Climate variability and dengue incidence

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Research published this week in *PLoS Medicine* demonstrates associations between local rainfall and temperature and cases of dengue fever, which affects an estimated fifty million people per year worldwide. But the study finds little evidence that the El Niño-Southern Oscillation - the climate cycle that occurs every three to four years as a result of the warming of the oceans in the eastern Pacific - has a significant impact on the incidence of dengue in Mexico, Puerto Rico or Thailand.

Large outbreaks of dengue, a vector-borne viral disease spread by the Aedes aegypti mosquito, occur every few years in many tropical countries. Michael Johansson, of the Centers for Disease Control and Prevention in Puerto Rico, used a technique called "wavelet analysis" to probe relationships between the local climate, El Niño, and incidence of dengue in Mexico, Puerto Rico and Thailand — three countries where dengue is endemic. They were able to separate and compare seasonal and multiyear components of each. In all three countries temperature, rainfall, and dengue incidence varied strongly on an annual scale, showing association in the wavelet analysis.

On the multiyear scale however, the researchers found no association between El Niño and dengue incidence in Mexico, a statistically insignificant association in Thailand, and an association in Puerto Rico only significant for part of the study period. The authors warn that the Puerto Rico outcomes should be viewed with caution.

The authors acknowledge that El Niño could still play a role undetected

by this research. But as Pejman Rohani of the University of Michigan - uninvolved in the research - states in a related Perspective, the absence of a predictable link between El Niño and dengue transmission "is an important piece of information for the development of early warning systems".

More information: Johansson MA, Cummings DAT, Glass GE (2009) Multiyear Climate Variability and Dengue— El Niño Southern Oscillation, Weather, and Dengue Incidence in Puerto Rico, Mexico, and Thailand: A Longitudinal Data Analysis. PLoS Med 6(11): e1000168. doi:10.1371/journal.pmed.1000168

Related PLoS Medicine Perspective: Rohani P (2009) The Link between doi:10.1371/journal.pmed.1000185thern Oscillation. PLoS Med 6(11): e1000185. doi:10.1371/journal.pmed.1000185

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