

Clinical Reading Questions #11

HST 190: Introduction to Biostatistics

These discussion questions are based on Hernán and Taubman (2008).

1. Explain the central paradox in “A tale of two policy makers”: How could three randomized trials with identical BMI distributions yield different mortality estimates (100,000, 50,000, and 120,000 preventable deaths)? What does this example reveal about the possible relationship between BMI and different types of interventions?
2. The authors argue that observational studies of obesity violate the “consistency condition” because they “do not explicitly specify the interventions on body mass index (BMI) that are being compared.” Explain what they mean and why different methods to modify BMI may plausibly lead to different mortality outcomes even when BMI itself does not change.
3. According to the authors, why do consistency violations “hamstring our ability to address exchangeability and positivity”? Provide specific examples of how ill-defined interventions make it harder to identify confounders and achieve conditional exchangeability. (Also, formally define conditional exchangeability and positivity.)
4. The authors emphasize that “causal effects cannot be defined, much less computed, in the absence of a well-defined intervention.” Explain why, as they claim, altering BMI is not itself an intervention and how this issue affects the interpretation of observational studies claiming to estimate “the effect of obesity on mortality.”
5. Discuss the authors’ conclusion that policy should focus on “modifiable lifestyle behaviors [rather] than on obesity itself.” How does this recommendation follow from their arguments about well-defined versus ill-defined interventions?
6. The authors note that “all causal effects from observational data are vague, but there is a question of degree.” Compare the vagueness of interventions like “1 hour of daily strenuous exercise” versus “achieving a BMI of 22.” Why might some exposures of interest be more problematic or challenging for causal inference than others?

References

Hernán, Miguel A, and Sarah L Taubman. 2008. “Does Obesity Shorten Life? The Importance of Well-Defined Interventions to Answer Causal Questions.” *International Journal of Obesity* 32 (S3): S8. <https://doi.org/10.1038/ijo.2008.82>.