On Bayesian g-computation and instrumental variables for determining efficacy from observational data

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Abstract

Clinical trials are often not practical for long-term outcomes. As such, researchers must consider observational data for determining effect, or lack thereof, of a given intervention. In order to circumvent confounding, researchers often use calendar periods as an imperfect proxy, an 'instrumental variable'. We contrast the instrumental variable approach with that of the Bayesian g-computation procedure. Alternatively, causal inference literature suggests a variety of analysis methods including propensity score based methods, inverse probability of treatment (IPT) weighting, covariate adjustment and matching.

inverse probability of treatment (IPT) weighting in estimation of marginal treatment effects is to construct a pseudo-population without imbalances in measured covariates, thus removing the effects of confounding and informative censoring when performing inference.

Two main obstacles with the analysis of time-varying observational data are:

I. Introduction

One strategy is to apply *g*-computation, as described in Borsi (2012) [1] . Another, seemingly cruder strategy, would involve treating calendar period of reaching eligibility for treatment as an instrumental variable, see Greenland (2000) [2]. The theoretical properties of the *g*-computation approach have been previously examined, see Johnston et al. (2008) [3], and applications exist, such as in the context of assessing the the effect of antiretroviral therapy on incident AIDS, see Cainn et al. (2009) [4].

In Section 5, we investigate the frequency-based properties of the different Bayesian approaches in a simulation study. In Section 6, we analyze data from the Canadian HIV/Hepatitis C Co-Infection Cohort Study. We conclude with a discussion in Section 7.

II. Methods

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*A thank you or further information

III. Results

Table 1: *Example table*

Name		
First name	Last Name	Grade
John	Doe	7.5
Richard	Miles	2

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$$e = mc^2 \tag{1}$$

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IV. Discussion

I. Subsection One

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II. Subsection Two

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References

[1] L. Borsi, *Estimating the Causal Effect of Switching to Second-line Antiretroviral HIV Treatment Using G-computation*. PhD thesis, ETH, Department of Mathematics, 2012.

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