1070-92-342   **Joel C Miller***, 677 Huntington Ave, Boston, MA 02119, and **Erik M Volz**. *Epidemics on networks with just one equation.*

The structure of social interactions along which disease spreads can be represented using a network. When we investigate disease spread in networks we find that many mass action assumptions fail. Individuals with many contacts tend to become infected earlier, and in turn infect more individuals, leading to faster initial growth. However, the remaining population has fewer contacts than average, and so the growth rate decreases more rapidly and the epidemic dies out sooner than mass action predicts.

Unfortunately models tend to require many equations to correct this. Recent work by Volz (JMB 2008) found a low-dimensional system that exactly captures the dynamics. Work by Miller (JMB 2010) simplified this derivation and also simplified the equations.

Our more recent unpublished work simplifies the derivation further, and allows easy generalization to a wide range of diseases and population structures, including populations whose contacts change in time. The key simplification comes from focusing our attention on the fraction of edges connecting to susceptible, infected, or recovered individuals rather than the fraction of the population with each status. We show how to derive these systems and compare the resulting predictions with simulation. (Received February 16, 2011)