1145-60-1170   **Aadrita Nandi*** (`aadrita.nandi@ttu.edu`) and **Linda J.S. Allen** (`linda.j.allen@ttu.edu`).
Probability, Final Size, and Duration of an Outbreak in Stochastic Multigroup Models.

A serious concern to public health is emerging infectious diseases, including those of zoonotic origin such as SARS, MERS and Ebola and re-emerging diseases such as measles and pertussis. Amplification and spread of infection in several emerging diseases have been attributed to highly infectious individuals known as superspreaders. Vaccine waning or lack of vaccine protection are some of the reasons for disease outbreaks in re-emerging diseases. We apply Markov chain models and branching process approximations in the setting of multigroup models to investigate the probability, final size and duration of an outbreak when there are differences between the groups in either host infectivity potential or host susceptibility to infection. One conclusion of the models is that probability of a major disease outbreak is much greater when initiated by individuals with the highest infectivity potential (e.g., superspreaders). Also, the models show that if groups are characterized by their infectivity potential as opposed to their susceptibility to infection, the overall probability of an outbreak is smaller but the final size is greater. (Received September 19, 2018)