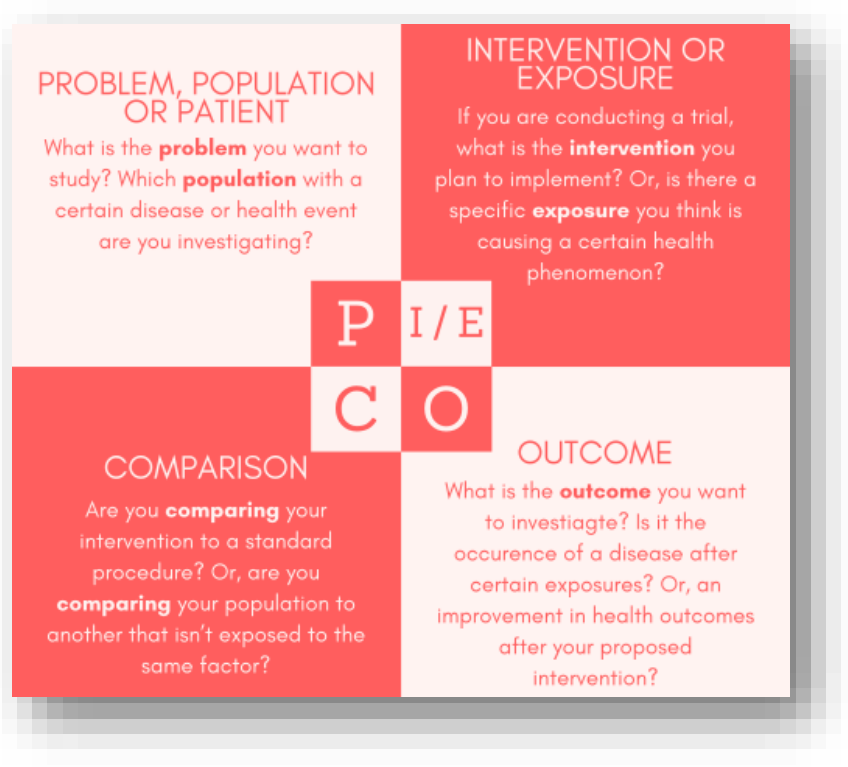
Guidelines for writing a systematic review

Pre-Writing Phase

1. Formulate a Clear and Focused Review Question

The review question is the anchor for the entire review. It should be:

- Specific (not too broad or narrow)
- Relevant (addresses a gap or controversy)
- Structured (ideally using a framework like PICO/PECO)



Use a Framework:

Element	Description	Example (PECO)
P	Population/Problem	Adults with confirmed dengue infection
E	Exposure/Intervention	Antibodies targeting E-protein domain III
C	Comparator (if applicable)	Other antibody types
O	Outcome	Risk of severe disease

If it is a qualitative review, SPIDER (**S**ample, **P**henomenon of **I**nterest, **D**esign, **E**valuation, **R**esearch type) might be better.

2. Conduct a Scoping Search

Before committing:

- Search broadly (e.g. in PubMed or Google Scholar)
- Check existing reviews - can yours add new value (e.g., updated timeframe, new subpopulations, regional focus)
- Assess how much and what type of literature is available - too little or too diverse may require adjusting scope

If you already find 100+ reviews on a topic, consider refining the angle, e.g., by pathogen subtype, geography, or method used.

3. Define Inclusion and Exclusion Criteria Early

These guide the screening process and should directly reflect the review question.
Define based on:

- Study type (e.g., randomized controlled trials (RCTs) only? observational? mixed?)
- Population (age, species, region, condition, etc.)
- Exposure/Intervention (precise definition, including route or dose if relevant)
- Outcome measures (must be measurable, reported)
- Language (will you include non-English studies?)
- Publication date range (especially for fast-evolving topics)

Write the criteria out in full sentences early, even before the search - this helps avoid shifting goalposts.

4. Define and Test Your Search Strategy

a) Identify Key Concepts and Synonyms

- Break down your question into keywords
- List synonyms, Medical Subject Headings (MeSH) terms, and variations

Example:

Dengue: dengue OR "dengue virus" OR DENV
Antibodies: antibodies OR immunoglobulins OR "neutralizing antibody"
Disease severity: "severe dengue" OR "DHF" OR "dengue hemorrhagic fever"

b) Use Boolean Logic

- Combine terms with **AND** / **OR**.

