

## **MODELLING THE EPIDEMIOLOGY OF DENGUE WITH LOSS OF IMMUNITY**

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### **ABSTRACT**

*In the paper, we consider models of SIR – SI dengue epidemic. The model considers the effect of loss (partial) of immunity on different state variables. Therefore the effect of loss of immunity or the immunity parameter ( $\gamma_1$ ) plays a very important role in dengue epidemic model and gives the possibility of occurrence of the dengue diseases. The characteristic roots of the model at disease -free equilibrium (DFE) point are the real and opposite sign, which indicate that no occurrence of dengue virus infection since there are no infected human or infected mosquito population. At DFE point, every human in the population is healthy and not infected with the virus. The characteristic roots at endemic equilibrium point are all negative (real part) and complex; indicate that the focus of dengue fever would be stable. The estimated value of the basic reproduction number is 2.73 with a range (2.14, 3.02). The source for the data is NVBDCP.*

**KEYWORDS:** *Dengue, Endemic, Immunity, Basic Reproduction Number, and Stability*

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### **Article History**

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