

STATISTICS SEMINAR

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Tuesday, February 7, 2012

Refreshments at 3:30 p.m. ~ Dickens 108



“Topics in Heterogeneous Group Testing”

Abstract

Since the early 1940s, group testing (pooled testing) has been used to reduce costs in a variety of applications, including infectious disease screening, drug discovery, and genetics. In such applications, the goal is often to classify individuals as positive or negative using initial group testing results and the subsequent process of decoding of positive pools. Many decoding algorithms have been proposed, but most fail to acknowledge, and to further exploit, the heterogeneous nature of the individuals being screened. In this talk, we generalize previous statistical work in group testing by formulating new “informative decoding” algorithms that are driven by the individuals’ risk probabilities. More explicitly, we consider developing “informative” variants of Dorfman and array testing. When compared to competing algorithms which treat the population as homogeneous, we show that our new methods offer significant gains in testing efficiency at virtually no loss in screening accuracy. Additionally, we are able to obtain closed form expressions for misclassification probabilities (sensitivity, specificity, predictive values) that are individual specific. We illustrate our new procedures using chlamydia and gonorrhea data collected in Nebraska as part of the Infertility Prevention Project.

This is collaborative research with Joshua M. Tebbs and Christopher R. Bilder.

Our work is funded by the National Institutes of Health (R01-AI067373).