Marginal Structural Models with Latent Class Growth Modeling of Treatment Trajectories

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Introduction

- Randomized Controlled Trial (RCTs): general way to measure the efficacy of a treatment.
- Lack of evidence for vulnerable subgroups.
- Analysis of observational data could add crucial information.

Latent Class Growth Modeling (LCGM)

- Reduction of dimension : LCGM defines homogeneous subgroups of individuals with respect to their patterns of change over time.
- Targeting of interventions: LCGM is a better method to measure adherence and makes describing adherence behaviors easier.

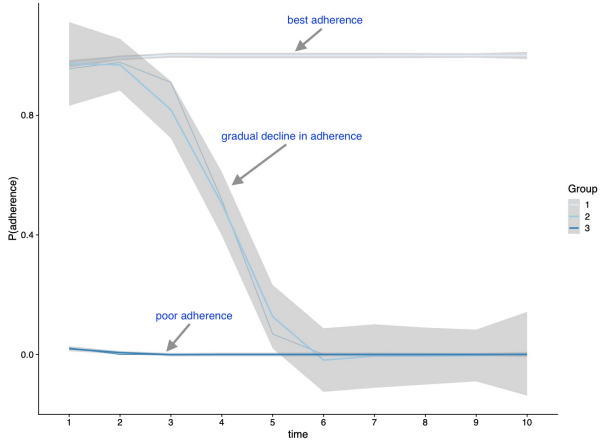
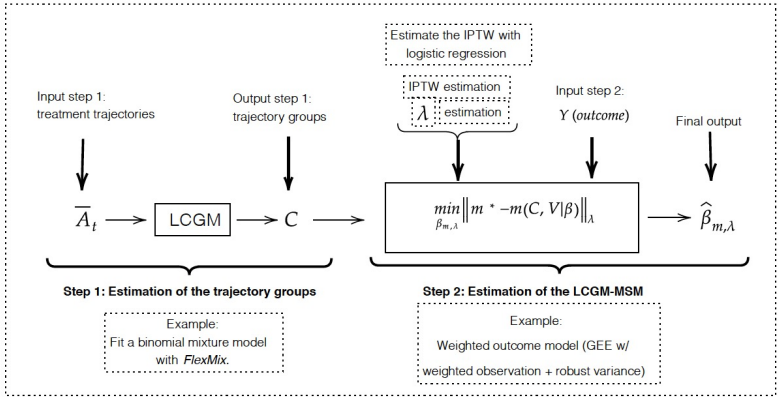


Figure - Example of LCGM with t=10 → 2^{10} = 1024 potential individual's trajectories reduced into 3 trajectory groups.

Goal

To propose a suitable theoretical framework to measure the impact of similar treatment adherence behaviors on an outcome using longitudinal observational data.

Methods



Justification: C is an ancillary statistic: distribution free from the parameter of interest β. The trajectory groups are not seen as random but rather as a fixed regressor.

Simulation Study

- Extensive simulation study with different number of follow-up times, trajectory groups and different outcomes (measured at the end of follow-up).
- **For this presentation: Y continuous, t=3,5, J=3, trajectory groups and 1000 replications.**

Results

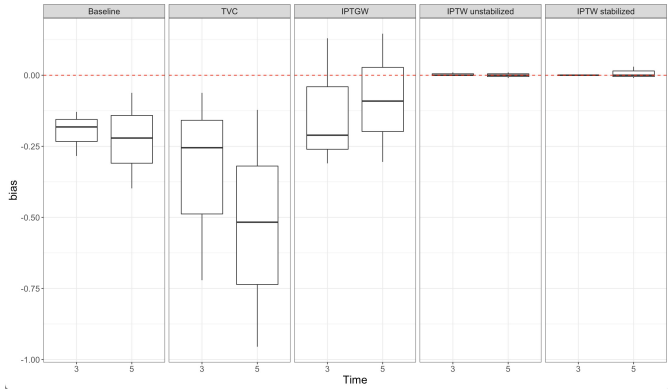


Figure - Absolute bias

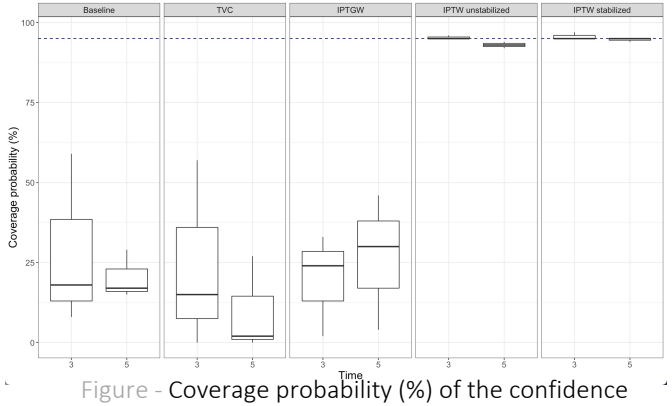


Figure - Coverage probability (%) of the confidence interval

Conclusion

- Strengths: little or no bias and high coverage of confidence intervals.
- Limit: IPTW estimator failed to completely eliminate the bias when t=10.