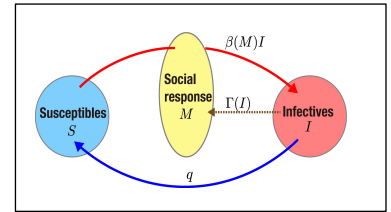


Social response could cause recurring epidemic outbreaks: A mathematical model

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Recurring epidemic outbreaks have been observed for different kinds of infectious diseases and places. Such an epidemic recurrence could affect the policy making, hinder the economy, consume medical resources, and break people's confidence in fighting the disease. When a transmissible disease invades, the community may respond to the disease in such a way as wearing masks to reduce the infection risk or by getting the vaccine to prevent serious symptoms and disease transmission. In some cases, the community may be insensitive to an invading transmissible disease. In this work, we consider a mathematical model with a system of ordinary differential equations, which is one of what is called Susceptible-Infective-Susceptible (SIS) models, specifically taking into account the effect of the social response. We shall discuss the possibility of an oscillatory variation in the epidemic dynamics, focusing on the relation of social sensitivity to the disease spread. Results obtained by the mathematical analysis on our model imply that the social sensitivity, the social insensitivity, and the community tolerance for maintaining the social response have a certain relevance to the occurrence of recurring epidemic outbreaks.