Systematic & Scoping Reviews

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I acknowledge the traditional owners of the land on which Curtin Perth is located, the Whadjuk people of the Nyungar Nation.

I pay my respects to their Elders past and present, and recognise that this Country has been a place of teaching, research and learning for tens of thousands of years.

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.
- Become familiar with advanced search techniques.
- Find additional help and support.

Systematic Review

Consists of a **clearly formulated question** that uses **systematic and reproducible methods** to identify, select and critically appraise **all relevant research**, and to collect and analyse data from the studies that are included in the review.

- Can be quantitative or qualitative.
- Many, but not all, include a meta-analysis.

Indications for **systematic reviews**:

- Uncover international evidence
- Confirm current practice/identify new practices
- Identify and inform areas for future research
- Produce statements to guide decision-making

Scoping Review

Aims to provide an **overview** of type, extent and quantity of research available. Often broader research questions, with sub-questions.

- Appraisal variable - not done, or may be narrative form.

Purposes for conducting a **scoping review**:

- To identify the types of available evidence in a given field
- Clarify key concepts/definitions
- Examine how research is conducted on a certain topic
- To identify and analyse knowledge gaps
- Useful in developing policy maps
- As a precursor to a systematic review

Type of 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

"Right Review" - web-based decision support tool that guides users through a series of simple questions for recommending knowledge synthesis methods suitable for their research question.

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

Handbooks and manuals

Cochrane Handbook for Systematic Reviews of Interventions

JBI Manual for Evidence Synthesis (2024 ed)

- Chapter 8: Mixed methods systematic reviews
- Chapter 10: Umbrella Reviews
- Chapter 11: Scoping Reviews

Peters, M.D.J.; Marnie, C.; Tricco, A.C.; Pollock, D.; Munn, Z.; Alexander, L.; McInerney, P.; Godfrey, C.M.; Khalil, H. *Updated methodological guidance for the conduct of scoping reviews*. JBI Evidence Synthesis 18(10):p 2119-2126, October 2020. | DOI: 10.11124/JBIES-20-00167

PRISMA (reporting reviews)

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 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 review. Maps out number of records identified, included and excluded.

PRISMA for Scoping Reviews (PRISMA-ScR)

- checklist containing 20 essential reporting items and 2 optional items to include when completing a scoping review.

PRISMA Extensions

PRISMA for systematic review protocols (PRISMA-P)

- to facilitate the development and reporting of systematic review protocols.

PRISMA for Searching (PRISMA-S)

- checklist containing 16 reporting items, detailed with exemplar reporting and Rationale, for literature search reporting.

And others…

https://www.prisma-statement.org/extensions

Steps in conducting a review

[Systematic & scoping reviews guide]

1. Check for existing reviews/protocols

PROSPERO	Protocols of systematic, rapid 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

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.

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

Define the question

Various processes and frameworks:

PICO
- Population
- Intervention/Exposure
- Comparison
- Outcome

PCC
- Population
- Concept
- Context

PICo (qualitative)
- Population
- Interest
- Context

PIO
- Population
- Intervention/Exposure
- Outcome

PICO(T)
PECO(T)
PIPOH
SPICE
SPIDER….

Focused question

Scoping Review:

What factors are associated with nursing students' attitudes toward older people?

Systematic Review:

Is there an association of inflammatory mediators in migraine patients and periodontal disease?

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

Is there an association of inflammatory mediators in migraine patients and periodontal disease?

Concept grid:

migraine	periodontal disease
headache* migrain*	**periodontal disease* periodontitis gum disease***

Text mining & text analysis

Find additional search terms/seed articles

- 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

Search operators & syntax

- Boolean operators: (*AND*, *OR*, *NOT*)
- Phrase searching: *"gum disease"*
- Truncation: *migrain**
- Proximity searching:

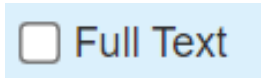
  periodontal ADJ3 disease**

  periodontal 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**"



Search strategy

Keywords only:

headache* **OR** migrain*

AND

“periodontal disease*” **OR** periodontitis **OR** “gum disease*”

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	(headache* or migrain*).mp. [mp=title, book 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, population supplementary concept word, anatomy supplementary concept word]
2	("periodontal disease*" or periodontitis or "gum disease*").mp. [mp=title, book 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, population supplementary concept word, anatomy supplementary concept word]
3	1 and 2

