Study reveals new information on climate drivers of Dengue fever

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Researchers at Upstate Medical University, in collaboration with a team of international investigators studying dengue fever, have discovered new information on climate drivers of the disease and social risk factors that may be contributing to its spread, according to two scientific papers recently published in *BMC Infectious Disease* and *BMC Public Health*, open access, peer-reviewed online journals.

The new information gained from the studies can help public health officials develop a dengue early warning system that incorporates climate and non-climate information, as well create targeted public health programs to promote community engagement in dengue control.

Dengue is a mosquito-borne viral illness that is a leading cause of illness in the tropics and subtropics, and whose presence has been reported in the United States and Western Europe. It is transmitted to people primarily by the Aedes aegypti mosquito, that reproduces in containers with standing water in and around homes. Because there is no vaccine or cure for dengue, there is an increased urgency of those in the public health sector to identify alternative strategies to manage the disease.

The two studies were conducted in the urban coastal city of Machala, Ecuador, an area where dengue is prevalent, and the site of ongoing dengue research by Upstate Medical University and partners.

"This work provides insights into the complex climate and social factors that trigger dengue outbreaks, contributing to efforts to develop a dengue

early warning system," said Upstate researcher Anna M. Stewart Ibarra, Ph.D., M.P.A., assistant professor of medicine at Upstate and Latin America Research Program Director for Upstate's Center for Global Health & Translational Science. Stewart Ibarra served as corresponding author of each of the papers published in the journal.

"We also found that social and political conditions have to be considered when designing dengue control interventions, especially for high-risk, marginalized populations," said Stewart Ibarra.

The team found that unusually high rainfall and minimum temperatures were associated with the outbreak, and that climate and dengue co-vary in annual and biannual cycles. They also found that risk factors included households headed by women, and among other factors, the combination of poor housing conditions and access to piped water, likely due to water storage practices in areas where water supply interruptions are frequent.

In the second study, the team used focus groups to assess community perceptions of dengue fever. They identified persistent misconceptions that limited people's ability to take actions to prevent dengue. Social cohesion and political access were also major dengue risk factors, especially in low-income communities where people were unable to mobilize the resources needed to prevent disease outbreaks. They highlighted the need for dengue interventions that target the most vulnerable populations, and the importance of strong collaborations with local municipal governments and community leaders.

More information: "Spatiotemporal clustering, climate periodicity, and social-ecological risk factors for dengue during an outbreak in Machala, Ecuador, in 2010" *BMC Infectious Diseases* 2014, 14:610 DOI: 10.1186/s12879-014-0610-4