

Systematic methods to identify evidence gaps

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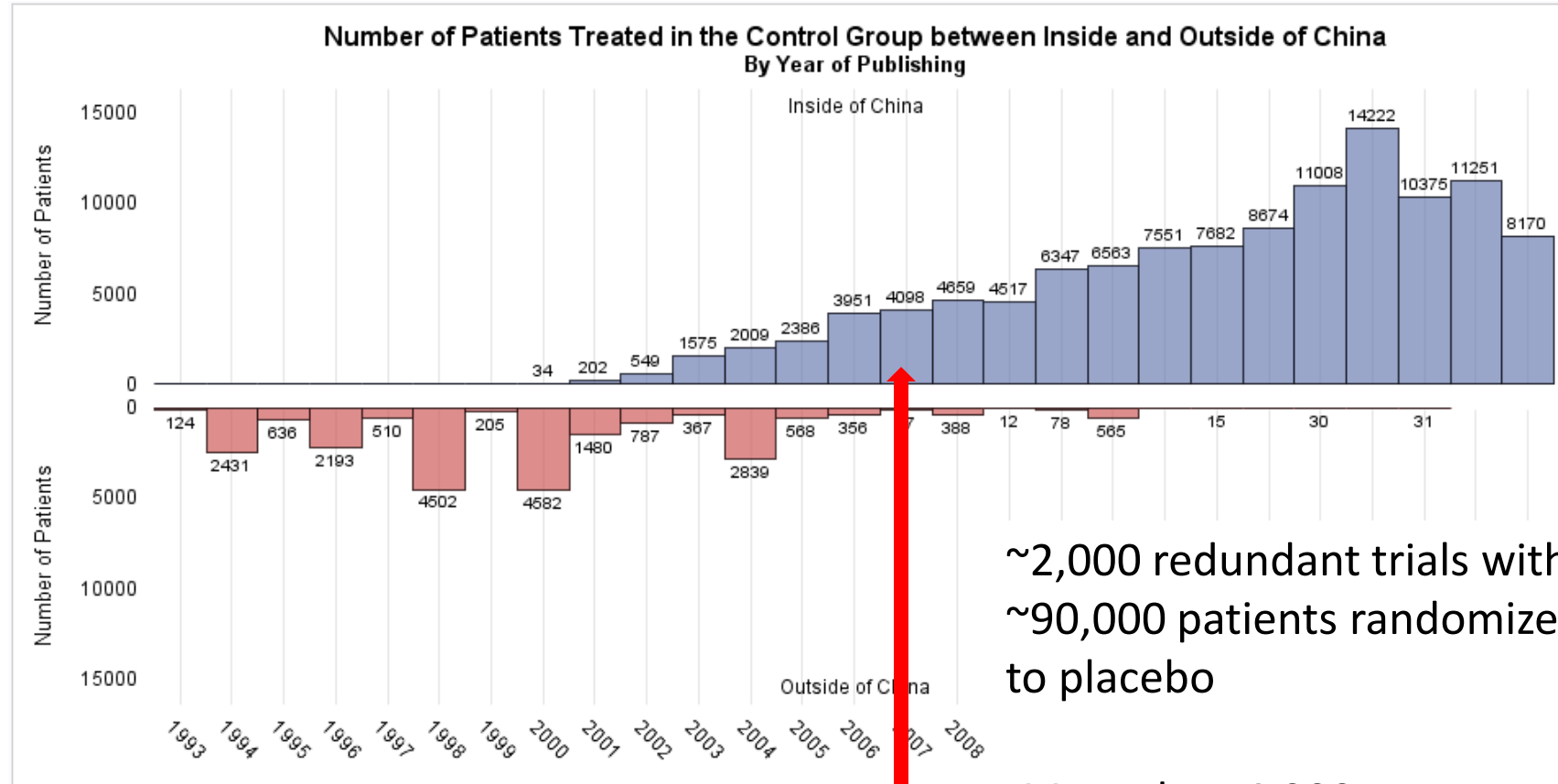
NASEM Committee on Addressing Evidence Gaps in Clinical
Prevention

4 March 2021



The Evidence-Based Research Network



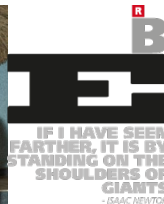


~2,000 redundant trials with
~90,000 patients randomized
to placebo

More than 4,000
unnecessary events,
including more than 500
deaths

Evidence-Based Research

Using evidence to inform research so that it is addressing questions that matter in a valid, efficient and accessible manner.



The Evidence-Based Research Network



What should happen?

