## REVIEWS

# **1.** Systematic Reviews: Synthesis of Best Evidence for Clinical Decisions

#### What Is a Systematic Review?

- 5 Systematic reviews are scientific investigations in themselves, with pre-planned methods and an assembly of original studies as their "subjects." They synthesize the results of multiple primary investigations by using strategies that limit bias and random error. These strategies include a comprehensive search of all potentially relevant articles and the use of explicit, reproducible criteria in the selection of articles for review. Primary research designs and study characteristics are appraised, data are synthesized, and results are interpreted.
- When the results of primary studies are summarized but not statistically combined, the review may be called a **qualitative systematic review**. A **quantitative systematic review**, or **meta-analysis**, is a systematic review that uses statistical methods to combine the results of two or more studies. The term "**overview**" is sometimes used to denote a **systematic review**, whether quantitative or
- 15 qualitative. Summaries of research that lack explicit descriptions of systematic methods are often called **narrative reviews**.

#### **Differences between Systematic and Narrative Reviews**

All reviews, narrative and systematic alike, are retrospective, observational research studies and are therefore subject to systematic and random error. Accordingly, the quality of a review-and thus its

- 20 worth-depends on the extent to which scientific review methods have been used to minimize error and bias. This is the key feature that distinguishes traditional narrative reviews from systematic reviews (Table 1). If a review is prepared according to the steps outlined in the right column of Table 1, it is more likely to be systematic and to provide unbiased conclusions. If review methods approximate those found in the middle column of Table 1, the article is more likely to be a narrative
- 25 review, and the conclusions are less likely to be based on an unbiased summary of all relevant evidence.

Systematic reviews are generated to answer specific, often narrow, clinical questions in depth. These questions can be formulated explicitly according to four variables: a specific population and setting (such as elderly outpatients), the condition of interest (for example, hypertension), an

- 30 exposure to a test or treatment (such as pharmacologic management), and one or more specific outcomes (such as cardiovascular and cerebrovascular events and mortality). Thus, an example of a well-formulated, clinically relevant question is, Does pharmacologic treatment of hypertension in the elderly prevent strokes and myocardial infarctions or delay death? If the question that is driving the review is not clear from the title, abstract, or introduction, or if no methods section is included,
- 35 the paper is more likely to be a narrative review than a systematic review. Most narrative review articles deal with a broad range of issues related to a given topic rather than addressing a particular issue in depth. For example, a narrative review on diabetes (such as that which might be found in a textbook chapter) might include sections on the physiology and pathophysiology of carbohydrate, lipid, and protein metabolism; the epidemiology of and prognosis
- 40 associated with diabetes; diagnostic and screening approaches; and preventive, therapeutic, rehabilitative, and palliative interventions. Thus, narrative reviews may be most useful for obtaining a broad perspective on a topic; they are less often useful in furnishing quantitative answers to specific clinical questions.

Narrative reviews are appropriate for describing the history or development of a problem and its

45 management. Narrative reviews may better describe cutting-edge developments if research is scant or preliminary or if studies are very limited by flawed design or execution. They may be particularly useful for discussing data in light of underlying theory and context. Narrative reviews can draw analogies and can conceptually integrate two independent fields of research, such as cancer and the acquired immunodeficiency syndrome.

Table 1           Differences between Narrative Reviews and Systematic Reviews		
Feature	Narrative Review	Systematic Review
Question	Often broad in scope	Often a focused clinical question
Sources and search	Not usually specified, potentially biased	Comprehensive sources and explicit searh strategy
Selection	Not usually specified, potentially biased	Criterion-based selection, uniformly applied
Appraisal	Variable	Rigorous critical appraisal
Synthesis	Often a qualitative summary	Quantitative summary*
Inferences	Sometimes evidence-based	Usually evidence-based
* A quantitative summary that includes a statistical synthesis is a meta-analysis		

However, the connection between clinical recommendations and evidence in narrative reviews is often tenuous, incomplete, or-worse still-based on a biased citation of studies. As a result, recommendations found in narrative reviews published in journals and textbooks often differ from

<sup>5</sup> recommendations found in systematic reviews. For example, narrative reviews may lag behind by more than a decade in endorsing a treatment of proven effectiveness, or they may continue to advocate a therapy long after it has been shown to be useless or harmful. Also, systematic reviews that incorporate quantitative techniques are more likely than narrative reviews to detect small but clinically meaningful treatment effects.

