Evidence maps: Informing research and practice

T Young

Centre for Evidence-based Health Care, Division of Epidemiology and Biostatistics, Stellenbosch University.

Cochrane South Africa, South African Medical Research Council.

Many factors influence decisions about health care

Burden of disease
Resource constraints
Level of care
Acceptability
Preferences/values
Politics
Evidence is necessary but not sufficient

Research synthesis is an important approach to find answers

- ‘Research synthesis is the process through which two or more research studies are assessed with the objective of summarizing the evidence relating to a particular question.’
- ‘The results of a particular research study cannot be interpreted with any confidence unless it has been considered together with the results of other studies addressing the same or similar questions.’

Iain Chalmers

Review Article

A typology of reviews: an analysis of 14 review types and associated methodologies

Maria J. Grant* & Andrew Booth†, *Salford Centre for Nursing, Midwifery and Collaborative Research (SCNMCR), University of Salford, Salford, UK, †School of Health and Related Research (ScHARR), University of Sheffield, Sheffield, UK

Table 1 *Continued*

		Methods used (SALSA)			
Label	Description	Search	Appraisal	Synthesis	Analysis
Rapid review	Assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research	Completeness of searching determined by time constraints	Time-limited formal quality assessment	Typically narrative and tabular	Quantities of literature and overall quality/direction of effect of literature
Scoping review	Preliminary assessment of potential size and scope of available research literature. Aims to identify nature and extent of research evidence (usually including ongoing research)	Completeness of searching determined by time/scope constraints. May include research in progress	No formal quality assessment	Typically tabular with some narrative commentary	Characterizes quantity and quality of literature, perhaps by study design and other key features. Attempts to specify a viable review
State-of-the-art review	Tend to address more current matters in contrast to other combined retrospective and current approaches. May offer new perspectives on issue or point out area for further research	Aims for comprehensive searching of current literature	No formal quality assessment	Typically narrative, may have tabular accompaniment	Current state of knowledge and priorities for future investigation and research
Systematic review	Seeks to systematically search for, appraise and synthesis research evidence, often adhering to guidelines on the conduct of a review	Aims for exhaustive, comprehensive searching	Quality assessment may determine inclusion/exclusion	Typically narrative with tabular accompaniment	What is known; recommendations for practice. What remains unknown; uncertainty around findings, recommendations for future research
Systematic search and review	Combines strengths of critical review with a comprehensive search process. Typically addresses broad questions to produce 'best evidence synthesis'	Aims for exhaustive, comprehensive searching	May or may not include quality assessment	Minimal narrative, tabular summary of studies	What is known; recommendations for practice. Limitations
Systematized review	Attempt to include elements of systematic review process while stopping short of systematic review. Typically conducted as postgraduate student assignment	May or may not include comprehensive searching	May or may not include quality assessment	Typically narrative with tabular accompaniment	What is known; uncertainty around findings; limitations of methodology
Umbrella review	Specifically refers to review compiling evidence from multiple reviews into one accessible and usable document. Focuses on broad condition or problem for which there are competing interventions and highlights reviews that address these interventions and their results	Identification of component reviews, but no search for primary studies	Quality assessment of studies within component reviews and/or of reviews themselves	Graphical and tabular with narrative commentary	What is known; recommendations for practice. What remains unknown; recommendations for future research

Evidence maps

- Evidence maps are aimed at identifying research gaps

Or

- Support evidence- informed policy making by displaying an overview of interventions and outcomes along a causal chain associated with those interventions.

AN EXAMPLE -- 3ie SR8: Handwashing and sanitation promotion programs & behaviour change

