

Impact of Vaccination and Accuracy of Serological Tests on Dengue Dynamics in Cali

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Dengue, a mosquito-borne viral disease, represents a global challenge, exacerbated by the presence of multiple serotypes. The second infection carries a high risk of mortality, contrasting with the asymptatology of successive infections. The main objective of this research is to analyze the transmission dynamics of dengue, with a particular focus on the effect of vaccination on reinfections. For this purpose, mathematical modeling using ordinary differential equations (ODEs), a crucial tool for understanding the dynamics of these diseases, is employed. Despite the availability of vaccines such as Dengvaxia (Sanofi-Pasteur), their efficacy is limited by serotype-specific immunity and the risk that they act as primo-infections, enhancing reinfections. This study seeks to evaluate how vaccination, in the context of multiple circulating serotypes, impacts the incidence of dengue reinfections. To achieve this objective, a SIRS-SI model that simulates the dynamics of dengue with two serotypes and vaccination of seropositive individuals is proposed.

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