

A Reader's Guide to Medical Education Systematic Reviews

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Systematic reviews are rigorous and complex. It is paramount that readers—consumers of systematic reviews as well as researchers—understand the steps necessary for high-quality systematic reviews. Here are brief summaries of key quality considerations for readers of medical education systematic reviews. For detailed research steps aimed at those performing systematic reviews, see our companion paper.¹

1. Evidence of Preparation

Did the researchers use resources such as the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) Statement² or the STructured appRoach to the Reporting In healthcare education of Evidence Synthesis (STORIES) Statement?³ Both the PRISMA and STORIES statements act as guidelines for what is necessary to report in the manuscript.

2. Key Team Members

Systematic reviews are not solo endeavors.^{4,5} Team composition can vary but should include content experts, a librarian or information specialist, and, depending on the research question and nature of included studies, a statistician.⁵ Having multiple team members also helps to manage bias.^{6,7}

3. A Focused Research Question

The research team should have a focused research question that is neither too broad nor too narrow. A question that is too broad can lead to retrieving far too many studies to review and failing to provide a focused overview for readers. A too narrow question may result in being unable to find any existing studies that meet the inclusion criteria.

4. A Registered Protocol

Register the protocol with a systematic review protocol registry such as PROSPERO. Researchers

should register the protocol to promote transparency of the process and reduce duplication of efforts.^{8,9}

5. A Defined Search Process

A systematic review search strategy is based on the review's focused research question and includes a variety of search terms synonyms (eg, faculty, educator, teacher) and, depending on the database, controlled vocabulary terms (eg, medical subject headings [MeSH]). The intention is to comprehensively identify all studies that possibly meet the inclusion criteria. Once the main search elements are defined, the search is conducted *in a minimum of 3 databases*.⁴ If conducting a review for medical education, databases such as ERIC (Education Resources Information Center) or PsycINFO may be searched.¹⁰ The authors may have also searched grey literature sources such as theses, dissertations, and conference abstracts to reduce publication bias: some studies are conducted but never published. The search strategy for each resource and the date it was searched should be documented.¹¹ (Note that these details are expected by most journals, and the PRISMA reporting guidelines require authors to include the full search for at least one database.²)

6. Careful Screening of Search Results

There should be 2 levels of screening: title/abstract and full text, both guided by the review's inclusion and exclusion criteria. In both screening levels, 2 reviewers should independently screen each result; this minimizes bias in the application of inclusion and exclusion criteria. If the reviewers disagree, the conflict may be resolved by a third individual or by the 2 reviewers reaching consensus through discussion. While it is unnecessary for authors to report exclusion reasons when screening at the title/abstract level, it is necessary to report this information at the full-text level. This information is often presented as a PRISMA flow diagram² using tracking software programs (eg, Covidence, Rayyan, DistillerSR).

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7. Collaborative Data Extraction and Analysis

After completing the screening processes, the researchers will extract data from individual studies. To facilitate this process, authors should collaboratively draft and pilot a data extraction tool designed to capture all relevant data and extract it in a format that is conducive to analysis and synthesis. Data extraction should be conducted by 2 team members independently to assure reliability and reduce errors.

8. Study Appraisal and Data Synthesis

Authors should critically appraise each study through a quality and risk of bias assessment, such as with the Newcastle-Ottawa Scale-Education (NOS-E) or the Medical Education Research Study Quality Instrument (MERSQI).¹² Depending on the review's research question, the extracted data may be analyzed qualitatively or through a meta-analysis. Meta-analysis of quantitative studies is possible only if the data from the individual studies is homogenous; if the data are too heterogeneous, as is often found in medical education, it is not possible to accurately perform a meta-analysis. In qualitative analyses, the data are analyzed, and themes are drawn out, synthesized, categorized, and presented.¹³

9. Manuscript Clarity

Authors may reference the PRISMA² or STORIES statements³ as their writing and reporting structure. Whether or not these guidelines are cited, the article should present the rationale, methods, and findings in a clear, ordered, succinct fashion and discuss the relevance to existing literature and to readers.

References

- Maggio LA, Samuel A, Stellrecht E. Systematic reviews in medical education. *J Grad Med Educ.* 2022;14(2):171-175. doi:10.4300/JGME-D-22-00113.1
- Page MJ, Moher D, Bossuyt PM, et al. PRISMA 2020 explanation and elaboration: updated guidance and exemplars for reporting systematic reviews. *BMJ.* 2021;29:372. doi:10.1136/bmj.n160
- Gordon M, Gibbs T. STORIES statement: publication standards for healthcare education evidence synthesis. *BMC Med.* 2014;12:143. doi:10.1186/s12916-014-0143-0
- Lasserson TJ, Thomas J, Higgins JPT. Chapter 1: Starting a review. In: Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA, eds. *Cochrane Handbook for Systematic Reviews of Interventions*. Cochrane, 2020. www.training.cochrane.org/handbook
- Maggio LA, Costello JA, Norton C, Driessen EW, Artino AR Jr. Knowledge syntheses in medical education: a bibliometric analysis. *Perspect Med Educ.* 2021;10(2):79-87. doi:10.1007/s40037-020-00626-9
- Hall KL, Vogel AL, Huang GC, et al. The science of team science: a review of the empirical evidence and research gaps on collaboration in science. *Am Psychol.* 2018;73(4):532-548. doi:10.1037/amp0000319
- Rethlefsen ML, Farrell AM, Osterhaus Trzasko LC, Brigham TJ. Librarian co-authors correlated with higher quality reported search strategies in general internal medicine systematic reviews. *J Clin Epidemiol.* 2015;68(6):617-626. doi:10.1016/j.jclinepi.2014.11.025
- Centre for Reviews and Dissemination, University of York. Guidance notes for registering a systematic review protocol with PROSPERO. Accessed February 25, 2021. https://www.crd.york.ac.uk/prospero/
- Shamseer L, Moher D, Clarke M, et al. Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation. *BMJ.* 2015;350:g7647. doi:10.1136/bmj.g7647
- Maggio LA, Tannery NH, Kanter SL. AM last page: how to perform an effective database search. *Acad Med.* 2011;86(8):1057. doi:10.1097/ACM.0b013e3182291716
- Rethlefsen ML, Kirtley S, Waffenschmidt S, et al. PRISMA-S: an extension to the PRISMA Statement for Reporting Literature Searches in Systematic Reviews. *Syst Rev.* 2021;10(1):39. doi:10.1186/s13643-020-01542-z
- Cook DA, Reed DA. Appraising the quality of medical education research methods: the Medical Education Research Study Quality Instrument and the Newcastle-Ottawa Scale-Education. *Acad Med.* 2015;90(8):1067-1076. doi:10.1097/ACM.0000000000000786
- Bearman M, Dawson P. Qualitative synthesis and systematic review in health professions education. *Med Educ.* 2013;47(3):252-260. doi:10.1111/medu.12092



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