

## Review on Zika Virus

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### ABSTRACT

Today the world has suffered to the Zika virus is a flavivirous related to yellow fever, dengue, West Nile and Japanese encephalis virus. Zika virus causes acute, serious illness which is often fatal if it is not treated. Its name comes from the Zika forest of Uganda. Zika is a mosquito born disease. Zika virus disease is caused by a virus transmitted primarily by *Aedes* mosquitoes. People with Zika virus disease can have symptoms including mild fever, skin rash, conjunctivitis, muscle and joint pain, malaise or headache. These symptoms normally last for 2-7 days. There is scientific consensus that Zika virus is a cause of microcephaly and Guillain-Barré syndrome. Links to other neurological complications are also being investigated. Neither an effective treatment nor a vaccine is available for Zika virus; therefore, the public health response primarily focuses on preventing infection, particularly in pregnant women. This article also covers from where the zika was firstly introduced or its history, its transmissions, causes, diagnosis, treatment and some current affairs.

**Keywords:** zika virus, infectious disease, mosquitoes, flavivirus, transmission, Africa

### INTRODUCTION

Zika virus disease is a mosquito-born disease caused by Zika virus. Most infections are either asymptomatic or cause a mild illness with a transient maculopapular rash.

The *Aedesaegypti* mosquito is the main vector but other *Aedes* species can also transmit the virus. Sexual transmission via semen has been reported recently.

Viral circulation and a few outbreaks were documented in tropical Africa and in some areas in south-east Asia. Since 2007, several island of the pacific region have experienced outbreaks were reported in the Americas emerging infectious disease. (World health organisation. Zika virus., 2017.)

Zika virus is a mosquito-borne flavivirus that was first identified in Uganda in 1947 in monkeys through a network that monitored yellow fever. It was later identified in humans in 1952 in Uganda and the United Republic of Tanzania. Outbreaks of Zika virus disease have been recorded in Africa, the Americas, Asia and the Pacific. From the 1960s to 1980s, human infections were found across Africa and Asia, typically accompanied by mild illness. The first large outbreak of disease caused by Zika infection was reported from the Island of Yap (Federated States of Micronesia) in 2007. In July 2015 Brazil reported an association between Zika virus infection and Guillain-Barré syndrome. In October 2015 Brazil reported an association between Zika virus infection and microcephaly.( An agency of the European Union, Factsheet about zika virus disease.,2017.)

### History of Zika virus

The Zika virus is a mosquito-transmitted infection related to dengue, yellow fever and West Nile virus. Although it was discovered in 1947 in the Zika forest, near the East African Virus Research Institute in Entebbe, Uganda. Zika was later identified in humans in 1952.



**Courtesy:** <http://www.who.int/emergencies/zika-virus/timeline/en/> , 19 oct2016, 2:20

**1947:** Scientists conducting routine surveillance for yellow fever in the Zika forest of Uganda isolate the Zika virus in samples taken from a captive, sentinel rhesus monkey.

**1948:** The virus is recovered from the mosquito *Aedes africanus*, caught on a tree platform in the Zika forest.

**1952:** The first human cases are detected in Uganda and the United Republic of Tanzania in a study demonstrating the presence of neutralizing antibodies to Zika virus in sera.



**Courtesy:** <http://www.who.int/emergencies/zika-virus/timeline/en/> , 19 oct2016, 2:22

**1969–1983:** The known geographical distribution of Zika expands to equatorial Asia, including India, Indonesia, Malaysia and Pakistan, where the virus is detected in mosquitoes. As in Africa, sporadic human cases occur but no outbreaks are detected and the disease in humans continues to be regarded as rare, with mild symptoms.

**2007:** Zika spreads from Africa and Asia to cause the first large outbreak in humans on the Pacific island of Yap, in the Federated States of Micronesia. Prior to this event, no outbreaks and only 14 cases of human Zika virus disease had been documented worldwide.

