1014-60-338 **Linda J. S. Allen*** (linda.j.allen@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79409-1042, and **P. van den Driessche**, Department of Mathematics and Statistics, University of Victoria, Victoria, BC V8W 3P4, Canada. *Stochastic Epidemic Models with a Backward Bifurcation.* Preliminary report.

Two new stochastic epidemic models, namely a continuous-time Markov chain model and a stochastic differential equation model, are formulated. These are based on a deterministic model that includes vaccination and is applicable to pertussis. For a range of parameter values, the deterministic model exhibits a backward bifurcation if the vaccine is imperfect. Thus a region of bistability exists in a subset of parameter space. The dynamics of the stochastic epidemic models are investigated in this region of bistability, and compared with those of the deterministic model. In this region the probability distribution associated with the infective population exhibits bimodality with one mode at the disease-free equilibrium and the other at the larger endemic equilibrium. The two stochastic models give similar results for large population sizes. (Received September 10, 2005)