Systematic Reviews 101

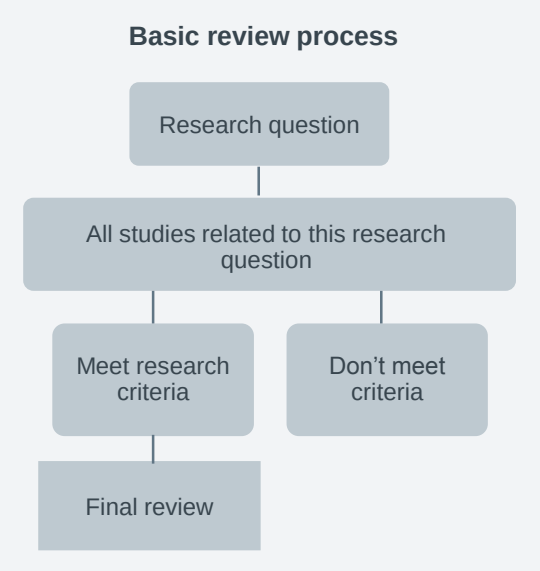
Educational Briefing

What is a systematic review?

- A systematic review is a summary of existing research on a given topic. It seeks to answers a particular research question by collecting and summarizing all empirical evidence that meets a certain pre-specified eligibility criteria. .
- Systematic reviews of randomized control trials are the basis for evidence-based medicine and offer the strongest evidence of a particular phenomenon. The most famous compiler of these systematic reviews is the **Cochrane Organization.**

What steps are required to complete a systematic review?

1. Researchers first define a research question and agree upon an objective criteria for answering it (i.e. which type of studies will be able to answer the question properly).
2. They then look at all of the studies related to the topic and evaluate them for quality (i.e., was the study design rigorous? Did researchers control for possible confounding variables? How big was the sample size?)
3. Next, they 'extract' the relevant data from the study, such as the research method, how many people were involved and what outcomes they found.
4. Finally, they collate these results into a qualitative 'research' or 'evidence synthesis.' If conducting a **meta-analysis**, researchers summarize the quantitative results of the studies into an estimation of impact.



What is an example of a systematic review?

- A research team wants to know how much the length of sleep older women get impacts their health outcomes. Since they know that people often make errors in accurately reporting how much sleep they get, they decide to only include studies where participants wore a sleep tracker. Since they think it takes awhile for sleep to impact health, they decide to only include studies which tracked participants over the course of at least 3 years. Finally, they decide that they only want studies with a control group (for example, where an intervention group gets 6 hours or less per night while a control group gets their normal amount) to better account for the actual impact of sleep.
- To evaluate this question, they read all of the literature on sleep and health (specifying where they look for studies and which databases they use) and select the studies which included women, use a sleep tracker in their methodology, were longer than three years and had a control group. They then evaluate the quality of each study (and might assign each study a 'score' based on its quality.)
- Finally, they compile all of these studies into a single review, grouping similar studies (i.e. the impact of less sleep on heart disease, the impact on longevity, the impact on diabetes, etc.…) together to try to extrapolate broader themes and answer the overall question.

How is this different than other study types?

- Systematic reviews differ from **narrative reviews**, which provide an overview of different studies to give an overview of the 'state of current research' on a topic or highlight a particular theme (often in the 'background' section of new research). Narrative reviews, while often informative, can suffer from selection bias (where authors select certain studies due to availability or their own viewpoint). Systematic reviews, conversely, typically involve a more comprehensive literature search and prioritize creating a guideline upfront of which studies will be included, in an effort to reduce selection bias. They also often involve a methodology of which databases were searched and which studies were selected.
- Systematic reviews often contain a **meta-analysis** which is a statistical method for aggregating the data from several studies into a single summary effect size or quantitative analysis of impact.

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Source: Cochrane Review; National Institutes of Health; Advisory Board insights and analysis.