1027-92-7   **Luis F. Gordillo*** (`gordillo@mathpost.asu.edu`), Department of Mathematics, Arizona State University, Tempe, AZ 85287-1801, and **Stephen Marion**, **Anders Martin-Lof** and **Priscilla Greenwood**. *Bimodal Epidemic Size Distributions for Near-Critical SIR with Vaccination.*

We introduce a recursive algorithm which enables the computation of the distribution of epidemic size in a stochastic SIR model for very large population sizes. In the important parameter region where the model is just slightly supercritical the distribution of epidemic size is decidedly bimodal. We find close agreement between the distribution for large populations and the limiting case where the distribution is that of the time a Brownian motion hits a quadratic curve. The model includes the possibility of vaccination at a constant rate during the epidemic. The effects of the parameters, including vaccination level, on the form of the epidemic size distribution are explored. (Received November 09, 2006)