**2013–2014:** The virus causes outbreaks in four other groups of Pacific islands: French Polynesia, Easter Island, the Cook Islands, and New Caledonia. The outbreak in French Polynesia, generating thousands of suspected infections, is intensively investigated. The results of retrospective investigations are reported to WHO on 24 November 2015 and 27 January 2016.



**Courtesy:** <http://www.who.int/emergencies/zika-virus/timeline/en/> , 19 oct2016, 2:22

**2 March 2015:** Brazil notifies WHO of reports of an illness characterized by skin rash in north-eastern states. From February 2015 to 29 April 2015, nearly 7000 cases of illness with skin rash are reported in these states. All cases are mild, with no reported deaths. Zika was not suspected at this stage, and no tests for Zika were carried out.

**1 February 2016:** WHO declares that the recent association of Zika infection with clusters of microcephaly and other neurological disorders constitutes a Public Health Emergency of International Concern. [World health organisation. The history of Zika virus. 2017, Zika Virus Net .com. History of zika virus, 2017)

## TRANSMISSION

Zika virus is primarily transmitted to people through the bite of an infected mosquito from the *Aedes* genus, mainly *Aedes aegypti* in tropical regions. *Aedes* mosquitoes usually bite during the day, peaking during early morning and late afternoon/evening. This is the same mosquito that transmits dengue, chikungunya and yellow fever. Sexual transmission of Zika virus is also possible. Other modes of transmission such as blood transfusion are being investigated.

### Sexual transmission

Zika virus can be transmitted through sexual intercourse. This is of concern due to an association between Zika virus infection and adverse pregnancy and fetal outcomes.

For regions with active transmission of Zika virus, all people with Zika virus infection and their sexual partners (particularly pregnant women) should receive information about the risks of sexual transmission of Zika virus. WHO recommends that sexually active men and women be correctly counselled and offered a full range of contraceptive methods to be able to make an informed choice about whether and when to become pregnant in order to prevent possible adverse pregnancy and fetal outcomes. Women who have had unprotected sex and do not wish to become pregnant due to concerns about Zika virus infection should have ready access to emergency contraceptive services and counselling. Pregnant women should practice safer sex (including correct and consistent use of condoms) or abstain from sexual activity for at least the whole duration of the pregnancy.

For regions with no active transmission of Zika virus, WHO recommends practising safer sex or abstinence for a period of six months for men and women who are returning from areas of active transmission to prevent Zika virus infection through sexual intercourse. Sexual partners of pregnant women, living in or returning from areas where local transmission of Zika virus occurs should practice safer sex or abstain from sexual activity throughout the pregnancy. (World health organisation. Zika virus., 2017)

### DIAGNOSIS

Infection with Zika virus may be suspected based on symptoms and recent history of travel (e.g. residence in or travel to an area with active Zika virus transmission). A diagnosis of Zika virus infection can only be confirmed through laboratory tests on blood or other body fluids, such as urine, saliva or semen. (Centres for disease control and prevention, 2017)

### ZIKA SPREADING

The World Health Organization is convening an Emergency Committee under International Health Regulations today, concerning the Zika virus 'explosive' spread throughout the Americas. The virus reportedly has the potential to reach pandemic proportions — possibly around the globe. But understanding why this outbreak happened is vital to curbing it. As the WHO statement said:

"A causal relationship between Zika virus infection and birth malformations and neurological syndromes ... is strongly suspected. [These links] have rapidly changed the risk profile of Zika, from a mild threat to one of alarming proportions.

