大阪医学統計学セミナー 第60回

【CLOSED】

Osaka Biostatistics Seminar

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「A simple sensitivity analysis method for unmeasured confounders in the estimation of the average causal effect」

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場所：
オンライン開催
医学系研究科基礎研究棟L階
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概要：

In estimating the causal effect in observational studies, the influence of confounders should be appropriately addressed. To this end, the propensity score (PS) is widely used. If the PSs are known for all the subjects, bias due to confounders can be adjusted by using for example the inverse probability weighting (IPW). Since the PS is unknown in general, it is often estimated by the parametric logistic regression model with observed potential confounders as explanatory variables and its unknown parameters is usually estimated by solving the score equation under the strong ignorable assumption. Violation of the strong ignorable condition and/or misspecification of the PS model can cause serious bias in the estimation of the average causal effect. To relax the strong ignorable assumption, the IPW estimator based on the outcome-dependent PS was successfully introduced. However, it still depends on correctly specified parametric PS model and its identification. In this paper, we propose a simple sensitivity analysis method against unmeasured confounders. Unlike the standard practice, where the PS of each subject is uniquely determined by the model and the estimating equation, we consider the estimating equation alone as a set of constraints among the PSs. We do not rely on any specific model but still rely on the estimating equation. Using the estimating equation, which the true PS asymptotically satisfies, as constraints, we construct the worst-case bounds for the average causal effect with linear programming. Differently from the existing sensitivity analysis methods, we can construct the worst-case bounds without relying on strong assumptions. By increasing the dimensionality of the estimating equations by involving many covariates, one can make the bounds further narrow. We illustrate the performance of our proposal on simulated datasets and a real-world example.

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