ATELIER SUR LES MÉTHODES STATISTIQUES UTILISÉES EN RECHERCHE SUR LE VIH
14-15 AVRIL 2011

WORKSHOP ON STATISTICAL METHODS IN HIV RESEARCH
APRIL 14-15, 2011

Data and models for inferring expected effects of HIV control programs

James S. Koopman [*] jkoopman@umich.edu
Erik M. Volz [*] erikvolz@umich.edu
Edward L. Ionides [†] ionides@umich.edu
Shah J. Alam [‡] alamj@math.mcmaster.ca
Ethan O. Romero-Severson [*] eoromero@umich.edu

The patterns of outbreaks of HIV through transmission during primary infection are important determinants of the effects control programs will have. For example testing and then treating detected infections will have little effects when the main determinant of infection levels are PHI transmission clusters. On the other hand cluster focused PrEP could be quite effective under these circumstances but would be fairly useless where clusters are very small and short lived. PHI transmission cluster patterns are shown to depend on transmission model characteristics that could possibly represent different populations in the real world. There is not a good way to observe these patterns directly so they must be inferred using models and data. Combined surveillance data and sequence data can be analyzed. Methods to estimate transmission system model parameters from such data are needed and are under development. An inference robustness assessment approach is presented for model choice. The robustness of inferences to realistic relaxation of simplifying model assumptions is assessed. Crucial model characteristics that need to be examined are contact rate by sex act (insertive vs. receptive, oral vs. anal vs. vaginal) and partnership duration variability, mixing pool patterns, and movement of individuals between mixing pools. These have all been shown to have strong effects on the outcomes of concern. The outcome examined for robustness can be either PHI transmission cluster patterns or projected effects of control programs using the estimated parameters for the models. Many details of program design and evaluation can be assessed with this approach and program implementation can be planned to provide data that will continually improve the model evaluation of program effects.

---

[*]Department of Epidemiology, School of Public Health, University of Michigan, 1415 Washington Heights, 4647 SPH Tower, Ann Arbor, MI 48109-2029, USA.

[†]Department of Statistics, University of Michigan, 439 West Hall, 1085 South University Ave, Ann Arbor, MI 48109-1107,USA.

[‡]Department of Mathematics and Statistics, McMaster University, 1280 Main Street West, Hamilton, ON L8S 4K1, Canada.