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Oscillations in epidemic models with spread of awareness

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Abstract

This presentation reports joint work with Winfried Just and Joan Saldaña.

We study ODE models of epidemic spreading with a preventive behavioral response that is triggered by awareness of the infection. Previous studies of such models have mostly focused on the impact of the response on the initial growth of an outbreak and the existence and location of endemic equilibria. Here we study the question whether this type of response is sufficient to prevent future flare-ups from low endemic levels if awareness is assumed to decay over time. In the ODE context, such flare-ups would translate into sustained oscillations with significant amplitudes.

Our results show that such oscillations are ruled out in Susceptible-Aware-Infectious-Susceptible models with a single compartment of aware hosts, but can occur if we consider two distinct compartments of aware hosts who differ in their willingness to alert other susceptible hosts.