

Sociol-ecological system approach leads to new information in study of mosquito-borne viruses

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In an article published online Sept. 13 in UGEC Viewpoints, Upstate Medical University researcher Anna Stewart Ibarra, PhD, MPA, describes how a collaborative approach by researchers of varying disciplines is being used as a framework for studying the mosquito-borne viruses, zika, dengue and chikungunya.

Called the "social-ecological systems (SES) approach," it leads to new information that is necessary for the development of effective policies, technologies and management strategies to fight the spread of these viruses. UGEC Viewpoints is an online journal dedicated to communicating current research, opinion and practice in urbanization and [global environmental change](#).

Stewart Ibarra also shares findings from her studies and those of other researchers that shed new light into how and why these viruses continue to proliferate. She also outlines steps that need to be taken to prevent the spread of these viruses, some as simple as ensuring access to municipal public services and utilities and correcting public misconceptions about these viruses and how they are spread.

Stewart Ibarra says that the SES approach aligns with integrated research and surveillance approaches that the global health community has proposed to manage the threat of emerging infectious diseases, bringing together information on the biophysical, ecological, and social drivers of

these diseases.

An internationally recognized expert in the ecology of [infectious diseases](#), Stewart Ibarra is a faculty member in Upstate Medical University's Department of Medicine and the director of the Latin America Research Program at Upstate's Center for Global Health & Translational Science. She and her colleagues study environmental and socio-political drivers of the transmission of dengue fever in coastal Ecuador, where dengue is hyper-endemic. Findings from one of her studies may lead to an early warning system that incorporates climate and non-climate information on zika and dengue transmission. Another study will lead to the development of a device that is capable of killing the *Ae. Aegypti* mosquito that can transmit zika, dengue, and chikungunya.

In her article, Stewart-Ibarra highlights the global changes that have led to the emergence and persistence of these viruses. She says that among the causes are "unprecedented rates of urban population growth, land use change, atmospheric and climate change, including extreme events such as drought and flooding, the development of insecticide-resistance, and global and governmental management failure."

She includes information on a surveillance system in the southern coastal city of Machala, Ecuador, that is generating data on the true burden of dengue, chikungunya and zika illness, and risk factors, including microclimate, virus and vector dynamics, nutrition and sociodemographics. "Results from these and other studies are important for the development of new vaccines, therapeutics, and interventions," she said.

Her article also includes insight into extreme climate events that are linked to disease outbreaks and social determinants of health. She also details the need for public health education to create awareness of

household risk factors.

"Major advances are being made with nanotechnology, such as low-cost point of care diagnostics using iPhones and smarter urban planning and design of mosquito-proof housing," says Stewart Ibarra. "It is also worth noting that the public health sector in El Oro Province was able to effectively eradicate malaria in 2011 through effective intersectoral collaboration, operational research to monitor drug and insecticide-resistance, binational partnerships with the public health sector in Peru, and strong surveillance systems. These studies indicate the importance of policy-relevant research that can be translated to strengthen the design, implementation, and evaluation of new innovative strategies that reflect local realities. The findings from these studies contribute to a growing body of research in this area, highlighting the value of the social-ecological systems (SES) approach to health."

Provided by SUNY Upstate Medical University

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