

Analysis of a Dengue Model with Vertical Transmission

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There is evidence showing that vertical transmission of dengue virus exists in *Aedes* mosquitoes. We propose a deterministic dengue model with vertical transmission in mosquitoes by including aquatic mosquitoes (eggs, larvae and pupae), adult mosquitoes (susceptible, exposed and infectious) and hosts (susceptible, exposed, infectious and recovered). We first analyze the existence and stability of disease-free equilibria, calculate the basic reproduction number and discuss the existence of the disease endemic equilibrium. Then, we study the impact of vertical transmission of the virus in mosquitoes on the spread dynamics of dengue.