

DEPARTMENT OF INDUSTRIAL AND ENTERPRISE SYSTEMS ENGINEERING

GE/IE 590 SEMINAR

Resource Allocation for Infectious Disease Control Sabina Alistar

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Abstract

Operations research and mathematical modeling can play a key role in informing high-cost, high-impact health policy decisions. This talk describes my research on resource allocation for infectious disease control. Resource allocation is especially difficult in this context because epidemics are nonlinear (preventing one infection now may prevent scores of future infections); interventions usually do not have additive effects, and the relationship between investment and outcomes is generally nonlinear; in addition, epidemics vary across settings in terms of transmission modes and key risk groups.

In theoretical work, I address the gap between epidemiological measures and the resource allocation decision. I present a new theoretical framework that quantifies the effects of investment in treatment and prevention interventions on a key epidemiological parameter, the reproductive rate of infection, which measures an outbreak's potential for becoming an epidemic. The approach accounts for nonlinearities of intervention scale-up effects. I develop analytical results characterizing the optimal solution and present illustrative examples with data for Uganda and Russia.

In practical work, in collaboration with the United Nations AIDS Programme (UNAIDS) I have created a spreadsheet-based planning tool for use by planners around the world in evaluating investment portfolios for HIV control. The tool is designed to be easy to use, includes optimization capability, and accounts for non-additive and nonlinear effects of interventions. I describe my ongoing work with UNAIDS decision makers to test and implement the model for regional and country-level HIV resource allocation.

Biography

Sabina Alistar is a PhD candidate at Stanford University in the Management Science and Engineering department. She is advised by Professor Margaret Brandeau. In her research, she develops and applies operations research tools to health care policy modeling, with a particular emphasis on resource allocation for the control of infectious diseases such as HIV. Her work is supported by a Stanford Graduate Fellowship and has been published in mathematical epidemiology journals, medical journals (PLoS Medicine) and decision science journals (Medical Decision Making). Prior to starting her PhD, she worked for two years as a Junior Brand Manager at Procter & Gamble, for the Gillette brand.

Location: 114 Transportation Building
Date: Tuesday, February 28, 2012
Time: 4:00 p.m.