

Celebración del 20 Aniversario del CIMPA

Conferencia: Comparative estimation of parameters for dengue and chikungunya in Costa Rica from weekly reported data



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Obtuvo su Bachillerato en Ciencias de la computación con orientación en matemática en la Universidad Metropolitana de Cupey en Puerto Rico en el 2001. Su tesis "Theoretical Studies in Epidemiology and Social Dynamics", lo hizo acreedor del título de doctor en la Universidad de Cornell en Estados Unidos. Su última publicación, junto con otros investigadores, es del 2017 con el título "*Comparative estimation of parameters for dengue and chikungunya in Costa Rica from weekly reported data*". Actualmente es docente de la Escuela de Matemática e investigador en el Centro de Investigaciones en Matemática Pura y Aplicada (CIMPA).

Abstract: For decades, dengue virus has been a cause of major public health concern in Costa Rica, due to its landscape and climatic conditions that favor the circumstances in which the vector, *Aedes aegypti*, thrives. The emergence and introduction throughout tropical and subtropical countries of the chikungunya virus, as of 2014, challenged Costa Rican health authorities to provide a correct diagnosis since it is also transmitted by the same vector and infected hosts may share similar symptoms. We study the 2015-2016 dengue and chikungunya outbreaks in Costa Rica while establishing how point estimates of epidemic parameters for both diseases compare to one another. Longitudinal weekly incidence reports of these outbreaks signal likely misdiagnosis of infected individuals: underreporting of chikungunya cases, while overreporting cases of dengue. Our comparative analysis is formulated with a single-outbreak deterministic model that features an undiagnosed class. Additionally, we also used a genetic algorithm in the context of weighted least squares to calculate point estimates of key model parameters and initial conditions, while formally quantifying misdiagnosis.

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