THE UNIVERSITY OF CHICAGO

Department of Statistics
DISSERTATION PROPOSAL

SHENG ZHONG

Department of Statistics
The University of Chicago

Adjusting for Covariates in Case-Control Association Testing with Related Individuals and Missing Data

THURSDAY, November 1, 2012, at 11:00 AM

110 Eckhart Hall, 5734 S. University Avenue

ABSTRACT

Adjusting for covariates can benefit association studies by reducing false positives and increasing statistical power. It's well understood that when a covariate is correlated with both the disease phenotype and the genotypes at a tested locus, inclusion of the confounding covariate provides protection against spurious associations. In addition, adjusting for covariates can increase the statistical power: covariates of this kind include, for instance, age, gender and body mass index [Papachristou et al. (2011)]. They can typically explain the phenotypic variation that would otherwise be modeled as random error.

Thornton and McPeek (2007) proposed a more powerful case-control association test with related individuals that exploits extra information in individuals with missing genotypes or phenotypes. We extend their method by controlling for covariates. We present simulation results regarding type 1 error and power. In addition, we discuss possible generalizations and applications in genome-wide association data with population stratification.