

Day 4, Practical 1

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This practical consists of understanding the study and the results of Kreif et al. (2017). The goals are particularly to:

1. Relate the key concepts of longitudinal causal inference to the study by Kreif et al. (2017), including the research question, observed variables, causal parameters, and the estimation approaches used.
2. Evaluate the results of Kreif et al. (2017) in terms of bias and variance, and discuss benefits and challenges in using TMLE for their research question.

You should read the items listed below in Section 1 and write up your responses.

1 Questions for Kreif et al. (2017)

1. What is the overall research question considered in the paper?
2. What are the observed variables? How many longitudinal time-points are there and how are they defined?
 - e.g., what do A_t , Z_t and Y_t measure?
 - what does M_t measure?
3. Which variables affect each other? Are there any time-dependent confounders?
4. What are the hypothetical regimes that are considered? Static regimes? Dynamic? What are the corresponding causal parameters?
 - what is the targeted causal contrast?
 - how is death handled?
5. Go over the stated causal assumptions required to identify the causal parameters. Is positivity equally likely to hold for all regimes/strategies considered?
6. Results: The authors consider a 'naive' approach, an IPW estimator, a g-formula estimator and a TMLE estimator. What results do they find with each method (see Figure 1 of the paper)? How do they differ in terms of bias and variance?

References

Kreif, N., L. Tran, R. Grieve, B. De Stavola, R. C. Tasker, and M. Petersen (2017). Estimating the comparative effectiveness of feeding interventions in the pediatric intensive care unit: a demonstration of longitudinal targeted maximum likelihood estimation. *American journal of epidemiology* 186(12), 1370–1379.