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Asymptotic dynamics of deterministic and stochastic epidemic models with multiple pathogens. (English) [Zbl 1080.34033](#)

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The paper deals with mathematical models of deterministic and stochastic multiple-stain epidemic, parts of which have reported in the literature. This work consists largely of two-strain epidemic models; the feature of such model is that the population is subdivided into susceptible individuals and individuals infected with two pathogens.

The equations for the deterministic epidemic form a system of ordinary – and for the stochastic epidemic as a system of stochastic differential equations. The models assume that there are total cross immunity, vertical transmission and a density-dependent death rate. The impact of vertical transmission on the coexistence of two strains is analyzed and the dynamics of the deterministic and stochastic model are compared. For example, it can be seen that the coexistence dynamics is different for the deterministic and stochastic models.

A set of numerical examples are given to prove the data for comparison.

Reviewer: Mohan Lal Mehra (Bonn)

MSC:

- [34C60](#) Qualitative investigation and simulation of ordinary differential equation models
- [34D05](#) Asymptotic properties of solutions to ordinary differential equations
- [34F05](#) Ordinary differential equations and systems with randomness
- [60H10](#) Stochastic ordinary differential equations (aspects of stochastic analysis)
- [92D30](#) Epidemiology

Cited in **6** Documents

Keywords:

deterministic and stochastic epidemic models; dynamic of epidemic models; multiple pathogens; coexistence of multiple strains; cross immunity; vertical transmission