STATISTICS COLLOQUIUM

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"MISSING GENOTYPES IN TRANSMISSION DISEQUILIBRIUM TEST"

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ABSTRACT

The Transmission Disequilibrium Test (TDT) detects linkage between a marker and a disease-susceptibility locus in the presence of linkage disequilibrium. It requires genotypes of affected offspring and their parents, which might not be available due to some problems. For example, it might be difficult to find alive parents for late onset diseases. Genotyping unaffected siblings, combining different genotype data sets, or assuming a model mechanism for missing parents have been proposed to deal with missing genotypes in parents but not in offspring. In this talk, I will describe a simple method (MI-TDT) developed by me, to impute missing genotypes in any members of the family with two affected offspring. Our method does not require any of the remedies mentioned above but simply utilizes basic properties of Mendel inheritance on the transmission of alleles from parents to offspring. The advantages of our method are its simplicity and robustness, in the sense that it reassures researchers about the declared significance genes when ignoring incomplete data. We illustrate the MI-TDT to identify significant genes in type 1 diabetes from U.K. Warren families.