Masthead Logo

Virginia Commonwealth University
VCU Scholars Compass

Biology and Medicine Through Mathematics Conference

2019

May 16th, 4:00 PM

Investigating drivers of dengue emergence in Cordoba, Argentina

Michael Andrew Robert
University of the Sciences of Philadelphia, m.robert@usciences.edu

Rachel Sippy
University of Florida, rsippy@ufl.edu

Anna M. Stewart-Ibarra
SUNY Upstate Medical University, amstew01@gmail.com

See next page for additional authors

Follow this and additional works at: https://scholarscompass.vcu.edu/bamm

Part of the Applied Mathematics Commons, Epidemiology Commons, and the Life Sciences Commons

https://scholarscompass.vcu.edu/bamm/2019/thur/7

This Event is brought to you for free and open access by the Dept. of Mathematics and Applied Mathematics at VCU Scholars Compass. It has been accepted for inclusion in Biology and Medicine Through Mathematics Conference by an authorized administrator of VCU Scholars Compass. For more information, please contact libcompass@vcu.edu.

Presenter Information
Michael Andrew Robert, Rachel Sippy, Anna M. Stewart-Ibarra, Rebecca C. Christofferson, Helen J. Wearing, and Elizabet L. Estallo

This event is available at VCU Scholars Compass: https://scholarscompass.vcu.edu/bamm/2019/thur/7

Investigating drivers of dengue emergence in Córdoba, Argentina

Michael A. Robert[1], Rachel J. Sippy[2], Anna M. Stewart-Ibarra[3], Rebecca C. Christofferson[4], Helen J. Wearing[5], and Elizabet E. Estallo[6].

1. University of the Sciences of Philadelphia
2. University of Florida
3. SUNY Upstate Medical University
4. Louisiana State University
5. University of New Mexico
6. Universidad Nacional de Córdoba

Dengue fever is a viral disease transmitted by the mosquito species *Aedes aegypti*. Dengue is endemic to many tropical and subtropical regions of the world; however, outbreaks have been occurring in more temperate regions in the last two decades. In the temperate city of Córdoba, Argentina, the first dengue outbreak on record occurred in 2009 and in the decade since, dengue transmission has been reported every year, with three other large outbreaks occurring in 2013, 2015, and 2016. This emergence of dengue is likely to have several drivers including increases in travel between Córdoba and dengue-endemic regions as well as changes in temperature and precipitation patterns caused by global climate change. Temperature and/or precipitation are known to impact various parts of the dengue transmission cycle, including mosquito development and survival and the incubation period of the virus in the mosquito host. In this work, we expand a classic vector-host epidemiological ordinary differential equations model to include time-varying impacts of temperature and precipitation. With this model, we explore the recent outbreaks of dengue in Córdoba to investigate the potential role of changes in climate patterns in the emergence of dengue in the city. We discuss the potential implications of our results for mosquito control and dengue mitigation strategies in Córdoba and other temperate cities, including U.S. cities where dengue emergence may be possible.