

STATISTICS COLLOQUIUM

MONDAY, MAY 23, 2011

TALK: 4:00 PM — SCIENCE CENTER RM. 705

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

“A Bayesian Method for Estimating Efficacy, Relative Risk, and Odds Ratios in the Presence of Strata”

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ABSTRACT

Efficacy, relative risk, and odds ratios are frequently specified as primary outcome measures in studies of public health. Often, the outcome measure must be estimated across strata to assess the overall effect of active treatment versus control. In particular, patients can be separated into subclasses based on estimated propensity scores to improve observed covariate balance in an observational study or a randomized experiment.

Though the assumption motivating propensity score subclassification is that patients in separate subclasses differ in ways likely to predict treatment effects, the standard Mantel-Haenszel estimators assume that the true relative risk or odds ratio is homogeneous across subclasses. We propose an alternative estimator that explicitly and repeatedly imputes missing potential outcomes from a Bayesian model with a data-driven prior, without assuming homogeneity. A simulation study demonstrates that, under conditions expected to arise in propensity score designs, the proposed method corrects the bias of the Mantel-Haenszel estimator, generates posterior intervals 1.3-1.5 times narrower than confidence intervals with the same nominal coverage produced by other methods, and maintains the nominal coverage rate.