

# Applied Mathematics Seminar

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## **"Mathematical modeling of biomedical interventions for HIV prevention"**

Friday, March 26, 2010

1:00 p.m.

304 Pickard Hall

### Abstract:

Vaginal microbicides (VMB) are currently among the few promising biomedical interventions candidates for preventing heterosexual transmission of HIV. They are specifically developed to help women reduce their risk of acquiring HIV infection. We developed two deterministic models of HIV transmission to study the factors which affect the observed VMB efficacy in clinical trials and the impact of a wide-scale usage of VMB in a heterosexual population. We use them to address some concerns regarding the levels of antiretroviral resistance and possible behavioral changes as well as to investigate several "myths" surrounding the VMB development. We estimate the expected public-health effects through different quantitative indicators under a wide array of utilization. The influence of specific factors on the population-level benefits (e.g. infections prevented, reduction of HIV prevalence) among women and men is studied in various scenarios, using parameters sampled from ranges representative for the developing countries. Our analysis confirms that VMB is very much a female preventive tool. We show that effective control measures, restricting the VMB-usage by HIV-positive women, will reduce significantly the risk of resistance development. We also discuss the mechanisms which drive the impact of a VMB intervention and how much they depend on the assumptions integrated in the mathematical models.

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<http://www.uta.edu/math/pages/main/seminar.htm>*