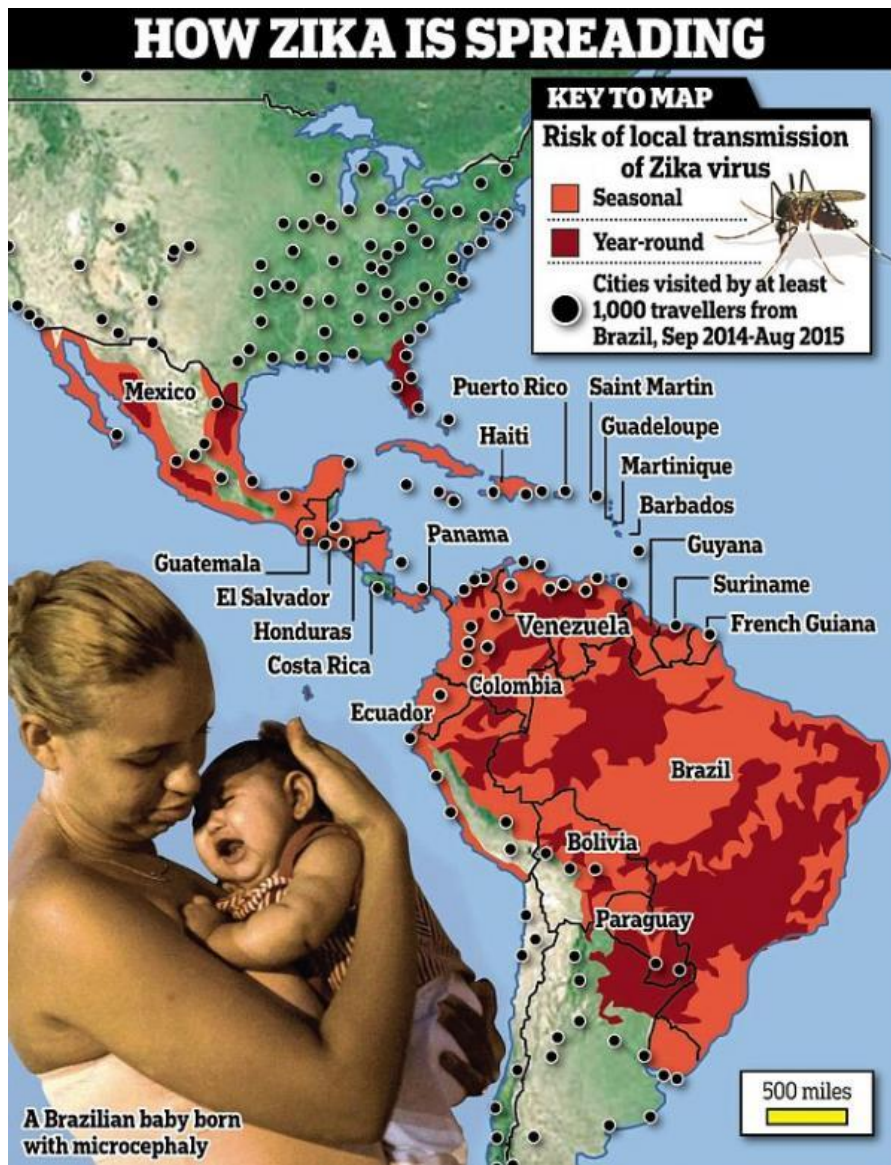
"WHO is deeply concerned about this rapidly evolving situation for 4 main reasons: the possible association of infection with birth malformations and neurological syndromes; the potential for further international spread given the wide geographical distribution of the mosquito vector; the lack of population immunity in newly affected areas; and the absence of vaccines, specific treatments, and rapid diagnostic tests.

### ZIKA VIRUS DAMAGE BRAIN

Zika infection was once thought to be a relatively harmless infection. It is particularly feared for its effect on the unborn babies of pregnant women.

As more studies are being conducted on the effects of the mosquito-borne virus, researchers learn that adults can also experience unwanted health effects because of Zika infection such as Guillain-Barré syndrome (GBS), a sickness of the nervous system.

Now, Italian researchers report of another danger of Zika. In a letter published in the journal Emerging Infectious Diseases, the researchers reported that they have found evidence that Zika infection can affect the brains of adults and damage memory. (TECH TIMES. Zika Virus Effects On Adults, 2017)



### ZIKA VIRUS IN PREGNANCY

Zika virus can cause severe birth defects in babies whose mothers are infected during pregnancy, and it is now carried by mosquitoes in the continental United States. While this news means pregnant and trying-to-conceive women should more seriously consider Zika virus prevention in their daily lives, it's no cause for panic.

