



Critical Appraisal Toolkit

1

Critical Appraisal Toolkit for Case Control Studies

How to use this toolkit?

Three broad issues need to be considered when appraising a case control study:

- Are the results of the study valid?
- What are the results?
- Will the results help locally?

The 11 questions on the following pages are designed to help you think about these issues systematically.

The first two questions are screening questions and can be answered quickly.

1. Did the study address a clearly focused issue?

A question can be focused in terms of:

- The population studied
- The risk factors studied
- Whether the study tried to detect a beneficial or harmful effect?

Yes Can't Tell No

2. Did the authors use an appropriate method to answer their question?

Consider:

Is a case control study an appropriate way of answering the question under the circumstances?

Did it address the study question?

Yes Can't Tell No

If you have answered "Yes" to both questions, it is worth continuing with the appraisal

3. Were the cases recruited in an acceptable way?

We are looking for selection bias which might compromise the validity of the findings:

- Are the cases defined precisely?
- Were the cases representative of a defined population (geographically and / or temporally)?

Cont. overleaf

Critical Appraisal Toolkits	
Case Control Study	1
Cohort Study	2
Diagnostic Test Study	3
Economic Evaluations	4
Qualitative Research	5
Randomised Controlled Trials	6
Systematic Reviews	7

- Was there an established reliable system for selecting all cases?
- Are they incident or prevalent?
- Is there something special about the cases?
- Is the time frame of the study relevant to the disease / exposure?
- Was there a sufficient number of cases selected?
- Was there a power calculation?

Yes Can't Tell No

4. Were the controls selected in an acceptable way?

We are looking for selection bias which might compromise the generalisability of the findings:

- Were the controls representative of a defined population (geographically and / or temporally)?
- Was there something special about the controls?
- Was the non-response high? Could non-respondents be different in any way?
- Are they matched, population based or randomly selected?
- Was there a sufficient number of controls selected?

Yes Can't Tell No

5. Was the exposure accurately measured to minimise bias?

We are looking for measurement, recall or classification bias:

- Was the exposure clearly defined and accurately measured?
- Did the authors use subjective or objective measurements?
- Do the measures truly reflect what they are supposed to measure? (have they been validated)
- Were the control methods similar in cases and controls?
- Did the study incorporate blinding where feasible?
- Is the temporal relation correct (does the exposure of interest precede the outcome)?

Yes Can't Tell No

6. (a) What confounding factors have the authors accounted for?

List the other ones you think might be important, that the author missed (genetic, environmental and socio-economic)

6.(b) Have the authors taken account of the potential confounding factors in the design and / or in their analysis?

Look for restrictions in design, and techniques e.g. modeling, stratified-, regression-, or sensitivity analysis to correct, control or adjust for confounding factors.

Yes Can't Tell No

7. What are the results of this study?

- What are the bottom line results?
- Is the analysis appropriate to the design?
- How strong is the association between exposure and outcome (look at the odds ratio?)
- Are the results adjusted for confounding and might confounding still explain the association?
- Has adjustment made a big difference to the OR?

8. How precise are the results?

How precise is the estimate of risk?

Consider:

- Size of the P-value
- Size of the confidence intervals
- Have the authors considered all the important variables?
- How was the effect of subjects refusing to participate evaluated/

9. Do you believe the result?

Consider:

- Big effect is hard to ignore!
- Can it be due to chance, bias or confounding?
- Are the designs and methods of this study sufficiently flawed to make the results unreliable?
- Consider Bradford Hills criteria* (e.g. time sequence, dose-response gradient, strength, biological plausibility)

Yes No

*See: Hill AB. The environment and disease: association or causation?
Proc R Soc Med 1965;58:295-300.

10. Can the results be applied to the local population?

Consider whether:

- The subject covered in the study could be sufficiently different from your population to cause concern
- Your local setting is likely to differ much from that of the study
- Can you estimate the local benefits and harm?

Yes Can't Tell No

11. Do the results of this study fit with other available evidence??

Consider all available evidence from RCTs, systematic reviews, cohort studies and case-control studies as well, for consistency.

Yes Can't Tell No

One observational study rarely provides sufficiently robust evidence to recommend changes to clinical practice or within health policy decision making.

However, for certain questions, observational studies provide the only evidence.

Recommendations from observational studies are always stronger when supported by other evidence.

For more information or assistance in using this toolkit, please contact the Knowledge and Informatics Trainer for the Knowledge and Information Service:
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