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## What Systematic Reviews Can and Cannot Do

A well-conducted systematic review is invaluable for practitioners. Many of us feel overwhelmed by the volume of medical literature and, as a result, often prefer summaries of information to publications of original investigations. Thus, review articles can help us keep up-to-date. Highquality systematic reviews can define the boundaries of what is known and what is not known and

can help us avoid knowing less than has been proven. Investigators need systematic reviews to summarize existing data, refine hypotheses, estimate sample sizes, and help define future research agendas. Without systematic reviews, researchers may miss promising leads or may embark on studies of questions that have been already answered.

20 Administrators and purchasers need review articles and other integrative publications to help generate clinical policies that optimize outcomes using available resources. Systematic reviews can aid, but can never replace, sound clinical reasoning. Clinicians reason about individual patients on the basis of analogy, experience, heuristics, and theory as well as research evidence. Awareness of a treatment's effectiveness does not confer knowledge about how to use that

treatment in caring for individual patients.

Evidence can lead to bad practice if it is applied in an uncritical or unfeeling way. Understanding the complex structure of medical decision making requires an appreciation of the ways in which knowledge, skills, values, and research evidence are integrated in each patient-clinician encounter. Source: Ann Intern Med. 1997; 126:376-380

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# 2. Understanding systematic reviews and meta-analysis

Health care professionals have always used review articles as a source of summarised evidence on a particular topic. Review articles in the medical literature have traditionally been in the form of "narrative reviews" where experts in a particular field provide what is supposed to be a "summary of evidence" in that field.

**Narrative reviews**, although still very common in the medical field, have been criticised because of the high risk of bias, and "**systematic reviews**" are preferred. Systematic reviews apply scientific strategies in ways that limit bias to the assembly, a critical appraisal, and synthesis of relevant studies that address a specific clinical question.

## 15 THE PROBLEM WITH TRADITIONAL REVIEWS

The validity of a review article depends on its methodological quality. While traditional **review** articles or narrative reviews can be useful when conducted properly, there is evidence that they are usually of poor quality. Authors of narrative reviews often use informal, subjective methods to collect and interpret studies and tend to be selective in citing reports that reinforce their

20 preconceived ideas or promote their own views on a topic. They are also rarely explicit about how they selected, assessed, and analysed the primary studies, thereby not allowing readers to assess potential bias in the review process. Narrative reviews are therefore often biased, and the recommendations made may be inappropriate.

### WHAT IS A SYSTEMATIC REVIEW?

- 25 In contrast to a narrative review, a systematic review is a form of research that provides a summary of medical reports on a specific clinical question, using explicit methods to search, critically appraise, and synthesise the world literature systematically. It is particularly useful in bringing together a number of separately conducted studies, sometimes with conflicting findings, and synthesising their results.
- 30 By providing in a clear explicit fashion a summary of all the studies addressing a specific clinical question, systematic reviews allow us to take account of the whole range of relevant findings from research on a particular topic, and not just the results of one or two studies.

### WHAT IS A META-ANALYSIS?

Following a systematic review, data from individual studies may be pooled quantitatively and reanalysed using established statistical methods. This technique is called **meta-analysis**.

Source: Arch Dis Child 2005;90:845–848.

# 3. Balancing the strengths of systematic and narrative reviews

- For some review topics, however, the strengths of the systematic review may turn into weaknesses.
  The primary problem is that the narrow focus and prescribed methods of the systematic review do not allow for comprehensive coverage. For example, the historical review is an irreplaceable means of tracing the development of a scientific principle or clinical concept, but the narrative thread could be lost in the strict rules of systematic review. While systematic reviews are more appropriate for focused topics and traditional narrative reviews are better suited to comprehensive topics, either
- 45 approach can be adapted to clinical or scientific subjects. An infusion of systematic review methods would strengthen narrative reviews and in turn systematic reviews could benefit from the presentation strengths of narrative reviews. The goal is to ensure that the methods of all reviews should be explicit, transparent, clearly stated and reproducible by interested readers. Source: Human Reproduction Update, Vol.11, No.2 pp. 103–104, 2005