



Mês de: Setembro 2011

BIOMATEMÁTICA

Dia 13 de Setembro (terça-feira), às 16h, na Sala B3-01

“Modelling dengue fever epidemiology: complex dynamics and its implication for data analysis”

Maira Aguiar

(CMAF)

Abstract:

It is estimated that every year, there are 70-500 million dengue infections, 36 million cases of dengue fever (DF) and 2.1 million cases of dengue haemorrhagic fever (DHF), with more than 20:000 deaths per year [1, 2]. In many countries in Asia and South America DF and DHF has become a substantial public health concern leading to serious social-economic costs. Mathematical models describing the transmission of dengue viruses has focussed on ADE effect and temporary cross immunity trying to explain the irregular behaviour of dengue epidemics by analysing the available data.

However, no systematic investigation of the possible dynamical structures has been performed so far. Our study focuses on a seasonally forced two-strain model with temporary cross immunity and possible secondary infection, motivated by dengue fever epidemiology. We extend the previous studied non-seasonal model [3, 4, 5] by adding seasonal forcing, mimicking the vectorial dynamics, and a low import of infected individuals, which is realistic in the dynamics of dengue fever epidemics. The extended model shows complex dynamics and qualitatively a good agreement between empirical DHF monitoring data and the obtained model simulation [6]. We discuss the role of seasonal forcing and the import of infected individuals in such systems, the biological relevance and its implications for the analysis of the available dengue data.

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Local:
COMPLEXO INTERDISCIPLINAR
Av. Prof. Gama Pinto, 2
1649-003 Lisboa

