especially helpful for works with a narrow focus and without controlled vocabulary keywords suitable to fully describe their content.

TYPES OF LITERATURE

Understanding the various types of literature and knowing which resources to use to locate the literature is essential to performing a quality literature search. Literature is defined by *Webster's Revised Unabridged Dictionary* as "the whole body of literary productions or writings upon a given subject, or in reference to a particular science or branch of knowledge" (Webster, 1913). Literature is generally classified into categories:

>Primary Source Literature: Primary source literature refers to original source materials created without use of interpretation and review and not previously published in any format. Primary source literature also includes materials that contain information recorded at the time of creation. Some original source material is subject to the peer review process. Peer review is defined as an organized procedure carried out by a select committee of professionals in evaluating the performance of other professionals in meeting the standards of their specialty. Review by peers is used by editors in the evaluation of articles and other papers submitted for publication. Most journal articles are subject to the peer review process.

- Conference Abstracts
- Data Sets
- Dissertations and Theses (if original research)
- Government Documents
- Journal Articles
- Laboratory Notebooks
- Manuscript Letters
- Oral histories
- Patents
- Rapid Communications (letters to journals or brief communications)
- Speeches
- Statistics
- Trial Transcripts

>Secondary Source Literature: Secondary source literature refers to materials that are interpretations or evaluations of primary source materials using scholarly analysis and provide access to primary source literature. Secondary source literature also includes journal articles or dissertations that review or evaluate previous research.

- Almanacs
- Atlases
- Books/Monographs
- Citation Indexes/Databases
- Commentaries
- Directories
- Dissertations and Theses (if include review material)
- Encyclopedias
- Journal Articles
- Popular Press
- Practice Guidelines
- Reviews of the Literature
- Trade Publications
- Treatises

>Reference Materials or Tertiary Sources: Reference materials are useful in conducting a review of primary and secondary literature. There is often overlap between secondary and tertiary materials. These materials are helpful in identifying subject areas and persons affiliated with a particular topic.

- Almanacs
- Atlases
- Bibliographies
- Directories
- Encyclopedias
- Popular press
- Technical or government reports

>Gray Literature: Gray literature refers to materials that are not published using typical means of publication. While not formally published or disseminated, gray literature is an important source of information as it is produced by researchers in a specific field and can contain relevant resources for a research topic.

- Bulletins
- Clinical Trial Registries
- Committee Reports
- Conference Abstracts
- Dissertations and Theses
- Fact Sheets
- Government Documents
- Oral Presentations
- Standards
- Symposia
- Technical Reports
- Working Papers

>Clinical Literature: When searching for literature related to a clinical question, there is a hierarchy of publication types considered the best source, i.e., "best evidence" of clinical information. The ideal sources are systematic reviews or meta-analyses of randomized, controlled trials.

- Randomized Controlled Trials
- Non-randomized Controlled Trials
- Non-randomized Intervention Studies
- Non-intervention Studies
- Cohort Studies
- Case Control Studies
- Cross-Sectional Surveys
- Case Reports
- Expert Opinions
- Evidence Guidelines
- Evidence Summaries
- Clinical Research Critiques
- Reviews of the Literature
- Practice Guidelines
- Clinical Reference Texts

For a full list of levels of evidence for locating the best evidence for clinical questions, see the "Oxford Centre for Evidence-based Medicine - Levels of Evidence" chart as noted at The Centre for Evidence Based Medicine.

SEARCH TIPS

Do not get discouraged if results are not relevant to the query. Points to consider are:

- Can the query be paraphrased or re-worded?
- Can the number of keywords be reduced?
- Are the Boolean operators being used correctly?
- Was correct spelling used for all the queries? One misspelling can produce negative results.
- Were keywords from a controlled vocabulary used? Databases that index using controlled vocabulary keywords usually offer a tool to search the keywords in the controlled vocabulary.
- Are there any other keywords based on natural language to consider for the query?

- Was more than one database used? One database will not contain all references to the literature.
- Was gray literature searched?
- Were the features and functions of each database utilized for the search?