Last two decades: approaches to promote WASH behaviour

- E.g. community-based participatory approaches
- E.g. marketing approaches

Not clear which of the approaches is most effective

3ie International Initiative for Impact Evaluation

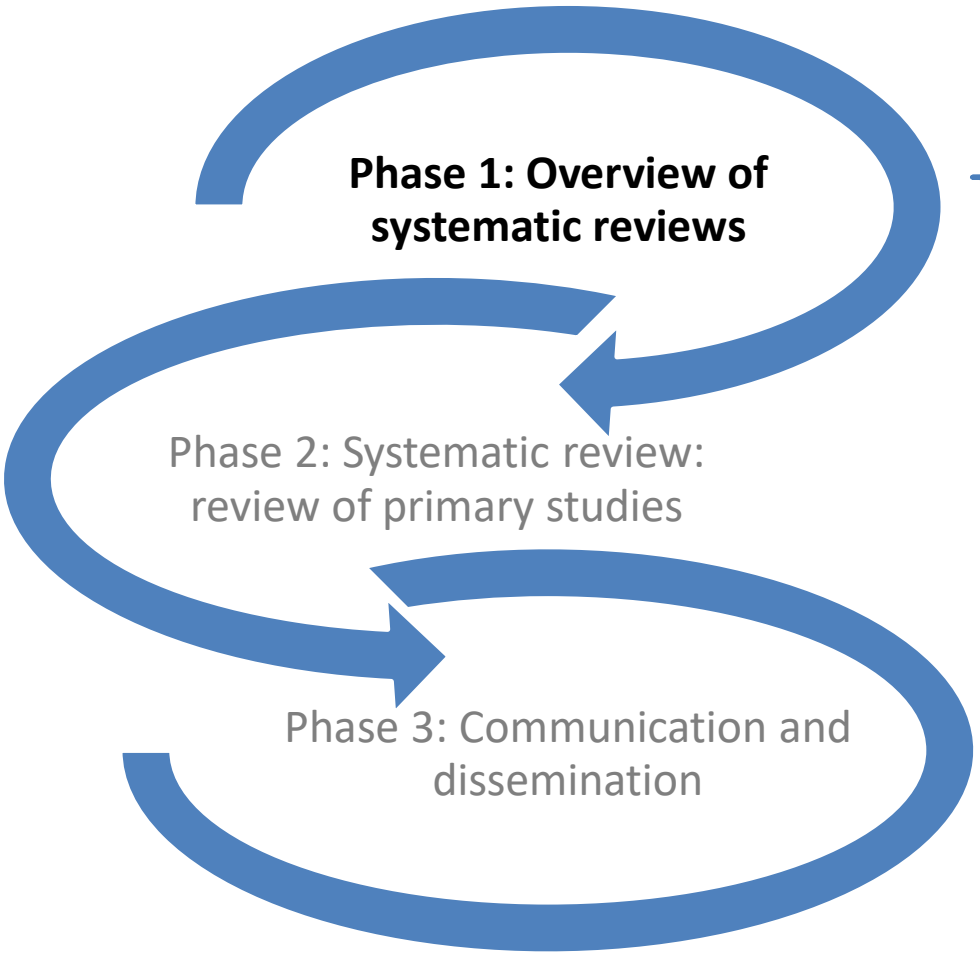
Belgian Red Cross

Water Supply & Sanitation Collaborative Council

Centre for Evidence Based Health Care

Universiteit Stellenbosch University

Project plan



AIM:

- Identify existing systematic reviews and create evidence gap map
- Help prioritizing research questions for Phase 2 of the project
- Use information in Theory of Change

Selection criteria review of reviews (phase 1)

Population:

- **low- and middle-income countries**
- **individual, household, community level or school settings**

Interventions:

- **WASH interventions**: water supply, water treatment, water storage, latrine use, sewer connection, drainage system, hand hygiene, faeces disposal practices.
- **Promotional approaches**: education, communication, social marketing principles, financial incentives, community-led total sanitation or any combination of these approaches.

Outcomes (EFFECTIVENESS):

