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## Introduction to Systematic Reviews for Librarians

Lindsey Sikora  
Health Sciences Research Liaison Librarian





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## OBJECTIVES

- 1 Understand the process of completing a systematic review
- 2 Understand the key areas that librarians can help researchers with their systematic review

2

## 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

3



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### KEY CHARACTERISTICS OF A SYSTEMATIC REVIEW



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

4a





### KEY CHARACTERISTICS OF A SYSTEMATIC REVIEW



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

4b

### KEY CHARACTERISTICS OF A SYSTEMATIC REVIEW



An assessment of the validity of the findings of the included studies, for example through the assessment of risk of bias

4c



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## KEY CHARACTERISTICS OF A SYSTEMATIC REVIEW

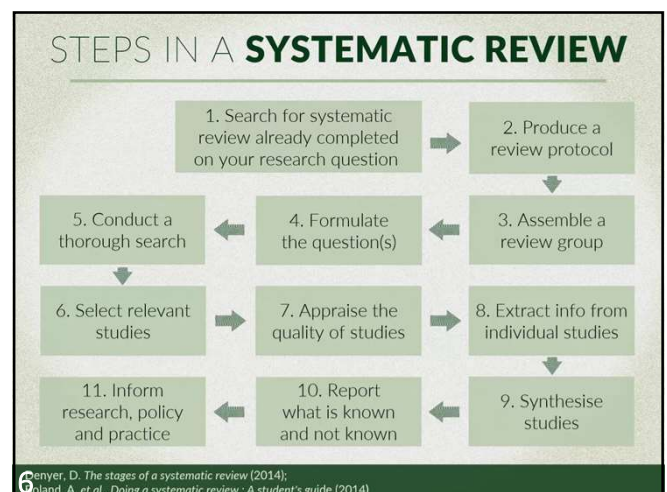
A systematic presentation, and synthesis of the characteristics and findings of the included studies

4d

## MANY OTHER TYPES OF REVIEWS

Type	Description
<b>Meta-analysis</b>	Technique that statistically combines the results of quantitative studies to provide a more precise effect of the results
<b>Scoping review</b>	Preliminary assessment of potential size and scope of available research literature. Aims to identify nature and extent of research evidence (usually including ongoing research)
<b>Rapid review</b>	Assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research
<b>Mixed studies (methods) review</b>	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

5





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## MANAGING EXPECTATIONS



Manpower      Budget      Timeline      Feasibility

7

## SOURCES FOR FINDING SYSTEMATIC REVIEWS




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

8a

## SOURCES FOR FINDING SYSTEMATIC REVIEWS

Health databases



MEDLINE      embase<sup>™</sup> BIOMEDICAL ANSWERS      CINAHL<sup>™</sup> Plus with Full Text  
PsycINFO<sup>®</sup>      PubMed

8b



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## QUESTION FORMULATION

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

9

## PROTOCOLS

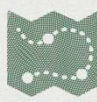
**A** **protocol** is the plan or set of steps to be followed in a study. A protocol for a systematic review should describe the rationale for the review, the objectives, and the methods that will be used to locate, select, and critically appraise studies, and to collect and analyse data from the included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

10

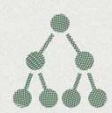
The Cochrane Collaboration. Glossary

## 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

11a



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## WHY USE A **PROTOCOL**?

There are many advantages of producing protocol:



It helps you to reflect on the topic




It helps you justify & defend your decisions


11b

## WHY USE A **PROTOCOL**?

There are many advantages of producing protocol:



It helps to provide constructive criticism



It helps your reader understand what you have done

11c

## 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

12



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REPORTING STANDARD  
FOR PROTOCOLS: **PRISMA-P**

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

13a

Moher D, Shamseer L et al., *Systematic Reviews* 4(1) 2046-4053 (2015)

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

Moher D, Shamseer L et al., *Systematic Reviews* 4(1) 2046-4053 (2015)

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

14

<http://www.crd.york.ac.uk/PROSPERO/>



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## STEPS IN A COMPREHENSIVE LITERATURE SEARCH


**Initial search**



Database selection / Trial registries



Grey literature



Bibliographies



Hand searches  
Major journals,  
Conference proceedings

**Supplemental search**

Citation searches, contact individual researchers,  
Snowball searches (all included studies, review papers)

15

## 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**

16

## 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, floating subject headings

17



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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://hiru.mcmaster.ca/hiru/HIRU\\_Hedges\\_MEDLINE\\_Strategies.aspx](http://hiru.mcmaster.ca/hiru/HIRU_Hedges_MEDLINE_Strategies.aspx)

### Scottish Intercollegiate Guidelines Network (SIGN)

<http://www.sign.ac.uk/methodology/filters.html>

18

## 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.cadth.ca/media/pdf/477\\_PRESS-Peer-Review-Electronic-Search-Strategies\\_tr\\_e.pdf](https://www.cadth.ca/media/pdf/477_PRESS-Peer-Review-Electronic-Search-Strategies_tr_e.pdf)

19 Margaret Sampson et al., *Journal of Clinical Epidemiology* 62(9) 944-952 (2009)

## 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

20

Alberani, V et al., *Bulletin of the Medical Library Association* 78(4) 358-363 (1990)



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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





21

## RECORD KEEPING FOR **SYSTEMATIC REVIEWS**

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

22a

## 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

22b



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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

23

<http://www.prisma-statement.org/>

## 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)

24

## 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*

Buris A et al., (2009)

Each publication type has different tools used to critically assess their quality

25



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CRITICAL APPRAISAL TOOLS		
Publication Type	Tool	For More Information...
Systematic Reviews	AMSTAR (Assessment of Multiple Systematic Reviews)	AMSTAR Checklist: <a href="http://amstar.ca/Amstar_Checklist.php">http://amstar.ca/Amstar_Checklist.php</a>
Primary Studies	GRADE	<a href="http://www.gradeworkinggroup.org/intro.htm#criteria">http://www.gradeworkinggroup.org/intro.htm#criteria</a>
Observational Studies	Cohort and Case Control Studies	<a href="http://www.sign.ac.uk/guidelines/fulltext/50/annexc.html">http://www.sign.ac.uk/guidelines/fulltext/50/annexc.html</a>
	Diagnostic Studies	<a href="http://www.sign.ac.uk/guidelines/fulltext/50/annexc.html">http://www.sign.ac.uk/guidelines/fulltext/50/annexc.html</a>
Clinical Practice Guidelines	Appraisal of Guidelines Research & Evaluation: AGREE II Instrument	<a href="http://www.agreetrust.org/agree-ii/">http://www.agreetrust.org/agree-ii/</a>

26

SYSTEMATIC REVIEW SOFTWARE
<p><b>DistillerSR</b> Software designed to give a better review experience, faster project completion and transparent, audit-ready results</p> <p><b>Review Manager (RevMan)</b> Software used for preparing and maintaining Cochrane Reviews</p> <p><b>Abstrackr (beta)</b> Software for abstract screening for systematic reviews. You will need to create a free account to access Abstrackr</p> <p><b>SRDR – Systematic Review Data</b> Powerful and easy-to-use tool for the extraction and management of data for systematic review or 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</p>

27

SUMMARY
<ul style="list-style-type: none"> <li>▪ Searching for systematic reviews already completed</li> <li>▪ Helping develop some aspects of the protocol</li> <li>▪ Formulating the research question</li> <li>▪ Search strategy development</li> <li>▪ Managing references</li> <li>▪ Critical appraisal tools</li> </ul>

28



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uOttawa Bibliothèque  
Library

29