Research is a skill that is best learned through trial and error. Practice with various databases to learn more about the nuances of each database. Experiment with different keywords to discover how various databases interpret the query. Review the keywords as noted for each work. Keywords such as author keywords, controlled vocabularies and natural language keywords are helpful to understanding how databases map keywords to indexed content.

DATABASE TOOLS

- **Personal Accounts**

Most databases offer registration to create personal accounts that allow for saving of search queries, customizing the interface, signing up for email alerts, creating personal lists of citations, etc.

- **Search Alerts**

Most databases allow for creation and saving of query alerts that allow for notification when new works that pertain to a query (search, author or citation) are added to the database. Examples of search alerts include:

  - Search query alerts—a query based on a specific keyword or phrase.
  - Author query alerts—a query based on a specific author.
  - Publication query alerts—a query based on a specific work that allows for tracking subsequent works added to the database that cite that particular work.

Alerts can be set to run daily, weekly, or monthly and via email or RSS feed. Each database offers different options—for details on each database, select the user's guide or help icon.

- **Limits Options**

Some databases offer options to limit a search query. This allows for refinement to a particular language, a publication type, year/s of publication, gender, age groups, humans or animals, full-text materials, journal sub-sets, to name a few.

- **Controlled Vocabulary Options**

Some databases also index their records using a controlled vocabulary such as the case with *PubMed/MEDLINE*. *PubMed/MEDLINE* uses Medical Subject Headings (MeSH) which offers the option of identifying appropriate MeSH terms for searches to allow for more precise searching.

- **Search by Author**

Another example of a search tool is the ability to search by an author name. *SCOPUS* offers a specialized Author Search feature for works by an author as indexed in the database and for citing references to those works. Another database that offers an author search feature is *ISI Web of Science* via Author Finder option.

- **Cited-By References**

If you locate a citation that you would like to follow up on, use the Cited Works or Cited By feature that is available on several databases such as *ISI Web of Science*, *Inspec* and *SCOPUS*. This feature allows for identification of works added to the same database that cite a previously published work as indexed in the database. For a list of databases that offer a cited-by reference feature, see Research Impact and Evaluation-Citation Tools.

- **Single Citation Matcher**

The *PubMed* Single Citation Matcher tool provides full citation information if you are missing part of the citation. For example, if you have only the page number and the author name. Another such tool is Citation Linker, offered by the Washington University Libraries, or Citation Linker, offered by Becker Medical Library.

- **Related Articles Link**

Some databases include a tool that finds related works. The related articles or works link is usually found on the citation abstract page or the results list. In the *Inspec* database, the related records link is on the citation abstract page.

- **Advanced Search Options**

Advanced search options allow for multiple search queries using Boolean combinations, assigning certain terms as operators or field qualifiers, certain date ranges, full-text-only options, abstracts-only options, specific language options, article types, to name a few. *PubMed/MEDLINE* is a database that offers an advanced search option.

- **Journal Abbreviations**

Most databases will give you tools for interpreting their specific journal abbreviations. Many lists of journal abbreviations can also be used to verify the ISSN of a journal before submitting a request for an article via Interlibrary Loan. Some lists of journal abbreviations are also freely available on the web:

  - Journals in the National Library of Medicine Catalog
  - Journal Abbreviation Resources on the Web
  - All that JAS

- **History Option**

Many databases offer an option to view your search history. This allows you to separate your search query into individual search strings and to combine select searches.

- **Federated Search Tools**

Some resources allow for searching of more than one database simultaneously using the same query. Using federated search tools, such a Primo at WU Libraries, or selecting several databases to search at the same time, can save time when you don't know where to start or only need a few hits, but you will often lose the benefits of special indexing fields and refinement tools. When you want comprehensive retrieval, it is usually better to search each database individually; and to keep track of the queries used and results from each database.

