Preparing for evidence synthesis in public health

Cochrane Method Symposium, Part I, 12 October 2021

Eva Rehfuess, Jacob Burns, Shari Krishnaratne, Ani Movsisyan, Lisa Pfadenhauer

Pettenkofer School of Public Health
LMU Munich, Germany
rehfuess@ibe.med.uni-muenchen.de
This presentation draws on research and thinking developed as part of several past or ongoing collaborative methodological research projects, often concerned with „complex interventions in complex systems“:

- COVID-19 evidence ecosystem (CEOsys)
- WHO project on retrieval, synthesis and assessment of evidence on complex health interventions
- Integrated health technology assessment for the evaluation of complex technologies (INTEGRATE-HTA)

The views presented are those of the authors and do not necessarily represent those of the above collaborative efforts.

Other than that, I have no conflict of interest in relation to this presentation.
Setting the scene
Characteristics of public health interventions

• Population-level interventions
• Broad range of intervention goals: primary/secondary/tertiary prevention, health promotion, health protection, ...
• Very heterogeneous interventions: behavioural, environmental, policy, health system, ...
• Broad range of intended and unintended, health and non-health outcomes
• High level of dependency on context and implementation

Petticrew et al 2019, Skivington et al 2021
Public health interventions in this presentation
Nine tentative recommendations
1. Place your review in the wider decision-making context.

Why?
• Enhance utility and uptake of evidence
• Embed review question in “bigger picture“
• Be forward looking and anticipate changes

How?
• Stakeholder consultation and (ongoing) knowledge translation
• Multi-component evidence package
• (Adaptable) living review
1. Place your review in the wider decision-making context.
2. Consider undertaking a **scoping review** and/or other ways of **formal scoping**.

Why?

- Obtain overview of the availability, nature and sources of evidence
- Inform scope, eligibility criteria and search strategies of subsequent reviews that are informative and feasible

How?

- Scoping review methodology
2. Consider undertaking a **scoping review** and/or other ways of **formal scoping**.

Example: Travel measures during COVID-19

- **Intervention**: only cross-border travel measures (review scope)
- **Outcomes**: primarily infectious disease control-related
- **Study design**: primarily modeling studies

**BMJ Open**  
Travel-related control measures to contain the COVID-19 pandemic: an evidence map

Ani Movsisyan, Jacob Burns, Renke Biallas, Michaela Coenen, Karin Geffert, Olaf Horstick, Irma Klerings, Lisa Maria Pfadenhauer, Peter von Philipsborn, Kerstin Sell, Brigitte Strahlwald, Jan M Stratil, Stephan Voss, Eva Rehfuess
3. Make use of the potential of **stakeholder engagement**.

**Why?**
- Prioritise question(s) and define scope
- Ensure that review is policy-relevant

**How?**
- Involve content experts
- Engage with potential end-users
- One-off vs. ongoing involvement
3. Make use of the potential of **stakeholder engagement**.

Example: Environmental interventions on soft drink consumption

- Review Advisory Group reviewed protocol and full review
- Sugar-sweetened milk: separate intervention category; total milk intake as potential adverse outcome
4. Compose your team to ensure **methodological and content expertise** as well as **sufficient manpower**.

**Why?**

- Ensure that review is scientifically rigorous and “in touch“ with work in research field
- Make sure that review is feasible to conduct within given timeframe

**How?**

- Identify required expertise during scoping and protocol development
- Recruit team members and train novices “on the job“
4. Compose your team to ensure **methodological and content expertise** as well as **sufficient manpower**.

Example: Travel measures during COVID-19

- Methods expertise: four modellers, focus on critical appraisal
- Manpower: shadowing, contributing, leading on tasks
5. Develop a **logic model** that accommodates a systems perspective.

**Why?**
- Consider interventions within broader system
- Capture context and implementation issues
- Think through possible causal pathways

**How?**
- Literature-based conceptual models
- Logic model templates and CICI framework

Pfadenhauer et al 2917, Rehfuess et al 2018, Rohwer et al 2017
5. Develop a **logic model** that accommodates a systems perspective.

Example: Ambient air pollution interventions

- Context and implementation aspects for data extraction and assessment of heterogeneity
- Interventions categorisation for evidence synthesis and grading
6. Conceptualise **unintended consequences** from a societal perspective.

