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"Modeling Control Strategies for Influenza Epidemic with the Emergence and Evolution of Drug Resistance"

One of the most important problems in preventing influenza outbreak is the spread of drug resistance during disease infection. In this study, we model an influenza epidemic considering emergence and evolution of drug resistance. Since antiviral treatment is not effective on resistant infecteds, we implement the quarantine control strategy to mitigate the final size of the epidemic. In addition, prophylaxis and treatment strategies are considered in our model. A system of ordinary differential equation is formulated for a SIQR influenza epidemic model. The influences of these three main control strategies are investigated on the final size of the epidemic. Numerical simulations show that implementation of optimal quarantine and treatment together leads to outbreak containment. The basic reproduction numbers and control reproduction numbers are calculated for sensitive and resistant strains.