HISTORICAL LITERATURE SEARCHES

Historical literature searches involve intensive review of a specific condition, disorder, therapy/treatment, intervention, practice, model, or social issue to identify the first recorded research or description, or to trace the advancement of knowledge of a particular topic. This is done by an iterative search of the literature using a variety of tools such as electronic databases, print indexes, catalogs, finding aids, and reference lists from relevant articles.

There are electronic databases and print indexes available for historical literature searches that search for citations to literature such as journal articles, conference abstracts, dissertations, technical reports and other published materials. In some instances it may be necessary to consult print indexes as some electronic databases may not include citations from the time period being researched. For example, the *PubMed/MEDLINE* database includes some citations dating from the 1940s, so, if references from 1900 to 1922 are required for your research, it may be necessary to use, *Index Medicus*, the print precursor to *PubMed/MEDLINE*. References from *Index Medicus* date from 1879 to 2004.

Example electronic databases

- *CINAHL* (1937 to current; nursing and allied health)
- *ERIC (*Pre-1966 to current; education and special education)
- *IndexCat:* Catalogue of the Library of the Surgeon-General's Office. U.S. Army, Series 1-5 (1880-1961, medical literature)
- *INSPEC* (1898 to current; physics and engineering)
- *JSTOR* (1665 to current; searchable full-text literature from many disciplines)
- *PsycINFO* (1806 to current; psychology)
- *PubMed/MEDLINE* (1948 to current; medical literature)

- *SciFinder* (1907 to current; chemistry and science)
- *Web of Science Core Collection (1900 to current; sciences)*

Example print indexes

- *Current Index of Medical Literature (*1941-1959; medical literature)
- *Index of the Catalogue of the Library of the Surgeon General's Office, US Army* (1873 to 1961; medical literature)
- *Index Medicus* (1879 to 2004; medical literature)
- *Pharmacopoeia of the United States* (19th century; medical literature)

Catalogs

Another tool to consider for a historical literature search is a catalog which contains a listing of books held by a library or multiple libraries. Many books on specific subject include chapters on the history or background of that topic. Examples of catalogs:

- Local library catalogs (public or academic)
- *WorldCat* provides records of the collections of more than 10,000 libraries worldwide.
- *LocatorPlus* provides records of the collections held by the National Library of Medicine.

Some books are bibliographies or include bibliographies which may also be helpful for conducting a historical literature search. Bibliographies include a list of books, book chapters, journal articles, conference abstracts, dissertations, and other published materials on a single subject or related subjects, and may cover a select time period. Some bibliographies are annotated.

Finding Aids

Historical literature searches may require the use of archival materials such as manuscript collections from individuals, records from organizations, or special collections such as oral histories, and visual materials, such as photographs, or artifacts. Special collection may also include unpublished. Some archives and special collections have finding aids that serve as a cataloged inventory of the contents of the collection. Others may have only a collection level catalog record or no description of contents at all. Finding aids usually include a historical or biographical note; the provenance; scope and content; information on access and use; subject headings; and an outline or inventory of the organization of the collection. Finding aids for collections vary, ranging from a basic collection level description to a comprehensive inventory of each item in the collection.

Assistance from an archivist or librarian may be required in order to locate a special collection. Some archival and special collections have been digitized and are available for viewing on the Internet. OAIster, a subset of *WorldCat*, is one tool for locating such collections.

WU Archives (letters, personal papers and records) and **Finding Aids:**

Becker Medical Library Special Collections
Finding Aids: Personal and Institutional

Washington University Libraries Special Collections Resources
Finding Aids: Special Collections

DOING A LITERATURE SEARCH OFF-CAMPUS

Becker Medical Library and Washington University Libraries offer proxy accounts to faculty, students and staff. Proxy serves as a means to authenticate users who wish to use electronic resources from the libraries at an off-campus location. Another option for remote access to electronic resources is a Virtual Private Network (VPN) account, which establishes a secure connection to network resources from a remote location. Note: Most electronic resources are available off-campus via proxy or VPN but there are some exceptions.

