1023-37-806 **Curtis Lawrence Wesley*** (cwesley@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX , and **Linda J. S. Allen** (linda.allen@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX. *A Rodent-Hantavirus Model Structured by Disease, Developmental Stage, and Sex.*

Hantavirus is a zoonotic disease carried by wild rodents. In humans this disease is manifested as either hantavirus pulmonary syndrome (HPS) or hemorrhagic fever with renal syndrome (HFRS). The goal of this research is to formulate realistic models that follow the disease dynamics within the rodent population. A new discrete-time model structured by the stages of the disease (susceptible and infected), the stages of development (juvenile, subadult, and adult) and the sex of the rodent (male and female) is formulated and analyzed. The model is a system of difference equations. We compute the basic reproduction number $\mathcal{R}_0$ for this system and provide a condition for the reduced system with males only (and sufficient number of females) to be uniformly persistent. A stochastic model is formulated based on the system of difference equations. Numerical simulations of the deterministic and stochastic models illustrate the differences in the disease dynamics among the three stages and the males and females. In the numerical examples, a transcritical bifurcation occurs at $\mathcal{R}_0 = 1$ and a unique endemic equilibrium exists when $\mathcal{R}_0 > 1$. The sensitivity of the endemic equilibrium values to changes in the model parameters are also investigated numerically. (Received September 26, 2006)