University for Continuing Education Krems

Cochrane Austria

Systematic Literature Searches and Information Retrieval

A Collection of Teaching Handouts

About These Resources

These materials were developed to support courses and workshops that teach systematic literature search methodology. They cover essential concepts and practical skills needed to plan and conduct high-quality literature searches for evidence synthesis projects. They were created for a health care context but could be adapted for other research areas.

Target Audience

These handouts are designed for anyone teaching or learning systematic search skills, e.g.:

- Health sciences librarians and information specialists
- Instructors teaching systematic search methodology
- Graduate students learning systematic review methodology

Collection Contents

This collection includes three handouts:

This document: **1. Types of Searching in the Systematic Review Process**
Covers different search approaches (lookup, exploratory, and systematic searches), their purposes, and when to use each method in the context of evidence synthesis.

2. Systematic Database Searching
Provides detailed guidance on planning and conducting systematic searches in bibliographic databases, including search strategy development, search terms, syntax, and documentation.

3. Supplementary Searching
Explains supplementary search methods beyond database searching, including citation searching, grey literature searching, and trial register searches.

License

Version Information

Last Updated: January 2026

Suggested Attribution: Irma Klerings, University for Continuing Education Krems, Cochrane Austria

Types of searching in the systematic review process

1. Different requirements - different approaches

- The appropriate approach for any literature search depends on the purpose (e.g. quickly answering a question vs. a comprehensive overview of a topic) and the surrounding conditions (e.g. time, context).
- "Systematic literature search" describes a specific methodology that differs from other search processes.
- Exploratory (and lookup) searching is an important step in the preparation of a systematic search. It is useful for refining research questions, identifying search terms, and getting an idea of the scope of the available evidence.

- **Comprehensive systematic literature search:**

Literature search process for various types of evidence syntheses (e.g., systematic reviews, evidence-based guidelines, rapid reviews, umbrella reviews, evidence maps, etc.)

- Objective: Avoiding bias due to unbalanced selection of studies/reviews
- Goal: Finding as many relevant studies/reviews as possible for a predefined research question
- Process:
    - Planned in advance: a priori selection of information sources (e.g. bibliographic databases, individual journals, reference lists, study registers, specific websites, etc.); literature search and selection are distinct steps
    - Detailed documentation of the search process: must be transparent and as reproducible as possible

- **Lookup searches:**

"Unsystematic" searches that do not need to be transparent or reproducible

- Objective: Finding a trustworthy answer as quickly as possible
- Goal: Finding the best possible evidence, doesn't have to be comprehensive
- Process:
    - Start looking at the top of the evidence pyramid, e.g. look for synthesized evidence (Note: The appropriate type of evidence depends on the research question.)
    - Targeted search in a suitable information source (depending on the question): Step-by-step procedure: try different search approaches; if the first source does not yield relevant results, choose another source.
    - The search ends as soon as a suitable answer is found.

- **Exploratory literature searches:**

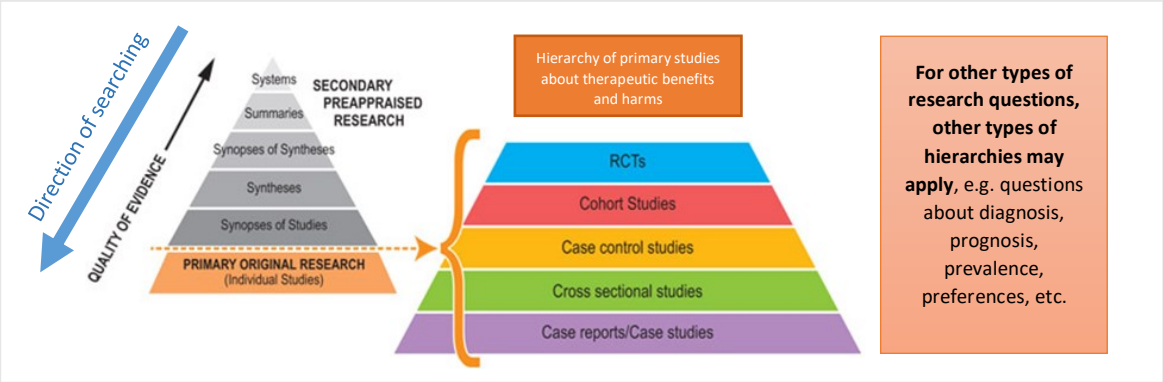
"Unsystematic" searches that do not need to be transparent or reproducible

