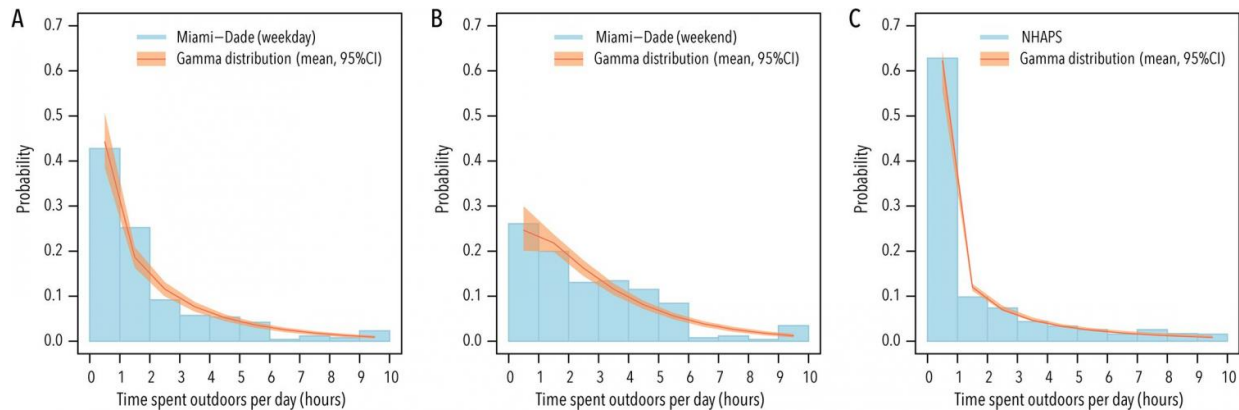


In US, spread of Zika linked to time outdoors

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Amount of time spent outdoors. A. Amount of time spent outdoors per day in weekdays in the surveyed Miami-Dade County population and the posterior gamma distribution. B. As A, but for weekends. C. As A, but data are taken from the NHPS survey on the U.S. population. Credit: Ajelli et al (2017)

When Zika first buzzed into the continental United States during the 2016 outbreak, Florida was hit first—and hardest—with 1,174 documented cases to date. So, when Marco Ajelli, associate research scientist at Northeastern and an expert in infectious disease modeling, wanted to study how time spent outside might affect the spread of the epidemic, he chose to focus on the state's most stricken county: Miami-Dade.

What Ajelli found was that the amount of time people spend outdoors impacts their risk for contracting the Zika virus.

Most U.S. Zika infections happen outdoors

Ajelli conducted a survey of 280 Miami-Dade residents and found the vast majority of people spend less than one hour per day outside. The survey also revealed that a small group of people spend a large amount of time outdoors. This is similar to the national average.

"To me that was a surprise, because the kind of weather you can have in Miami compared to Wyoming, for example, is completely different," said Ajelli.

That second group, the findings revealed, were most at risk for Zika infection. That's because, in the U.S. most Zika infections are contracted by people outdoors.

In other regions of the world, such as the tropics, where Zika's impact has been especially severe, mosquito bites mainly occur indoors. Therefore, time spent outside is not a big factor in understanding the epidemic's spread.

But in the U.S., there are certain groups—construction workers, for example—who are much more at risk. According to Ajelli, the vast majority of Zika infections in the U.S. have been contracted by people outdoors. And the first neighborhoods the virus infiltrated in the U.S. were Miami Beach and Wynwood, both known for outdoor public art and beach-related tourist activities.

Few infections, but rapid spread

Using the survey data, plus the latest available knowledge of Zika infection time and transmissibility, Ajelli developed a computational model. It showed Zika would infect few people—predominantly those

who spend large amounts of time outdoors—but would spread quickly among that specific population.

Ajelli described his findings in a paper published last week in the journal *PLOS Neglected Tropical Diseases*. He said the epidemic would spread fast among people who spend lots of time outside because there are fewer of them, they have a high probability of being bitten, and it would take relatively few bites to infect the whole group.

"That means you have less time to put in place a vector control strategy. Whatever strategy you want to implement, you have to be very quick and ready to take action, otherwise it could be too late," Ajelli said.

Ajelli said his findings suggest that outdoor time should be considered an important factor when developing a plan to halt the potential spread of Zika in the U.S. "Maybe just looking at the areas with the highest density of mosquitos is not enough," he explained. "Of course, it is crucial, because you need to target interventions in those areas of the city, but you also have to take into account whether people spend time outdoors."

More information: Ajelli M, Moise IK, Hutchings TCSG, Brown SC, Kumar N, Johnson NF, et al. (2017) Host outdoor exposure variability affects the transmission and spread of Zika virus: Insights for epidemic control. *PLoS Negl Trop Dis* 11(9): e0005851.
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