

Systematic summaries

From: [Key Concepts for assessing claims about treatment effects and making well-informed treatment choices \(Version 2022\)](#)

2.2a Consider whether systematic methods were used.

Explanation

A [systematic review](#) is a summary of research evidence (studies) which uses systematic and explicit methods to summarise the research on the effects of a treatment (or some other topic). A systematic review addresses a clearly formulated question using a structured approach to identify, select, and critically appraise relevant studies, and to collect and analyse data from the studies that are included in the review. Systematic reviews begin with [protocols](#), which should be registered and searchable in registries such as Prospero [[Booth 2012](#)].

Even reviews that purport to be systematic may not be. Reviews that do not use systematic methods may result in [biased](#) or imprecise estimates of the effects of treatments because the selection of studies for inclusion may be biased, or the methods may result in some studies not being found. In addition, the appraisal of the quality of some studies may be biased, or the synthesis of the results of the selected studies may be inadequate or inappropriate.

For example, if a systematic review of giving blood thinners to patients with an acute heart attack had been done in the late 1970s, it would have established the effectiveness of that treatment about 10 years before the results a very large [randomized trial](#) became available [[Antman 1992 \(SR\)](#)]. If those results had been acted upon, thousands of premature deaths could have been avoided. Instead, recommendations were based on unsystematic reviews of the evidence. Similarly, the harmful effects of medicines to reduce heart rhythm abnormalities in patients with an acute heart attack could have been recognised years earlier. And thousands of deaths caused by those medicines could have been prevented if those results had been acted upon.

Basis for this concept

Many reviews of the effects of treatments are unsystematic. For example, a systematic review of reviews of two treatments for arthritis found that 91% of 281 published reviews were unsystematic and did not report methods and conflicts of interest in sufficient detail [[Roundtree 2009 \(SR\)](#)]. A “cumulative [meta-analysis](#)” starts with the results of the first study evaluating a treatment, typically a [randomized trial](#), and adds other studies one at a time. This shows how the overall effect estimate changes as each new study is added. A systematic review of more than 1,500 cumulative meta-analyses shows that, had researchers systematically assessed what was already known, some beneficial and harmful effects of treatments (such as blood thinners and medicines to reduce heart rhythm abnormalities for acute heart attacks) could have been identified earlier than they were. This could have reduced unnecessary research as well as improving health outcomes [[Clarke 2014 \(SR\)](#)].

A review of reports of 1,523 trials published from 1963 to 2004 found that fewer than 25% of preceding trials were cited [[Robinson 2011 \(SR\)](#)]. Other research has shown that authors selectively cite studies based on their results when research is not systematically reviewed [[Duyx 2017 \(SR\)](#), [Leng 2018 \(RS\)](#), [Urlings 2019 \(RS\)](#), [Urlings 2021 \(RS\)](#)]. Explicit criteria for deciding which studies to include in a review, adequate searches for studies, and efforts to minimize error in selecting studies can reduce selective inclusion of studies in research reviews. In contrast to selective citation of

research in unsystematic reviews, a review of a random sample of systematic reviews did not find evidence of selective inclusion of studies [[Page 2016 \(RS\)](#)].

The starting point for a systematic review is a clearly formulated question. A widely used framework for this is PICO, which stands for Population, Intervention (treatment), Comparator (comparison treatment), and Outcomes [[Cumpston 2020](#), [Huang 2006 \(RS\)](#)]. In addition to being helpful formulating the question, this framework can be helpful for specifying inclusion criteria for studies, designing search strategies for finding relevant research, and extracting and analysing data from included studies.

To avoid missing relevant studies, it is important to conduct an adequate search, particularly using bibliographic databases [[Ewald 2020 \(RS\)](#), [Lefebvre 2021](#), [Marshall 2019 \(RS\)](#)]. People can easily make errors when screening the results of searches to decide which studies to include and extracting data from those studies [[E 2020 \(RS\)](#), [Gartlehner 2020 \(RS\)](#), [Robson 2019 \(SR\)](#), [Waffenschmidt 2019 \(SR\)](#), [Wang 2020 \(SR\)](#)]. Having two people screen and select studies for inclusion, extract data from included studies, and assess the risk of bias in included studies can reduce those errors. Increasingly, automation is being used to do this, with the potential to save time and increase accuracy [[Scott 2021 \(RS\)](#), [Tsafnat 2014 \(OR\)](#)]. Using statistical or structured methods to synthesise study results can reduce errors such as giving inappropriate weight to studies that support the authors' prior views or being misled by inappropriate analyses such as vote counting (counting the number of "positive" and "negative" studies [[Oxman 1994](#)]. Once the results have been reliably summarised, it is important to interpret and report the results without misrepresentation of the findings (spin) [[Page 2021](#), [Rucker 2021 \(SR\)](#)].

There is an endless amount of information on the Internet about treatments. However, most of that information is not based on systematic reviews and there is a lot of misinformation. A review of English language websites intended for patients and the public, which provide information on a broad scope of treatments found two sources that provide information about treatments that is explicitly based on systematic reviews [[Oxman 2019 \(SR\)](#)]. Sources such as those are essential, to make it easy for people to find reliable information about the effects of treatments. Although an increasing number of systematic reviews are being published, many are poorly conducted and reported [[Page 2016b \(SR\)](#), [Rosenberger 2021 \(SR\)](#)]. The results of reliable systematic reviews can be difficult for most people (including health professionals) to find without user-friendly sources of information about the effects of treatments that is based on reliable, up-to-date systematic reviews.

Implications

Whenever possible, use up-to-date systematic reviews of fair comparisons to inform decisions rather than non-systematic reviews of fair comparisons of treatments.

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