Controlling and avoiding mosquitoes helps minimize risk of Zika

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Taking steps to control mosquitoes and prevent bites can go a long way to protecting public health and curbing transmission of the Zika virus, says Purdue medical entomologist Catherine Hill.

"There are a lot of questions surrounding Zika that we don't have answers to, and those uncertainties are making people uneasy - understandably so," said Hill, professor of entomology and Showalter Faculty Scholar. "But there's actually a lot we can do to control the mosquitoes that vector Zika and a number of steps people can take to minimize their risk of acquiring the virus."

Zika, a flavivirus in the same group as dengue and chikungunya, requires a vehicle to spread - a mosquito. Controlling the mosquitoes that carry Zika can be an extremely effective way of reducing transmission of the virus, Hill said.

Zika, dengue and chikungunya are transmitted via the bite of an infected Aedes aegypti or Aedes albopictus mosquito, also known as the yellow fever mosquito and tiger mosquito, respectively.

Eliminating potential breeding sites of Aedes mosquitoes can significantly reduce people's chances of getting bitten by an infected mosquito, Hill said.

"These are container-breeding mosquitoes that are often found in urban areas," she said. "Getting rid of objects that collect water around houses,

workplaces and recreational areas can go a long way to reducing disease transmission."

Typical breeding sites include birdbaths, potted plants, dog bowls, tin cans, tires and other places likely to become inundated with water.

If traveling in a region where the virus is actively transmitted, take steps to protect yourself against mosquitoes, Hill advised. Stay indoors during the day, the typical feeding time for Aedes mosquitoes. If going outdoors, use a U.S. Environmental Protection Agency-approved mosquito repellant and wear clothing with long sleeves and pants.

Because of the possible link between Zika and microcephaly, a severe birth malformation, the Centers for Disease Control and Prevention recommends that women who are pregnant or considering becoming pregnant avoid travelling to countries where Zika transmission is ongoing.

A clear understanding of mosquito-borne diseases can put risks associated with Zika in perspective and help the public make informed decisions, Hill said.

While yellow fever and tiger mosquitoes can transmit the disease, not all of them carry the pathogen. Initial studies in Africa suggest only a small percentage of Aedes mosquitoes carry the virus, but more research is needed to determine Zika's prevalence in global mosquito populations, Hill said.

About 80 percent of people infected with Zika will likely not even realize they have it, she said. The remaining 20 percent experience mild symptoms such as rash, fever, red eyes and joint pain. About one in 1,000 cases will result in death.

People who begin to show symptoms of Zika shortly after travelling to an area where the virus is active should stay indoors and avoid mosquitoes to reduce the potential of contributing to further transmission, Hill said.

Discovered in 1947, Zika was a disease of minor concern until it appeared in Brazil in May 2015. Since arriving in the Americas, the virus has spread rapidly to more than 20 countries and regions across the Americas. The World Health Organization says Zika could infect as many as 4 million people by the end of the year.

While mosquitoes cause the vast majority of Zika cases, Zika-infected mothers can transmit the virus to infants during childbirth, and one case of possible sexual transmission has been reported.

There are no treatments or vaccines for Zika.

While researchers strongly suspect a causal link between Zika-infected mothers and babies born with microcephaly, the connection has not been conclusively established, and testing this hypothesis could take many months, Hill said.

Zika might also be linked to Guillain-Barré syndrome, a condition in which the immune system attacks the nervous system, potentially resulting in paralysis.

No locally transmitted Zika cases have been reported in the continental U.S., but the virus has been reported in Puerto Rico and the U.S. Virgin Islands.

A major concern, Hill said, is the possibility that the virus could become established in Aedes mosquitoes in the U.S., leading to local transmission. This could cause an annual cycle of Zika virus during

seasons when mosquitoes are active.

Aedes aegypti inhabits the Southeast U.S., and Aedes albopictus, an invasive species, is spread across most of the eastern half of the country, including Indiana.

Hill said predictions that warmer temperatures and rainfall brought by El Niño will lead to a surge in mosquito populations could be misleading.

"We should be prepared for more mosquitoes, but weather and disease transmission is very localized," she said. "We do know that mosquitoes are changing their geographic range, but whether that is due to climate change, warmer temperatures or more rain is not clear."

Hill said other mosquito-borne diseases, such as dengue and chikungunya, can help researchers make limited prediction about what might happen with Zika, but every virus in unique.

"We can make predictions, but every time we have an outbreak, whether it's West Nile virus, Ebola or avian flu, there are always surprises," she said. "There are always aspects we can't anticipate that we'll need to respond to, and that will happen with Zika as well."

An important lesson from Zika is that the relative scarcity of mosquito-borne diseases in the U.S. is a recent - and disappearing - phenomenon, Hill said. Until the mosquito control programs of the 1940s and '50s, infectious diseases such as yellow fever and malaria were common in the U.S. As mosquitoes increasingly develop resistance to pesticides, diseases that seem relegated to history could reappear.

"Ebola, chikungunya and Zika are showing us that new diseases can emerge and old diseases can reemerge," she said. "We should never assume that we've eradicated these diseases or that we know what they're

going to do should they reappear. We are in a time of unprecedented change in terms of human population numbers, movement, urban sprawl and increasing global travel. That can impact transmission of disease and the reemergence of diseases we thought were under control."

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