

1027-92-172

Colleen T Webb* (ctwebb@lamar.colostate.edu), Colorado State University, Department of Biology, Campus Delivery 1878, Fort Collins, CO 80523. *Modeling Plague Dynamics in Natural Biological Systems*. Preliminary report.

We use a suite of models including ODE and simulation approaches to explore the disease dynamics of plague. We lack a clear understanding of how plague is maintained in natural systems despite its extremely high virulence. One key to elucidating the epidemiological dynamics is determining the dominant transmission routes of plague. Routes include "blocked" infectious fleas, pneumonic infection, or contact with a short-term infectious reservoir. Our modeling approach includes transmission from all three sources of infection simultaneously and uses sensitivity analysis to determine their relative importance. While transmission via blocked fleas is a dominant paradigm, our model clearly predicts that this form of transmission cannot drive epizootics in some natural hosts. Rather, a short-term reservoir is required for epizootic dynamics. Empirical work suggests that atypical fleas are the most likely reservoir. We have modified our model to incorporate this route explicitly, and it can explain the observed epidemiological dynamics. Finally, we have incorporated evolutionary processes into our model, and our results suggest that many species may not be able to evolve resistance despite strong selection pressures. (Received February 26, 2007)