In mid-April 2016, CDC experts confirmed that Zika can cause microcephaly and other severe neurological defects in babies, including eye problems, hearing loss and impaired growth. That's because when a mom-to-be becomes infected with Zika virus, the virus can also infect the fetus. Microcephaly is a neurological condition where babies are born with small heads and sometimes small brains. .

However, this does not mean that if you are infected with Zika during pregnancy that your baby will definitely experience health problems. It simply means that babies whose mothers are infected with Zika during pregnancy have an increased risk. Many women infected during this outbreak have

delivered apparently healthy babies.

Because there is no Zika vaccine and no medication to protect the fetus if you are bitten by a mosquito with Zika, the best approach is preventing mosquito bites. (WHAT TO EXPECT. Zika Virus and Pregnancy, 2017)

### Symptoms of Zika virus

The incubation period (the time from exposure to symptoms) of Zika virus disease is not clear, but is likely to be a few days. The symptoms are similar to other arbovirus infections such as dengue, and include fever, skin rashes, conjunctivitis, muscle and joint pain, malaise, and headache. These symptoms are usually mild and last for 2-7 days.

Fever

Rash

Headaches

Red eyes

Muscle and joint pain

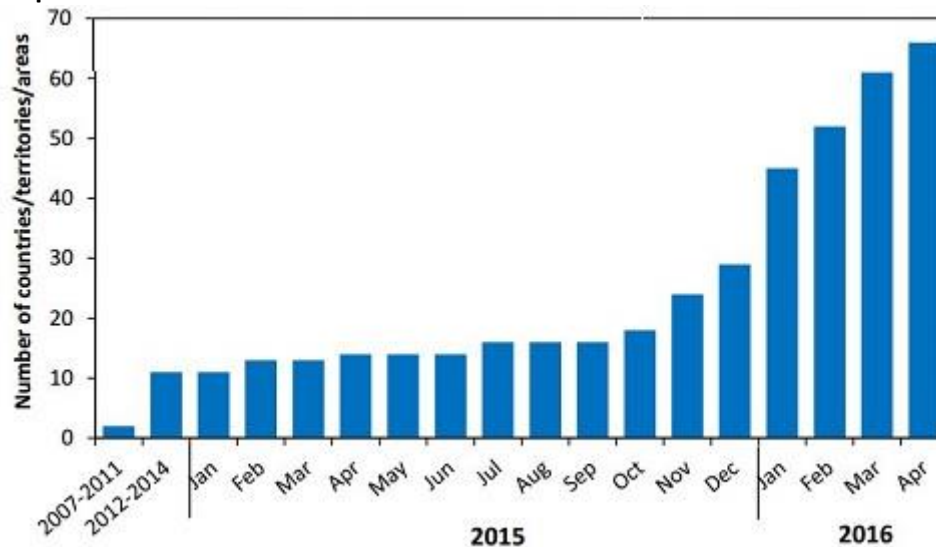
Pain behind eyes



**Figure- symptoms of Zika**

**Courtesy:** <http://www.who.int/mediacentre/infographic/zika-virus/What-is-zika.pdf>, 19oct 2016 , 14:15

#### WHO Situation Reports – Zika



**Figure:** Cumulative number of countries, territories and areas reporting Zika virus transmission in years, 2007-2014, and monthly from 1 January 2015 to 13 April 2016

**Courtesy:** <http://www.who.int/emergencies/zika-virus/april21-graph-zika.jpg>, 19oct 2016 , 14:04

#### TREATMENT OF ZIKA VIRUS

There is no specific medicine or vaccine for Zika virus. Treat the symptoms take medicine such as acetaminophen(Tylenol®)or Paracetamol to reduce fever and pain. Do not take aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) until dengue can be ruled out to reduce the risk of bleeding.