Example:

(dengue OR "dengue virus") AND (antibodies OR immunoglobulins) AND ("severe dengue" OR "dengue hemorrhagic fever")

c) Databases to Consider

- PubMed
- Web of Science
- Scopus
- Embase
- Google Scholar (as a supplementary source)
- Preprint servers like arXiv, bioRxiv, medRxiv, Research Square, Authorea (if appropriate)

Test your search on a few known "must-include" articles. If your search does not find them, it needs refining.

5. Draft a Protocol

Even if not submitting to PROSPERO, a written protocol ensures clarity and helps prevent scope creep.
Include:

- Review question
- Rationale
- Search strategy
- Inclusion/exclusion criteria
- Screening process
- Data extraction plan
- Risk of bias assessment

If you are new to review writing, then write the protocol as a separate document - it helps structure your later "Methods" section almost automatically.

6. Set Up the Workflow Tools

To stay organized:

- Screening: Rayyan or Covidence for blinded screening
- Reference management: Zotero, Mendeley, or EndNote
- Extraction spreadsheet: Predefine columns (e.g., author, year, study design, sample size, outcomes, quality score)
- PRISMA Checklist: Start filling it as you go - it's not just for the end

7. Build a Timeline

Systematic reviews are deceptively time-consuming. Set milestones (e.g., complete screening by week X, extraction by week Y). Use a Gantt chart or shared planner if helpful.

Writing a Systematic Review

1. Title and Abstract

Title: Should clearly include the words "systematic review" and reflect the scope (population, intervention/exposure, outcome).
Abstract: Follow PRISMA format if possible:

- Background
- Objective
- Methods (databases, search terms, inclusion/exclusion criteria)
- Results (number of studies included, main findings)
- Conclusion

Keep the abstract concise, focused on the method and key findings.

While the title and abstract appear first in a paper, they are often best written last. Once the full manuscript is complete - especially the discussion and conclusion – you will have a clearer view of the key message and contributions of your work. This ensures that the title accurately reflects the study's scope and that the abstract effectively summarizes the most important findings and implications.

2. Introduction

- Context: Briefly introduce the topic and its importance
- Knowledge gap: What is unknown or debated? Why is a systematic review needed?
- Objective: Explicitly state the review question (consider PICO/PECO format)

Avoid overly broad scopes. Precision here helps the whole review stay focused.

3. Methods

This section must be transparent and replicable.

a) Protocol and Registration

Mention if the protocol was registered (e.g., in PROSPERO).

b) Eligibility Criteria

Define inclusion and exclusion criteria:

- Study type (RCTs, observational studies, etc.)
- Population
- Timeframe
- Language
- Outcomes of interest

c) Information Sources and Search Strategy

- List all databases searched (e.g., PubMed, Scopus, Web of Science)
- Include the full search string (either here or in a supplement)

d) Study Selection Process

- How were studies screened (titles/abstracts/full-text)?
- How many reviewers were involved, and how was consensus reached?

e) Data Extraction

- What data were extracted (study design, sample size, outcomes)?
- Were standardized forms used?

