Systematic & Scoping Reviews

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Curtin University acknowledges the traditional owners of the land on which Curtin Perth is located, the Wadjuk people of the Nyungar Nation; and on our Kalgoorlie campus, the Wongutha people of the North-Eastern Goldfields.

This session will enable you to:

- Gain an understanding of the systematic and scoping review process.

- Consider how to formulate a research question.

- Plan a search using both keywords and subject headings, and become familiar with advanced search techniques.

- Find additional help and support.

Review types

Indications for **systematic reviews**:

- Confirm current practice/identify new practices
- Identify and inform areas for future research
- Produce statements to guide decision-making
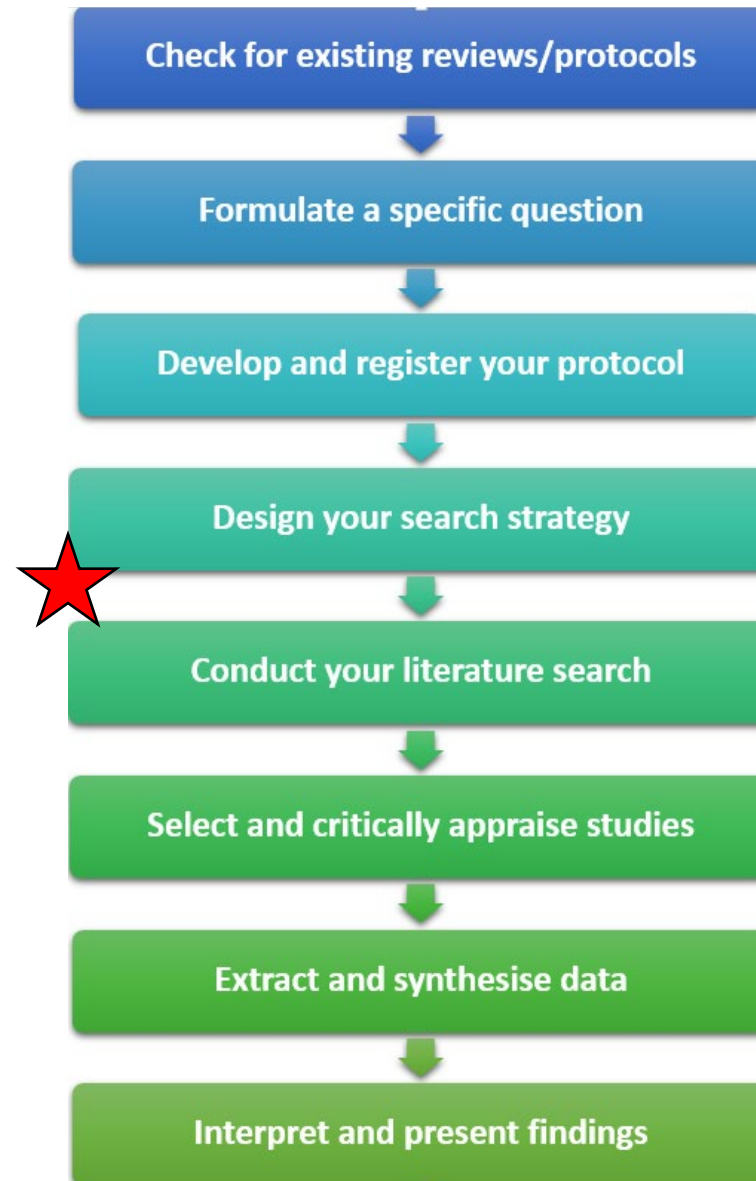
Purposes for conducting a **scoping review**:

- To identify the types of available evidence in a given field
- To identify and analyse knowledge gaps
- As a precursor to a systematic review

Munn, Z., Peters, M.D.J., Stern, C. et al. (2018), *Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach*. BMC Med Res Methodol 18, 143. https://doi.org/10.1186/s12874-018-0611-x

Grant, M.J. and Booth, A. (2009), *A typology of reviews: an analysis of 14 review types and associated methodologies.* Health Information & Libraries Journal, 26: 91-108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

Steps in conducting a review

[Systematic & scoping reviews guide](#)

Check for existing reviews/protocols

Formulate a specific question

Develop and register your protocol

Design your search strategy

Conduct your literature search

Select and critically appraise studies

Extract and synthesise data

Interpret and present findings

PRISMA

Preferred Reporting Items for Systematic Reviews and Meta-Analyses

- an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.
- PRISMA 2020 Statement was published in 2021. Consists of:

Checklist - a 27-item checklist addressing the introduction, methods, results and discussion sections of a systematic review report.