- Objective: Gaining an overview of a new topic

- Goal: Understanding the evidence base for a topic, e.g. when preparing a comprehensive systematic search
- Process:
    - Iterative: new search steps are adjusted based on previous findings
    - Results of lookup searches can be a starting point for further searching, e.g. citation-based searches

- **Evidence Pyramid and literature searching:**

For lookup and exploratory searches: Consider what the highest relevant level of evidence would be and start the search at that point. (e.g., systematic reviews, clinical information systems, evidence-based guidelines)



NSW Ministry of Health, CIAP, Level of evidence pyramid, CC BY 4.0, additions (distinction therapy/other questions) by Irma Klerings, CC BY-SA 4.0

2. Preliminary searching as part of the systematic review process

Systematic searches should never be conducted without in-depth understanding of the topic and the potential evidence base: Preliminary lookup and exploratory searching is crucial.

These searches are usually conducted during topic refinement. Their findings should inform:

- the development of the eligibility criteria of the review,
- the selection of search sources and methods,
- the search strategy development.

- **Guiding questions**
- Are there already published or planned evidence syntheses on this topic?
- Are there any studies that fit the proposed eligibility criteria?
- Does the research question contain implicit/hidden elements that need to be defined in the eligibility criteria?
- What type(s) of data do you need to address your question?
- What study design(s) would yield those data?
- What types of publications or reports are most likely to contain the data you need to address your question? Do these include unpublished/grey literature?

- **Identifying a set of known relevant studies**

At the end of the exploratory search, you should have collected a set of documents that fit the proposed eligibility criteria at least at abstract level.

These are important to:

- identify appropriate search sources (e.g. databases, grey literature sources),

- identify search terms (e.g., free text and controlled vocabulary),
- test the performance (i.e., sensitivity/recall) of database search strategies.

If you have not found any eligible studies in your preliminary search:

- Seek advice on the search process from your team or an expert searcher,
- Consider revising the research question.

3. Search methods

- **Search terms**

The most common type of electronic literature searching: Search for a topic by looking up documents that contain specific words.

Search interfaces may interpret search terms in different ways, e.g.:

- Boolean searching: Boolean operators (AND, OR, NOT) can be used to combine search terms into more complex search strategies. Application of these operators may be implicit, e.g. most databases interpret a space between words as Boolean AND.
- Word order: Web search engines that provide relevancy ranked results, may interpret the first search term as more important than the last.
- Term mapping/stemming/automated synonym search: Some search interfaces may reinterpret entered search terms, e.g. by automatically looking for singular and plural terms, or by mapping the term to controlled vocabulary (e.g. MesH). This leads to the additional retrieval of documents that do not contain the search terms used.

- **Citation-based searching**

An alternative to entering search terms is citation-based/reference-based searching. New relevant documents are found based on seed references.

Use for:

- Exploratory searches: quickly find similar literature based on a suitable seed reference
- Systematic searches: as supplement to database searching → search for additional literature that was not found in the database searches

Types of citation searching:

- Backward citation searching: viewing reference lists of known relevant texts
- Forward citation searching/cited by: looking for texts that cite a seed reference
- Similar articles algorithms (e.g., in PubMed): finding articles that have similarities to the seed reference based on terminology, word frequencies, topics, authors, etc.
- Co-citations or co-references (e.g., in Web of Science or Scopus): finding articles that are frequently cited together, or whose bibliographies have large overlaps.

- **AI-supported literature searching:**

AI-powered search engines usually combine large language models with their search algorithms. Often, search results are automatically summarized, or information is extracted from individual results. Depending on the tool, the search process can be very different from classic database and web searches.

AI tools for academic literature research can be categorized as "Finders" and "Connectors"

- Finders: The input/prompt is a natural language question (or search terms). AI is used for interpreting, ranking, summarizing search results

- Connectors use citation-based searching enhanced by AI-algorithms

4. Useful information sources for lookup and exploratory searches

This list contains a selection of sources suitable for finding systematic reviews and similar evidence syntheses as well as pre-appraised studies, and examples of AI-supported search engines.

- **Clinical information systems**

Platforms that provide evidence-based information for clinical practice. Useful for finding concise answers to clinical questions and getting an overview of the existing evidence base. They are usually subscription-based.

