

1. Determine the causal question

Clearly lay out the causal question that you ultimately wish to answer. What is your risk factor or exposure (X) and what is your outcome (Y).

2. Draw a directed acyclic graph

A DAG allows you to map out the most relevant variables, clarify assumptions and identify key sources, using arrows to indicate the direction of the hypothesized causal effects. The DAG can help you clarify your question, explicate potential biases, outline assumptions, and identify covariates for analyses.

3. Identify available resources and samples

Scope out the resources available to find the (financial, ethical, practical) boundaries within which the triangulation will have to be conducted. For secondary data-sets, specifically consider sample characteristics and selection mechanisms so that these sources of bias may also be triangulated.

4. Identify suitable methodological approaches

Identify methods or approaches suitable to test your causal question which have different (preferably uncorrelated) sources of bias. Aim to mitigate the most problematic sources of bias as identified under step 2. Finally, match the methods with the identified samples.

5. Further specify the causal question per method

Refine and further specify the causal questions for each of the approaches that you have chosen, taking into account your samples and methodological approaches.

6. Explicate the effects of potential biases

For each of the approaches, in what way/direction do you expect potential biases to impact the results? Try to identify at least the key biases that you need to take into account for each method you intend to apply.

7. Pre-specify expectations under causality

Pre-specify the expected results under true causality and under no causal effects, considering the (differences in the) precise causal questions for each approach, the effects of key potential biases, and statistical power.

