1027-92-39 **Linda J. S. Allen*** (linda.j.allen@ttu.edu), **Ben M. Bolker**, **Yuan Lou** and **Andrew L. Nevai**. *Existence of a Disease-Free Equilibrium in an SIS Epidemic Patch Model When the Rate of Susceptible Dispersal Approaches Zero.*

Spatial heterogeneity, habitat connectivity, and rates of movement impact the persistence and extinction of infectious diseases. These factors are shown to determine the asymptotic profile of the equilibria in a frequency-dependent SIS epidemic model with n patches in which susceptible and infected individuals move between patches. Patch differences in local disease transmission and recovery rates characterize whether patches are low-risk or high-risk, and these differences collectively determine whether the spatial domain is low-risk or high-risk. For low-risk domains, the disease-free equilibrium is stable ($R_0 < 1$) if and only if the dispersal rate of infected individuals lies above a threshold value, but for high-risk domains, the disease-free equilibrium is always unstable ($R_0 > 1$). When the endemic equilibrium exists, it tends to a spatially inhomogeneous disease-free equilibrium as the dispersal rate of susceptible individuals tends to zero. These results have important implications for disease control. (Received February 02, 2007)