500 Class 09

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

2024-03-21

Lab 4 sketch will be posted by class time

My choices: deliberately (nearly) guaranteed not to be yours...

- I studied the subpopulation of patients who have no prior MI (`PREVMI` == 0).
- The exposure of interest to me was NYHA Functional Class (`FUNCTCLS`) of III or IV, as compared to I or II.
- The outcome I studied was all-cause hospitalization (`HOSP`).

I am anticipating that among the patients without a prior myocardial infarction, those with baseline NYHA Class III or IV will be hospitalized more freqently than those with NYHA Class I or II.

I chose 15 covariates (listed in the Lab 4 sketch) including quantities, binary and multi-categorical covariates.

My Lab 4 Results (see Sketch for Details)

1. Build an appropriate Table 1.
   - Several covariates are unbalanced by exposure.
   - Rubin's Rules are not quite where we want them.
2. Unadjusted estimate of treatment effect on outcome.
   - Indicates a fairly substantial effect.
3. 1:1 matching with sensitivity or stability analysis.
   - Love plots look much improved after greedy matching.
   - 760 matched pairs, much better Rubin's Rule 1.
   - Discussed both sensitivity *and* stability analyses in sketch.
4. Weighted (with regression adjustment if you like).
   - Excellent Love plot, Rubin's Rules after ATT weighting
   - Effective Sample Sizes: 760 treated, 1206 control.
5. Compare your results, and describe any concerns.
   - Matched, weighted, unadjusted estimates pretty similar.

This is, of course, the set of analyses for your Project.

Today's OSIA Presentations

1st Reader	2nd Reader	Manuscript
Sid Dugar	Jesse Chen	Lan P et al. 2019 Utilization of echocardiography during septic shock was associated with a decreased 28-day mortality: a propensity score-matched analysis of the MIMIC-III database *Annals of Translational Medicine*
Hala Nas	Aman Pande	Wang Q et al. 2022 Adverse Events Following Limited Resection versus Stereotactic Body Radiation Therapy for Early Stage Lung Cancer *Annals American Thoracic Society*
Sriram Satyavolu	Marie Masotya	Webbe JWH et al. 2022 Outcomes in relation to early parenteral nutrition use in preterm neonates born between 30 and 33 weeks' gestation: a propensity score matched observational study *Arch Dis Child Fetal Neonatal Ed*

Rosenbaum Chapter 8

Replication, Resolution and Evidence Factors

- Replication is Not Repetition
- Repetition without Resolution
- Varied Views of a Single Object
- Evidence Factors

The lead in the blood of children example is discussed in several of Paul's books, including Rosenbaum 2010 (see our Sources page.)

- What was the most important thing?
- What was the muddiest, most confusing thing?

Replication and Replication Projects: Some Guidance

- Replication and Replicability in Science from the National Academies of Sciences, Engineering, and Medicine.
- Nosek B and Errington TM What is replication?
- Moreau D and Wiebels K Ten simple rules for designing and conducting undergraduate replication projects
- Royal Society Open Science Replication Studies: Guidance for Authors and for Referees and Reviewers
- Wikipedia on the Replication Crisis
- Ioannidis JPA 2005 Why Most Published Research Findings are False
- Peng RD and Hicks SC 2021 Reproducible Research: A Retrospective *Annual Review of Public Health*

Bayes Factors as a measure of strength of evidence

The Bayes factor is a ratio of two competing statistical models represented by their evidence, and is used to quantify the support for one model over the other.

See, for instance,

- Wikipedia on Bayes factor
- The BayesFactor package in R
- Stefan et al. 2019 A tutorial on Bayes Factor Design Analysis using an informed prior, doi: 10.3758/s13428-018-01189-8

Reminders for Next Week

See the Class 09 README

- OSIA slides from 1st readers (Morgan, Karlo and John) by 1 PM Wednesday
- 2nd reader slides from Lydia, Miza and Chris by 7:30 AM Thursday
- Video OSIA: 1st reader slides due by class time from Aman, Ava, Chris, Jesse, Justin, Lent, Lydia, Marie, Miza, Naji, Orsino, Sam and Sara.
- We'll discuss Rosenbaum Chapter 9 (Uncertainty and Complexity)