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Infectious disease models with switching general nonlinear incidence rate

In a pulse vaccination strategy, the transmission of an infectious disease, which depends crucially on the infectivity of the disease and the population behaviour, plays a vital role in determining vaccination levels necessary to ensure disease eradication. In particular, it is possible that a vaccine scheme may fail because the nonlinear dependence on the number of infected individuals is not being accounted for properly in the model's incidence rate. In this talk, infectious disease models with time-varying parameters and switching general nonlinear incidence rate are proposed and analyzed. The functional form of the nonlinear incidence rate is assumed to change in time, due to, for example, changes in population behaviour or environmental factors. Pulse vaccination and treatment schemes are considered and some threshold criteria are found which guarantee disease eradication. Some results on disease persistence are also presented.