Introductory causal inference journal club

Joanna Diong

Paper 1. Hernán MA. The C-Word: scientific euphemisms do not improve causal inference from observational data.

"The proscription against the C[ausal]-word is harmful to science because causal inference is a core task of science [in many instances], regardless of whether the study is randomized or non-randomized."

How a research question is asked reflects its aim:

1) Do the sorts of people who drink a glass of red wine daily have lower risk of heart disease?
2) Does drinking a glass of red wine daily lower the risk of heart disease?

Q1 is interested in association.
Q2 is interested in causation.

Paper 1.

Being explicit about scientific aims, even when using observational data, improves study design by helping to

- specify the exact causal effect of a research question (e.g. exposure, dose, frequency, population, etc.), which guides the analysis
- better adjust for confounding, the distorted association between variables, using subject-matter knowledge and a plausible causal structure

Even if there's no guarantee a causal model includes all confounders, "we can [only] have an informed scientific discussion ... if we first acknowledge the causal goal of the analysis."

Discussion

Comments or clarifications?

Does anyone disagree with Hernán (e.g. do you think using 'association'/'correlation'/'link' words are better)? Why?

How are RCTs imperfect, and how are these limitations overcome?

How else are observational data limited at allowing causal inference? Do these problems only affect observational studies?