1067-92-1975   **Peng Zhong*** (`zhong@math.utk.edu`), Math Department, University of Tennessee, Knoxville, TN 37996, **Suzanne Lenhart** (`lenhart@math.utk.edu`), Math Department, University of Tennessee, Knoxville, 37996, and **Elsa Schaefer** (`elsa.schaefer@marymount.edu`). *Optimal Control of a Cholera Model by Vaccination.*

A model of Cholera with nine ordinary differential equations is built to track movement of susceptible individuals with and without partial immunities to either an asymptomatic infected class or a symptomatic infected class, then to two recovered classes with different waning rates. A vaccinated class is added into this model as well and the vaccination rate is a control function.

We look for an optimal vaccination rate that minimizes the economic and social losses, thus the objective functional is set to be the total asymptomatic infected together with weighted vaccination cost. We use 4th order Runge Kutta method for numerical results. How some sensitive parameters, like the ingestion rate of vibrios, could affect the vaccination suggestion is studied. (Received September 22, 2010)