Examples:

- UpToDate: https://www.uptodate.com/home
- DynaMed: https://www.dynamed.com/home

- **Databases for evidence syntheses**

Epistemonikos: http://www.epistemonikos.org

- Operated by: Fundación Epistemonikos (Chile)
- Coverage: Meta-database for systematic reviews, umbrella reviews and included primary studies in health care
- Sources: Several databases including Cochrane Database of Systematic Reviews (CDSR), PubMed, EMBASE and others
- Bibliographic database, contains links to electronic full texts
- Access: free
- Citation-based searching: Available for some database entries: Backwards citation searching, Forward citation searching, Co-citations (based)
- Help:
  - https://www.epistemonikos.org/en/about_us/how_to_use
  - https://www.epistemonikos.org/en/documents/download_manual

PubMed: https://pubmed.ncbi.nlm.nih.gov/

- Operated by: US National Library of Medicine
- Coverage: Individual studies and evidence syntheses, there is a filter for systematic reviews
- Bibliographic database, contains links to electronic full texts
- Access: free
- Citation-based searching: Similar articles, Forward citation searching, (Backwards citation searching)
- Help: https://pubmed.ncbi.nlm.nih.gov/help/

Cochrane Library: http://www.cochranelibrary.com/

- Operated by: Cochrane and Wiley
- Coverage: Cochrane systematic reviews, randomized controlled trials
- Cochrane Database of Systematic Reviews (CDSR): full-text database, Cochrane Central Register of Controlled Trials (CENTRAL): bibliographic database
- Access: can be searched for free, access to full texts and abstracts is subscription-based
- Citation-based searching: similar articles ("related content"), backward citation searching (studies included in systematic reviews)

- Help:
  - https://www.wiley.com/network/cochranelibrarytraining
  - https://www.cochranelibrary.com/search-tab-help

TRIP: https://www.tripdatabase.com/

- Operated by: Trip Database Ltd.
- Coverage: Search engine for evidence syntheses, guidelines, and controlled trials
- Sources: Various databases and guideline-producing organisations
- Access: Freemium model (different search options for non-registered/paying users)
- Help: https://www.tripdatabase.com/Howtouse

- **Registers for evidence synthesis protocols**

Prospero: https://www.crd.york.ac.uk/prospero/

- Operated by: Centre for Reviews and Dissemination, University of York
- Coverage: registrations for systematic reviews, rapid reviews and umbrella reviews. PROSPERO does not accept scoping reviews or literature scans.

Cochrane Library: contains protocols of in-progress Cochrane reviews

JBI Register: https://jbi.global/systematic-review-register

- Operated by: JBI
- Coverage protocols of in-progress JBI reviews.

OSF Registries: https://osf.io/registries

- Operated by: Center for Open Science
- Platform for registration of various types of research projects, including evidence syntheses

Journal published protocols

- Some journals publish evidence synthesis protocols as articles, e.g.: BMJ Open, Plos One, Systematic reviews, Campbell Systematic Reviews

- **Pre-appraised literature**

Some databases evaluate scientific literature according to methodological or content-related criteria.

McMaster PLUS: https://hiruweb.mcmaster.ca/hkr/what-we-do/plus-projects/

- 2 projects: EvidenceAlerts, ACCESSSS: Pre-selection of studies and reviews according to specific quality criteria
- Different access options: free access after registration
- Help:
  - https://www.accessss.org/Pages/FAQ
  - https://www.evidencealerts.com/Pages/About

Health Evidence: https://www.healthevidence.org/default.aspx

- Operated by: McMaster University
- Coverage: quality assessments of public health systematic reviews
- Bibliographic database, containing links to electronic full texts
- Help: https://www.healthevidence.org/search-tips.aspx

KSR Evidence: https://ksrevidence.com/

- Operated by: Kleijnen Systematic Reviews Ltd
- Coverage: risk of bias assessments of systematic reviews since 2015
- Access: The latest reviews can be viewed without an account, the entire database can only be accessed with a subscription
- Bibliographic database, containing links to electronic full texts

- **Academic Search Engines:**

In contrast to specialized databases, web search engines do not have clear content coverage. This is useful to find interdisciplinary research and grey literature (e.g. reports, theses, preprints, etc.).

Search, filtering and export options may be limited compared to traditional bibliographic databases. The results displayed may differ depending on your location and previous search behavior.

