962-92-547 **Robert S Cantrell**, Department of Mathematics, University of Maimi, Coral Gables, FL 33124, **Chris Cosner*** (gcc@math.miami.edu), Department of Mathematics, University of Miami, Coral Gables, FL 33124, and **William F Fagan**, Department of Biology, Arizona State University, P.O. Box 871501, Tempe, AZ 85287-1501. *Brucellosis, Botflies, and Brainworms: the Impact of Edge Habitats on Pathogen Transmission and Species Extinction.*

We derive and analyze reaction-diffusion models for competitive interactions between species which are mediated by pathogen transmission which occurs in regions where the habitats of the species overlap. An example of the sort of system we model is the interaction between deer, elk, and the brainworm parasite. The models we use for the population interactions are derived from more detailed epidemiological models for pathogens which are transmitted between species. Under assumptions which are plausible for the specific systems we consider, the epidemiological system reduces to a two species Lotka-Volterra competition model. The spatial structure of the model is somewhat unusual because it is assumed that the habitats for the two populations intersect but are not the same. Hence, the reaction-diffusion system is somewhat novel in that the two components are defined on different spatial domains and the interaction terms are nonzero only on the intersection of the domains. We obtain a number of conditions for coexistence or extinction in terms of the parameters in the system and the geometry of the underlying spatial domains. The methods include persistence theory (in the form of permanence) and estimates of the eigenvalues of certain elliptic operators. (Received September 15, 2000)