Improving risk-of-bias assessment and reporting in vaccine effectiveness research: introduction to the RoB-VE project

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Background

Vaccination is a key public health tool for preventing infectious disease (154 million deaths averted since the 70s!)[1]

but…

Appropriateness & efficacy of vaccination programs depend on how (well) vaccine evaluation is conducted and assessed

→ RCTs for vaccine efficacy/safety

→ A range of post-approval observational studies for vaccine effectiveness

1. Shattock et al. Lancet 2024; 403: 2307–16.

Our problem

Systematic reviews and meta-analyses combine data from multiple VE studies

- Results depend on the quality of included studies and a thorough risk-of-bias (RoB) assessment
  - no existing RoB tool that provides guidance on assessment of RoB in the context of VE studies
  - inconsistent reporting quality[2]
    - hinder informed decision-making

2. Seehra et al. Journal of Clinical Epidemiology 2016; 69: 179-184.e5.

Our response: the RoB-VE project

CIHR IRSC
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Funding: Canadian Institutes of Health Research (FRN 198084)

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Overall research aims

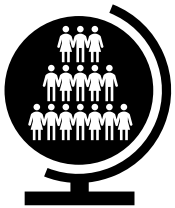
1. Design, validate, and disseminate a **RoB assessment resource (RoB-VE) and user manual** tailored for use in systematic reviews of VE studies.

2. Create a complementary **reporting guideline (i.e., checklist)** to standardize and improve the reporting of primary VE studies.

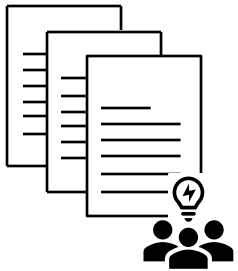
Deliverables: **RoB-VE Version 1** (*or an extension or adaptation to an existing tool*) and **VE Study Reporting Checklist**

Overview

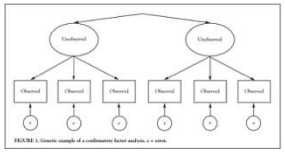
Step 1
Perspectives from policy decision-makers and the public



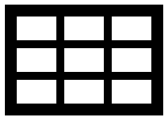
Step 2
Generation and assessment of signal items



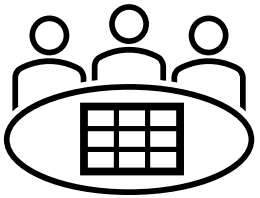
Step 3
Usability, performance, and structure of draft signal items



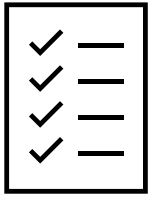
Step 4
Creation of initial rubric for RoB judgements



Step 5
Testing the β-RoB-VE and user manual

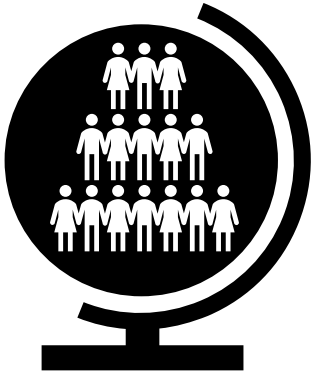


Step 6
Development of the VE reporting guideline



CFA example from: Schreiber et al. 2006 *J Educ Res*

STEP 1



Perspectives from policy decision-makers and the public

STEP 1: Objectives

1. to explore the **information needs and preferences** of key knowledge users regarding VE studies

2. to identify **assets and challenges** in the VE space to inform our knowledge translation strategy

STEP 1: Procedure

Participants

- policy decision-makers and the public (e.g., caregivers of children, older adults, and underrepresented groups)
- recruited by email

Method

- series of focus groups
- two sessions each, 8-10 participants/session

STEP 1: Procedure

Focus group session

- project overview
- pre-defined questions:

Public

- recent experience with vaccines
- discussions about VE and accessibility of information about VE

Policy-decision makers

- gaps in VE studies that make decision making difficult
- whether systematic reviews adequately address questions most important to policymakers regarding VE

