

b Zika virus

Zika virus is an arbovirus belonging to the Flavivirus genus, family Flaviviridae. It was first isolated from a rhesus monkey in Uganda in 1947 and from humans in Nigeria in 1968. Zika virus is transmitted to humans by certain daytime-active *Aedes aegypti* mosquitoes that also transmit dengue and chikungunya viruses in the urban setting. Symptoms of Zika fever are usually mild and include an acute onset of fever, maculopapular rash, arthralgia, conjunctivitis, myalgia and headache. About 1 in 4 infected persons are symptomatic. Symptoms are self-limited and may persist for 2-7 days. Severe disease requiring hospitalization is rare and to date, no deaths due to Zika have been reported. Treatment is nonspecific and supportive. Zika, dengue and chikungunya present with similar clinical signs and symptoms, and have a similar geographical distribution. Dengue and Zika virus infections may cross-react in serology tests but PCR tests reliably detect and differentiate between viruses. Persons with Zika virus are only viraemic for 2-4 days during the first week of illness, so PCR may not reliably identify older infections.

Prior to 2015, Zika virus outbreaks were intermittently reported in a narrow equatorial band extending from Central Africa through Southeast Asia to the Pacific Islands. In May 2015, the Pan American Health Organization issued an alert regarding the first confirmed Zika virus infections in Brazil. Since then, 18 countries in the Americas have confirmed autochthonous circulation of Zika virus. The Pan American Health Organization (PAHO) and the World Health Organization acknowledged an increase of congenital anomalies (microcephaly, unilateral ophthalmological abnormalities and cerebral calcifications), Guillain-Barre syndrome and other neurological and autoimmune syndromes in areas where Zika virus is currently circulating. Presently, no definite causality can be attributed to Zika virus infection, but investigations are ongoing. On 17 January 2016 the WHO made specific recommendations to member states to establish and maintain the capacity to detect and confirm Zika virus cases, prepare healthcare facilities to respond to a possible increased demand of specialized care for neurological syndromes and to strengthen antenatal care.

In the light of the possible association with congenital anomalies, prevention of Zika virus infection is critical. Efforts to eliminate mosquito vectors through effective vector control strategies should be strengthened and communicated to the public in areas where Zika is currently prevalent. Mosquito exposure during the first few days of

illness should be avoided to prevent other mosquitoes from becoming infected. Personal protection to avoid mosquito bites is essential for travellers visiting areas where the Zika virus is circulating. As a further precaution, pregnant women should delay travel to areas with current outbreaks of Zika virus.

It is important to emphasize that Zika virus has not been found on the African continent further south than Uganda. The vector species, *Aedes aegypti* is common in South Africa, particularly in the eastern coastal plain but also in the cities of the inland plateau. In the urban centres, the mosquito breeds in small collections of water such as discarded tyres and buckets, or the leaf axils of *Strelitzia nicolae* ("banana trees"). The question is, why has Zika virus spread to Indonesia and Brazil but not to southern Africa? We don't have a definitive answer but believe that the reason is probably the same as for yellow fever and the dengue viruses, which also don't occur this far south. One could speculate that numerous introductions of either infected mosquitoes or infected travellers are necessary before a foreign arbovirus can become established in a new area, because the virus needs to be introduced into a capable vector population as well as host population. These arboviruses are not contagious and usually require the assistance of an intermediate vector between hosts. Then there is also the question about vector susceptibility and ability to transmit the virus by bite. *Aedes aegypti* is made up of two subspecies, only one of which occurs predominantly outside of Africa. This subspecies has enjoyed several centuries of adaptation to the urban environment and has developed a preference for human blood. The typical African subspecies, *Aedes aegypti* subspecies *formosus*, tends not to bite humans and may well be less susceptible to Zika virus when compared to the South American *Aedes aegypti* subspecies *aegypti*. However, this needs to be established in the laboratory before one can categorically state that it is a competent or poor vector.

Even though the possibility of an infected traveller introducing Zika virus to South Africa obviously does exist, the short viraemic period in humans would lessen the chance of being transferred to a susceptible mosquito, particularly because local *Aedes aegypti* mosquitoes have very limited flight ranges (measured in a few metres) and tend not to enter buildings (unlike subspecies *aegypti*, which utilize homes in crowded urban settlements). The Brazilian outbreak appears to be associated with lack of piped water and the resultant storage of water in indoor vats and pails, all ideal habitats for

Aedes aegypti mosquitoes to breed in. For this reason, the best way to eliminate or at least minimize Zika virus is to control the *Aedes aegypti* populations by eliminating their breeding habitats. Aerial spraying of insecticides for *Aedes aegypti*, though appearing to be useful, has failed in the past for various reasons and is not recommended. Brazilian vector control teams are attempting to reduce vector populations by a combination of removing containers that could be used for oviposition by mosquitoes, and deployment of traps for attracting gravid mosquitoes, laced with a larvicide to kill larvae as they hatch out.

Source: Centre for Emerging and Zoonotic Diseases, Division of Public Health Surveillance and Response, NICD-NHLS; (outbreak@nicd.ac.za)

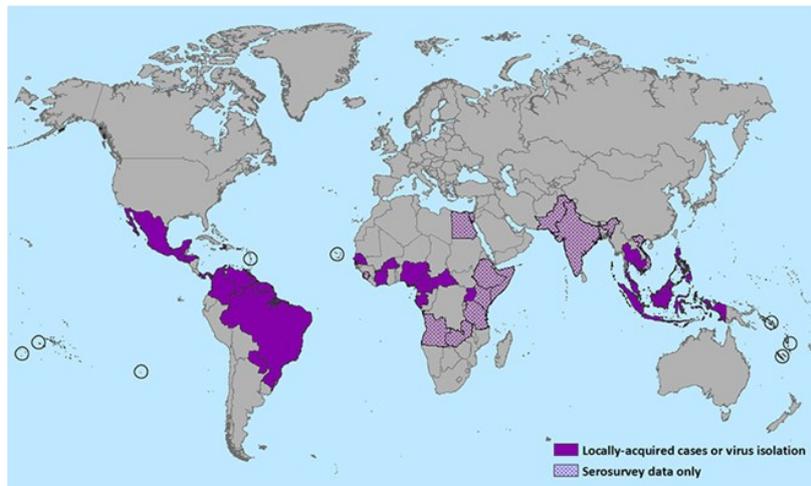


Figure 5. A map showing the distribution of Zika virus as of January 2016 (Source: Centers for Disease Control, Atlanta, USA)