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Stochastic eco-epidemiological model of dengue disease transmission by *Aedes aegypti* mosquito. (English) [Zbl 1180.92057](#)

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Summary: We present a stochastic dynamical model for the transmission of dengue that takes into account seasonal and spatial dynamics of the vector *Aedes aegypti*. It describes disease dynamics triggered by the arrival of infected people in a city. We show that the probability of an epidemic outbreak depends on seasonal variation in temperature and on the availability of breeding sites. We also show that the arrival date of an infected human in a susceptible population dramatically affects the distribution of the final size of epidemics and that early outbreaks have a low probability. However, early outbreaks are likely to produce large epidemics because they have a longer time to evolve before the winter extinction of vectors. Our model could be used to estimate the risk and final size of epidemic outbreaks in regions with seasonal climatic variations.

MSC:

[92C60](#) Medical epidemiology
[92D30](#) Epidemiology
[60G99](#) Stochastic processes
[60J99](#) Markov processes

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