1020-60-90 **Steven P. Lalley*** (lalley@galton.uchicago.edu), Department of Statistics, University of Chicago, Chicago, IL. *Spatial Epidemics: Critical Behavior.*

At each site of the integer lattice there is a population of size N. A spatial epidemic evolves according to the following rules: (1) An infected individual i at site x may infect susceptible individuals j only at sites x-1, x, or x+1. (2) The probability that i infects j is p.(3) Infected individuals remain infected for one unit of time. There are two variants of the model: (A) In the SIS variant, infected individuals, upon recovery, become once again susceptible. (B) In the SIR variant, infected individuals recover and then are immune from further infection for the duration of the epidemic.

We consider the progression of the epidemic at criticality, that is, when the infection probability is 1/3N, in the large-N limit. We show that there is a critical threshold for both epidemics: If the number of individuals initially infected is substantially less than $N^{2/3}$ (for SIS epidemics) or $N^{2/5}$ (for SIR epidemics) then the epidemic evolves in approximately the same manner as the branching random walk envelope. However, at the critical threshold ($N^{2/3}$ or $N^{2/5}$) the epidemic evolves approximately as the branching random walk envelope with a state-dependent killing. In all cases, the limit process, after rescaling, is a measure-valued diffusion. (Received August 17, 2006)