

# Day 4, Practical 1

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This practical consists of understanding the study and the results of Kreif et al. (2017). 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.