Flow Diagram - depicts the flow of information through the different phases of a systematic review. Maps out number of records identified, included and excluded.

https://prisma-statement.org/

PRISMA Extensions

PRISMA for systematic review protocols (PRISMA-P)
- to facilitate the development and reporting of systematic review protocols.

PRISMA for Scoping Reviews (PRISMA-ScR)
- checklist containing 20 essential reporting items and 2 optional items to include when completing a scoping review.

PRISMA for Searching (PRISMA-S)
- checklist containing 16 reporting items, detailed with exemplar reporting and Rationale, for literature search reporting.

https://prisma-statement.org/Extensions/

1. Check for existing reviews/protocols

PROSPERO	SRs, rapid reviews and umbrella reviews
Cochrane Database of Systematic Reviews	Cochrane SRs and protocols only
Joanna Briggs Institute	JBI SRs only, primarily covering nursing disciplines
DoPHER	SRs and other reviews of effectiveness in health promotion and public health
Campbell Collaboration	SRs covering a range of subject areas
EPPI-Centre	SRs covering a range of subject areas
OSF - Open Science Framework	All review types
Figshare	All review types

2. Formulate a specific question

Scoping review - aims to answer a clearly defined objective and sub-questions drawn from an overall topic.

Systematic review - aims to answer a clear, well-formed, and focused question.

- conduct some scoping searches to help define concepts and identify additional terminology.
- confirm that there is enough evidence (studies) to answer question.

Define the question

Various processes and frameworks:

PICO
- **P**opulation
- **I**ntervention/Exposure
- **C**omparison
- **O**utcome

PIO
- **P**opulation
- **I**ntervention/Exposure
- **O**utcome

PICo (qualitative)
- **P**opulation
- **I**nterest
- **Co**ntext

PICO(T)
PECO(T)
PIPOH
SPICE
SPIDER….

Scenario

*Jillian, a **68-year-old woman**, with **osteoarthritis**.*

*You are her general practitioner and have been treating her for several years using conventional **anti-inflammatory and pain-relieving medication**.*

*Jillian's yoga teacher recommended that she take **ginger supplements** and you wonder whether there have been any studies investigating the use of ginger for control of the symptoms of osteoarthritis.*

PICO process

P – Adults with osteoarthritis

I – Ginger supplements

C – Conventional anti-inflammatory and pain-relieving medication

O – Decreased pain and improved joint movement

Focused question

In adult patients with osteoarthritis, does the use of ginger result in decreased pain and increased joint mobility?

3. Develop and register protocol

Will often include:

- Research question/s and aims
- Sample search strategy
- Inclusion/exclusion criteria
- Study selection process
- How records will be screened, extracted, assessed and analysed.

Where to register:

PROSPERO	SRs, rapid reviews and umbrella reviews
Cochrane Database of SRs	Cochrane SRs and protocols only
OSF - Open Science Framework	All review types
Figshare	All review types

4. Design a (reproducible) search strategy

"Strategy is more important than the search itself and requires a great deal more time"

Edoardo Aromataris (Joanna Briggs Institute)

Types of searches

Search type	Purpose	Goal
Exploratory	General research discovery, narrative reviews, scoping reviews (sometimes as a precursor to a systematic review)	Learn about a concept or body of research, including its characteristics (eg, terms, volume of evidence, type of research). Initially the search goal is fuzzy and ill-defined, but gets clearer throughout the iterative search process.
Systematic	Systematic reviews, meta-analyses, etc.	To **identify all records on a specific topic through an unbiased, transparent, and reproducible search**. Users conduct a set of transparent and replicable search steps using complex search strings that have been carefully constructed to balance recall/sensitivity and precision in a systematic manner.

