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INFORMS Seminar Series

Considering Efficacy-Based Objective Functions for Dorfman Style Pooling using a Combo Assay

SEMINAR SESSION INFORMATION

DATE: Wednesday, March 1

TIME: 12:15pm

LOCATION: Durham 260

PROVIDED: Pizza and Soda

SPEAKER INFORMATION

Evan Mullins
PhD Candidate

Grado Department of Industrial & Systems Engineering

MEMBERSHIP INFORMATION

Fees are as follows and include all weekly seminars (12+) & workshops.

FIRST MEETING: FREE

MEETING: $5

SEMESTER: $25

Pooled testing, also known as group testing, is a testing scheme in which specimens from multiple individuals are assigned to a pool, which is then tested for the infection(s). Robert Dorfman first introduced pooled testing in 1943 and the method has been employed in various settings to reduce the cost of screening large populations. Additionally, combo assays are medical screening tools capable of detecting two or more infections at a time. Combo assays are commercially available and utilized in many different settings, such as in blood donation screening, to screen for HIV, and hepatitis viruses B and C simultaneously, or in public health screening, to screen for, for example, multiple sexually transmitted infections (STD's). We derive performance metrics for a two-infection combo assay and develop optimization models to capture classification accuracy with respect to a testing budget constraint. We consider performance metrics influenced by the dilution effect and then modify them for the special case of no dilution effect. The methodology is then evaluated by simulating results for four distinct sub-groups, each with their own sensitivities, specificities, and prevalence for each infection.

Questions? Comments? Send an e-mail to shafae1@vt.edu

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