

**Wang, Wendi**

**Epidemic models with nonlinear infection forces.** (English) Zbl 1089.92052

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Summary: Epidemic models with behavior changes are studied to consider effects of protection measures and intervention policies. It is found that intervention strategies decrease endemic levels and tend to make the dynamical behavior of a disease evolution simpler. For a saturated infection force, the model may admit a stable disease-free equilibrium and a stable endemic equilibrium at the same time.

If we vary a recovery rate, numerical simulations show that the boundaries of the region for the persistence of the disease undergo the changes from the separatrix of a saddle to an unstable limit cycle. If the inhibition effect from behavior changes is weak, we find two limit cycles and obtain bifurcations of the model as the population size changes. We also find that the disease may die out although there are two endemic equilibria.

**MSC:**

92D30 Epidemiology

34D23 Global stability of solutions to ordinary differential equations

34C60 Qualitative investigation and simulation of ordinary differential equation models

Cited in **32** Documents

**Keywords:**

nonlinear incidence; basic reproduction number; cycles; limit cycles; SIRS-type model

**Full Text:** [DOI](#)