Gusenbauer, M. and Haddaway, N.R. (2021), What every researcher should know about searching – clarified concepts, search advice, and an agenda to improve finding in academia. Res Syn Meth, 12: 136-147. https://doi.org/10.1002/jrsm.1457

Consider sources to search - databases

Medicine/health specific

- Medline, Embase, PsycINFO, Global Health – Ovid platform
- Cochrane – reviews, protocols, clinical trials
- CINAHL – nursing & allied health, EBSCO platform

Multidisciplinary

- Scopus, Web of Science – also good for citation searching
- ProQuest – includes health & medicine
- Informit – Australian material, includes health collection

Library Databases list – filter by subject   https://databases.library.curtin.edu.au/

Translating the question

Concept grid:

Osteoarthritis	Ginger
osteoarthritis joint disease	ginger ginger extract zingiber officinale zingiberaceae

Text mining & text analysis

Find additional search terms for your search strategy

- Use several highly relevant articles/studies to analyse relevant subject headings, phrases, words, spelling, grammar etc.

- Use text mining & other tools
  - PubMed PubReminer
  - MESH on Demand
  - LitSense
  - Elicit

Search operators & syntax

- Boolean operators: (*AND, OR, NOT*)

- Phrase searching: *"joint disease"*

- Truncation: *osteo**

- Proximity searching:

  joint* ADJ3 disease*

  joint* NEAR/3 disease*

Search limits

Apply any limits at the **end of the search**. Limits might include:

- **Time periods**, eg. last 10 years

- **Language**, eg. English only

- **Publication type**, eg. reviews, clinical trials

- NOTE on limiting to "**Full Text**"

☐ Full Text

Search strategy

Keywords only:

osteoarthritis **OR** "osteo-arthritis" **OR** "joint disease*"

AND

ginger **OR** zingiber*

Medline

Bibliographic database by the U.S. National Library of Medicine containing > 28 million references to journal articles in life sciences with a concentration on biomedicine. **Combination full-text/abstract**.

In Advanced Search, The **default keyword search** is a multi-purpose (mp) search:

Example keyword search

# ▲	Searches
1	((osteoarthritis or osteo-arthritis or "joint disease*") and (ginger or zingiber*)).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]

Keywords vs Subject Headings

https://youtu.be/bNIG4qLuhJA   (3.30m)

Medline - MeSH

Medline records are indexed with **Medical Subject Headings** (MeSH), applied by staff at the NLM.

Unique Identifier:	32214292
Title:	Effectiveness of **Ginger** on Pain and Function in Knee **Osteoarthritis**: A PRISMA Systematic Review and Meta-Analysis.
Source:	Pain Physician. 23(2):E151-E161, 2020 03.
Status:	MEDLINE
Authors:	Araya-Quintanilla F; Gutierrez-Espinoza H; Munoz-Yanez MJ; Sanchez-Montoya U; Lopez-Jeldes J
MeSH Subject Headings:	*Ginger
	Humans
	Knee Joint / de [Drug Effects]
	Knee Joint / ph [Physiology]
	Musculoskeletal Pain / di [Diagnosis]
	Musculoskeletal Pain / dt [Drug Therapy]
	Musculoskeletal Pain / ep [Epidemiology]
	Osteoarthritis, Knee / di [Diagnosis]

Searching by subject heading

1 Resource selected | Hide | Change

ⓘ **Ovid MEDLINE(R) ALL** 1946 to March 08, 2022

word or phrase truncation)

◉ **Keyword** ○ Author ○ Title ○ Journal

ginger

Search

▾ **Limits** *(close)*   ☐ Include Multimedia   ☑ Map Term to Subject Heading

☐ **Include All Subheadings**

Combine with: OR ⌄   Continue

Select	Subject Heading
☑	Ginger
☐	Condiments
☐	Drugs, Chinese Herbal
☐	Plant Extracts

Concept grid – keywords and headings

	Osteoarthritis	**Ginger**
Keywords	osteoarthritis osteo-arthritis "joint disease*"	ginger zingiber*
MeSH subject headings	exp Osteoarthritis/	Ginger/ Zingiberaceae/

Search strategy

Keywords and subject headings:

osteoarthritis **OR** "osteo-arthritis" **OR** "joint disease*"

