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Local climate influences dengue transmission

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Researchers from the US Centers for Disease Control and Prevention (CDC) and the Johns Hopkins Bloomberg School of Public Health have found that dengue transmission in Puerto Rico is dependent upon local climate and short-term changes in temperature and precipitation. Details are published February 17 in the open-access journal *PLoS Neglected Tropical Diseases*.

"Previous studies have shown that there are biological relationships between temperature, precipitation and dengue transmission, but empirical evidence of these relationships is inconsistent," says Michael Johansson, a postdoctoral fellow with the CDC's National Center for Zoonotic, Vector-Borne and Enteric Diseases Dengue Branch in San Juan, Puerto Rico.

"This finding on how local climate moderates the relationship between temperature, precipitation and dengue incidence helps explain previous discrepancies," he says. "It also suggests that the effects of global climate change on dengue transmission will be local rather than global."

The study looked at 20 years of data from 77 municipalities in Puerto Rico to demonstrate how local climate alters the patterns of disease transmission. The researchers found that even in a relatively small geographical area there were differences in the relationship between weather and dengue transmission.

For example, in the southwestern coast, where it is hot and dry, precipitation played a very strong role and temperature a lesser role in

dengue transmission. In these dry areas, the lack of water limits mosquito reproduction. In contrast, in the cooler central mountains, temperature is more important and precipitation less important because the lower temperatures there slow mosquito and virus development.

Dengue is a disease caused by any one of four closely related viruses (DENV-1, DENV-2, DENV-3, or DENV-4). The viruses are transmitted to humans by the bite of an infected mosquito. The dengue viruses are the most widely distributed and damaging arthropod-borne viruses (arboviruses) affecting humans. The viruses and their predominant mosquito vector, Aedes aegypti, are endemic to most of the tropical and subtropical regions of the world, where they cause seasonal epidemics varying in size. In Puerto Rico, thousands of dengue cases and several dengue-related deaths are reported every year.

Citation: Johansson MA, Dominici F, Glass GE (2009) Local and Global Effects of Climate on Dengue Transmission in Puerto Rico. PLoS Negl Trop Dis 3(2): e382. doi:10.1371/journal.pntd.0000382, dx.plos.org/10.1371/journal.pntd.0000382

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