1086-60-81 **Xueying Wang*** (xueying@math.tamu.edu), Department of Mathematics, Texas A&M University, College Station, TX 77840, and **Raju Gautam**, **Pablo J. Pinedo**, **Linda J. S. Allen** and **Renata Ivanek**. *A stochastic model for transmission, extinction and outbreak of Escherichia coli O157:H7 in cattle as affected by ambient temperature and pathogen cleaning practices.*

This study proposes a stochastic-differential equation model as an approximation to a Markov jump process model, using Escherichia coli O157:H7 in cattle as a model system. In the model, the host population infection dynamics are described using the standard susceptible-infected-susceptible framework, and the E. coli O157:H7 population in the environment is represented by an additional variable. The backward Kolmogorov equations that determine the probability distribution and the expectation of the first passage time are rigorously derived in a general setting. The outbreak and apparent extinction of infection are investigated by numerically solving the Kolmogorov equations for the probability density function of the associated process and the expectation of the associated stopping time. The results provide insight into E. coli O157:H7 transmission and apparent extinction, and suggest ways for controlling the spread of infection in a cattle herd. Specifically, this study highlights the importance of ambient temperature and sanitation, especially during summer. (Received July 09, 2012)