Sept 14, 2024

To,
Editor-in-Chief
BMC Medical Research Methodology

I am pleased to submit our manuscript, titled *"Is There a Competitive Advantage to Using Multivariate Statistical or Machine Learning Methods Over the Bross Formula in the hdPS Framework for Bias and Variance Estimation?"* for your consideration as an original research article in BMC Medical Research Methodology. This study systematically evaluates the performance of traditional statistical methods and machine learning approaches within the high-dimensional propensity score (hdPS) framework using a plasmode simulation study and real-world data from the National Health and Nutrition Examination Survey (NHANES).

Our findings provide novel insights into the comparative effectiveness of various proxy selection methods, including machine learning techniques like XGBoost and Random Forest, compared with more traditional methods such as the Bross formula, LASSO, and Elastic Net. We assess key metrics such as bias, mean squared error (MSE), standard error (SE), and coverage across several epidemiological scenarios involving different exposure and outcome prevalence rates. The results underscore the importance of tailoring method selection based on the specific characteristics of the data to achieve optimal balance between bias reduction and precision.

Given the increasing importance of selecting appropriate methods in observational studies and the rising use of machine learning techniques in epidemiology, we believe this study will be of great interest to readers of BMC Medical Research Methodology. Furthermore, to enhance transparency and reproducibility, we have made the simulation results publicly available via a Shiny web application, which can be accessed at https://ehsanx.shinyapps.io/hdPS-Alternatives/.

We confirm that this manuscript is original, has not been published elsewhere, and is not under consideration by another journal. All authors have contributed significantly to the work and have read and approved the final manuscript. There are no conflicts of interest to declare.

Thank you for your consideration of our manuscript. We look forward to your feedback and hope that it meets the high standards of your journal.
Sincerely,

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