Accounting for Unmeasured Confounders in the Analysis of Time-to-event Data in Vascular Surgery

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Abstract

In this talk I review the development, evaluation, and application of methods of accounting for unmeasured confounding of treatment and survival-times subject to censoring. The confounding-censoring problem will first be characterized using simple Directed Acyclic Graphs (DAGs) followed by a review of various approaches to the problem. I will then consider adapting traditional instrumental variable methods to censored survival-time or event-time data subject to censoring. The resulting methods will finally be used to evaluate the comparative effectiveness of endovascular surgery and open surgical repair for ruptured abdominal aortic aneurysm (rAAA) in Medicare patients. Because various physician and patient factors affect treatment selection in observational data, unmeasured factors related to both treatment selection and survival are likely, motivating the use of IV methods. Due to limited follow-up near the end of the study period, censoring is extensive. Therefore, methods that account for both confounding and censoring have the potential to perform substantially better than naïve methods on rAAA data.

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