Chapter 10 Essays

Weichuan Dong

The study population include women who were diagnosed with breast cancer with age between 45 to 70 in 2016 in Ohio. The objective of this study is to determine whether longer distance from a woman's residential location to the nearest mammography facility lead to the diagnosis of breast cancer to be late stage. Thus, the treated group versus control group is longer distance versus shorter distance to the nearest mammography facility. We would match the two groups by demographic factors, and socioeconomic factors on individual level as well as contextual level. To restrict the comparison groups to more intensive receipt or lack of receipt of treatment, we can exclude patients who had median distance to facility, so that longer distance is much longer than shorter distance to ensure the treatment effect to be less sensitive to unmeasured bias. A subgroup regarding low vehicle availability among households in the neighborhood where the woman lives can be applied, assuming that lack of vehicle availability together with longer distance to facility would increase the spatial access to mammography screening.

Joseph Hnath

For my current MPH Capstone research project, I'm looking at the effect of state-level abortion policies on county-level pregnancy outcomes, such as abortion rate, birth rate, maternal mortality rate, and neonatal mortality rate. The population of interest is women aged 15-44 in the U.S. and the main covariates are related to sociodemographic status, like race/ethnicity and employment. For this project, I was only able to look at the effect of multiple policies implemented in Ohio in 2012 compared to other states with no policy changes from 2006-2015.In future research on this subject, it is a great example for identifying subgroups who are likelier to exhibit a treatment effect due to the variation in abortion policies that have different mechanisms of action. One policy like this is requiring women under the age of 18 to have parental consent before getting an abortion. If a state passed only a policy like this, we would expect there to be changes in our outcomes for women under age 18 but not over 18. This subgroup stratification is close to an ideal example in that we would expect there to be no treatment effect for women over 18, so observing a change in this population would indicate that there is some unmeasured bias that is not being accounted for.

Jason Huang

Adelborg et al. examines the effect of low endogenous testosterone in Danish men on stroke, and other cardiovascular outcomes. They suspect that age is an important confounder, in that people with low testosterone levels tend to be older than people with normal testosterone levels, and age is a strong predictor for stroke. In their analysis, hazard ratios were calculated for people with low versus normal testosterone levels. An increased risk was seen for people with low testosterone levels. After stratification for age, the association is only seen for people over 75 years old, but not for any other age strata.In order to look at the effect of age on risk of stroke among a subpopulation of people from their study who had low testosterone levels, we may use the same information that they had, while comparing different subgroups. To reduce the sensitivity of this new analysis, we may compare the groups, with the same referenced low testosterone levels, who differ a lot in age. For instance, comparing a group who aged between 50-55 to a group who aged

75-80. In this case, if the difference between people who are 25 years apart is large, it is insensitive to larger unmeasured biases.

Laurie Ann Moennich

If we wanted to study the effect of the tolerability of Entresto (sacubitril/valsartan) in Stage IV heart failure patients at the Cleveland Clinic, we could control for unmeasured bias by matching our cohort on specific characteristics such as heart failure stage, ejection fraction, and type of cardiomyopathy. It would be plausible to control for pre-existing hypotension within the patients who have stage IV heart failure (and therefore more likely to already have lower blood pressure and therefore lower tolerability to the drug) by identifying these patients as a subgroup of our study. It could also be plausible to exclude patients whose blood pressure falls regularly below a safe level, or assign these patients to a lower dose to fully examine the safety of Entresto in this patient population whilst attempting to make the study less sensitive to unmeasured bias.

Amin Saad

Reduced heterogeneity with paired samples leads to greater insensitivity to bias. It makes us more confident in conveying a finding of a treatment effect to the public. In some instances, the treatment effect may vary between subgroups of the population. For instance, the administration of Tranexamic acid (TXA) has been shown in a randomized controlled trial to improve mortality after hemorrhagic traumatic injuries. Few other observational studies have found that the effect is more pronounced in a subpopulation of patients; those who present with hemodynamic shock. However, conceptually it is hard to just attribute the treatment effect to the drug itself given fact that the more severe the case; here it is being in shock, the more aggressive the fluid and blood product resuscitation is. To tackle this in my project, I would like to compare the effects of TXA on matched pairs suffering from blunt hemorrhagic shock then filter the patient population to those who are in hemodynamic shock and reexamine the effect of administering the drug. If the drug shows a protective effect in both scenarios then the observed effect can be attributed to the drug itself and my study would be insensitive to unmeasured bias. However, if the treatment effect was only observed then another interpretation would be that the treatment effect has been modified by the state of being in shock.