

# Systematic review

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A **systematic review** is a literature review focused on a research question that tries to identify, appraise, select and synthesize all high quality research evidence relevant to that question. Systematic reviews of high-quality randomized controlled trials are crucial to evidence-based medicine.<sup>[1]</sup> An understanding of systematic reviews and how to implement them in practice is becoming mandatory for all professionals involved in the delivery of health care. Besides health interventions, systematic reviews may concern clinical tests, public health interventions, social interventions, adverse effects, and economic evaluations.<sup>[2][3]</sup>

Systematic reviews are not limited to medicine and are quite common in other sciences where data are collected, published in the literature, and an assessment of methodological quality for a precisely defined subject would be helpful.<sup>[4]</sup> Other fields where systematic reviews are used include psychology, nursing, dentistry, public health, occupational therapy, speech therapy, physical therapy, educational research, sociology, business management, environmental management and conservation biology.<sup>[5]</sup>

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## Characteristics

A systematic review aims to provide an exhaustive summary of literature relevant to a research question. The first step of a systematic review is a thorough search of the literature for relevant papers. The *Methodology* section of the review will list the databases and citation indexes searched, such as Web of Science, Embase, and PubMed, as well as any individual journals. Next, the titles and the abstracts of the identified articles are checked against pre-determined criteria for eligibility and relevance. This list will always depend on the research problem. Each included study may be assigned an objective assessment of methodological quality preferably using a method conforming to PRISMA (the current guideline)<sup>[6]</sup> or the high quality standards of Cochrane collaboration.<sup>[7]</sup>

Systematic reviews often, but not always, use statistical techniques (meta-analysis) to combine results of the eligible studies, or at least use scoring of the levels of evidence depending on the methodology used. An additional rater may be consulted to resolve any scoring differences between raters.<sup>[4]</sup> Systematic review is often applied in the biomedical or healthcare context, but it can be applied in any field of research. Groups like the Campbell Collaboration are promoting the use of systematic reviews in policy-making beyond just healthcare.

A systematic review uses an objective and transparent approach for research synthesis, with the aim of minimizing bias. While many systematic reviews are based on an explicit quantitative meta-analysis of available data, there are also qualitative reviews which adhere to the standards for gathering, analyzing and reporting evidence. The EPPI-Centre has been influential in developing methods for combining both qualitative and quantitative research in systematic reviews.<sup>[8]</sup>

Recent developments in systematic reviews include realist reviews,<sup>[9]</sup> and the meta-narrative approach.<sup>[10][11]</sup> These approaches try to overcome the problems of methodological and epistemological heterogeneity in the diverse literatures existing on some subjects. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement<sup>[12]</sup> suggests a standardized way to ensure a transparent and complete reporting of systematic reviews, and is now required for this kind of research by more than 170 medical journals worldwide.<sup>[13]</sup>

## Cochrane Collaboration

The Cochrane Collaboration is a group of over 28,000 specialists in health care who systematically review randomised trials of the effects of prevention, treatments and rehabilitation as well as health systems interventions. When appropriate, they also include the results of other types of research. Cochrane Reviews are published in *The Cochrane Database of Systematic Reviews* section of The Cochrane Library. The 2010 impact factor for *The Cochrane Database of Systematic Reviews* was 6.186, and it was ranked 10th in the “Medicine, General & Internal” category.<sup>[14]</sup>

The Cochrane Collaboration provides a handbook for systematic reviewers of interventions which "provides guidance to authors for the preparation of Cochrane Intervention reviews."<sup>[15]</sup> The *Cochrane Handbook* outlines eight general steps for preparing a systematic review:<sup>[15]</sup>

1. Defining the review question and developing criteria for including studies
2. Searching for studies
3. Selecting studies and collecting data
4. Assessing risk of bias in included studies
5. Analysing data and undertaking meta-analyses
6. Addressing reporting biases
7. Presenting results and "summary of findings" tables
8. Interpreting results and drawing conclusions

The Cochrane Handbook forms the basis of two sets of standards for the conduct and reporting of Cochrane Intervention Reviews (MECIR - Methodological Expectations of Cochrane Intervention Reviews)<sup>[1]</sup> (<http://www.editorial-unit.cochrane.org/mecir>)

## Strengths and weaknesses

While systematic reviews are regarded as the strongest form of medical evidence, a review of 300 studies found that not all systematic reviews were equally reliable, and that their reporting could be improved by a universally agreed upon set of standards and guidelines.<sup>[16]</sup>

A further study by the same group found that of 100 systematic reviews monitored, 7% needed updating at the time of publication, another 4% within a year, and another 11% within 2 years; this figure was higher in rapidly-changing fields of medicine, especially cardiovascular medicine.<sup>[17]</sup> A 2003 study suggested that extending searches beyond major databases, perhaps into gray literature, would increase the effectiveness of reviews.<sup>[18]</sup>

Systematic reviews are increasingly appearing in other fields, such as international development research.<sup>[19]</sup> Subsequently, a number of donors – most notably the UK Department for International Development (DFID) and AusAid – are focusing attention and resources on testing the appropriateness of systematic reviews in assessing the impacts of development and humanitarian interventions.<sup>[19]</sup>

## See also

- Critical appraisal
- Review journal

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## Stumble



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## External links

- Centre for Reviews and Dissemination (http://www.york.ac.uk/inst/crd/) , University of York.
- Cochrane Collaboration (http://www.cochrane.org/)
- Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre), (http://eppi.ioe.ac.uk) University of London.
- MeSH: Review Literature (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=mesh&list\_uids=68012196&dopt=Full) - articles about the review process
- MeSH: Review [Publication Type] (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=mesh&list\_uids=68016454&dopt=Full) - limit search results to reviews
- PubMed search (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=PureSearch&db=pubmed&details\_term=%22Review%20Literature%22%5BMAJR%5D) : "Review Literature" [MAJR]
- MIX 2.0 (http://www.meta-analysis-made-easy.com) Software for professional meta-analysis in Excel.
- Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement (http://www.prisma-statement.org) , “an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses.”

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