500 Class 04

https://thomaselove.github.io/500-2024/

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Today's Agenda

Today's class involves a walk-through of the `toy` example, which is a simple simulated observational study of a treatment on three outcomes (one quantitative, one binary, and one time-to-event) which we will use to demonstrate the completion of 13 tasks using R, which include:

- Fitting a propensity score model
- Assessing pre-adjustment balance of covariates
- Estimating the effects of our treatment on our outcomes ...
  - Using matching on the propensity score
  - Using subclassification on the propensity score
  - Using direct adjustment for the propensity score
  - Using weighting on the propensity score

Note we have three other (more realistic) examples we'll share in time: `lindner`, `dm2200` and `rhc`.

Readings for Today

- Austin and Mamdani 2006
  - Case study examining the effectiveness of statins after AMI
  - Good antidote to only seeing me talk about these things
- Normand 2001
  - A matched analysis using propensity scores
  - Inspiration for the Love plot
- D'Agostino 1998
  - Tutorial on Propensity Score Methods for Bias Reduction
  - Initial steps towards dealing with missing data in propensity analyses

Section 1

The `toy` Example

The `toy` example

The `toy` example presents methods for doing 1:1 greedy matching without replacement using the `Match` function from the `Matching` package, and for evaluating the balance before and after matching with `cobalt` and with an alternative strategy for obtaining Love plots.

- The example uses 3 Rules I attribute to Rubin (2001) for determining when a sample comparison shows sufficient balance to allow for a reasonable regression model for the outcome.
  - **Please read** Rubin (2001) in advance of Class 06, which will mostly be about that example.
- What to do in terms of a sensitivity analysis is discussed in the final section of that example, and we'll get to that later on.