Identifying and Prioritizing Research Gaps

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Importance:
Why We Need to Identify and Prioritize Research Gaps from Systematic Reviews

Primary Research	Systematic Review	Assessment of Gaps	Prioritization of New Research	Funding Opportunities	Conduct New Research	Systematic Review Update

- Systematic reviews are the standard for evaluating the current state of scientific knowledge regarding a specific clinical or policy question.

- Identification and prioritization of research gaps has the potential to lead to more rapid generation of subsequent research, informed by input from stakeholders

- Audiences including researchers, funders, clinicians, advocates, and patients could use information about prioritized research gaps to understand areas of uncertainty and more quickly initiate studies.

Existing Methods to Identify and Prioritize Research Gaps

- Identification of research gaps from and within systematic reviews is common, but often very general.

  - Criteria used to date have been variable and often unclear.

- Prioritization of research gaps arising out of systematic reviews is not common at present.

- Only half of the systematic reviews in major journals discussed future research needs at all, one-fifth described study designs that would address research gaps.

- Text devoted to future research generally less than a paragraph.

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Existing Methods to Identify and Prioritize Research Gaps

- Search for published articles describing the methods of identification of research gaps from systematic reviews or related processes found 18 eligible publications, only 9 detailed prioritization methods.

- Methods varied, no replications or evaluations of reproducibility of the methods or frameworks.

- A survey of 64 US and international systematic review organizations found that only 5/37 respondents reported a formal process for the identification of research gaps and/or needs.

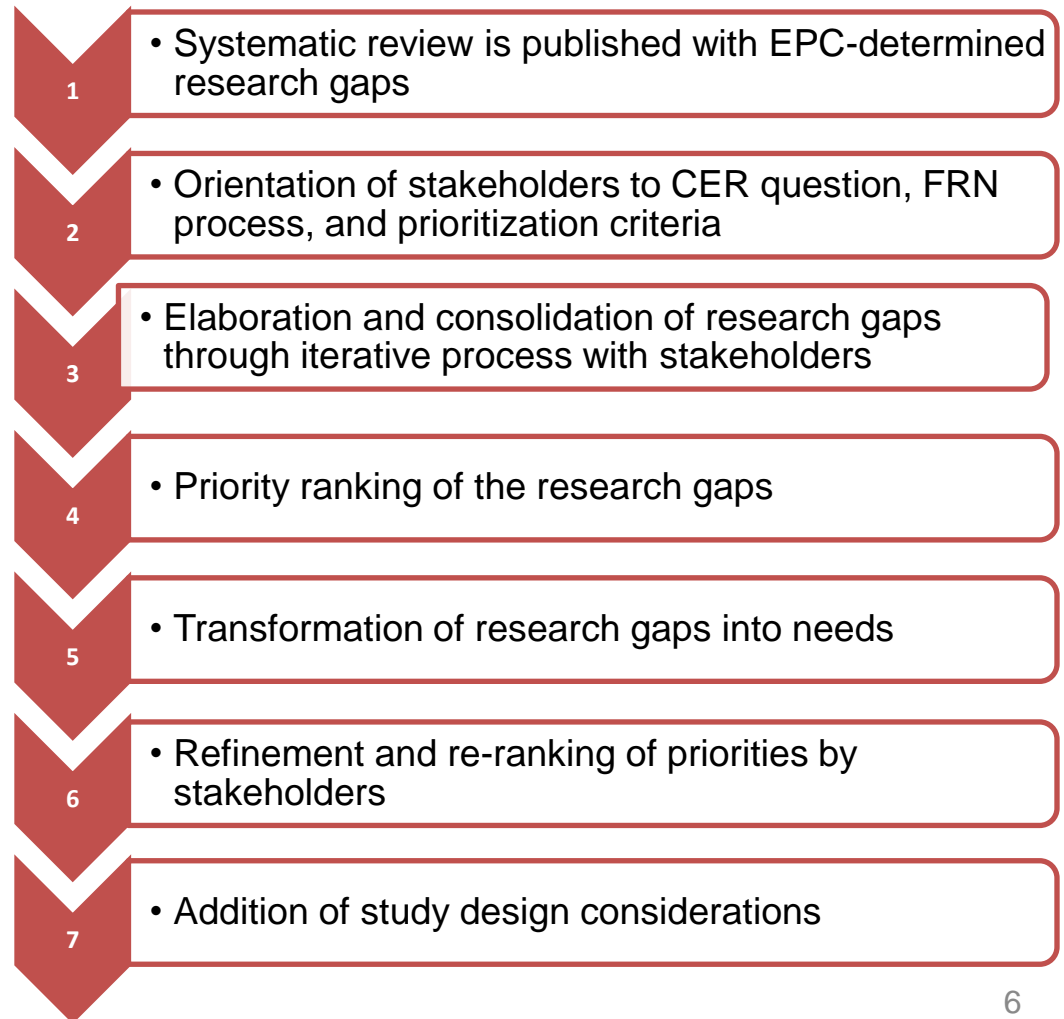 – Most used the PICOTS framework to describe research gaps.

