

Project Summary Report
YODA Project # 2020-4189

“Design and validation of an external control arm using prior clinical trials and real-world data”

Objective

1. Develop an external control arm using data from prior trials and data abstracted from electronic health records from normal clinical care
2. Assess the total explained variance in OS and PFS from known prognostic factors
3. Analyze the sources of inter-trial variability in outcomes

Methods Used

Terminology and Notation: The binary variable A indicates the assignment of a patient to the experimental treatment, $A=1$, or to the control arm, $A=0$, and Y denotes the outcome. We focus on binary endpoints, such as survival at 12 months from enrollment (OS12) and expand the discussion to time-to-event outcomes. The vector X indicates a set of pre-treatment patient characteristics including known or likely prognostic factors.

We evaluated whether characteristics X are sufficient to obtain unbiased treatment effect estimates or not, and use $\Pr(Y=1 \mid A=a, X)$ to indicate the probability of a positive response to treatment a given the pre-treatment characteristics X .

We estimated -for a hypothetical randomized study- the average treatment effect by averaging the conditional outcome probabilities with respect to a distribution $\Pr_X(x)$. We considered adjustment methods, all based on the usual hypothesis of no unmeasured confounders, to estimate average treatment effects: direct standardization, matching, inverse probability weighting and marginal structural methods. These methods use different reweighting schemes to obtain estimates of the average treatment effect.

We could not continue the project due to changes in research priorities due to the covid19 pandemic.

Results

No data was downloaded or used, due to changes in the project priorities.

Conclusions

N/A.