11 questions to help you make sense of case control study

How to use this appraisal tool

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

Are the results of the study valid?	(Section A)
What are the results?	(Section B)
Will the results help locally?	(Section C)

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. If the answer to both is "yes", it is worth proceeding with the remaining questions.

There is some degree of overlap between the questions, you are asked to record a "yes", "no" or "can't tell" to most of the questions. A number of italicised prompts are given after each question. These are designed to remind you why the question is important. Record your reasons for your answers in the spaces provided.

These checklists were designed to be used as educational pedagogic tools, as part of a workshop setting, therefore we do not suggest a scoring system. The core CASP checklists (randomised controlled trial & systematic review) were based on JAMA 'Users' guides to the medical literature 1994 (adapted from Guyatt GH, Sackett DL, and Cook DJ), and piloted with health care practitioners.

For each new checklist a group of experts were assembled to develop and pilot the checklist and the workshop format with which it would be used. Over the years overall adjustments have been made to the format, but a recent survey of checklist users reiterated that the basic format continues to be useful and appropriate.

Referencing: we recommend using the Harvard style citation, i.e.:

Critical Appraisal Skills Programme (2017). CASP (insert name of checklist i.e. Case Control Study) Checklist. [online] Available at: *URL*. Accessed: *Date Accessed.*

(A) Are the results of the study valid?

Screening Questions

1. Did the study address a clearly focused issue? ❒ **Yes** ❒ **Can't tell** ❒ **No**

HINT: 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?

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2. Did the authors use an appropriate method to answer their question? ❒ **Yes** ❒ **Can't tell** ❒ **No**

HINT: Consider

- Is a case control study an appropriate way of Answering the question under the circumstances? (Is the outcome rare or harmful)
- Did it address the study question?

Is it worth continuing?

Detailed questions

3. Were the cases recruited in an acceptable way? ❒ **Yes** ❒ **Can't tell** ❒ **No**

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

- Are the cases defined precisely?
- Were the cases representative of a defined population? (geographically and/or temporally?)
- Was there an established reliable system for selecting all the cases
- Are they incident or prevalent?
- Is there something special about the cases?
- Is the time frame of the study relevant to disease/exposure?
- Was there a sufficient number of cases selected?
- Was there a power calculation?

4. Were the controls selected in an acceptable way?

❑ Yes ❑ Can't tell ❑ No

HINT: We are looking for selection bias which might compromise The generalisibilty of the findings

- Were the controls representative of 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?

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5. Was the exposure accurately measured to minimise bias?

❑ Yes ❑ Can't tell ❑ No

HINT: 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 measurement methods similar in the cases and controls?
- Did the study incorporate blinding where feasible?
- Is the temporal relation correct? (Does the exposure of interest precede the outcome?)

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

List:

HINT: List the ones you think might be important, that The author missed.

- Genetic
- Environmental
- Socio-economic

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

❒ Yes ❒ Can't tell ❒ No

HINT: Look for

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

(B) What are the results?

7. What are the results of this study?

HINT: Consider

- 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?

HINT: 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 results?

❒ Yes ❒ No

HINT: Consider

- Big effect is hard to ignore!
- Can it be due to chance, bias or confounding?
- Are the design 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)

(C) Will the results help locally?

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

❒ Yes ❒ Can't tell ❒ No

HINT: Consider whether

- The subjects 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 quantify the local benefits and harms?

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

❒ Yes ❒ Can't tell ❒ No

HINT: Consider all the available evidence from RCT's, systematic reviews, cohort studies and case-control studies as well for consistency.

Remember

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.