Existing Methods to Identify and Prioritize Research Gaps

- A scan of reports published within the past two years by the Drug Effectiveness Review Project (N = 4), NIH Consensus Conferences (N=5), and the Cochrane Collaboration (N = 19) showed no standardized methods for identifying or prioritizing research gaps.

  - Cochrane Collaboration reviews generally included 'implications for future research' but the discussions were often nonspecific.

- Global Evidence Mapping (GEM) describes gap analysis as part of planning for future research after a systematic review is completed with stakeholder engagement.

- The James Lind Alliance (UK) supports the development of partnerships of clinicians, patients, and advocacy groups in the prioritization of areas of uncertainty in clinical medicine.

Existing Methods to Identify and Prioritize Research Gaps

Agency for Healthcare Research and Quality Future Research Needs

– AHRQ piloted 8 Future Research Needs (FRNs) Projects in 2010 to extract research gaps from a systematic review, transforming them into prioritized research questions with aided by diverse stakeholder groups.

– AHRQ EPCs have published multiple FRN methods papers to date.

– 7 steps common to AHRQ FRN projects.

1 • Systematic review is published with EPC-determined research gaps

2 • Orientation of stakeholders to CER question, FRN process, and prioritization criteria

3 • Elaboration and consolidation of research gaps through iterative process with stakeholders

4 • Priority ranking of the research gaps

5 • Transformation of research gaps into needs

6 • Refinement and re-ranking of priorities by stakeholders

7 • Addition of study design considerations

Publication of the Systematic Review

- Currently research gap identification and description is quite general in AHRQ reviews.
- Examination of the review for gaps may occur at the draft stage.
  - Engagement too early may lead to revisions if the review is modified.
- The team generating and prioritizing the research gaps may be somewhat different from the team conducting the review.
  - FRN team should include members with expertise in study designs specific to the content area.

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Stakeholder Engagement

- Advisory *vs.* determinative
- Providers, patients and caregivers, advocates, funders, researchers, regulators, policymakers, manufacturers
- Training needed
- Conflict of interest/competing interest issues

Identification of Research Gaps

- "Topic or area for which missing or inadequate information limits the ability of reviewers to reach a conclusion for a given question."

- Utility of an analytic framework illustrating the relationship of gaps to the key questions and analytic framework of the review.

- Stakeholders may identify gaps not identified by the reviewers.
  - But…they need to be in the scope of the key questions.

- Gaps derived from GRADE
  - Insufficient or imprecise information
  - Biased information
  - Inconsistency or unknown consistency
  - Not the right information (wrong population or wrong outcome)

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Priority Ranking

- Reviews may generate many gaps, need for prioritization
- Some organizations use broad internet data gathering
  - Will the participants understand all of the issues?
- Multiple methods currently used
  - Ranking 1-xx
  - Likert scale 1-7
  - Multi-voting, multiple (but limited) votes per choice
  - Pair-wise comparisons
  - Delphi methods
  - Consensus conference

Transformation of Research Gaps into Needs

- Gaps are generally in the form of a declarative sentence.

- Needs are questions similar to research questions in a grant proposal.

- Most organizations use PICOTS framework: **P**opulation, **I**ntervention, **C**omparator, **O**utcome, **T**imeframe, **S**etting.

- Methods questions may be important, but may not be a fit for PICOTS.

Refinement and Re-Ranking

- When number of gaps is large, multiple rounds of prioritization may be needed.
  - Many groups use 2 rounds
- Gaps may be combined or split depending on the level of granularity that is useful.
- Is consensus needed?

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Study Design Considerations

- Provides early guidance on study design(s) to address the identified gaps in terms of valid and feasible designs
- Guidance, <u>not</u> mandate
- May address sample size issues
- Importance of engaging investigators with experience
- Criteria for appropriate study design
  - Advantages of the design for producing a valid result
  - Resource use, size, and duration needed to conduct the study
  - Availability of appropriate data and/or ability to recruit subjects
  - Ethical, legal, and social issues

Dissemination and Implementation Issues

- Will the gaps and prioritization resonate with funders and policymakers?
  - Need to work with them to identify the best formats and content for efficient communication of results
  - US environment is heterogeneous, with multiple federal agencies, PCORI, other foundations
  - Funders may use the priorities, but not acknowledge doing so.
- What are the best ways to communicate with the public and funders?
- What is the role of peer-reviewed articles?

