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 November 13, 2013
 Doretta Royer 315 464-4833

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Research findings will help in the fight against dengue, one of the fastest spreading tropical diseases



SYRACUSE, N.Y.— A study by an international team of researchers led by Anna M. Stewart Ibarra, Ph.D., of the Center for Global Health and Translational Science (CGHATS) at SUNY Upstate Medical University, has provided public health officials with information that will help decrease the risk of dengue, a life-threatening mosquito-borne viral disease that is now one of the fastest spreading tropical diseases globally.

Stewart Ibarra's team discovered that certain household risk factors, combined with changes in rainfall and minimum temperature, could be used to predict the presence and abundance of the mosquito that transmits dengue fever.

This study is published Nov. 12 in PLOS ONE, an international, peer-reviewed, open-access, online publication reporting on primary research from different scientific disciplines. The title of the study is Dengue Vector Dynamics (*Aedes aegypti*) Influenced by Climate and Social Factors in Ecuador: Implications for Targeted Control, available at <http://dx.plos.org/10.1371/journal.pone.0078263>.

Dengue fever is a public health threat throughout the tropics and now emerging as a threat in Florida and along the Texas border. It is a viral disease transmitted to people primarily by the *Aedes aegypti* mosquito, a mosquito that reproduces in containers with standing water in and around people's homes. The virus cannot be spread directly from person-to-person. There is no vaccine or drug currently available, although dengue vaccine trials are ongoing at SUNY Upstate and elsewhere.

Until a vaccine becomes available, mosquito control is the only way to control the spread of the disease. "The findings from this study will help public health officials develop mosquito control campaigns that target high-risk households and mosquito habitats in each season," said Stewart Ibarra.

The team conducted this study from 2010 to 2011 in the city of Machala, located in southern coastal Ecuador, an area where dengue is prevalent. They monitored mosquito populations and conducted household surveys to identify dengue risk factors, such as water storage practices, access to piped water and knowledge and perceptions of dengue. They also looked at local climate factors, since previous studies by Stewart Ibarra and colleagues had demonstrated that climate and sea surface temperature (El Niño-Southern Oscillation) influence dengue transmission in this region.

"Our findings can help reduce the burden of dengue in this particular region by conducting focused interventions that target high-risk households and containers in each season and by

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developing predictive models using climate and non-climate information," said Stewart Ibarra.

The results from this study also have contributed to the development of a multi-year investigation of climate, the dengue virus, and *Aedes aegypti* in the same region, led by Stewart Ibarra and Timothy Endy, MD, MPH, of CGHATS at SUNY Upstate.

Joining Stewart Ibarra in the PLOS ONE publication are: Sadie J. Ryan, Ph.D., of CGHATS at SUNY Upstate, SUNY College of Environmental Science and Forestry, and the University of KwaZulu-Natal, Pietermaritzburg, South Africa; Efrain Beltran, M.D., and Mercy Silva, M.D., of the National Service for the Control of Vector-Borne Diseases, Ministry of Health, Machala, Ecuador; Raul Mejia of the National Institute of Meteorology and Hydrology, Guayaquil, Ecuador; and Angel Muñoz of the International Institute of Climate and Society, Columbia University and the Centro de Modelado Científico, Universidad del Zulia, Maracaibo, Venezuela.

Caption: Anna Stewart Ibarra inspects an ovitrap in the patio of a study household to look for Aedes aegypti mosquito eggs. Ovitrap were monitored over a period of eight months to estimate Aedes aegypti populations, the mosquito that transmits the disease dengue fever.

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