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Journal of Clinical Epidemiology ■ (2016) ■

Journal of Clinical Epidemiology

ORIGINAL ARTICLE

# Knowledge synthesis methods for integrating qualitative and quantitative data: a scoping review reveals poor operationalization of the methodological steps

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Accepted 10 December 2015; Published online xxxx

## Abstract

**Objectives:** To describe and compare, through a scoping review, emerging knowledge synthesis methods for integrating qualitative and quantitative evidence in health care, in terms of expertise required, similarities, differences, strengths, limitations, and steps involved in using the methods.

**Study Design and Setting:** Electronic databases (e.g., MEDLINE) were searched, and two reviewers independently selected studies and abstracted data for qualitative analysis.

**Results:** In total, 121 articles reporting seven knowledge synthesis methods (critical interpretive synthesis, integrative review, meta-narrative review, meta-summary, mixed studies review, narrative synthesis, and realist review) were included after screening of 17,962 citations and 1,010 full-text articles. Common similarities among methods related to the entire synthesis process, while common differences related to the research question and eligibility criteria. The most common strength was a comprehensive synthesis providing rich contextual data, whereas the most common weakness was a highly subjective method that was not reproducible. For critical interpretive synthesis, meta-narrative review, meta-summary, and narrative synthesis, guidance was not provided for some steps of the review process.

**Conclusion:** Some of the knowledge synthesis methods provided guidance on all steps, whereas other methods were missing guidance on the synthesis process. Further work is needed to clarify these emerging knowledge synthesis methods. 

*Keywords:* Systematic review; Knowledge synthesis; Integrative review; Mixed studies review; Realist review; Meta-summary; Meta-narrative review; Narrative synthesis; Critical interpretive synthesis

## 1. Introduction

Decision makers, including clinicians, policy makers, and patients, face increasingly complex health care decisions. Numerous interventions are available to improve the quality of the population's health, yet it is often difficult to select among them. By providing evidence on the effectiveness, safety, and cost of available interventions for specific populations, systematic reviews can be used to inform health-related decision making. However, there are inherent challenges in using systematic reviews, including lack of time or knowledge of available resources [1,2], financial

Conflict of interest: A.C.T. holds a CIHR/Drug Safety and Effectiveness Network New Investigator Award in Knowledge Synthesis, and S.E.S. holds a Tier 1 Canada Research Chair in Knowledge Translation.

SES and ACT are on the editorial board for the journal, but were not involved with the peer review process or decision to publish.

Funding: The study was funded by a Canadian Institutes of Health Research (CIHR, grant number: KST-116633) Knowledge Synthesis grant.

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http://dx.doi.org/10.1016/j.jclinepi.2015.12.011
0895-4356/

**What is new?**

**Key findings**

- We found seven emerging knowledge synthesis methods that can be used to integrate qualitative and quantitative evidence: critical interpretive synthesis, integrative review, meta-narrative review, meta-summary, mixed studies review, narrative synthesis, and realist review. For integrative review and realist review, guidance was provided on all steps of the review process, whereas meta-summary had guidance on the fewest number of steps.

**What this adds to what was known?**

- This is the first study to compare and contrast the features of emerging knowledge synthesis methods that can be used to integrate qualitative and quantitative evidence.

**What is the implication and what should change now?**

- We found a lack of guidance on how to integrate qualitative and quantitative evidence.
- We propose convening an international group of leaders in the field to clarify the methods for emerging knowledge synthesis approaches as they relate to integrating qualitative and quantitative evidence.

constraints, unmanageable literature search results, and difficulty in applying the evidence to local contexts [3]. In particular, systematic reviews have been criticized for lacking the rich contextual detail required for making decisions [4].

To address the lack of contextual information in studies of interventions, other synthesis methods have evolved. A recent series in the Journal of Clinical Epidemiology has described other types of knowledge synthesis that can be used to evaluate complex interventions [5−14]. In one article in that previous series, the authors discussed the importance of synthesis methods for integrating qualitative and quantitative methods, such as realist synthesis [5]. Such types of synthesis combine the strengths of qualitative and quantitative research, providing decision makers with rich details, such as patient characteristics and setting, that might be lacking from traditional systematic reviews [5].

In this scoping review, we aimed to describe how emerging knowledge synthesis methods that integrate qualitative and quantitative evidence are applied. Our objectives were to describe, on the basis of reviews using these methods, the expertise required to carry out these synthesis methods, the similarities and differences between these methods and systematic reviews of quantitative studies, and the reported strengths and limitations of these methods. In addition, we aimed to identify the operational steps of these methods, according to some seminal articles. This is the third in a series of articles reporting the results of our scoping review [15−19].

## 2. Methods

We formulated our protocol [20] using methods outlined by Arksey and O'Malley [21]. As our methods have been presented in detail previously [20], they are described only briefly here.

### 2.1. Information sources

We searched several databases from inception until December 2011: MEDLINE, CINAHL, EMBASE, PsycINFO, the Cochrane Methodology Register, the Cochrane Database of Systematic Reviews, Social Sciences Abstracts, Library and Information Science Abstracts, Philosopher's Index, and Education Resources Information Center, which was supplemented by scanning reference lists of included studies and searching textbooks for details on the methods.

### 2.2. Inclusion criteria

We included any article, study, report, dissertation, or book that evaluated, used, or described emerging knowledge synthesis methods in health (according to the WHO definition [22], which includes disciplines beyond health such as psychology, education, and sociology) or philosophy (the discipline in which the realist review was rooted) that could be used to integrate qualitative and quantitative data.

### 2.3. Screening and data abstraction

After pilot testing the eligibility criteria, two reviewers independently screened the literature search results at both level 1 (titles and abstracts) and level 2 (full-text articles). Discrepancies were resolved through discussion. After pilot testing the data form, data from all included studies were independently abstracted by two reviewers. Discrepancies were resolved through discussion. The abstracted data focused on the expertise required to conduct the method, similarities, and differences relative to other knowledge synthesis methods, strengths and limitations of the method, and the steps used to operationalize the method.

### 2.4. Synthesis

Qualitative analysis was conducted using NVivo 10 [23] to chart the expertise required for, as well as the similarities, differences, strengths, and weaknesses of, the emerging synthesis methods and systematic reviews, as reported by the authors of the included articles. According to the Cochrane Collaboration, "A systematic review attempts to collate all empirical evidence that fits prespecified