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Cholera is a diarrhoeal disease that is caused by an intestinal bacteria named as *Vibrio cholerae*. Recently an outbreak of cholera in Haiti brought public attention on this deadly disease. Cholera outbreak is not common in a developed country; however, handling this outbreak still remains a major challenge in both developing and underdeveloped country once the disease has its first onset. In this work, the objective in our differential equation model is to find an effective optimal vaccination strategy to minimize the disease related mortality and to reduce the associated costs. The effect of seasonality in pathogen transmission on vaccination strategies was investigated under several types of disease scenarios, including an endemic case and a new outbreak case. This model is an extension of a general water-borne pathogen model. This work involves optimal control problem formulation, analysis and numerical simulations. (Received September 25, 2012)