Google Scholar: https://scholar.google.com/

- Operated by: Google LLC
- Web search engine for academic documents. Contains links to full electronic texts
- Citation-based searching: Similar articles, Forward citation searching
- Help:
  - https://scholar.google.com/intl/de/scholar/help.html, https://support.google.com/websearch/answer/2466433?hl=en&visit_id=637260903840153596-691556420&rd=1
  - International Institute for Restorative Practices, „Google / Google Scholar Search Tips": https://www.what/images/pdf/google_search_tips.pdf
  - Paperpile, "Google Scholar: the ultimate guide": https://paperpile.com/g/google-scholar-guide/

OpenAlex: https://openalex.org/

- Operated by: OurResearch
- Web search engine for academic documents. Contains links to full electronic texts
- Citation-based searching: Similar articles, Forward citation searching, Backwards citation searching
- Access: free
- Help: https://help.openalex.org/hc/en-us/search?utf8=%E2%9C%93&query=searching

Dimensions: https://app.dimensions.ai/

- Operated by: Digital Science & Research Ltd.
- Web search engine for academic documents. Contains links to full electronic texts
- Citation-based searching: Similar articles, Forward citation searching, Backwards citation searching
- Access: Freemium, login required
- Help: https://www.dimensions.ai/resource-type/library-toolkit/

The Lens Scholarly Works: https://www.lens.org/lens/search/scholar/structured

- Operated by: Cambia
- Web search engine for academic documents. Contains links to full electronic texts
- Citation-based searching: Forward citation searching, Backwards citation searching

- Help: https://support.lens.org/article-categories/scholarly-search/

- **AI-supported literature searching:**

Semantic Scholar: https://www.semanticscholar.org/

- Operated by: Allen Institute for Artificial Intelligence
- Focus: academic literature. The most important contents of articles are briefly summarized.
- Citation-based searching: Similar articles, Forward citation searching, Backwards citation searching
- Access: free, no login required
- Help: https://www.semanticscholar.org/product/tutorials, https://www.semanticscholar.org/faq
- Note: Many other AI-applications use Semantic Scholar as their data source

Ai2 Paper Finder: https://paperfinder.allen.ai/

- Operated by: Allen Institute for Artificial Intelligence
- Focus: Academic literature. The tool breaks down a natural language query into relevant components, searches for papers, and provides relevance assessments for each retrieved document
- Access: free, no login required

Consensus: https://consensus.app/

- Operated by: Consensus NLP, Inc.
- Focus: Academic literature. Answers to research questions are synthesized based on ranked search results.
- Access: Freemium, search possible without login
- Help: https://consensus.app/home/blog/maximize-your-consensus-experience-with-these-best-practices/, https://consensus.app/home/blog/category/help-center/

Elicit: https://elicit.com/

- Operated by: Elicit Research, PBC
- Focus: Academic literature. Answers to research questions are synthesized based on ranked search results.
- Access: paid, trial version available with login
- Help: https://support.elicit.com/

ResearchRabbit: https://www.researchrabbit.ai/

- Operated von: Litmap Ltd
- Focus: citation-based search with AI-supported ranking
- Access: free, login necessary
- Help: https://researchrabbit.notion.site/Welcome-to-the-FAQ-c33b4a61e453431482015e27e8af40d5, https://www.jcu.edu.au/__data/assets/pdf_file/0008/1958831/Research-Rabbit-Overview.pdf

5. Further Reading

Agoritsas, T., Vandvik, P. O., Neumann, I., Rochwerg, B., Jaeschke, R., Hayward, R., Guyatt, G., & McKibbon, K. A. (2015). Finding Current Best Evidence. In G. Guyatt, D. Rennie, M. O. Meade, & D. J. Cook (Eds.), *Users' Guides to the Medical Literature: A Manual for Evidence-Based Clinical Practice, 3rd ed*. McGraw-Hill Education. https://jamaevidence.mhmedical.com/content.aspx?bookid=847&sectionid=69031461

Eberhard Karls Universität Tübingen. (2024). *Artificial Intelligence for Academic Research* https://uni-tuebingen.de/en/facilities/university-library/learning-working/workshops-consultations-and-guided-tours/literature-research-with-ai/

Gusenbauer, M., & Haddaway, N. R. (2020). What every researcher should know about searching – clarified concepts, search advice, and an agenda to improve finding in academia. *Research Synthesis Methods*, *12*(2), 136-147. https://doi.org/10.1002/jrsm.1457

Rutgers University Libraries. (Apr 4, 2024). *Artificial Intelligence (AI).* https://libguides.rutgers.edu/artificial-intelligence

Texas A&M University Libraries. (2024, Feb 2, 2024). *Selected AI-Based Literature Review Tools*. https://tamu.libguides.com/c.php?g=1289555