

STATISTICS COLLOQUIUM

FRIDAY, FEBRUARY 1, 2013

TALK: 4:15 PM — SCIENCE CENTER RM. 705

RECEPTION: 3:50 PM — SCIENCE CENTER, 7TH FLOOR

**A Potential Outcomes, and Typically More Powerful, Alternative to
“Cochran-Mantel-Haenszel”**

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ABSTRACT

In studies of medicine and public health, outcome measures such as the odds ratio, rate ratio, or efficacy are often estimated across strata to assess the overall effect of active treatment versus control treatment. Patients may be partitioned into such strata by experimental design, or, in non-randomized studies, patients may be stratified on key covariates or estimated propensity scores to improve observed covariate balance across treatment groups. For finite samples, it is possible to create tests and intervals for these estimands that are typically more powerful than tests and intervals created with standard Cochran-Mantel-Haenszel procedures.

In this talk, I will describe the design of an international Phase IV clinical trial for which propensity score strata were created to allow causal inference. I will then propose a method for multiply imputing missing potential outcomes within the Rubin Causal Model, so that any estimand can be directly estimated across strata. The power of the proposed method is closely tied to assumptions about the unknowable correlation between active treatment potential outcomes and control potential outcomes. These assumptions have strong implications for the definition of the term “conservative” in statistical inference.