Does more rain mean more risk of mosquito-borne diseases?

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Experts have ranked May 2019 as one of the wettest Mays on record in central Illinois. Is it possible that the incidence of mosquito-borne illnesses increases with the amount of rainfall? To find out, News Bureau science writer Ananya Sen asked Brian F. Allan, an entomology

professor at the University of Illinois.

What kinds of mosquitos are present in Illinois and what diseases do they carry?

Dozens of species of mosquitoes occur in Illinois, although humans typically encounter only a subset of these. The main mosquito-borne diseases of concern include West Nile virus, St. Louis encephalitis, La Crosse encephalitis and Eastern equine and Western equine encephalitis. The mosquitoes that pose the greatest health threat in Illinois are members of the genus Culex, which transmit West Nile virus.

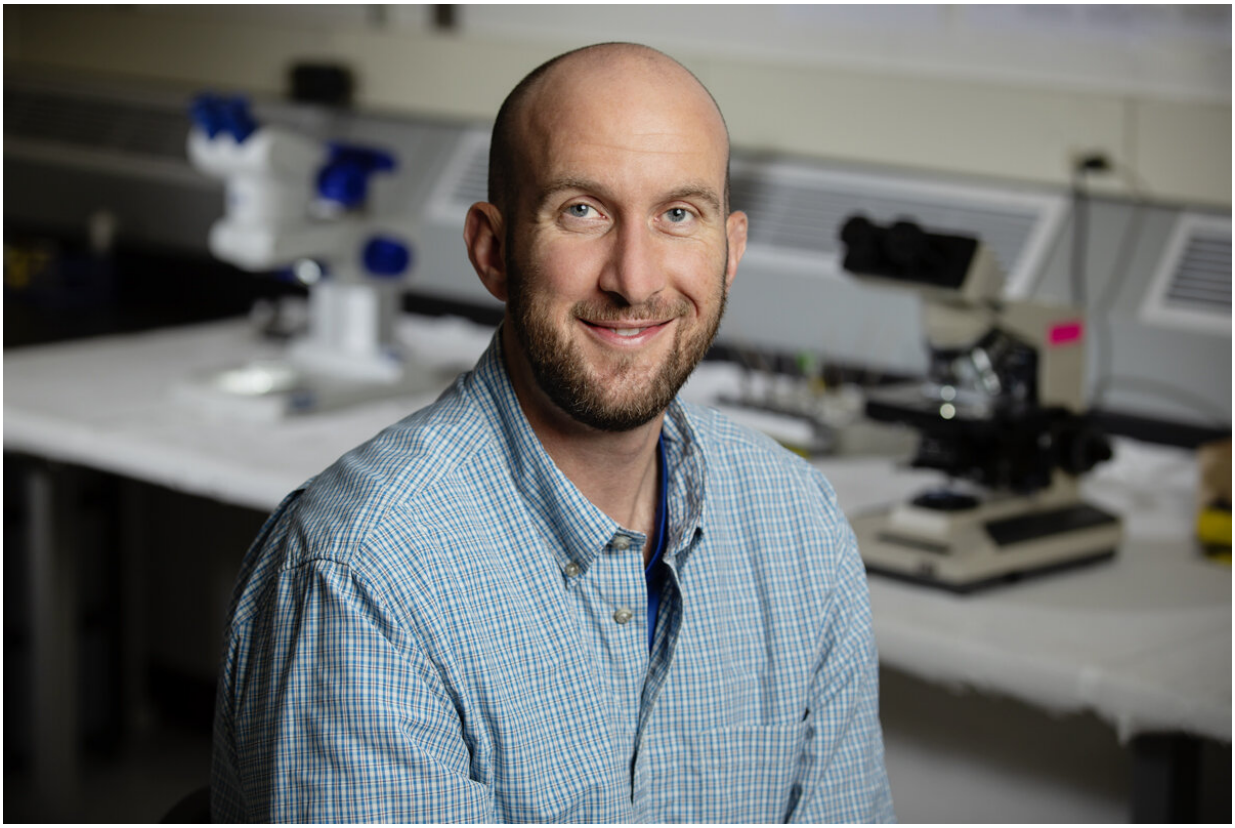
Recently, an invasive species called the Asian tiger mosquito (*Aedes albopictus*) has spread throughout much of the state, including Champaign-Urbana. Globally, it is an important vector of diseases such as dengue virus and Zika virus, but in Illinois it is primarily a nuisance species since these diseases are not reported to be transmitted by mosquitoes here and it is an aggressive biter of humans in the daytime.

Do all these species of mosquitos require stagnant water to breed?

Yes, all mosquitoes lay eggs and their larvae develop in still or very slow-moving water. But the range of habitats is highly diverse, from small containers such as flower pots or tree hole cavities, to larger bodies of water like ponds and floodwaters. Most mosquito species are adapted to completing their juvenile development in specific types of larval habitats.

Have studies shown that increased rainfall is associated with increased mosquito-borne disease

risk?



The risk of some mosquito-borne diseases can go up with increased rainfall, U. of I. entomology professor Brian Allan said. However, excess rainfall can reduce the number of mosquitos that hatch in stormwater catch basins, such as the Culex species that carry West Nile virus. Credit: L. Brian Stauffer

The answer is complicated. Many mosquito species experience an increase in larval habitat availability due to increased precipitation, so most people reasonably assume more rain will result in more mosquitoes and mosquito-borne disease. Indeed, studies demonstrate that for mosquito species that complete larval development in floodwaters or small containers, more rain can result in larger mosquito populations.

But, somewhat counter-intuitively, mosquito larvae that develop in roadside storm water catch basins, such as the Culex species that vector West Nile virus, tend to get flushed out of the storm water system when there is a lot of rainfall. Recent research by former Illinois pathobiology professor Marilyn O"Hara Ruiz demonstrated that the highest human prevalence of West Nile virus in Chicago occurs during hot, dry summers, not the wet ones. This presumably is because Culex larvae are able to complete development in storm water systems when there is less rain, not more.

What symptoms should people watch out for if they have been bitten? How long does it take for symptoms to appear?

West Nile virus is the most common mosquito-borne disease in Illinois, but it still is relatively rare. The incubation period ranges from two to 14 days. The U.S. Centers for Disease Control and Prevention estimates that most people who are exposed will experience no symptoms. About 1 in 5 may develop a mild illness that can include fever, headache, body aches and joint pains, and a rash. Much more rarely, about 1 in 150 people who are exposed can develop a severe illness affecting the central nervous system, which typically requires hospitalization and can cause death. Some of the other mosquito-borne viruses that occur in Illinois are rarer still, although the rate of severe illness may be higher.

What steps can we take to prevent mosquito-borne diseases?

Basic precautionary steps can be highly effective. Use Environmental Protection Agency-registered insect repellents that contain DEET or picaridin and use clothing as a physical barrier to protect against mosquito bites. Limit activity outside at dawn and dusk, when Culex

species are most active. And one thing that everyone can do to help is eliminate larval habitats for mosquitoes around the home. Some species will lay eggs in even the smallest container habitats, such as flower pot saucers or clogged gutters, so be vigilant about removing standing water where mosquito larvae can develop. Do this at least once per week for optimal mosquito population control.

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