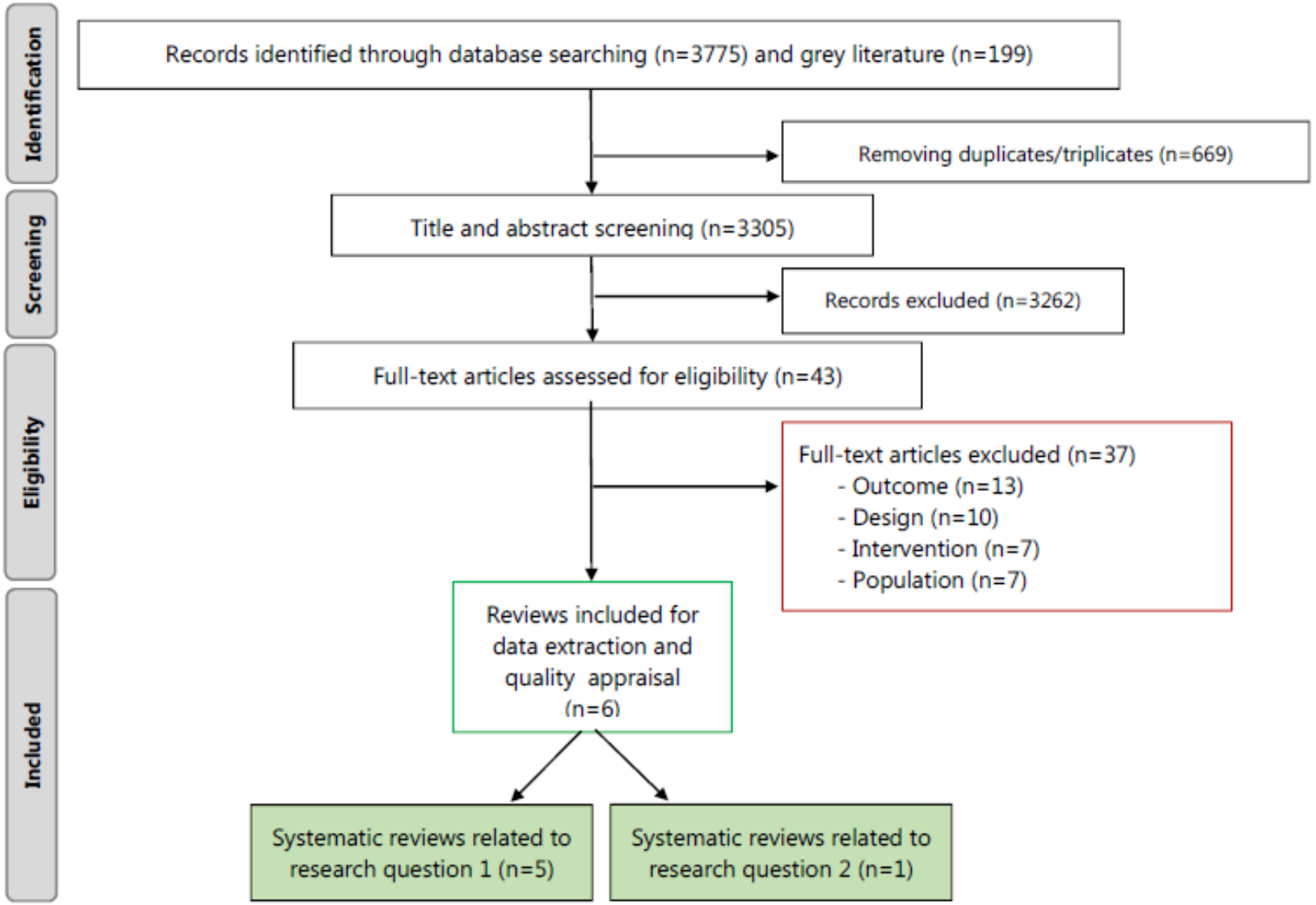
I. **Primary outcomes: behavior change outcomes**
II. **Secondary outcomes: behavioral factors, health outcomes**

Outcomes (IMPLEMENTATION):

I. **Perceptions/experiences (applicability-appropriateness of the program) that can influence WASH behaviour change**

Study design: systematic reviews that (1) at least searched two electronic databases, (2) reported their search strategy and (3) reported their selection criteria.

Results of the search process



Evidence gap map

WASH intervention		Promotional approach						Outcomes Q1 (EFFECT)							Outcomes Q2 (IMPL)
								Primary					*Secondary*		
									Use						
		Social marketing	Community-led total sanitation	Financial incentives	Education	Communication	Multiple	Intention	Uptake	Adherence	Sustainability	Habit	Behavioural, contextual, gender-related factors & human rights	Morbidity, mortality	
Water supply	Water supply source							?	?	?	?	?	?	?	?
	Water supply point of use (POU)							?	Joshi 2013	?	?	?	?	Joshi 2013	?
Water quality	Water quality source							?	?	?	?	?	?	?	?
	Water quality point of use (POU)						Fiebelkorn 2012	?	Fiebelkorn 2012	?	?	?	?	?	?
Sanitation	Sanitation latrines							?	?	?	?	?	?	?	?
	Sanitation sewer							?	?	?	?	?	?	?	?
	Connection/drainage system							?	?	?	?	?	?	?	?
Hygiene	Hygiene education							?	?	?	?	?	?	Joshi 2013	?
	Soap provision							?	?	?	?	?	?	?	?
	Hygiene hand sanitizers	Mah 2008			Ejemot-Nwadiaro 2015			?	Ejemot-Nwadiaro 2015	Mah 2008	?	?	?	Joshi 2013, Mah 2008	?
	Multiple WASH	Evans 2014	Hulland 2015		Hulland 2015, Joshi 2013			?	Evans 2014	?	?	?	Evans 2014	?	Hulland 2015