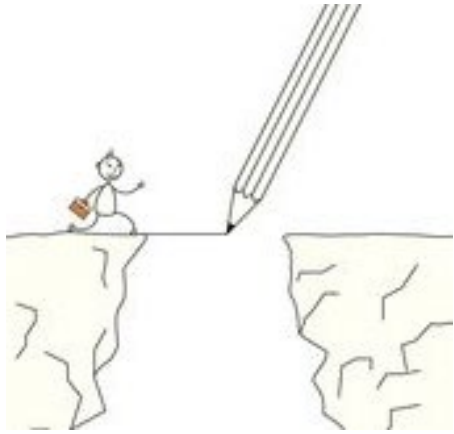
Use synthesis of existing evidence to:

- Identify worthwhile questions
- Design valid and informative studies
- Report results within context of what is known

Robinson KA et al. What evidence-based research is and why is it important? JCE 2021

Lund H et al. Using an evidence-based research approach before a new study is conducted to ensure value. JCE 2021

Lund H et al. Using an evidence-based research approach to place results into context after the study is performed to ensure usefulness of the conclusion. JCE 2021

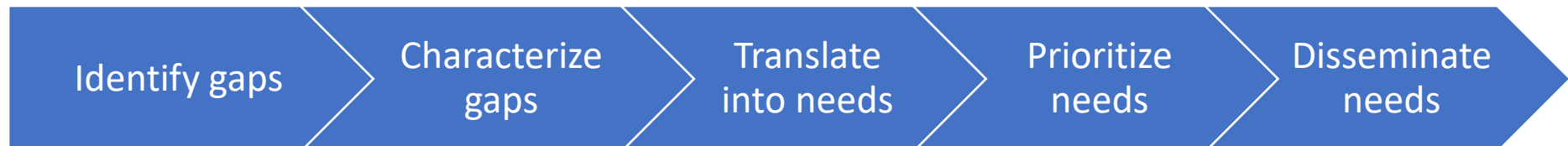


Evidence Gap

A topic or area for which missing or inadequate information limits the ability of reviewers to reach a conclusion for a given question.

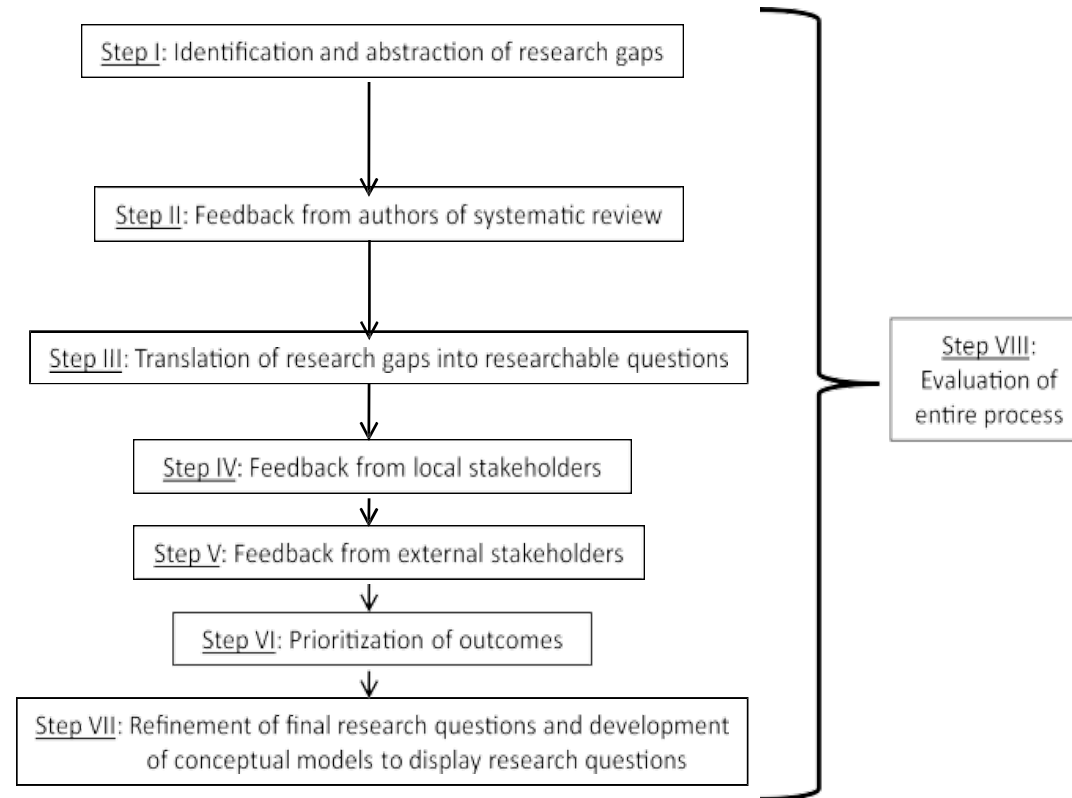
Research Need

A gap that limits the ability of healthcare decisionmakers (patients and caregivers, physicians, policy makers, etc.) from making decisions.



Process to Identify Research Needs

Multi-step continuum for setting research agendas*



Identification of research gaps from evidence-based guidelines: A pilot study in cystic fibrosis

Karen A. Robinson, Ian J. Saldanha, Naomi A. McKoy
Johns Hopkins University

Identified gaps from evidence-based
guidelines as:

- Insufficient evidence, no recommendations made
- Insufficient evidence, consensus recommendations made
- “Needs further research”



Identifying research gaps from guidelines:

- 62 gaps identified across 5 guidelines:
 - only one was fully specified (PICO)
 - relevant comparisons and outcomes were explicitly stated for only 7% and 16% of gaps respectively
- Only about 20% of the gaps were called out by guideline committees as research gaps.

