

Meeting: 1006, Lubbock, Texas, SS 10A, Special Session on Extinction, Periodicity, and Chaos in Population and Epidemic Models

1006-92-132 **Maia Martcheva***, Department of Mathematics, 358 Little Hall, P.O.Box 118105, University of Florida, Gainesville, FL 32611, and **Sergei Pilyugin** (pilyugin@math.ufl.edu), Department of Mathematics, 358 Little Hall, P.O.Box 118105, University of Florida, Gainesville, FL 32611. *The Role of Coinfection in Multi-Disease Dynamics*. Preliminary report.

We investigate an epidemic model of two diseases. The primary disease is assumed to be a slowly progressing disease and the density of individuals infected with it is structured by infection-age. Hosts already infected with the primary disease can become coinfecting by a secondary disease. Besides the infection-free equilibrium there is a unique dominance equilibrium corresponding to each disease. Without coinfection there are no coexistence equilibria, however, with coinfection we find for some parameter values up to two coexistence equilibria. We observe competitor mediated oscillatory coexistence. Furthermore, weakly subthreshold (occur when exactly one of the reproduction numbers is below one) and strongly subthreshold (occur when both reproduction numbers are below one) coexistence equilibria may exist. Some of those are a result of a two-parameter backward bifurcation. Bistability occurs in several regions of the parameter space. Despite the presence of coinfection, coexistence of the two diseases appears possible only for relatively small values of the reproduction numbers – for large values of the reproduction numbers the outcome of the competition is dominance of one of the diseases, including in the form of bistable dominance. (Received February 11, 2005)