**Why?**

- Facilitate assessment of the balance between benefits and harms of an intervention from a societal perspective

**How?**

- WHO-INTEGRATE framework
- Dark logic models and other tools to focus on adverse consequences
- Separate review with searches conducted in health and non-health databases

Rehfueß, Stratil et al 2019, Bonell et al 2015
6. Conceptualise *unintended consequences* from a societal perspective.

Example: School measures during COVID-19

- Scoping review on unintended consequences (in progress)
- German guidelines on school measures during COVID-19
7. Define and categorise PICO elements with a view to evidence synthesis.

Why?
• Enable informative and efficient data extraction
• Prepare for meaningful evidence synthesis

How?
• Literature-based classification system (with adaptation)
• Theoretical or causal pathway-informed categorisation
7. Define and categorise PICO elements with a view to evidence synthesis.

Example: School measures during COVID-19

- Logic model in scoping review and rapid review

<table>
<thead>
<tr>
<th>Measures to reduce transmission of SARS-CoV-2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measures reducing the opportunity for contacts</strong></td>
</tr>
<tr>
<td>• Measures reducing the number of students and contacts</td>
</tr>
<tr>
<td>• Measures reducing the number of contacts</td>
</tr>
<tr>
<td><strong>Measures making contacts safer</strong></td>
</tr>
<tr>
<td>• Masks</td>
</tr>
<tr>
<td>• Cleaning</td>
</tr>
<tr>
<td>• Handwashing</td>
</tr>
<tr>
<td>• Modification of activities</td>
</tr>
<tr>
<td>• Ventilation</td>
</tr>
<tr>
<td>• Multicomponent measures</td>
</tr>
<tr>
<td><strong>Surveillance and response measures</strong></td>
</tr>
<tr>
<td>• Mass testing and isolation measures</td>
</tr>
<tr>
<td>• Symptom-based screening and quarantine measures</td>
</tr>
</tbody>
</table>

Multi-component measures
8. Carefully consider eligible study designs and decide on methods to appraise and synthesise these.

Why?

• Inform appropriate methods during all stages of review
• Where applicable, address challenges of different types of non-randomised study designs
• Where applicable, address challenges of modelling studies

How?

• Formal scoping regarding availability and nature of evidence
• Consultations with policy stakeholders and methodologists
8. Carefully consider eligible study designs and decide on methods to appraise and synthesise these.

Example: Travel measures during COVID-19

- Randomised and high-quality observational evidence unlikely
- Almost exclusive reliance on modelling studies
  - Unclear distinction between more/less informative modelling studies
  - Bespoke tool to appraise modelling studies
  - Multiplicity of scenarios (interventions, co-interventions, context) in evidence synthesis

- Reflective points on modelling studies:
  - Garbage in, garbage out?
  - Does aggregation always increase power?
9. Decide on a relevant threshold for grading the evidence.

Why?

- Prepare for a meaningful interpretation of review findings
- Ensure that domains for grading certainty of evidence down or up are appropriately applied

How?

- Difference from the null usually a good starting point in systematic reviews (and guidelines)
9. Decide on a relevant **threshold for grading** the evidence.

Example: School measures during COVID-19

- Difference from the null considered most relevant threshold across multiple outcomes
- Direction of effect: positive/negative in narrative synthesis
- Inconsistency: no downgrading if most studies showed consistently positive or negative effects
- Imprecision: downgrading if studies showed variation in magnitude of effect across the null
Conclusion
Nine tentative recommendations

1. Place your review in the wider decision-making context.
2. Consider undertaking a scoping review and/or other ways of formal scoping.
3. Make use of the potential of stakeholder engagement.
4. Compose your team to ensure methodological and content expertise as well as sufficient manpower.
5. Develop a logic model that accommodates a systems perspective and captures context and implementation issues.
6. Conceptualise unintended consequences from a societal perspective.
7. Define and categorise PICO elements with a view to evidence synthesis.
8. Carefully consider eligible study designs and decide on methods to appraise and synthesise these.
9. Decide on a relevant threshold for grading the evidence.
Thank you
References for methods


- Rohwer et al. Logic models help make sense of complexity in systematic reviews and health technology assessments. *Journal of Clinical Epidemiology* 2017; 83:37-47.

References for reviews

- CEOsys Public Health website
  https://covid-evidenz.de/2021/09/01/ceosys-public-health/