Keywords vs Subject Headings

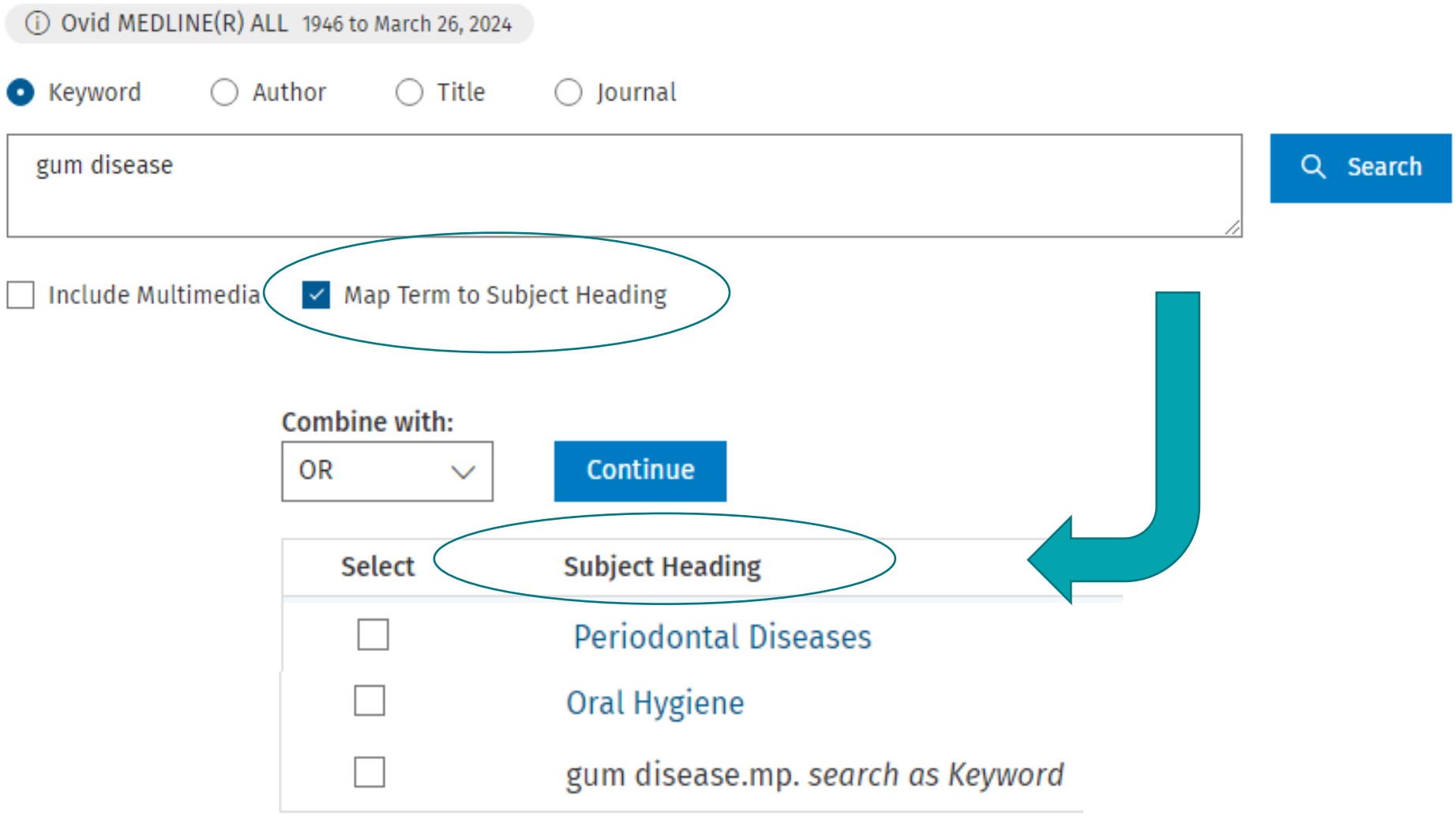
https://youtu.be/bNIG4qLuhJA (3.30m)

