Introduction to systematic reviews for librarians

Ms. Lindsey Sikora – University of Ottawa, Canada

OBJECTIVES

1. Understand the process of completing a systematic review

2. Understand the key areas that librarians can help researchers with their systematic review

WHAT IS A SYSTEMATIC REVIEW?

A systematic review attempts to gather all the empirical evidence that fits pre-specified eligibility criteria in order to answer a specific research question.

It uses explicit, systematic methods that are selected with a view to minimizing bias, thus providing more reliable findings from which conclusions can be drawn and decisions made.

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### Key Characteristics of a Systematic Review

**4a**
A clearly stated set of objectives with pre-defined eligibility criteria for studies

**4b**
An explicit, reproducible methodology; a systematic search that attempts to identify all studies that would meet the eligibility criteria

**4c**
An assessment of the validity of the findings of the included studies, for example through the assessment of risk of bias
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KEY CHARACTERISTICS OF A SYSTEMATIC REVIEW

A systematic presentation, and synthesis of the characteristics and findings of the included studies

MANY OTHER TYPES OF REVIEWS

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meta-analysis</td>
<td>Technique that statistically combines the results of quantitative studies to provide a more precise effect of the results.</td>
</tr>
<tr>
<td>Scoping review</td>
<td>Preliminary assessment of potential size and scope of available research literature. Aims to identify nature and extent of research evidence usually including ongoing research.</td>
</tr>
<tr>
<td>Rapid review</td>
<td>Assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research.</td>
</tr>
<tr>
<td>Mixed studies (methods) review</td>
<td>Refers to any combination of methods where one significant component is a literature review (usually systematic). Within a review context, it refers to a combination of review approaches, such as combining quantitative with qualitative research or outcome with process studies.</td>
</tr>
</tbody>
</table>

STEPS IN A SYSTEMATIC REVIEW

1. Search for systematic review already completed on your research question
2. Produce a review protocol
3. Assemble a review group
4. Formulate the question(s)
5. Conduct a thorough search
6. Select relevant studies
7. Appraise the quality of studies
8. Extract info from individual studies
9. Synthesise studies
10. Report what is known and not known
11. Inform research, policy and practice

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MANAGING EXPECTATIONS

- Manpower
- Budget
- Timeline
- Feasibility

SOURCES FOR FINDING SYSTEMATIC REVIEWS

- Cochrane Database of Systematic Reviews
- Database of Abstracts of Reviews of Effects (DARE)
- Health Technology Assessments

SOURCES FOR FINDING SYSTEMATIC REVIEWS

- Health databases
  - PsycINFO®
  - Embase
  - CINAHL
  - PubMed

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QUESTION FORMULATION

<table>
<thead>
<tr>
<th>P</th>
<th>Patient, Population, or Problem</th>
<th>How would I describe a group of patients similar to mine?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Intervention, Prognostic Factor, or Exposure</td>
<td>Which main intervention, prognostic factor, or exposure am I considering?</td>
</tr>
<tr>
<td>C</td>
<td>Comparison or Intervention (if appropriate)</td>
<td>What is the main alternative to compare with the intervention?</td>
</tr>
<tr>
<td>O</td>
<td>Outcome you would like to measure or achieve</td>
<td>What can I hope to accomplish, measure, improve, or affect?</td>
</tr>
<tr>
<td>(T)</td>
<td>What type of question are you asking?</td>
<td>What can I hope to accomplish, measure, improve or affect?</td>
</tr>
<tr>
<td>(S)</td>
<td>What type of study do you want to find?</td>
<td>What would be the best study design/methodology?</td>
</tr>
</tbody>
</table>

PROTOCOLS

A protocol is the plan or set of steps to be followed in a study. A protocol for a systematic review should describe the rationale for the review, the objectives, and the methods that will be used to locate, select, and critically appraise studies, and to collect and analyse data from the included studies.

WHY USE A PROTOCOL?

There are many advantages of producing protocol:

- It helps to keep you on track
- It helps you describe & explain your methods
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### Why Use a Protocol?

There are many advantages of producing a protocol:

- It helps you to reflect on the topic
- It helps you justify & defend your decisions

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### Why Use a Protocol?

There are many advantages of producing a protocol:

- It helps to provide constructive criticism
- It helps your reader understand what you have done

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### What Should a Protocol Include?

- A conceptual discussion of the problem (background information)
- Review question(s) and objective(s)
- Search strategy
- Study selection criteria
- Study quality assessment
- Data extraction procedure
- Data synthesis procedure
- Project timetable
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REPORTING STANDARD FOR PROTOCOLS: PRISMA-P

Preferred reporting items for systematic review and meta analysis protocols (PRISMA-P)

13a

REPORTING STANDARD FOR PROTOCOLS: PRISMA-P

* Aim is to improve the quality of systematic review protocols, similar to the impact achieved by other reporting guidelines
* Checklist of 17 items (with 26 sub-items), categorized into 3 main sections: administrative information, introduction and methods
* PRISMA-P was harmonized with the items from the PRISMA checklist to help authors transition from their protocol to a systematic review

13b

REGISTERING YOUR PROTOCOL

PROSPERO
An international database of prospectively registered systematic reviews in health and social care. Key features from the review protocol are recorded and maintained as a permanent record

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http://www.crd.york.ac.uk/PROSPERO/
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**STEPS IN A COMPREHENSIVE LITERATURE SEARCH**

- **Initial search**
  - Database selection
  - Grey literature
  - Bibliographies
  - Hand searches
  - Major journals, conference proceedings

- **Supplemental search**
  - Citation searches
  - Contact individual researchers
  - Snowball searches (all included studies, review papers)

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**SELECTION OF SOURCES**

- **Databases**
  - Must search several databases to be comprehensive, and avoid bias
  - Database selection will be dependent on the nature of the research question

- **Clinical Trial Registries**
  - Cochrane Central Register of Controlled Trials (CENTRAL)
  - Clinicaltrials.gov

- **Grey Literature**

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**DEVELOPING A SEARCH STRATEGY**

- **Subject Headings**
  - Explode?
- **Keywords (text words)**
  - Truncation, synonyms, alternative spelling
- **Boolean operators**
- **Limits**
  - Dates, languages, publication types, etc.
- **Field searching**
  - Title, abstract, full text, subject headings

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SEARCH FILTERS/HEDGES

Search filters are predefined strategies to improve recall and retrieve maximum recall of primary research of studies (i.e., randomized trials [RCTs], systematic reviews, meta-analysis etc., and clinical queries such as diagnosis, prognosis, etiology and therapy).

