

Zika virus causes first mainland US case of microcephaly

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On May 31, a baby girl in New Jersey became the first infant with Zika virus related microcephaly born in the continental United States. The number of confirmed Zika cases continues to rise, threatening a series of outbreaks in the US during the summer months. Zika has the potential to spread far beyond its Brazilian epicenter and reach epidemic proportions in densely populated areas across the globe.

The mother, aged 31, is believed to have contracted the Zika virus in her home country of Honduras, where it is being actively transmitted by mosquito bites.

In January, a woman in Hawaii gave birth to a child with microcephaly having been exposed to the virus while living in Brazil. Several pregnant women who discovered they had contracted Zika early in their pregnancy have either miscarried or terminated their pregnancies.

According the Center for Disease Control (CDC), there are 195 confirmed cases of pregnant women infected with Zika in the United States, all from travel. There are another 146 in US territories, primarily in Puerto Rico, where almost all are from local transmission. In total there are 618 confirmed cases in the US, and 1,114 in US territories.

These numbers are expected to rise sharply in the summer along with the *Aedes Aegypti* mosquito population that spreads the disease. During the summer months, *Aegypti* can spread through most of the US, from Sacramento, California to New York City. The CDC estimates that 700,000 Puerto Ricans will be at risk of infection before the end of 2016.

The Zika virus is able to spread quickly and undetected in poor urban areas. Roughly three-fourths of adults who contract the virus experience no symptoms, and most of those that do experience moderate symptoms like fevers and rashes that are not

deadly. The major impact of the disease comes from its effect on fetal development, which only become apparent months after an epidemic begins. It is also associated with a sharp increase in rare neurological disorders like Guillain-Barré Syndrome, which only becomes statistically apparent after several hundred thousand are infected.

The cost in medical care of a serious outbreak in the US could be enormous. The precise neurological disorder in fetuses caused by Zika infection is not fully known. The most obvious effect is a much higher chance of microcephaly, which by itself almost precludes normal brain development. In addition, Zika infection is associated in infants with seizures, spasticity, ocular abnormalities and other severe effects even in some cases without microcephaly. Since there have been no long term studies before, only severe and immediate effects have been discovered. Any milder developmental effects will only become apparent in the coming years as the children who were infected in utero grow up.

The director of the CDC, Dr. Thomas Frieden, estimated that lifetime care for a child with microcephaly could range between \$1 million and \$10 million. Brazil, the epicenter of the current outbreak, has over 4,900 cases of Zika-related microcephaly.

Although the disease was first discovered in 1947, the lack of severe symptoms and the poverty of the African people it infected meant that it was not carefully studied. The first known epidemic of Zika was in 2007 in Micronesia, followed by outbreaks in 2013-2014 in a series of Pacific islands. It spread to Brazil in late 2014 causing the current epidemic, in which an estimated 1.5 million have been infected.

In the face of this threat, the US Congress has delayed funding requests from the CDC to prevent outbreaks in

the US. Health officials in February requested \$1.9 billion to fight Zika and have so far received only \$589 million that was moved from anti-Ebola funding.

Like many epidemics, a primary factor in the spread of Zika is poverty. The *Aegypti* mosquito that spreads the disease breeds quickly in the small amounts of stagnant water that are abundant in any city without regular trash collection or piped water. Even very inexpensive measures like mosquito netting, costing roughly 50 cents a year for an adult, can significantly reduce the spread of the mosquito-born disease.

Moreover, without regular medical care, a Zika outbreak can go unnoticed. Haiti's current outbreak began in December 2014 but was not detected until January 2016.

The spread of the current outbreak is unknown. Although the virus originated in Uganda and spread to Asia before reaching Brazil, it is only known from scattered cases. Researchers have no idea whether there is widespread immune protection among Africans and Asians. Roughly half of the world's population lives in the range of *Aegypti* mosquitos, and most of the at-risk countries are ill equipped to handle an epidemic.



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