OR exp Osteoarthritis/

AND

ginger **OR** zingiber*

OR Ginger/ **OR** Zingiberaceae/

Curtin University Library

Medline - MeSH

MeSH headings included in strategy for a more comprehensive search:

Example keyword & subject heading search

# ▲	Searches
1	(osteoarthritis or osteo-arthritis or "joint disease*").mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
2	exp Osteoarthritis/
3	1 or 2
4	(ginger or zingiber*).mp. [mp=title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
5	Ginger/ or Zingiberaceae/
6	4 or 5
7	3 and 6

Refining search

Limiting search by fields: *(ginger or zingiber*).ti,ab.*

Search limits
- English
- Years
- Types of studies
- Search filters/hedges (methodology or subject)

Test to see if key articles/studies are retrieved

Sensitivity versus Specificity

Sensitivity is the ability to identify all the relevant studies

Specificity is the ability to exclude irrelevant studies.

The aim of the search strategy is to maximise the retrieval of relevant documents and minimise the retrieval of non-relevant material.

Extended searching

Reference lists

Citation searching

- a way of finding relevant research in a field by looking at what an article has referenced, and also who has since used that article as a reference.
- many databases provide this, including Scopus, Web of Science, and Google Scholar.

Hand-searching (targeted journals)

Grey literature

Can be both **published and unpublished** research, produced by government, academia, business and industry, **not controlled by commercial publishers**

Examples include: theses, govt/company reports, conference papers, manuals, handbooks, trial registers, etc

Consider:

- Targeting what is likely to be out there
- Google – Advanced search
- Separate, pared-back search

5. Conduct searches

Translate search strategy for all databases

Record keeping - document from start**:**
- Databases used and date of searches
- Full search strategies and limits applied
- EndNote, other software

Using PRISMA
- Note the result numbers for flow diagram

Pick a date and run the searches!

6. Select & critically appraise studies

Screening

- Initial title/abstract
- Full-text
  - Remember **Document delivery**
- Numbers for PRISMA flow chart

Critical appraisal

- Examine quality and risk of bias
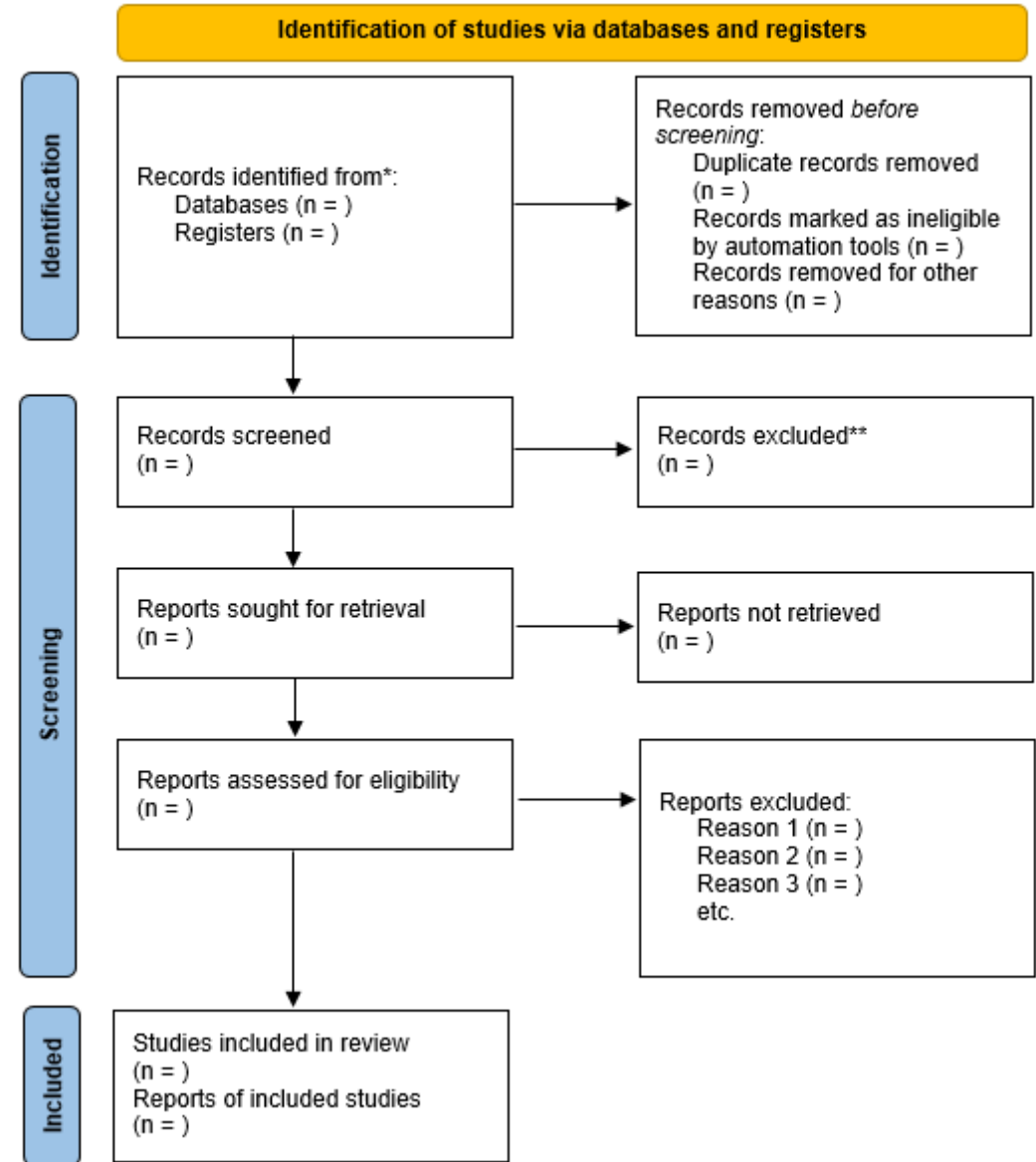- Variety of tools – AMSTAR, GRADE, COSMIN, etc.

