1046-37-612 **Eric Forgoston***, Naval Research Laboratory, Code 6792, 4555 Overlook Avenue, SW, Washington, DC 20375-5337, and **Lora Billings** and **Ira B. Schwartz**. *Stochastic Epidemic Model Reduction: A Normal Form Approach.* Preliminary report.

We consider a stochastic Susceptible-Exposed-Infected-Recovered (SEIR) epidemiological model. Through the use of a normal form coordinate transform, we are able to analytically derive the stochastic center manifold along with the associated, reduced set of stochastic evolution equations. The transformation correctly projects both the dynamics and the noise onto the center manifold. Therefore, the solution of this reduced stochastic dynamical system yields excellent agreement, both in amplitude and phase, with the solution of the original stochastic system for a temporal scale that is orders of magnitude longer than the typical relaxation time. These continuous solutions are found using Langevin equations having Gaussian noise that describe the fluctuations of the SEIR dynamics about an equilibrium. To examine the effects of general noise, the continuous results are compared with those found using a Markov simulation having finite population size in which the noise is due to internal fluctuations. (Received September 09, 2008)