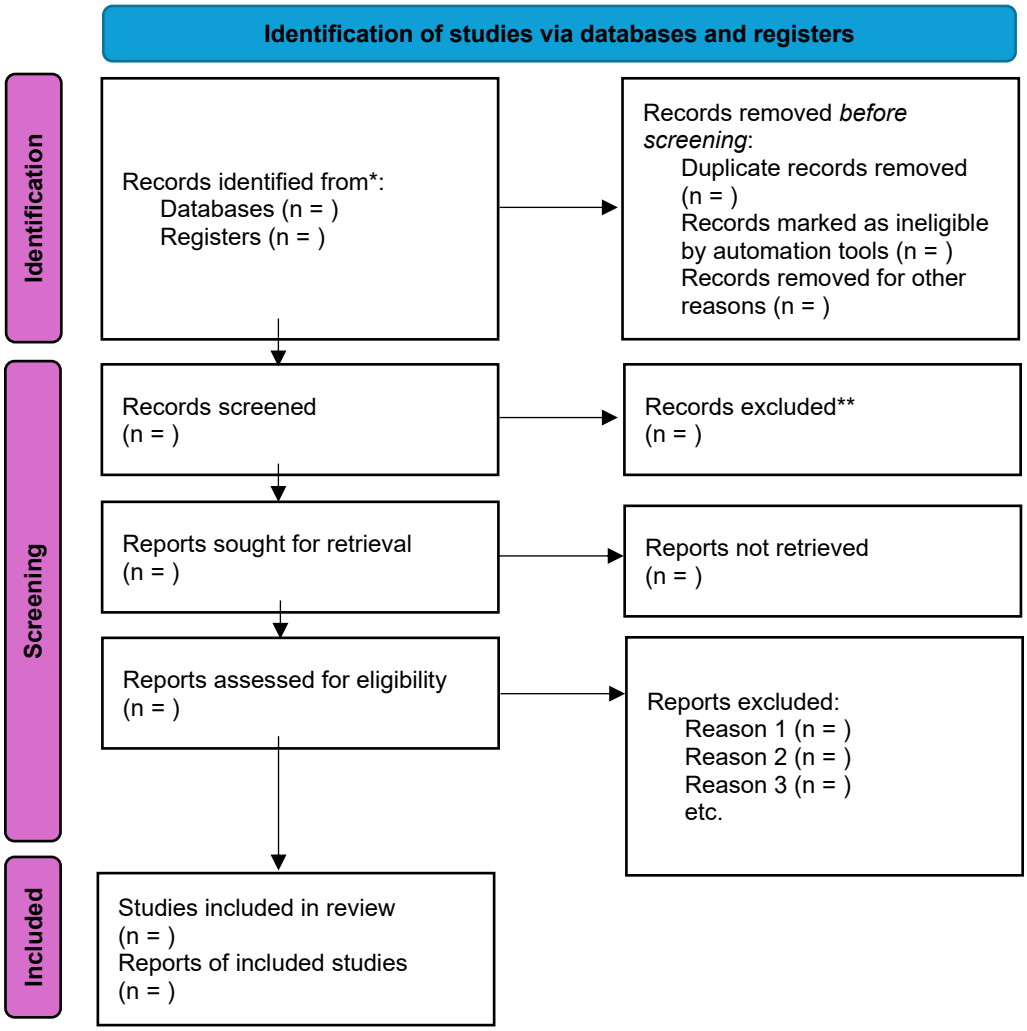
f) Quality/Risk of Bias Assessment

- Describe the tool used (e.g., Cochrane RoB tool, STROBE, Newcastle-Ottawa).

g) Data Synthesis

- Was it a qualitative synthesis or quantitative (meta-analysis)?
- How were studies grouped or compared?

A flow diagram (e.g., PRISMA) is essential for showing how studies were selected.



*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

4. Results

a) Study Selection

- Number of records retrieved and included
- Present the PRISMA diagram

b) Study Characteristics

- Table summarizing each study: year, country, sample, design, key findings

c) Risk of Bias / Quality Assessment

- Present a table or figure summarizing quality scores or risk levels

d) Synthesis of Findings

- Group findings by themes, subtopics, or outcome categories
- Highlight patterns, consistencies, and contradictions

Use subheadings, summary tables, and figures to improve clarity

5. Discussion

- Summary of main findings: What does the evidence collectively say?
- Comparison to other reviews or major papers
- Strengths and limitations:
  - Of the included studies
  - Of your review process
- Implications:
  - For research, practice, or policy
  - Future directions: What still needs to be studied?
- Emphasize the evidence weight (strong/moderate/weak) and not just list results

6. Conclusion

- A few sentences only.
- Reiterate the central message and significance of findings.

7. References

- Use a reference manager (e.g., Zotero, EndNote).
- Ensure consistency in format.

8. Supplementary Material (if applicable)

- Search strategy
- Full data extraction tables
- Risk of bias forms

Practical Advice

- Follow PRISMA guidelines (use the checklist to self-evaluate)
- Plan before writing: Flow from the search to synthesis must be clear
- Use tools: Rayyan for screening, Excel or Covidence for extraction, RevMan or R for meta-analysis
- Keep a record of decisions during screening—it supports transparency
- Don’t overquote individual studies in the results—focus on synthesis
- Work iteratively: Methods and results first, then discussion and intro