Evidence gap map

WASH intervention		Promotional approach						Outcomes Q1 (EFFECT)							Outcomes Q2 (IMPL)
								Primary					*Secondary*		
									Use						
		Social marketing	Community-led total sanitation	Financial incentives	Education	Communication	Multiple	Intention	Uptake	Adherence	Sustainability	Habit	Behavioural, contextual, gender-related factors & human rights	Morbidity, mortality	
Water supply source								?	?	?	?	?	?	?	?
Water	Water supply point of use (POU)							?	Joshi 2013	?	?	?	?	Joshi 2013	?
Water quality source								?	?	?	?	?	?	?	?
Water	Water quality point of use (POU)						Fiebelkorn 2012	?	Fiebelkorn 2012	?	?	?	?	?	?
Sanitation								?	?	?	?	?	?	?	?
								?	?	?	?	?	?	?	?
								?	?	?	?	?	?	?	?
Hygiene	Hygiene education							?	?	?	?	?	?	Joshi 2013	?
	Soap provision							?	?	?	?	?	?	?	?
	Hygiene hand sanitizers	Mah 2008			Ejemot-Nwadiaro 2015			?	Ejemot-Nwadiaro 2015	Mah 2008	?	?	?	Joshi 2013, Mah 2008	?
	Multiple WASH	Evans 2014	Hulland 2015		Hulland 2015, Joshi 2013			?	Evans 2014	?	?	?	Evans 2014	?	Hulland 2015

Evidence gap map

WASH intervention		Promotional approach						Outcomes Q1 (EFFECT)							Outcomes Q2 (IMPL)
								Primary					*Secondary*		
									Use						
		Social marketing	Community-led total sanitation	Financial incentives	Education	Communication	Multiple	Intention	Uptake	Adherence	Sustainability	Habit	Behavioural, contextual, gender-related factors & human rights	Morbidity, mortality	
Water supply	Water supply source							?	?	?	?	?	?	?	?
	Water supply point of use (POU)							?	Joshi 2013	?	?	?	?	Joshi 2013	?
Water quality	Water quality source							?	?	?	?	?	?	?	?
	Water quality point of use (POU)						Fiebelkorn 2012	?	Fiebelkorn 2012	?	?	?	?	?	?
Sanitation	Sanitation latrines							?	?	?	?	?	?	?	?
	Sanitation sewer							?	?	?	?	?	?	?	?
	Connection/drainage system							?	?	?	?	?	?	?	?
Hygiene	Hygiene education							?	?	?	?	?	?	Joshi 2013	?
	Soap provision							?	?	?	?	?	?	?	?
	Hygiene hand sanitizers	Mah 2008			Ejemot-Nwadiaro 2015			?	Ejemot-Nwadiaro 2015	Mah 2008	?	?	?	Joshi 2013, Mah 2008	?
	Multiple WASH	Evans 2014	Hulland 2015		Hulland 2015, Joshi 2013			?	Evans 2014	?	?	?	Evans 2014	?	Hulland 2015

Evidence gap map

WASH intervention		Promotional approach						Outcomes Q1 (EFFECT)						Outcomes Q2 (IMPL)
								Primary				*Secondary*		
								Intention	Use		Sustainability			
		Social marketing	Community-led total sanitation	Financial incentives	Education	Communication	Multiple		Uptake	Adherence		Habit	Behavioural, contextual, gender-related factors & human rights	Morbidity, mortality	
Water supply	Water supply source								?	?		?	?	?	?
	Water supply point of use (POU)								Joshi 2013	?		?	?	Joshi 2013	?
Water quality	Water quality source								?	?		?	?	?	?
	Water quality point of use (POU)						Fiebelkorn 2012		Fiebelkorn 2012	?		?	?	?	?
Sanitation	Sanitation latrines								?	?		?	?	?	?
	Sanitation sewer								?	?		?	?	?	?
	Connection/drainage system								?	?		?	?	?	?
Hygiene	Hygiene education								?	?		?	?	Joshi 2013	?
	Soap provision								?	?		?	?	?	?
	Hygiene hand sanitizers	Mah 2008			Ejemot-Nwadiaro 2015				Ejemot-Nwadiaro 2015	Mah 2008		?	?	Joshi 2013, Mah 2008	?
	Multiple WASH	Evans 2014	Hulland 2015		Hulland 2015, Joshi 2013				Evans 2014	?		?	Evans 2014	?	Hulland 2015

What is an evidence map?

