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A multigroup mod

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We propose a general multigroup and indirect transmission pathway model under biologically feasible conditions, with a sharp threshold for cholera dynamics, supported by numerical simulation results. We also propose an optimal vaccination strategy for

Keywords: Cholera epidemics; m

Mathematics Subject Classification

1. Introduction

Cholera epidemics continue to access to clean water and sanitation. The disease caused by the bacterium *Vibrio cholerae* can cause death within days or hours if left untreated. A large number of cholera outbreaks were reported in modern history that took place in 1953, 1961, 1991, and 2000. In 2010, 530,000 reported cases [22]. Major outbreaks occurred in Malawi (2003), Mozambique (2004), Leone (2012), Ghana (2011), Nigeria (2010), India (2007), among others. The