1125-92-2011   **Gerald W Baygents*** (`baygentsg@umkc.edu`), Kansas City, MO 64118. *Transmission dynamics of bluetongue and epizootic hemorrhagic diseases in a patchy environment.* Preliminary report.

Epizootic hemorrhagic disease and bluetongue are two orbivirus-related diseases (HD) of white-tailed deer with multiple outbreaks in late July through November are spread by the small biting midge, Culicoides Ceratopogonidae. HD outbreak is a major concern in the wildlife and natural resource management, and using mathematical modeling, we explore efficacy of various control strategies. In particular, an epidemic model is proposed to analyze the HD dynamics between multiple patches due to deer population dispersal. The model embodies deer movements between the patches and the vector-borne infections within the patches. In the present work (1) using the harvest, disease mortality and dispersal data of deer population in Missouri, the host-related parameter values of the model are estimated, (2) the conditions for existence and stability of equilibria are established, and (3) the local and global basic reproduction numbers are respectively calculated for each patch and the entire environment. It is shown that increasing movements of susceptible deer from patches with reproduction numbers greater than one to those with reproduction number less than one can only be an effective control strategy when it is combined with suppression of the midges' population in all patches. (Received September 19, 2016)