THE UNIVERSITY OF OKLAHOMA HEALTH SCIENCES CENTER

OSCTR Oklahoma Shared Clinical & Translational Resources

Biostatistics, Epidemiology, and Research Design
Key Component Activity

OSCTR Biostatistics, Epidemiology and Research Design Core

SEMINAR

DESIGN AND ANALYSIS OF TWO-PHASE BIOMARKER STUDIES WITH BINARY OUTCOMES USING INVERSE PROBABILITY WEIGHTING WITH CALIBRATION

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Wednesday, October 1st, 2025
12:00 PM – 1:00 PM

Virtual: Zoom

https://oklahoma.zoom.us/j/91473742196?pwd=grFlMdog0Fmy2PGU018dMeTSceyDNp.1
Meeting ID: 914 7374 2196
Passcode: 01604471

Abstract:
Two-phase designs are widely used in epidemiological and biomedical studies to balance cost and statistical efficiency by collecting expensive biomarker data on a carefully selected Phase II subsample within a larger Phase I cohort. The efficiency of biomarker analyses under such designs depends on critically on both the Phase II subsampling scheme and the analytic framework. Inverse probability weighting (IPW) with calibration has gained increasing attention for improving efficiency relative to standard IPW while retaining robustness. However, existing guidance has largely focused on estimating biomarker-outcome association parameters, with limited research to predictive performance. In this paper, we provide general guidance on both the Phase II subsampling scheme and the semiparametric weight calibration approach that can improve efficiency in estimating association parameters as well as evaluating risk prediction for binary outcomes, based on a preliminary model developed in the Phase I data. Simulation studies show that the combination of our proposed subsampling scheme and calibration estimators outperforms existing design-based approaches. We further illustrate the proposed methods through its application in a prospective cohort study involving patients with oral pre-cancers.

END OF WORKSHOP EVALUATION SURVEY:

- Please complete the survey at the following link: https://bbmc.ouhsc.edu/redcap/surveys/?s=9NN3DW3YFDXAMNPC
- You will also receive the link by email after the workshop.

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FACULTY BIOGRAPHICAL SUMMARY:

- Lingxiao Wang is an Assistant Professor of Statistics at the University of Virginia. Her research focuses on interdisciplinary applications of statistics in survey research and medical studies. Currently, she is working on improving statistical modeling by integrating data from multiple sources, enhancing the efficiency of risk prediction models for binary and time-to-event outcomes under two-phase designs in medical studies, and obtaining population-representative inferences using data from national surveys.