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**Title: “Estimating the Effect of Intensity of Care on Rates of Death for Premature Infants”**

**Abstract:**

Health care providers that earn a reputation for delivering high quality or high intensity care tend to attract patients who are significantly sicker. This process, sicker patients preferentially selecting "high quality" providers, complicates comparisons between providers. To answer questions of the effect of an intervention (for example, "Which provider produces better outcomes?") one would usually want to run a randomized controlled experiment. Unfortunately, regarding questions about quality of care, experimentation is often infeasible. Therefore, instead of experimental data, those of us interested in answering health care quality and policy questions rely on observational data.

Observational studies are commonly plagued by concerns about selection bias (usually thought of as arising from unobserved, lurking or confounding variables). One technique for addressing issues of selection bias is to use instrumental variable (IV) techniques. Unfortunately, a common barrier to using instrumental variable techniques is having a "weak instrument." An analysis based on weak instruments suffers from several problems: large standard errors, or (if care is not taken) inappropriately small standard errors, as well as severe sensitivity to small violations of the assumptions of IV. It is a common belief that the strength of an instrument is fixed. This is false. In this talk we present a new matching-based IV technique, "near-far matching," which can be used to design studies which have stronger instruments. We will examine this method through a case study of death rates for preemies being delivered at neonatal intensive care units (NICUs) with varying levels of intensity of care. We use patient-level data to estimate a complier average causal effect of being delivered at either a "high" or a "low" level NICU on rate of death.