#### Associations with GBS and microcephaly

A relationship between Zika infection and Guillain-Barré syndrome (GBS) has been suggested due to higher-than-usual rates of GBS observed in French Polynesia, Brazil, and El Salvador during recent outbreaks. (European

Centre for Disease Prevention and Control. Rapid risk assessment,2017, Oehler E, Watrin L, et al.,2013, Pan American Health Organization/World Health Organization Epidemiological update,2016, Pan American Health Organization/World Health Organization. Epidemiological alert, 2017) Research into this association is ongoing.

Zika virus infection has also been linked to congenital abnormalities, specifically microcephaly. Brazilian states with known Zika transmission have reported a greater than twentyfold increase in rates of children born with microcephaly since the outbreak began.( Rapid Risk Assessment: the risk of zika virus to cannadians, 2016 , Brazil Ministry of Health, The public health Emergency Operations Center report on microcephaly. ,2016 ) A recent case report of vertical Zika transmission identified viral RNA in the brain tissue of a fetus with severe microcephaly.( Mlakar J, Korva M, et al. , 2016) Other case reports have identified Zika RNA and antibodies in the amniotic fluid of microcephalic fetuses from affected areas in Brazil.( Calvet G, Aguiar RS, et al., 2016 , Oliveira Melo AS, Malinge G, et al. , 2017) Although these findings do not prove causality between Zika virus infection and microcephaly, the link is now strongly supported by mounting epidemiologic and clinical data.

### CURRENT NEWS OF ZIKA

Florida health officials on Monday reported **four more mosquito-borne Zika infections** in Miami-Dade County, including one case linked to the area of ongoing transmission in Miami Beach and two associated with the **NEWLY DESIGNATED ZONE** in Miami's Little River neighborhood.

The fourth local infection reported Monday in Miami-Dade is under investigation to determine the area of exposure, according to the Florida Department of Health. In addition, state health officials reported three new travel-related infections, including one in Miami-Dade and two involving pregnant women. Florida does not identify the county of residence for pregnant women who acquire Zika.

In total, Florida has reported 1,031 Zika infections this year, with 179 local cases and 847 travel-related cases, including 108 pregnant women. An additional five cases have been labeled "undetermined" after state health officials failed to determine a local area of exposure.

### CURRENT NEWS OF ZIKA IN WASHINGTON

Research has shown that toddlers and adults – as well as fetuses and infants – could face developmental effects after contracting Zika, and scientists are trying to find out why.

After months of controversy among lawmakers, Congress passed a bill late last month to fund Zika relief efforts, and the virus has continued to spread in countries including the U.S. and Brazil, which is gearing up for its next mosquito season.

Meanwhile, scientists are investigating the dangers of Zika outside the womb.

This summer, the New England Journal of Medicine published a report highlighting a child in Sao Paulo, Brazil, who was infected with Zika for at least 67 days after he was born, allowing scientists to take a closer look at the virus and its impacts on both fetuses and young children.

"It's well known that there are certain viruses that cause problems in the fetal brain," said Dr. Deborah Levine, a radiology professor at Harvard Medical School. "But the brain continues to develop after birth, and we don't know the other (impacts) yet."

### CONCLUSION

The Zika virus is a member of the *Flaviviridae* family in the genus, flavivirus. Other members of this largely mosquito-borne genus include yellow fever, West Nile viruses, Dengue fever and Japanese encephalitis, all of which can cause infections in humans. Although the symptoms of the Zika virus are relatively mild for most people, there is no vaccine or medicine available for treating these infections and pregnant women are at particular risk due to the growing body of scientific evidence that indicates a link between Zika infections and microcephaly as well as its potential as a trigger for Guillain-Barre syndrome. In sum, the Zika virus joins a growing list of animal-borne pathogens that represent a threat to global public health, especially for pregnant

women, due in large part to the ease with which people can travel internationally and a lack of awareness concerning how the virus is transmitted and public health measures to control mosquito populations.

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