Medline - MeSH

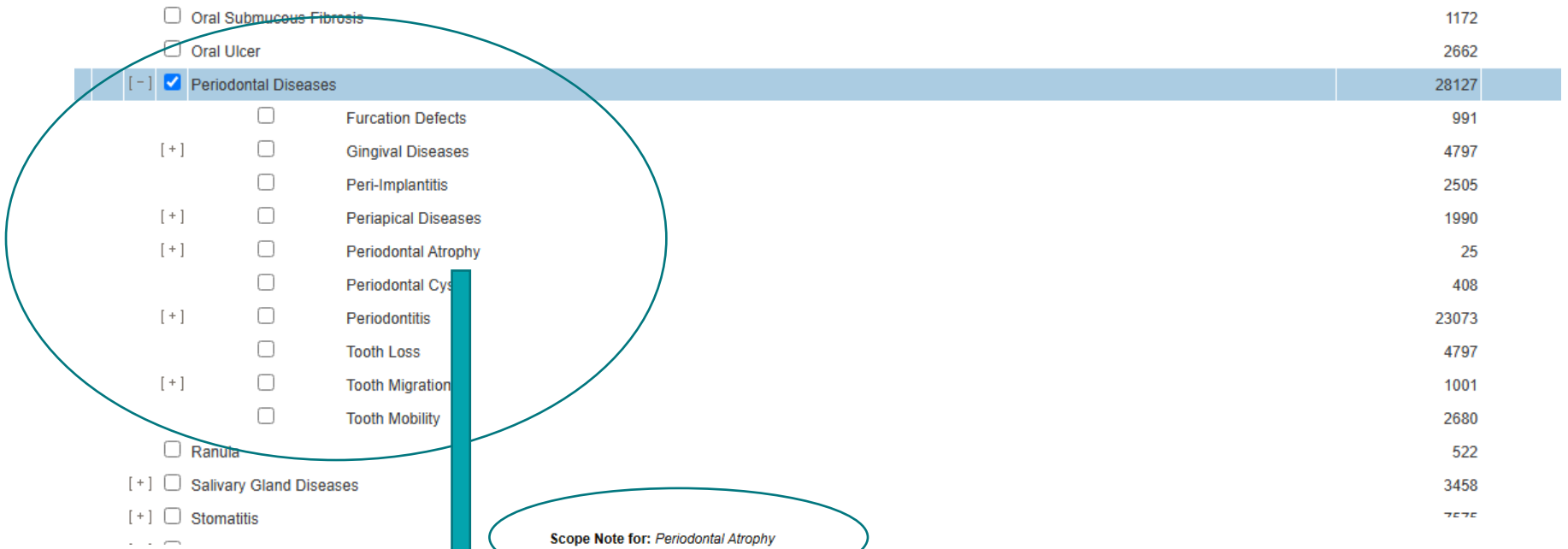
Medline records are indexed with **Medical Subject Headings** (MeSH), applied by staff at the NLM.

Unique Identifier:	37225630
Title:	**The Association Between Periodontal Disease and Chronic Migraine: A Systematic Review. [Review]**
Digital Object Identifier:	https://dx.doi.org/10.1016/j.ide...
Source:	International Dental Journal. 73(4):481-488, 2023 Aug.
Status:	MEDLINE
Authors:	Mohammed MMA; Almayeef D; Abbas D; Ali M; Haissam M; Mabrook R; Nizar R; Eldoahji T; Al-Rawi NH
MeSH Subject Headings:	Humans *Periodontal Diseases *Periodontitis Migraine Disorders / co [Complications] Migraine Disorders / th [Therapy] *Migraine Disorders Biomarkers

Searching by subject heading



Explode subject heading



Concept grid – keywords and headings

	migraine	periodontal disease
Keywords	headache* migrain*	“periodontal disease*” periodontitis “gum disease*”
MeSH subject headings	exp Headache Disorders/	exp Periodontal Diseases/

Search strategy

Keywords and subject headings:

headache* **OR** migrain*

OR exp Headache Disorders/

AND

“periodontal disease*” **OR** periodontitis **OR** “gum disease*”

OR exp Periodontal Diseases/

Medline - MeSH

MeSH headings included in strategy for a more comprehensive search:

Example keyword & subject heading search

# ▲	Searches
1	(headache* or migrain*).mp. [mp=title, book 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, population supplementary concept word, anatomy supplementary concept word]
2	exp Headache Disorders/
3	1 or 2
4	("periodontal disease*" or periodontitis or "gum disease*").mp. [mp=title, book 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, population supplementary concept word, anatomy supplementary concept word]
5	exp Periodontal Diseases/
6	4 or 5
7	3 and 6

Refining search

Limiting search by fields: *(headache* or migrain*).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!

Reporting searches

PRISMA Elaboration and Explanation

Page MJ, Moher D, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. *PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews*. BMJ 2021;372:n160. doi: 10.1136/bmj.n160 (open access)

Examples of good reporting for each checklist item in PRISMA 2020 (pdf)

Also – look at the Methods section of other published reviews

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..

