Systematic reviews in nutrition – what’s different

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What’s the same

• Need for policies are contextualized, transparent and evidence-based

From Muir Gray – *Evidence-based Health Care*
Making decisions explicit

- Clarify critical questions
  - Define PICO, develop analytic framework
- Specify appropriate sources of information to address questions
  - \textit{a priori} Inclusion and exclusion criteria
  - Complete and unbiased search
- Evaluate quality of individual studies
  - Internal and external validity
- Summarize evidence for each question (by outcome)
  - Evidence Map
  - Qualitative synthesis, Meta-analysis
  - (Decision analysis, Cost-effectiveness. Qualitative Comparative Analysis)
- Judge net benefits
  - Weight outcomes, threshold for certainty
- Translate evidence into recommendations for practice or policy
  - Consider resources, values
Ensuring appropriate context

- Engaging stakeholders and partners
  - Clarify critical questions up front
- Technical Experts
  - Provide context
  - Clarify definitions for inclusion and exclusion criteria
  - Peer Review
AHRQ Evidence-based Practice Center Approach

- Clarify critical questions
- Specify appropriate sources of information to address questions
- Evaluate quality of individual studies
- Summarize evidence for each question (by outcome)
- Judge net benefits
- Translate evidence into recommendations for practice or policy
- Topic refinement with end-users, topic experts and methodologists
- Protocol development with expert input
- Unbiased systematic review and methodological experts versed Risk of Bias assessment
- Unbiased experts versed in qualitative or quantitative methods, Report summary peer reviewed and posted for public comment
- Partner organization uses EPC report to make recommendations
Application of SR process to nutrition

• Benefits:
  ► Transparent, rigorous, structured approach
  ► Meta-analysis to increase the power
  ► Flexibility in types of question or data needed to answer them

• Challenges
  ► Complex Interventions
  ► Heterogeneity of Treatment Effectiveness
  ► Defining and scoping questions
  ► Other nutrition specific issues?
Common Challenges - Complex Interventions

• Multiple components
  ► Identifying the “active component”
  ► Identifying the sufficient or necessary components
  ► Interactions between components

• Contextual factors
  ► Affecting intervention effectiveness

• Need for individualization
  ► Tailoring, adaptation given personal characteristics

• Complex causal pathway
  ► Multiple steps
  ► Non-linear
Examples of Systematic Reviews of Complex Interventions

- Case management
- Care integration
- Diet, exercise
- Self-management
- Mobile health apps
- Chronic pain management
- Transitions of care
Common Challenges – Heterogeneity of Treatment Effect

• Differences in PICO factors that affect the intervention-outcome relationship
• Need to identify and account for
  ► Contextual factors or other interventions
    – Patient needs and resources
    – External policy and incentives
  ► Population differences
    – Nutrition status
    – Knowledge and beliefs
    – Self-efficacy
    – Individual stage of change
  ► Intervention differences
    – Cost
    – Complexity
Common Challenges – Clarifying questions

- Effectiveness: Does it work? What works best?
- Explanatory: Why and how is an intervention effective?

Increasing complexity of systematic review questions

<table>
<thead>
<tr>
<th>Does the overall class or bundle of interventions work compared with no action or usual care?</th>
<th>Does the effectiveness of the intervention vary based on intervention features or other factors?</th>
<th>What explains the success or failure of the intervention?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using PICOTS</td>
<td>Using PICOTS, group by intervention</td>
<td>Theoretical approaches</td>
</tr>
<tr>
<td>Holistic approach</td>
<td>Group by Intervention features (components, active components, functions, other intervention characteristics, theories, topic-specific typologies)</td>
<td>Realist review approach</td>
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<td></td>
<td>Using PICOTS, group by other commonalities</td>
<td>Mechanisms of action</td>
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<tr>
<td></td>
<td>• Context</td>
<td>Configurational</td>
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<td></td>
<td>• Implementation factors</td>
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<tr>
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<td>• Structure, process, outcome (Donabedian)</td>
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</tbody>
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Use an Analytic Framework to define the question and PICO

Following the chain of evidence

- Which questions does SR help answer?
- Each arrow can be a question
- Consider applicability issues (modifying factors) in defining specific PICO

Generic Analytic Framework for nutrition question

Arrow 1 exposure - clinical outcome association
Arrow 2 exposure - surrogate or intermediate outcome association
Arrow 3 indicators of exposure - clinical outcome association
Arrow 4 exposure - indicators of exposure association
Arrow 5 indicators of exposure - surrogate or intermediate outcome association
Arrow 6 surrogate or intermediate outcome - clinical outcome association

Example Analytic framework for Vitamin D and/or Calcium

Arrow 1 exposure - clinical outcome association
Arrow 2 exposure - surrogate or intermediate outcome association
Arrow 3 indicators of exposure - clinical outcome association
Arrow 4 exposure - indicators of exposure association
Arrow 5 indicators of exposure - surrogate or intermediate outcome association
Arrow 6 surrogate or intermediate outcome - clinical outcome association

What’s “different” about nutrition?

- Defining comparator
  - No such thing as none
  - Causality vs association
- Mechanism of action
  - Dose response, average requirements, upper limits
  - Defining theory
- Measurement
  - Baseline nutrition status
  - Intake
Conclusions

• Importance of systematic process and approach to inform policy decisions
  ► Systematic review provides structured and transparent approach
  ► Independent review of literature separates questions of evidence from questions of values or resources
  ► Peer review and public review process provides quality control
• Importance of topic refinement to get the questions right
  ► Define the type of question (effectiveness vs exploratory)
  ► Use an analytic framework
    – Define PICO
    – Define theory and mechanism
    – Define relevant contextual or other factors
• Importance of engaging appropriate and unbiased personnel
  ► Unbiased evidence reviewers
  ► Appropriate methodological expertise
  ► Appropriate topical and clinical expertise