Centre for Reviews and Dissemination
https://sites.google.com/a/york.ac.uk/issg-search-filters-resource/home

Hedges (McMaster University)
http://hriu.mcmaster.ca/hriu/HIRU_Hedges_MEDLINE_Strategies.aspx

Scottish Intercollegiate Guidelines Network (SIGN)
http://www.sign.ac.uk/methodology/filters.html

PEER REVIEW OF THE SEARCH STRATEGY

Peer reviewing the search strategy is essential to ensure all existing evidence is identified for the systematic review.

Peer Review of Electronic Search Strategies (PRESS) instrument: an evidence-based guideline for peer review of the electronic search strategy

https://www.catdi.ca/media/pdf/477_PRESS-Peer-Review-Electronic-Search-Strategies_lr_e.pdf

GREY LITERATURE

“...grey literature publications are non-conventional, fugitive and often ephemeral...”

- Reports
- Theses
- Conference proceedings
- Technical specifications
- Non-commercial translations
- Bibliographies
- Documentation
- Official documents
- Government reports

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CITATION SEARCHING
- Complements database searching
- Can be used for books or book chapters
- Used to confirm comprehensive search strategy, acts as a safety net

WEB OF SCIENCE
Scopus
Google Scholar

RECORD KEEPING FOR SYSTEMATIC REVIEWS
Preferred reporting items for systematic review and meta analysis protocols (PRISMA-P)

RECORD KEEPING FOR SYSTEMATIC REVIEWS
An evidence-based minimum set of items for reporting in systematic reviews and meta-analyses

The aim of the PRISMA Statement is to help authors improve the reporting of systematic reviews and meta-analyses
It can also be used as a basis for reporting systematic reviews of other types of research, particularly evaluations of interventions

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**RECORD KEEPING FOR SYSTEMATIC REVIEWS**

**PRISMA checklist**
- Record who developed and conducted the search
- Databases with date ranges, date last searched, provider/platform and additional limits
- Inclusion of supplementary methods, including citation searches, hand searches, contacting researchers, etc.
- Inclusion of the use of hedges or any peer reviewed search strategies
- Inclusion of a full electronic search strategy for at least one database, for potential replication


**MANAGING REFERENCES**

Reference management software, citation management software or personal bibliographic management software is software for researchers to use for recording and utilising bibliographic citations (references).

- **EndNote** (Desktop)
- **RefWorks** (Web based)
- **Mendeley** (Desktop)

**CRITICAL APPRAISAL**

Critical appraisal is the process of carefully and systematically examining research to judge its trustworthiness, and its value and relevance in a particular context.

Burki A et al., (2009)

Each publication type has different tools used to critically assess their quality.
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CRITICAL APPRAISAL TOOLS

<table>
<thead>
<tr>
<th>Publication Type</th>
<th>Tool</th>
<th>For More Information...</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic Reviews</td>
<td>AMSTAR</td>
<td>AMSTAR Checklist:</td>
</tr>
<tr>
<td></td>
<td>[Assessment of Multiple</td>
<td><a href="http://amstar.ca/amstar_Checklist.php">http://amstar.ca/amstar_Checklist.php</a></td>
</tr>
<tr>
<td></td>
<td>Systematic Reviews]</td>
<td></td>
</tr>
<tr>
<td>Primary Studies</td>
<td>GRADE</td>
<td><a href="http://www.gradeworkinggroup.org/list">http://www.gradeworkinggroup.org/list</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td>of criteria</td>
</tr>
<tr>
<td>Observational Studies</td>
<td>Cohort and Case Control Studies</td>
<td><a href="http://www.sign.ac.uk/guidelines/">http://www.sign.ac.uk/guidelines/</a></td>
</tr>
<tr>
<td></td>
<td>Diagnosis Studies</td>
<td>fulltext/50/annex.html</td>
</tr>
<tr>
<td>Clinical Practice</td>
<td>Appraisal of Guidelines</td>
<td><a href="http://www.agree2.org/agree-e/">http://www.agree2.org/agree-e/</a></td>
</tr>
<tr>
<td>Guidelines</td>
<td>Research &amp; Evaluation: AGREE II Instrument</td>
<td></td>
</tr>
</tbody>
</table>

SYSTEMATIC REVIEW SOFTWARE

- **DistillerSR**
  Software designed to give a better review experience, faster project completion and transparent, audit-ready results

- **RevMan**
  Software used for preparing and maintaining Cochrane Reviews

- **Abstrackr (beta)**
  Software for abstract screening for systematic reviews. You will need to create a free account to access Abstrackr

- **SRDR – Systematic Review Data**
  Powerful and easy-to-use tool for the extraction and management of data for systematic reviews and meta-analysis. It is also an open and searchable archive of systematic reviews and their data. You will need to create a free account to access SRDR

SUMMARY

- Searching for systematic reviews already completed
- Helping develop some aspects of the protocol
- Formulating the research question
- Search strategy development
- Managing references
- Critical appraisal tools
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