Unveiling bias: going beyond study types

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Medical Library

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Context

Evidence synthesis

All systematic reviews require risk of bias assessment be formally done of the included studies so that users of such research are cognizant of how much the results can be trusted.

Risk of bias assessment concerns about the *implications* of the methodological safeguards in the *study results*
Tips for successfully leading your team in a systemic review

Key tools

1. Focuses on risk of bias

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Tips for successfully leading your team in a systemic review

Key tools

1. Focuses on risk of bias
2. Offers a method to reach either a domain specific or overall assessment of risk of bias
3. Used in at least one review that none of the tool authors were co-authors
4. Tool development involving a range of stakeholders from different disciplines (e.g. methodologists, statisticians, clinicians)
5. Avoids recommending use of summary numerical quality scores
Tips for successfully leading your team in a systemic review

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### Tips for successfully leading your team in a systemic review

![LATITUDES Network](https://www.latitudes-network.org/)

#### Validity assessment tools for evidence synthesis: your one-stop-shop

Welcome to the LATITUDES Library of validity assessment tools

<table>
<thead>
<tr>
<th>Tool name</th>
<th>Study types</th>
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</thead>
<tbody>
<tr>
<td>ROBINS-E</td>
<td>Cohort studies</td>
</tr>
<tr>
<td>ROBINS-I</td>
<td>Cohort studies</td>
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<tr>
<td>Newcastle-Ottawa Cohort</td>
<td>Cohort studies</td>
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</tbody>
</table>

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ROBIS

Assessing the Risk Of Bias in Systematic reviews

- Interventions
- Diagnosis
- Prognosis
- Etiology

Phase 1
Assess Relevance (Research question - review)

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signaling questions</td>
<td>1. Study eligibility criteria</td>
<td>4. Synthesis and findings</td>
</tr>
<tr>
<td>1.1 Did the review adhere to predefined objectives and eligibility criteria?</td>
<td>2. Identification and selection of studies</td>
<td>4.1. Did the synthesis include all studies that it should?</td>
</tr>
<tr>
<td></td>
<td>2.1 Did the search include an appropriate range of databases/electronic sources for published and unpublished reports?</td>
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<tr>
<td></td>
<td>3. Data collection and study appraisal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.1. Were efforts made to minimize error in data collection?</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Risk of bias in the review</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Did the interpretation of findings address all of the concerns identified in domains 1 to 4?</td>
</tr>
<tr>
<td>Judgment</td>
<td>Concerns regarding specification of study eligibility criteria</td>
<td>Concerns regarding methods used to identify and/or select studies</td>
</tr>
<tr>
<td></td>
<td>Concerns regarding methods used to collect data and appraise studies</td>
<td>Concerns regarding the synthesis</td>
</tr>
</tbody>
</table>
ROB 2.0

Risk of Bias in randomized trials

The tool is structured into five domains (signalling questions) through which bias might be introduced into the result:

1. Randomization process
2. Deviations from intended interventions
3. Missing outcome data
4. Measurement of the outcome
5. Selection of the reported result
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**ROBINS-I**

**Risk Of Bias In Non-randomized Studies - of Interventions**

Comprises **seven domains** for assessing bias in Non-Randomized Studies of Interventions (NRSI)

<table>
<thead>
<tr>
<th>Pre-Intervention</th>
<th>At intervention</th>
<th>Post-intervention</th>
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<tbody>
<tr>
<td>2. Selection of participants</td>
<td></td>
<td>5. Missing data</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Measurement of outcomes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Reported results</td>
</tr>
</tbody>
</table>
ROBINS-E

Risk Of Bias In Non-randomized Studies - of Exposures

Seven domains of bias:
1. Confounding
2. *Measurement of the exposure*
3. Selection of participants into the study (or into the analysis)
4. Post-exposure interventions
5. Missing data
6. Measurement of the outcome
7. Selection of the reported result
QUADAS-2
Risk of bias and Applicability Of Primary Diagnostic Accuracy Studies

QUADAS-2, consists of four domains (signalling questions)

1. Patient selection
2. Index test
3. Reference standard
4. Flow and timing
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**PROBAST**

Prediction Model Risk **Of Bias Assessment Tool**

Four domains with signalling questions:

1. Participants
2. Predictors
3. Outcome
4. Analysis
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Other sources

<table>
<thead>
<tr>
<th>Tool Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYRCLE RoB tool</td>
<td>Animal studies</td>
</tr>
<tr>
<td>SANRA</td>
<td>General reviews</td>
</tr>
<tr>
<td>RTI item bank – bias and precision</td>
<td>Observational studies (mixed designs)</td>
</tr>
<tr>
<td>Prompts for appraising qualitative research</td>
<td>Qualitative studies</td>
</tr>
<tr>
<td>Newcastle-Ottawa Cohort</td>
<td>Cohort studies</td>
</tr>
<tr>
<td>Evidence Project risk of bias tool</td>
<td>Non-randomised studies of interventions</td>
</tr>
<tr>
<td>Drummond Checklist</td>
<td>Economic evaluations</td>
</tr>
<tr>
<td>Downs &amp; Black Tool</td>
<td>Observational studies (mixed designs)</td>
</tr>
<tr>
<td>CHEC List</td>
<td>Economic evaluations</td>
</tr>
<tr>
<td>AXIS tool</td>
<td>Cross-sectional studies</td>
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<tr>
<td>Arrive</td>
<td>Diagnostic test accuracy (DTA) studies</td>
</tr>
<tr>
<td>EPHPP tool for quantitative studies</td>
<td>Observational studies (mixed designs)</td>
</tr>
<tr>
<td>RCT-POBSS</td>
<td>Randomized controlled trials (RCT)</td>
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<tr>
<td>Boutron</td>
<td>Randomized controlled trials (RCT)</td>
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</tbody>
</table>
Conclusions

The right tool choice is crucial, and awareness of its limitations is essential. Especially if it's not explicitly designed for risk of bias assessment.

Latitudes Network provides helpful resources for risk of bias assessment tools.

All tools will guide you over three main topics

- Selection bias
- Information bias
- Confounding
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Literature


Thanks for your attendance

Next Coffee Lectures, slides and screencasts:

http://bib.unibe.ch/scimed
Thanks for your attendance

Now there is time for...

Questions & Discussion

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