Zika Virus Update

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Zika is a virus, spread mostly by the bite of an infected Aedes species mosquito. While many people infected with Zika virus will have no symptoms or mild symptoms, Zika infection during pregnancy can cause a birth defect of the brain called microcephaly. Zika is also linked to other problems, such as miscarriage, stillbirth, and other birth defects. There have also been increased reports of Guillain-Barré syndrome, an uncommon sickness of the nervous system, in areas affected by Zika.

This supplement to PRI’s spring 2016 Zika report (https://prairie.illinois.edu/responseteams) describes the current Zika risk and recommends mitigation strategies.

The Situation in Illinois
To date 105 cases of Zika infection—all related to travel outside Illinois—have been reported to the Centers for Disease Control (CDC) and the Illinois Department of Public Health (IDPH). Two of these cases occurred in pregnant women, but the outcome of these pregnancies is unknown as such information increasingly is not reported by states or the CDC to protect privacy.

In summer 2016, PRI’s medical entomology program surveyed 10 towns in southern Illinois for the Aedes aegypti mosquito on behalf of IDPH. While no Aedes aegypti populations were found, the published range of this mosquito skirts the boundaries of Illinois and extends north into Missouri and Indiana. To minimize the spread of Aedes aegypti into Illinois, and thereby to reduce the risk of in-state Zika transmission, one strategy would be to equip municipalities in southern Illinois to implement integrated mosquito management and control strategies. Since Aedes aegypti is primarily associated with human habitation, the long distances between southern Illinois towns that aggressively conduct mosquito control programs could create a barrier to the spread of Aedes aegypti into Illinois.

Perhaps the most important considerations for potential transmission of Zika virus in Illinois are: 1) whether the Asian tiger mosquito (Aedes albopictus) can transmit the virus and 2) if it can, whether the virus could overwinter in the Midwest. To date, there are no reports of transmission of Zika by Aedes albopictus, but it has been shown to be able to transmit Zika in laboratory settings and therefore remains a potential vector. The range where Aedes albopictus could occur includes all of Illinois, and alarmingly the 2016 mosquito survey detected Aedes albopictus in towns where it had not previously been recorded. The IDPH plans to fund PRI to survey southern Illinois counties where Aedes albopictus was not detected in 2016 to assess whether the Asian tiger mosquito has spread.
The Situation in the United States and Territories

In the continental United States, local transmission of Zika has been detected only in Miami-Dade County, Florida, and southern Texas. In 2016, 218 cases of Zika infection were recorded that were presumed to have resulted from local transmission in Miami-Dade County; six cases were reported in Brownsville, Texas. Populations of Aedes aegypti remain; therefore, the risk persists of reintroduction of the virus by travelers who have been infected elsewhere. So far in 2017 no Zika virus has been detected in mosquito populations in Florida, where professional integrated pest management, screened windows, and air conditioning may have eliminated the population of infected mosquitoes and reduced or stopped transmission to humans. However, we might see Zika spread into the Gulf coastal states this summer.

Based on pregnancies followed during the 2016 Brazilian epidemic, 10% of women known to have been infected with Zika during pregnancy are estimated to have babies exhibiting birth defects. Extrapolating from CDC data suggests the rate is about 4.6%. In these assessments the definition of a birth defect is much broader than just symptoms of microcephaly, which itself covers a broad spectrum of severity. The CDC’s definition of birth defect includes developmental impairments of the eyes and other neurological problems. While implementing a CDC grant to track women who experienced Zika infection during pregnancy, Puerto Rican officials employed a narrower interpretation of what constituted a Zika-related birth defect; the CDC believes those data understate the risk. Puerto Rico, which is experiencing severe economic problems, is very dependent on tourism.

The best hope to prevent economic damage to states and territories that depend on tourism is a vaccine for Zika virus. The most optimistic projections suggest a vaccine is at least a year away. Therefore, mosquito control and disease reporting will be our best protection this summer and probably the next.

Vaccine development

The National Institutes of Health announced in March 2017 that an experimental DNA vaccine is being tested in a clinical trial. This first phase will evaluate the vaccine’s safety and ability to stimulate an immune response in a sample population of healthy men and non-pregnant women. It will also help determine the optimal dose and injection sites for administration. Phase two aims to determine if the vaccine can effectively protect against Zika-related disease. At least 2,400 healthy men and non-pregnant women will receive either the investigational vaccine or a placebo and will be followed for nearly two years.

The Global Situation

Zika virus is established throughout Mexico, Central and South America, and the Caribbean islands and is likely to become established throughout the tropics and sub-tropics. For most people living in temperate regions, the primary Zika health threat is travel-related illness. Travel advisories for women of child-bearing age are now common for much of the tropics and sub-tropics, and travel to these regions could decline as both women and their partners seek to avoid risk.

About the Prairie Research Institute

The Prairie Research Institute (PRI) at the University of Illinois provides objective expertise, data, and applied research to aid decision making and provide solutions for government, industry, and the people of Illinois. PRI is the home of the state’s scientific surveys: the Illinois Natural History Survey, Illinois State Archaeological Survey, Illinois State Geological Survey, Illinois State Water Survey, and Illinois Sustainable Technology Center. [www.prairie.illinois.edu](http://www.prairie.illinois.edu)