Supervisor/Project Information Form

Due February 14 2018 by email to crems.programs@utoronto.ca

PLEASE SUBMIT IN WORD FORMAT ONLY. PDF will not be accepted

Supervisor Name: Sharmistha Mishra

Hospital/Research Institution: St. Michael’s Hospital, Li Ka Shing Knowledge Institute

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Field of Research (2 keywords): sexually transmitted infections, mathematical modeling

Department: Department of Medicine, Division of Infectious Disease, University of Toronto

School of Graduate Studies Appointment (IMS, LMP, IHPME etc)? Yes

If YES, please name: Institute of Medical Science (IMS) and Institute of Health Policy, Management and Evaluation (IHPME)

Project Title: Estimating the epidemiologic impact of syphilis pre-exposure prophylaxis in Canada: a mathematical modeling study

Brief Project Description (<300 words):

Rationale: Rates of syphilis continue to rise in Canada, and disproportionately affect men who have sex with men and those living with HIV. New approaches to syphilis prevention are in the pipeline – including pre-exposure prophylaxis (PrEP) with doxycycline. We do not know “how, when, and in whom” to focus syphilis-PrEP such that syphilis rates are sustainably reduced at a population-level. To inform clinical trials and implementation science studies on syphilis-PrEP, we will use a mathematical model to address these knowledge gaps.

Objective: To identify the intervention conditions under which the scale-up of syphilis-PrEP among men who have sex with men in Canada, could optimize the number of syphilis infections prevented per person-years of syphilis-PrEP. Intervention conditions include: syphilis epidemic stage (stable, increasing, decreasing incidence) and characteristics (proportion re-infections, proportion co-infected with HIV); doxycycline effectiveness, uptake, adherence, and duration of use; prioritized subgroups (individuals with a prior documented history of syphilis, higher individual-level or network-level risk).

Methods (what the student will do and learn, and pre-requisite skills): The student will modify, calibrate, and analyze an existing mathematical (deterministic, compartmental) model of syphilis transmission; parameterize the model using data from the literature on doxycycline PrEP; and contribute to dissemination of findings. The student will work in a multi-disciplinary, diverse lab with mathematical modelers, statisticians, and epidemiologists; and with collaborators with expertise in syphilis clinical care and epidemiology. The student must have strong experience programming and debugging in Matlab, Python, or R; experience conducting focused literature searches; strong analytic skills and commitment to model-reproducibility and transparency; and excellent skills in teamwork, collaboration, and communication. Experience working with communities affected by HIV and/or in the field of sexual health is an asset. Interested candidates will be selected via a performance-based interview (coding and documentation, literature search, and analytic skills).