- Synthesis
- Based on a systematic search
- To identify gaps in knowledge (thus identify future research needs) or summarise existing evidence
- Presents results in a user-friendly format, often a visual figure or graph, or a searchable database.

Miake-Lye et al. Systematic Reviews (2016)

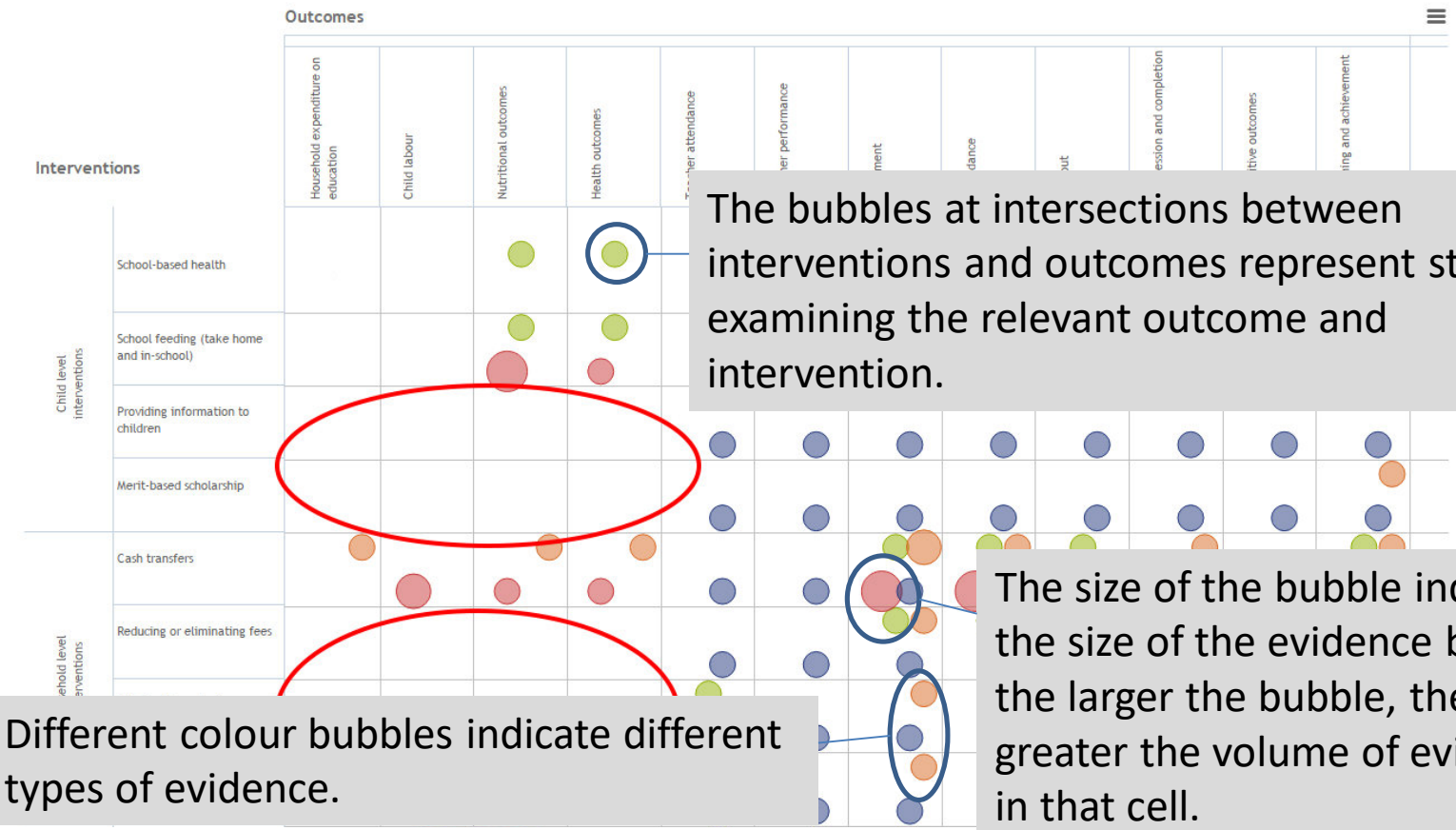
Typical presentation format

- It uses a matrix to plot interventions and outcomes in a theory-based model.
- It also uses bubbles and colours to indicate the quality of the evidence and the type of review, study or evaluation, and links to a database with summaries of the systematic reviews and impact evaluations.

