

Climate-based models of mosquito-borne diseases: investigating dengue emergence in Argentina

Michael Robert

Virginia Tech

Mosquito-borne diseases endemic to areas with tropical climates have been spreading in temperate regions of the world with greater frequency in recent years. Numerous factors contribute to this spread, including urbanization, increases in global travel, and changes in temperature, precipitation, and humidity patterns due to climate change. Mathematical, statistical, and computational modeling are useful tools to examine how these different influences impact transmission and spread of arboviruses and for projecting how potential future changes in these factors may affect arbovirus dynamics. In this talk, I will present climate-based models developed to study the introduction, emergence, and spread of dengue, with a particular focus on its emergence in a region of temperate Argentina, where the virus appeared for the first time in 2009. I will present mathematical and statistical models we have developed to better understand the role of temperature and precipitation in dengue's emergence and increase in incidence in the region and discuss how we have used these models to make projections under future climate scenarios.

In Special Session 54 on Emergence, Spread, and Control of Mosquito-borne Diseases: Insights from Mathematical Modeling at the Mathematical Congress of the Americas 2025.