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## Modelling the dynamics of dengue real epidemics

The infectious diseases are still a relevant problem for human life. Nowadays, due to the intense flow of people around the world and within the cities, the understanding of their complex dynamics is a multidisciplinary issue. Concerning dengue, a vector transmitted disease, there is no vaccine against any of the four serotypes of the virus, although many efforts have been done in that direction. As a result, dengue transmission control is based on the control of the aquatic and adult mosquito forms. So far, the modelling of the dynamics of dengue may be very helpful for testing both the adopted vector control strategies and the action of future vaccines.

In South and North America, there are records of occurrence of all serotypes of dengue virus, while in Brazil, until now, only 3 serotypes (DENV1, DENV2 and DENV3) have been reported. However, Brazil is responsible for 80% of dengue cases in South America and 60% of notified cases around the world. The circulation of the three serotypes represent an important risk factor for the occurrence of dengue hemorrhagic fever (DHF). Although all the efforts applied by the Brazilian dengue control program to stop dengue transmission, it is still a relevant problem in the first decade of this century. Two factors had been associated to the failure of dengue control: the vector's adaptive capacity and the occurrence of new virus strains.

In this work we use a mathematical model for dengue transmission with the aim to analyze and compare two dengue epidemics that occurred at Salvador, Brazil in 1995-1996 and 2002. Using real data, we obtain the force of infection,  $\Lambda$ , and the basic reproductive number,  $R_0$  for both epidemics. We also obtain the time evolution of the effective reproduction number,  $R(t)$ , which result to be a very asuitable measure to comparing the patterns of both epidemics. Based on the estimations of  $R_0$  and  $R(t)$  we show that control applied only on the adult stage of the mosquito population is not sufficient to stop dengue transmission, emphasizing the importance of the control applied on the aquatic mosquito phase.