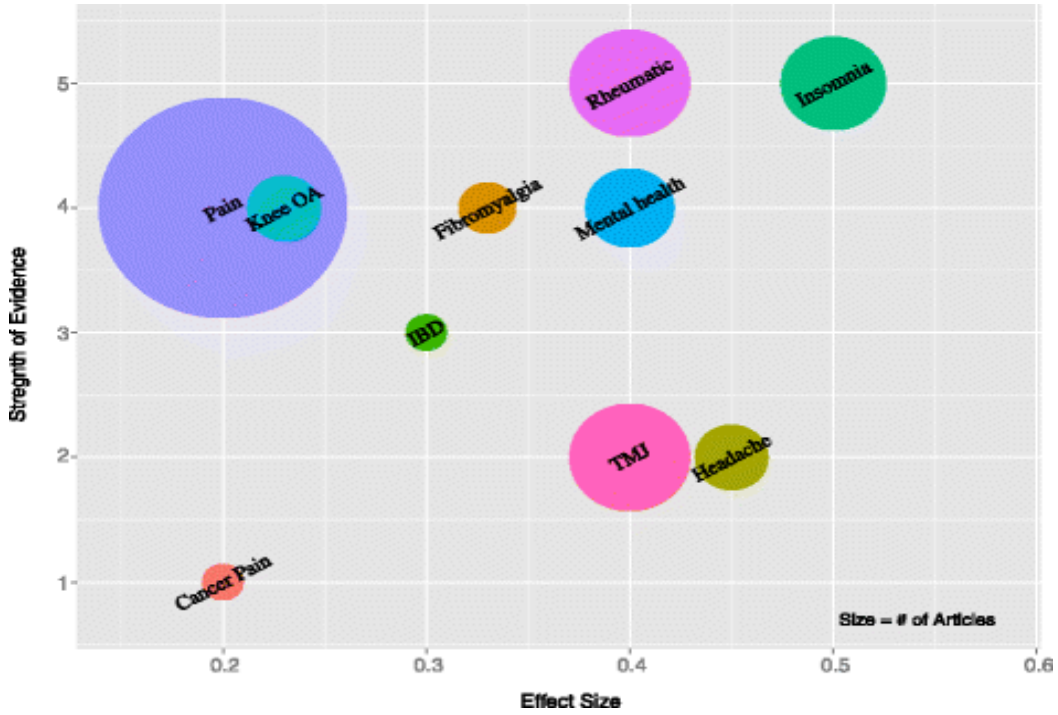
Approach to develop

- Engagement and determine the question; time frame
- Decide on types of studies
- Conduct systematic searches of the literature
- Select studies
- Critical appraisal of included studies
- Extract information for the domains identified- e.g. intervention, outcomes, study design
- Collate and summarize studies
- Visually present the extracted data using cross-tabulation
- Engage stakeholders

Screenshot of 3iE Evidence Gap Map on Development Evidence from existing systematic reviews



Format of presentation



Source: Taylor S et al. J Altern Complement Med. 2014;20(5);A91-2

Evidence Map of acupuncture for pain. The bubble plot shows an estimate of the evidence base for pain-related indications judging form the systematic reviews and the recent large trials. The plot depicts the estimated number of RCTs (size of the bubble), the effect size (x-axis), and the strength of the evidence (y-axis)

