Optimal Age for Dengue Vaccination in Brazilian cities
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Aedes Aegypti is responsible for transmission of many diseases; in Brazil, nowadays, Dengue, Yellow Fever, Zika and Chikungunya are drawing attention of the researchers and the government. Besides the vector control, there is vaccine against Yellow fever; at the end of 2015, a tetravalent vaccine against the four serotypes of dengue fever virus was approved in Brazil. Very recently, the government recommends that people, who are seronegative, do not get vaccinated; it was observed severe forms of Dengue when he/she became infected after got vaccinated. Even for a safe and efficient vaccine, at least, at the very beginning of the Public Campaign, its production will not be enough to cover the population under risk.

In this work, a partial differential equation model, that mimics dengue transmission, and dengue incidence are used to estimate the optimum vaccination age in ten cities in Brazil using data from 2001 to 2014. For this proposal, the reproduction number of the disease was analytically minimized given an one-dose vaccination strategy [Cruz G, Esteva L, Vargas C.; Bull. Math. Biol. 46 (2014) 2073-2090], and an optimal age range is numerically calculated. The results show that the optimal age for vaccination does not coincide with the age of the peak incidence for the analysed cites. The optimum vaccination age, targeting individuals less than 14 years old, is compatible with the values reported in other works for Brazil. More interesting, the results show a great heterogeneity related to the obtained optimum vaccination age and its confidential interval along the country. Finally the heterogeneous confidential intervals for different cities allow an optimized distribution of the immunogen which is very relevant for the Public Campaign due to its limited quantitative, leading to a better vaccination coverage for the population.