And finally..

7. Extract & synthesis data

- Extract relevant data from individual studies and use established methods to synthesise the data, eg. meta-analysis.
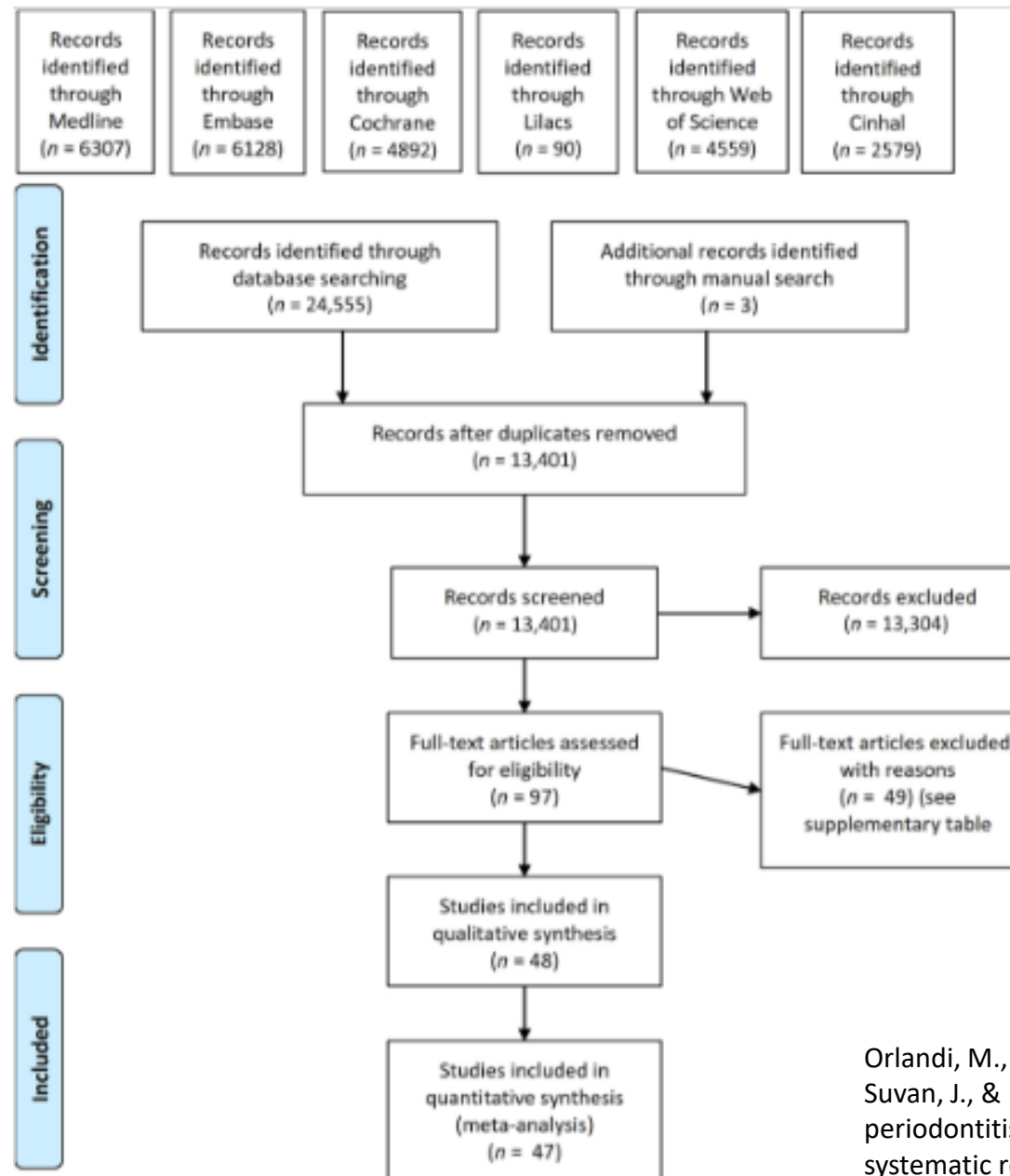
8. Interpret and present findings