Uses

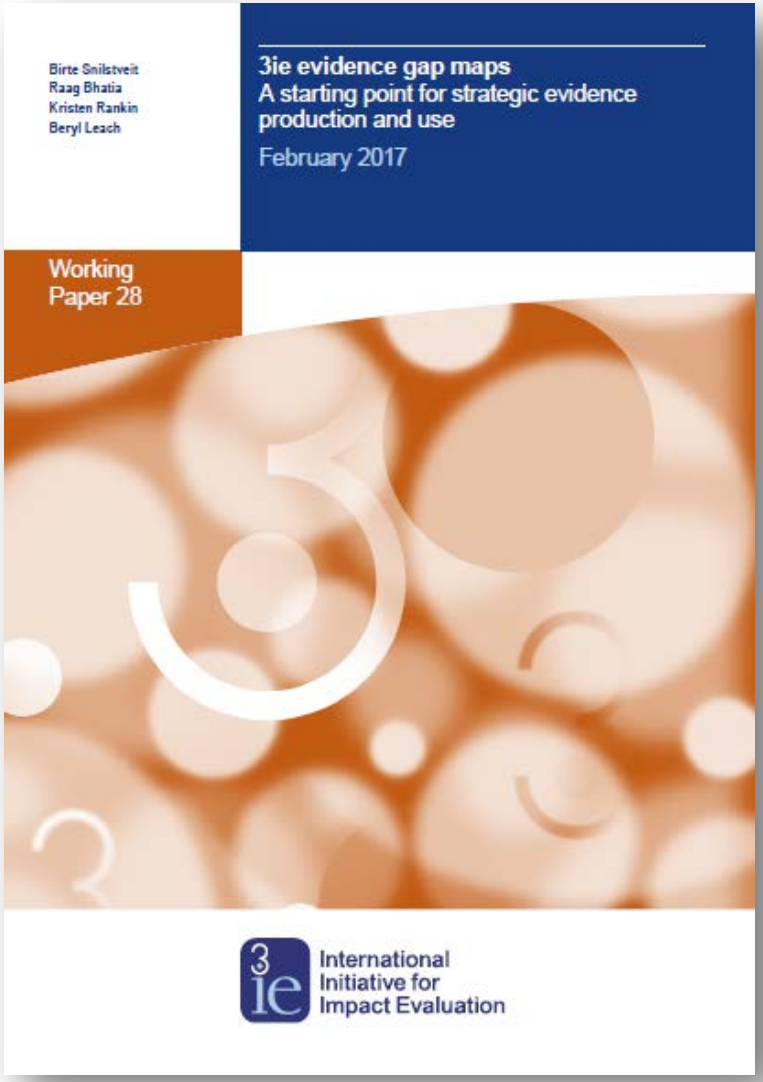
A **scoping tool** to set policy objectives and outline policy direction, background, and evaluation.	A **decision-making tool** to inform policy design and implementation.	An **engagement tool** to facilitate policy conversations with different actors from a mutual basis.	An **organisational tool** to raise awareness for evidence-based policy-making and to facilitate its process.
A **knowledge management tool** providing a repository of easily accessible and policy-relevant evidence tailored to decision makers' needs.	A **research tool** to identify gaps, coverage, and patterns in the available evidence on a policy question.	An **accountability tool** to record the evidence behind a decision and the construction of different evidence-bases and narratives for future decisions.	A **research commissioning tool** to target funding for new primary and secondary evidence.

