

An age-structured epidemic model of rotavirus with vaccination

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Abstract The recent approval of a rotavirus vaccine in Mexico motivates this study on the potential impact of the use of such a vaccine on rotavirus prevention and control. An age-structured model that describes the rotavirus transmission dynamics of infections is introduced. Conditions that guarantee the local and global stability analysis of the disease-free steady state distribution as well as the existence of an endemic steady state distribution are established. The impact of maternal antibodies on the implementation of vaccine is evaluated. Model results are used to identify optimal age-dependent vaccination strategies. A convergent numerical scheme for the model is introduced but not implemented. This paper is dedicated to Prof. K. P. Hadeler, who continues to push the frontier of knowledge in mathematical biology.

Keywords Rotavirus · Age-structure · Vaccination

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