STEP 1: Analysis

Thematic analysis

- involves an iterative coding process
- transcripts will be coded in duplicate
- a codebook will be developed to guide the analysis
- identify major themes and patterns

STEP 1: Deliverable

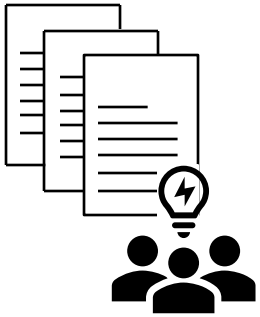
Steering Committee (uOttawa research team + collaborators) will use the results of the focus groups:

to refine the development of candidate signal items

to shape knowledge translation activities in subsequent steps

STEP 2

Generation and assessment of signal items



STEP 2

Objectives: to generate a list of candidate signal items and to conduct initial content validation

Materials: Candidate signal items

- RoB concepts important to VE studies
- identified from our scoping review
- each item/concept includes a label, a clear definition, and an illustrative example

STEP 2: Example of concept label, definition, and example

Concept label:
Individual level confounding bias

Concept definition:
Bias occurs when differences in underlying participant characteristics affect the relationship between vaccination status and the outcome(s), resulting in a distorted assessment of the vaccine's true effectiveness.

Concept example:

Healthcare-seeking behaviour: Vaccinated individuals may be more likely to seek medical care or get tested for the disease of interest than unvaccinated individuals.

STEP 2: Procedure

Identification of individuals

- authors of VE studies and systematic reviews
- WHO SAGE group
- vaccine research networks
- collaborator nominations

Participants

- Phase 1: 15 VE experts and 15 methodologists
- Phase 2: Up to 500 VE experts and methodologists

Method

- Invitation to participate by email with a link to SurveyMonkey to complete survey
- Reminder emails at weeks 2 and 4 of each round
- 2 or 3-round consensus process

STEP 2: Signal item survey

1. The concept label is appropriate.
2. The definition of the concept is clear and understandable.
3. The concept examples accurately define the concept.
4. The description of the concept example accurately reflects the concept example.
5. This component of the draft framework accurately reflects a distinct quality construct unique and/or important to VE studies.
6. The concept, *individual level confounding bias*, should be included as a signal item in the RoB-VE.
7. The concept, *individual level confounding bias*, should be included in a Reporting Guide for VE studies.

Qualitative feedback: how to refine items, any items missing

STEP 2: Response scale survey

1. 5-point scale assessing **quality**
   e.g., lowest to highest quality

2. 5-option scale assessing **information reported**
   e.g., NA/yes/partial yes/partial no/no

STEP 2: Analysis

Signal item survey

- medians and IQR for each statement related to candidate signal items

Response scale survey

- proportion of support for each rating scale

STEP 2: Consensus process

Round 1

Signal item retained for next round if ≥75% of participants provide neutral/favorable rating on:

5. This component of the draft framework accurately reflects a distinct quality construct unique and/or important to VE studies.
6. The concept should be included as a signal item in the RoB-VE.
7. The concept should be included in a Reporting Guide for VE studies.

Retained items will be revised based on feedback.

STEP 2: Consensus process

Round 2

Participants will receive a summary package of results from Round 1

- summary of consensus scores
- feedback received
- revisions

Follow same procedure as mentioned on previous slide.

If required, will conduct a third round.

STEP 2: Meeting of Steering Committee

- Will examine data and make decisions and refinements
- Will create User Manual to support use of RoB-VE tool

STEP 2: Deliverable

Draft RoB-VE

- Finalized list of signal items + User Manual
  - no thresholds or direction for making RoB judgements (yet!)

Current status of the project

- Recruiting policy-decision makers and members of the public for **focus groups** (Step 1)

- Inviting vaccine experts as well as study design and evidence synthesis methodologists to participate in the **signal item & response scale survey** (Step 2)

More information

Coming soon!

Check out:
RoB-VE Project Protocol on OSF

Learn more about us and our work on:
RoB-VE Project Website

Interested in participating or have a question for us?
Email us at: RoB-VE.Project@uottawa.ca

THANK YOU

Questions, guidance, suggestions?