Jessica M. Conway, Department of Mathematics, University of British Columbia, Vancouver, BC, Canada
Bernhard Konrad, Department of Mathematics, University of British Columbia, Vancouver, BC, Canada
Daniel Coombs, Department of Mathematics, University of British Columbia, Vancouver, BC, Canada

Stochastic model of HIV prevention using anti-retroviral drugs

Drug treatments for HIV very effectively control chronic infection. They can also be used to prevent the initiation of HIV infection, either in advance of risky exposure (termed pre-exposure prophylaxis, PrEP), or very shortly after accidental exposure to the virus (termed post-exposure prophylaxis, PEP). To investigate this use of HIV treatments, we developed a multi-type, continuous-time branching process model of the very early stages of HIV infection within-host. We extract extinction probabilities for HIV from equations for the probability generating function, derived from the related Chapman-Kolmogorov equation. We will discuss model predictions regarding the effectiveness of PrEP/PEP depending on factors such as drug type, post-exposure initiation time, and duration of treatment.