Becker Medical Library
- Proxy Account Information
- Proxy Account Sign-in

Washington University Libraries
- Off-Campus Access (Proxy Server and VPN)
- Proxy Accounts Sign-in

LINKING TO AND OBTAINING FULL-TEXT MATERIALS

Becker Medical Library Linking to Full-text

Many electronic full-text journals, licensed by Becker Library, offer links within a database record, also referred to as "link-outs." Link outs allow you to search in a database, then link from a citation directly to the full-text article without exiting the database. Databases have different ways of noting full-text availability depending on the publisher or vendor. Some databases display a link to the Journal on the results page; others display the link in the abstract of the citation. Some links are icons; others are text based. Databases that link to full-text include *PubMed/MEDLINE*, *SCOPUS, ISI Web of Science*, and *EMBASE*.

Becker Library Examples:

If you are unable to find an icon or an icon that does not lead you to the full-text article, go to the Becker Catalog, and search for the journal title. There are some citations that slip through the cracks and do not have the icons noted on the abstract page. Some publishers do not allow for link out capability.

Becker Medical Library Interlibrary Loan Options

Full-text articles from journals, books, conference proceedings, standards, dissertations, etc., not held by Becker Library, will need to be ordered via Interlibrary Loan/Document Delivery (ILLiad) services. For assistance, please contact Interlibrary Loan or Ask-A-Librarian.

Washington University Libraries Linking to Full-text

Link-out from Washington University Libraries is a tool called "Get it!" 

. Some databases also have direct links to full-text such as the publisher/vendor examples above. If you are unable to find an icon or an icon that does not lead you to the full-text article, go to the Washington University Libraries Catalog, and search for the journal title.

Washington University Libraries Interlibrary Loan Options

Full-text articles from journals, books, conference proceedings, standards, dissertations, etc., not held by Washington University Libraries, will need to be ordered via Interlibrary Loan/Document Delivery services. For assistance, please contact ILL or Ask Us!

INTERPRETING AND EVALUATING THE RESULTS

Evaluating the sources you locate is a crucial step in the process of researching. Questions to ask when you consider the appropriateness of the information are:

- What are the credentials of the author?
- Does the author's bias appear?
- Who is the author affiliated with?
- What is the date of the publication?
- Is it pertinent and up to date?

- Is it the most recent edition or revision?
- What is the reputation of the publisher?
- Is there adequate documentation? Bibliography, notes, credits?
- Who has the author cited in their references?
- To what extent are the methods valid and reliable, and/or the treatment logical?
- Are the methods competent and appropriate?
- Are samples and sampling procedures and sizes adequate and identified?
- Is the information well researched using appropriate scientific research methods and supported with evidence?
- Are the results logical or speculative? Do they answer the query?
- Do the claims, interpretations, and conclusion follow logically from facts collected or observations made?
- Do conclusions relate to the hypotheses or questions asked?
- Use of primary or secondary sources of information?
- Is it peer-reviewed?

CITATION MANAGEMENT

There are a variety of citation management software options. Citation management software collects, stores, organizes citations from books, articles, web sites, and other sources, and automatically converts citations into properly formatted bibliographies, in many different citation styles. Some citation management software packages allow for storage of PDFs and research papers. Most programs allow export for transfer to other programs. Examples of citation management software include EndNote, EndNote Web, Reference Manager, Zotero, Mendeley, RefWorks, and many others. Some of these are freely available, such as Zotero or Mendeley.

WASHINGTON UNIVERSITY LIBRARIES AND BECKER MEDICAL LIBRARY SERVICES

- Personal consultation.
- Group training sessions/workshops.
- Guidance with literature searching (current and historical).
- Assist with creating automated database alerts.
- Guidance with citation management software.
- Consultation on copyright questions – contact Copyright Help at the Washington University Libraries or Cathy Sarli at the Becker Medical Library for more information.

WEB RESOURCES FOR HELP

Becker Medical Library

- Classes at Becker
- Subject Guides
- Research and Publishing Support for Authors

Washington University Libraries

- Publishing and Copyright
- Subject Guides