PRISMA 2020 flow diagram

Depicts the flow of information through the different phases of a systematic review

Example of PRISMA flow diagram

Identification

| Records identified through Medline (n = 6307) | Records identified through Embase (n = 6128) | Records identified through Cochrane (n = 4892) | Records identified through Lilacs (n = 90) | Records identified through Web of Science (n = 4559) | Records identified through Cinhal (n = 2579) |

Records identified through database searching (n = 24,555)

Additional records identified through manual search (n = 3)

Records after duplicates removed (n = 13,401)

Screening

Records screened (n = 13,401)

Records excluded (n = 13,304)

Eligibility

Full-text articles assessed for eligibility (n = 97)

Full-text articles excluded, with reasons (n = 49) (see supplementary table

Included

Studies included in qualitative synthesis (n = 48)

Studies included in quantitative synthesis (meta-analysis) (n = 47)

Orlandi, M., Muñoz Aguilera, E., Marletta, D., Petrie, A., Suvan, J., & D'Aiuto, F. (2022). Impact of the treatment of periodontitis on systemic health and quality of life: A systematic review. Journal of Clinical Periodontology, 49(Suppl. 24), 314– 327. https://doi.org/10.1111/jcpe.13554

Handbooks and manuals

Cochrane Handbook for Systematic Reviews of Interventions

JBI Manual for Evidence Synthesis

- Chapter 11: Scoping Reviews

- Chapter 10: Umbrella Reviews

- Chapter 8: Mixed methods systematic reviews

Review tools

EndNote – can be used to manage and code references for reviews. This article provides some guidance.

[**Rayyan**](Rayyan) - free & paid options (*Curtin does not subscribe).

[**Covidence**](Covidence) - offers a free trial review (up to 500 records only). Paid options (*Curtin does not subscribe).

[**Systematic Review Accelerator**](Systematic Review Accelerator) **-** free online suite of tools, including word frequency analyser, search refiner, search strategy translator, de-duplication tool, and options for screening and disputes.

Where to find help

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Systematic & Scoping Reviews guide

In Scope
- Guidance on the systematic review process and locating existing systematic reviews
- Assistance with selection and use of databases & grey literature resources
- Assistance formulating & structuring the search strategy
- Reviewing and providing feedback on the search strategy
- Advice on managing search results
- Assistance setting up alerts

Out of Scope
- Running searches
- Searching grey literature or hand searching
- Data extraction and collation of results
- Finding full text content (other than providing advice on the document delivery service)
- Screening or reviewing articles
- Use of Systematic Review software

Email: LibraryResearchSupport@curtin.edu.au

Book appointment via Research Toolkit