

1135-92-2037

Krystin E. Steelman Huff* (krystin.huff@ttu.edu) and **None**. *Stochastic Models of Within-Host Viral Infection*. Preliminary report.

Viral infections caused by influenza virus, Ebola virus, and hantavirus are of serious public health concern. Each virus replicates within specific target cells. For example, hantavirus replicates within the lung microvascular endothelial cells. A well-known target cell model for the early stage of infection is a system of ODEs which includes healthy target cells, latent cells, infected cells, and free viruses. The ODE model serves as a framework for formulation of new stochastic models, a continuous-time Markov chain (CTMC) and a system of stochastic differential equations (SDEs). The stochastic models account for variability in the transition between states and the transmission process. During the early stages of the infection, estimates of the probability of a successful infection is obtained from a multi-type branching process approximation of the CTMC model. The estimates depend on the initial concentration of virions, latent cells, and infected cells. After the infection is established the SDE model shows the variability in timing of the peak infection. Numerical examples illustrate the results for influenza A virus infection. (Received September 25, 2017)