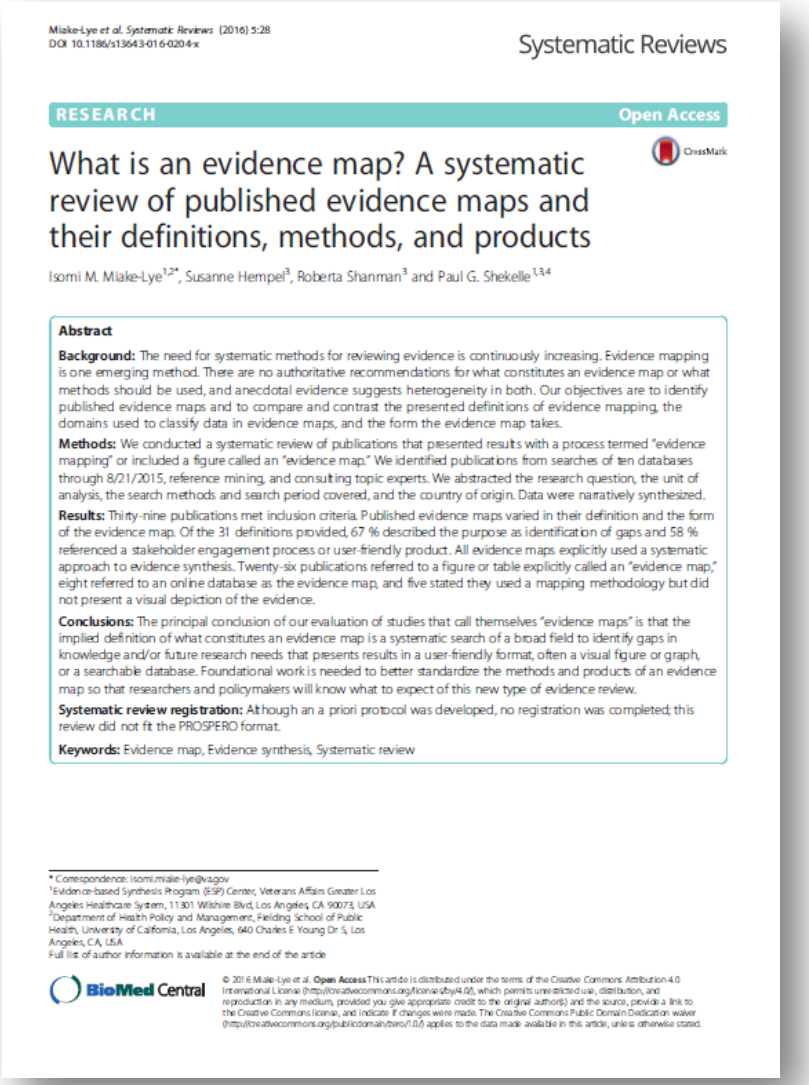
DPME

In summary: New and evolving field

- Collection of evidence
- May be part of a systematic review
- Evidence maps are typically broad in scope and address questions related to the size and characteristics of the evidence base, with the purpose of identifying existing research and research gaps (Haddaway et al. 2016; Miake-Lye et al. 2016).

Useful resource





Miake-Lye et al. Systematic Reviews (2016) 5:28
DOI 10.1186/s13643-016-0204-x

Systematic Reviews

RESEARCH Open Access

What is an evidence map? A systematic review of published evidence maps and their definitions, methods, and products

Isomi M. Miake-Lye[1,2*], Susanne Hempel[3], Roberta Shanman[3] and Paul G. Shekelle[1,3,4]

Abstract

Background: The need for systematic methods for reviewing evidence is continuously increasing. Evidence mapping is one emerging method. There are no authoritative recommendations for what constitutes an evidence map or what methods should be used, and anecdotal evidence suggests heterogeneity in both. Our objectives are to identify published evidence maps and to compare and contrast the presented definitions of evidence mapping, the domains used to classify data in evidence maps, and the form the evidence map takes.

Methods: We conducted a systematic review of publications that presented results with a process termed "evidence mapping" or included a figure called an "evidence map." We identified publications from searches of ten databases through 8/21/2015, reference mining, and consulting topic experts. We abstracted the research question, the unit of analysis, the search methods and search period covered, and the country of origin. Data were narratively synthesized.

Results: Thirty-nine publications met inclusion criteria. Published evidence maps varied in their definition and the form of the evidence map. Of the 31 definitions provided, 67 % described the purpose as identification of gaps and 58 % referenced a stakeholder engagement process or user-friendly product. All evidence maps explicitly used a systematic approach to evidence synthesis. Twenty-six publications referred to a figure or table explicitly called an "evidence map," eight referred to an online database as the evidence map, and five stated they used a mapping methodology but did not present a visual depiction of the evidence.

Conclusions: The principal conclusion of our evaluation of studies that call themselves "evidence maps" is that the implied definition of what constitutes an evidence map is a systematic search of a broad field to identify gaps in knowledge and/or future research needs that presents results in a user-friendly format, often a visual figure or graph, or a searchable database. Foundational work is needed to better standardize the methods and products of an evidence map so that researchers and policymakers will know what to expect of this new type of evidence review.

Systematic review registration: Although an a priori protocol was developed, no registration was completed; this review did not fit the PROSPERO format.

Keywords: Evidence map, Evidence synthesis, Systematic review

* Correspondence: isomi.miake-lye@va.gov
[1]Evidence-based Synthesis Program (ESP) Center, Veterans Affairs Greater Los Angeles Healthcare System, 11301 Wilshire Blvd, Los Angeles, CA 90073, USA
[2]Department of Health Policy and Management, Fielding School of Public Health, University of California, Los Angeles, 640 Charles E Young Dr S, Los Angeles, CA, USA
Full list of author information is available at the end of the article

BioMed Central

© 2016 Miake-Lye et al. **Open Access** This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

Acknowledgements

Emmy De Buck, Hans Van Remoortel (Manager CEBaP, BRC)

Vittoria Lutje
(Information specialist)

Philippe Vandekerckhove
(CEO, BRC)

Thashlin Govender
(CEBHC, Stellenbosch University)

Belgian Red Cross

Evidence-based by CEBaP

UNIVERSITEIT STELLENBOSCH UNIVERSITY

Centre for Evidence Based Health Care

WATER SUPPLY & SANITATION COLLABORATIVE COUNCIL

3ie International Initiative for Impact Evaluation