

Bifurcation and Stability Analysis of the Dynamics of Cholera Model with Controls

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Abstract : Cholera is a disease that is predominately common in developing countries due to poor sanitation and overcrowding population. In this paper, a deterministic model for the dynamics of cholera is developed and control measures such as health educational message, therapeutic treatment, and vaccination are incorporated in the model. The effective reproduction number is computed in terms of the model parameters. The existence and stability of the equilibrium states, disease free and endemic equilibrium states are established and showed to be locally and globally asymptotically stable when $R_0 < 1$ and $R_0 > 1$ respectively. The existence of backward bifurcation of the model is investigated. Furthermore, numerical simulation of the model developed is carried out to show the impact of the control measures and the result indicates that combined control measures will help to reduce the spread of cholera in the population

Keywords : backward bifurcation, cholera, equilibrium, dynamics, stability

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