Framework for Determining Research Gaps During Systematic Reviews

- Identification of gaps from systematic reviews in a systematic way
- Framework to facilitate the identification and characterization of gaps:

Where the evidence falls short, as well as how and why

Robinson KA, Saldanha IJ, Mckoy NA. Frameworks for determining research gaps during systematic reviews. Methods Future Research Needs Report No. 2 AHRQ Publication No. 11-EHC043-EF. Rockville, MD: Agency for Healthcare Research and Quality. June 2011. PMID: 21977524

Robinson KA, Saldanha IJ, Mckoy NA. Development of a framework to identify research gaps from systematic reviews. *Journal of Clinical Epidemiology* 2011 Dec;64(12):1325-30. PMID: 21937195

Robinson KA, Akinyede O, Dutta T, Sawin VI, Li T, Spencer MR, Turkelson CM, Weston C. Framework for determining research gaps during systematic review: Evaluation. Rockville (MD): Agency for Healthcare Research and Quality (US) 2013 Feb. Report No. 13-EHC019-EF. PMID: 23487868.



We applied the framework to 50 systematic reviews

Research Gap Worksheet
Project Name: Oral diabetes meds

Completed by – KR
 Date – 20 July 2012
 Page 1 of 1
 Key Question Number – 3

+	Serial No.	Reason(s) for Gap*	Other Reason(s) for Gap	POPULATION (P)	INTERVENTION (I)	COMPARISON (C)	OUTCOMES (O)	SETTING (S)	Free Text Gap	Notes
	Example	B1			Metformin	Metformin + Any insulin	Weight, lipoproteins	-		-
	Example	D1		African-American adults						
	Example	A3, A4			Sulfonylurea	GLP-1 agonist	HDL			
	Example	D1, D4		Over 70 with comorbidities			Hypoglycemia, liver injury, congestive heart failure			

*** Reasons for Gap**
Insufficient or Imprecise Information → A1=No studies, A2=Limited number of studies, A3=Sample sizes too small, A4=Estimate of effect is imprecise
Biased Information → B1=Inappropriate study design, B2=Major methodological limitations in studies
Inconsistency or Unknown Consistency → C1=Consistency unknown (only 1 study), C2=Inconsistent results across studies
Not the right information → D1=Results not applicable to population of interest, D2=Inadequate duration of interventions/comparisons, D3=Inadequate duration of follow-up, D4=Optimal/most important outcomes not addressed, D5=Results not applicable to setting of interest

A. Insufficient or imprecise information

Information is insufficient or imprecise if data are sparse and thus uninformative and/or confidence intervals are wide and thus can include conflicting results or conclusions.

A1 – This reason should be selected if no studies are identified.

A2 – This reason should be selected if a limited number of studies are identified.

A3 – This reason should be selected if the sample sizes or event rates in the available studies are too small to allow conclusions.

A4 – This reason should be selected if the estimate of the effect (usually achieved from a meta-analysis) is imprecise. That is, if the width of the confidence interval is such that the conclusion could be for benefit or harm.

Correspondence to grading systems:

- *EPC SOE*: **Precision** is a required domain.
- *GRADE*: The GRADE Working Group advises decreasing the grade of the quality of the evidence if the data are “**imprecise** or sparse”.
- *USPSTF*: The following questions are considered while grading the evidence:
 - “How many studies have been conducted that address the key question(s)?”

Application of Framework- Results

- 144 review questions in the 19 EPC reports (average 5.5 questions) and 31 Cochrane reviews (average 1.3 questions).
- A total of approximately 600 unique research gaps were identified and characterized.
 - Number of gaps per question: average 12.75 per question for EPC reports (95% CI 9.31 to 16.19) and 8.5 per question for Cochrane reviews (95% CI 6.23 to 10.32).
- Insufficient information (Reason A) was most frequent reason for the gaps, followed by inconsistency (C), not the right information (D), and biased information (B).



Framework for Determining Research Gaps During Systematic Review: Evaluation

Methods Research Reports

Investigators: Karen A Robinson, PhD, Oluwaseun Akinyede, MPH, Tania Dutta, MS, MPP, Veronica Ivey Sawin, BA, Tianjing Li, MD, PhD, Merianne Rose Spencer, BS, Charles M Turkelson, PhD, and Christine Weston, PhD.

Johns Hopkins University Evidence-based Practice Center

Rockville (MD): [Agency for Healthcare Research and Quality \(US\)](#); 2013 Feb. Report No.: 13-EHC019-EF

Summary

To identify worthwhile questions AND design valid and informative studies we need to identify/characterize *where the evidence falls short, as well as how and why*

- Gaps are not same as needs
- Who does it?
- At what time?
- Reality
 - Trees
 - Burden
- Product or report?
- Does anyone care?

PROCESS?