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Example: AHRQ Future research needs on ADHD

Key Questions from Comparative Effectiveness Review

KQ1	Among children less than 6 years of age with Attention Deficit Hyperactivity Disorder or Disruptive Behavior Disorder, what are the effectiveness and adverse event outcomes following treatment?
KQ2	Among people 6 years of age or older with Attention Deficit Hyperactivity Disorder, what are the effectiveness and adverse event outcomes following 12 months or more of any combination of follow-up or treatment, including, but not limited to, 12 months or more of continuous treatment?
KQ3	How do A) underlying prevalence of Attention Deficit Hyperactivity Disorder, and B) rates of diagnosis (clinical identification) and treatment for Attention Deficit Hyperactivity Disorder vary by geography, time period, provider type, and sociodemographic characteristics?

20 research gaps from the review mapped to the key questions, presented to a group of 12 stakeholders, including funders, advocates, clinicians, regulators, researchers, and policymakers.

After stakeholder input, 29 research gaps. 8 gaps emerged as the top future research needs after two rounds of prioritization using an online prioritization tool.

The next two slides show the presentation of one gap from identification to study design.

Example: AHRQ FRN on ADHD

Identify Research Gap:

For children less than 6 years of age with disruptive behavior disorder or ADHD, limited data are available about the efficacy and effectiveness of psychosocial treatment programs (e.g., parent training and summer behavior treatment programs), alone or in combination with pharmacological interventions, compared with other psychosocial treatment programs, alone or in combination with pharmacological interventions. (KQ 1)

After One Round of Prioritization Apply PICOTS and Develop Research Question:

P	I	C	O	T/S
Age < 6 years Diagnosed with ADHD or at risk for ADHD or diagnosed with disruptive behavior disorder (including ODD and CD by DSM)	Psychosocial interventions alone (including parent training and school-based interventions)	Pharmacological treatments, alone or in combination with psychosocial treatments	Outcomes for children and parents*	6 Months/ 1Year Private clinic, community clinic

Research Question: For children less than 6 years of age with disruptive behavior disorder or ADHD, what is the comparative efficacy and effectiveness of specific psychosocial treatments alone compared with pharmacological treatments alone or in combination with psychosocial treatments for patient outcomes?

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Example: AHRQ ADHD FRN

After Second Round of Prioritization Develop Study Design Considerations:

Randomized controlled trials

Randomized trials could be designed to test various components in a 2x2 matrix of psychosocial treatment variants (parent training, school-based intervention, combination, or pharmacological).

- ***Advantages of study design for producing a valid result***
  Allows isolation of causal inferences related to the intervention being tested. Multiple-armed trials would allow testing of several hypotheses regarding relative efficacy of singular or combination treatment components.

- ***Ability to recruit/availability of data***
  Common condition in this age group with uncertainty regarding treatment choice; all arms receive some treatment.

- ***Resource use, size, and duration***
  Large sample size ($N = 840$; $n = 210$ per treatment arm) needed. Key outcomes such as school achievement will require follow-up of several years.

- ***Ethical, legal, and social issues***
  Vulnerable population, careful informed consent will need to occur.

State of the Science

- Multiple groups are currently conducting work in this area
- Sufficient common aspects to serve as a consensus
  - Criteria for gaps identification
  - Broad aspects of stakeholder panel composition
  - Need to train stakeholders in PCOR
  - Explicit prioritization method - but multiple methods currently used
  - Decisions regarding study design considerations
- PCORI could use existing methods now while refining the approaches

Next Steps and Recommendations

1. Work with funders, advocates, and others regarding the optimal format and presentation of future research needs documents.

2. Evaluate different stakeholder panel sizes and compositions in prioritization.

3. Evaluate the reliability of stakeholder prioritization through replication studies.

4. Test different methods of prioritization to assess for transparency, reproducibility and efficiency.

5. Clarify role of gap identification and prioritization with other methods such as VOI.

6. Collaborate with other patient-centered outcome research programs in refining this area.

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Acknowledgments:

Funding: PCORI, AHRQ EPC Program, NIH CTSA

RTI-UNC EPC: Meera Viswanathnan, Dan Jonas, Lissette Saavedra, Brad Gaynes, Rob Christian, Christiane Voisin

AHRQ: Stephanie Chang, Elisabeth Kato

OHSU and Duke EPC's: Jeanne-Marie Guise, Gillian Sanders-Schmidler

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