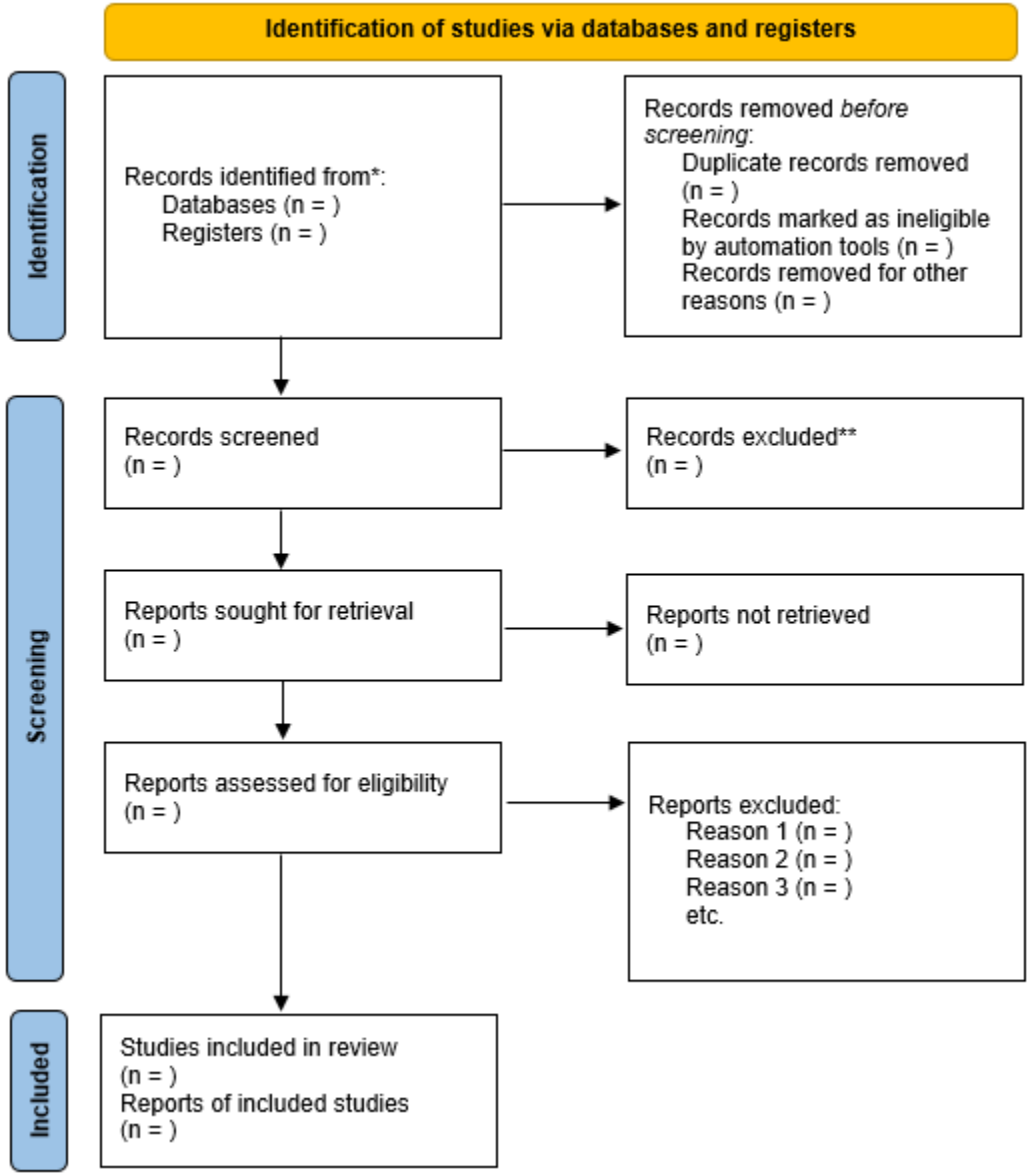
7. Extract & synthesise data

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

8. Interpret and present findings

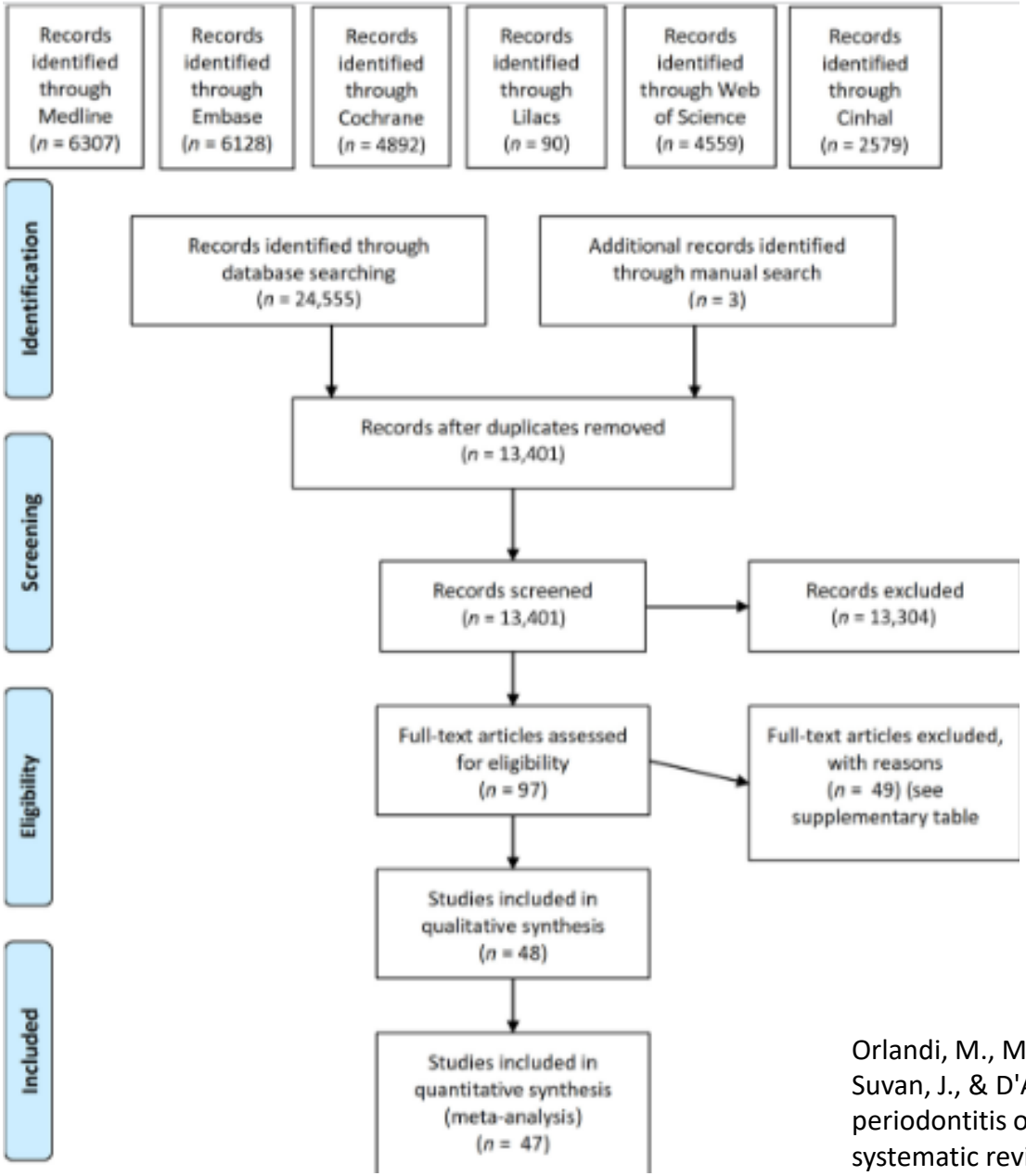
PRISMA 2020 flow diagram

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



https://www.prisma-statement.org/prisma-2020-flow-diagram

Example of PRISMA flow diagram



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

Review tools

Online tool that streamlines the process of conducting systematic and other types of research reviews, by integrating the process of results management, study screening, data extraction and reporting for a review team

Join the Curtin institutional license via the Signup page using your Curtin email

Training and support links:

- Curtin institutional information page
- Covidence Academy and Covidence Knowledge Base
- Covidence webinars

Review tools

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

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

Systematic Review Accelerator - free online suite of tools developed by Bond Uni's Institute for Evidence Based Healthcare, including:

- Polyglot Search (search strategy translator)
- Deduplicator (de-duplication tool)
- Screenatron & Disputatron

AI tools for reviews

AI tools may assist with the review process in:

- developing a search strategy
- locating relevant articles or resources
- data screening, data extraction or synthesis stage
- drafting plain language summaries.

➢ Important to fully understand how tools work, any bias and weakness.

➢ Essential to consider ethical, copyright and intellectual property issues.

Fabiano, N., Gupta, A., Bhambra, N., Luu, B., Wong, S., Maaz, M., Fiedorowicz, J. G., Smith, A. L., & Solmi, M. (2024). **How to optimize the systematic review process using AI tools**. JCPP Advances, 4(2), e12234. https://doi.org/10.1002/jcv2.12234

Khalil, H., Ameen, D., & Zarnegar, A. (2022). **Tools to support the automation of systematic reviews: a scoping review**. Journal of Clinical Epidemiology, 144, 22-42. https://doi.org/10.1016/j.jclinepi.2021.12.005

Where to find help

Systematic & Scoping Reviews guide

- 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

- 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: LibraryResearchServices@curtin.edu.au

Book appointment via Research Toolkit