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A MODEL FOR THE COINFECTION OF MALARIA AND ZIKA VIRUS DISEASE WITH INTERVENTION STRATEGIES

Communication Info

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Abstract

Malaria–Zika co-infection complicates diagnosis, increases disease severity, and influences transmission dynamics due to overlapping symptoms and immune interactions [2]. In this study, we develop a comprehensive mathematical model capturing co-infection dynamics, incorporating vaccination, treatment, and sterile insect technique (SIT) vector control [1]. The model emphasizes the risk of co-infection in regions where both pathogens circulate and provides a unified framework to evaluate control strategies [5]. Stability analysis shows that the disease-free equilibrium (DFE) is locally stable when $R_{mz} < 1$ but is not globally stable, revealing a backward bifurcation; thus, reducing R_{mz} alone may not eliminate infection [3,4]. Enhancing treatment coverage, vaccination rates, and SIT deployment substantially reduces both single infections and co-infections, highlighting the importance of integrated intervention strategies.

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