

Zika virus infection and encephalitis

By Dr. Cristiane N Soares, Neurologist of Infectious diseases Service, Federal Hospital dos Servidores do Estado, Rio de Janeiro, Brazil, and peer reviewed by Professor Ben Michael, Dr Mark Ellul, and Anne Caroline Marcos, University of Liverpool

Background

Zika virus (ZIKV) was first discovered in 1947, when a mysterious fever developed in a rhesus monkey in the Zika Forest of Uganda. Since then, outbreaks have been documented in Yap Island, Micronesia, and in French Polynesia. However, in 2015 it spread rapidly through South and Central America and has reached epidemic proportions. An up-to-date list of the countries where ZIKV has been reported is available from Public Health England:

www.gov.uk/guidance/zika-virus-country-specific-risk

The World Health Organization (WHO) declared Zika a public health emergency of international concern in 2016, since an association between ZIKV and severe birth defects as well as other neurological disorders had been proved. By mid-2017, ZIKV incidence had declined considerably in most affected countries, and the public health emergency was declared over. Since then, sporadic cases and small outbreaks have continued to be reported globally.

ZIKV is transmitted primarily through the bite of infected *Aedes* species mosquitoes which tend to bite mainly during the day. There is also evidence of transmission from mother to child (transplacental infection), blood transfusion and sexual contact.

Complications of ZIKV infection

Regarding neurological manifestations, ZIKV has been particularly associated to Guillain-Barre syndrome. This normally causes a weakness of the arms and legs and changes in sensation but can also lead to paralysis and difficulty breathing. Myelitis (inflammation of the spinal cord), encephalitis (inflammation of the brain), meningoencephalitis (inflammation of the brain and the meninges – the protective layers that cover the brain) and acute disseminated encephalomyelitis (post-infectious inflammation of the brain and spine) have all been reported in relation to ZIKV infection.

It is not possible to predict whether an individual will develop problems in the nervous system when they are infected with ZIKV.

When ZIKV infection occurs during pregnancy, it can cause congenital Zika syndrome (CZS), a pattern of congenital abnormalities and long-term neurodevelopmental disabilities. The central nervous system is the main target, although multiple organ systems can be affected. Features of CZS include severe microcephaly, abnormalities of brain development, eye abnormalities, congenital contractures, seizures, abnormal muscle tone, and developmental difficulties. The risk of severe congenital abnormalities is highest when infection occurs early in pregnancy, although complications can occur following infection at any stage of pregnancy. Congenital abnormalities can occur even when the mother has no symptoms of ZIKV infection during pregnancy.

It is recommended that pregnant women:

- Postpone non-essential travel to areas at high risk of Zika virus transmission.

- Consider postponing non-essential travel to areas at moderate risk of ZIKV transmission until after pregnancy.
- If travel cannot be avoided, pregnant women should strictly follow mosquito bite prevention measures, including using insect repellent, wearing loose clothing that covers arms and legs, and sleeping under insecticide-treated mosquito nets. As Aedes mosquitoes are most active during the day, precautions should be maintained throughout the day.

Further advice about the risk of ZIKV in pregnancy, or in women trying to get pregnant, is available on the NHS website: www.nhs.uk/conditions/zika/#advice-for-pregnant-women

Symptoms and diagnosis

In most people (approximately 80%), ZIKV infection causes no symptoms at all. When symptoms occur, they are usually mild. The most common signs and symptoms of **ZIKV infection** are skin rash (mostly maculopapular- red bumps on a flat and red skin patch), fever, arthralgia (joints pain), myalgia (muscle pain), headache and conjunctivitis. Other symptoms such as articular oedema (joint swelling), sore throat, cough, and vomiting are also reported.

ZIKV encephalitis symptoms range from disturbed level of consciousness, irritability, personality change and seizures to deep coma and death.

The diagnosis can be made by clinical history, symptoms and laboratory tests looking for the virus or the antibody response to the virus in the blood and spinal fluid (which is collected from the lower back using a fine needle via a lumbar puncture). It is important to note that the window for detecting the virus by molecular tests (PCR) is short. The virus typically disappears from the blood within 5–7 days of symptom onset, although it may persist longer in urine. In regions where [dengue](#), [chikungunya](#) and Zika co-circulate, serological tests may cross-react, making laboratory distinction between these infections challenging.

Treatment, outcomes and prevention

At the moment there is no specific treatment for ZIKV infection. Treatment is symptomatic, including antipyretic (to reduce fever), analgesic (to reduce pain), anti-inflammatory drugs (to reduce joint and muscle pain), lubricating eye drops if required, anti-allergy drugs (for itching), among others.

There is no specific treatment for ZIKV encephalitis. Usually, it consists of treating the complications of encephalitis such as aches, seizures or raised pressure within the skull.

The outcome is extremely variable: people can recover completely or remain with deficits. The outcome of ZIKV encephalitis is difficult to assess as only a few cases have been reported. In children who had been infected during pregnancy, the prognosis is usually poor, with cognitive deficits and a psychomotor development delay.

There is currently no vaccine against ZIKV. Although several vaccine candidates have been studied, there is concern that immunization of individuals against ZIKV may exacerbate subsequent Dengue Virus (DENV) infection symptoms. In ZIKV endemic regions this question should be observed since there are multiple flaviviruses coexisting. Preventive measures include simple measures involving mosquito bite prevention (wearing trousers and long sleeves along with repellents use, bed nets).

For more information about mosquito bite prevention methods, please see our relevant webpage: [Infectious encephalitis guidelines for travellers – Encephalitis International](#).

Future research

Researchers continue to study how ZIKV is transmitted and why some people develop neurological complications such as encephalitis, Guillain-Barré syndrome and myelitis following infection. Ongoing research is also focused on improving surveillance, diagnostic tests, treatments and methods of controlling the mosquitoes that spread ZIKV.

Several studies involving ZIKV vaccines are in development, and it is hoped that a safe and effective one may be available in a near future.

FS016V3 Zika virus infection

Page created: August 2018. Page updated: September 2026. Review date: September 2029.

Disclaimer: We try to ensure that the information is easy to understand, accurate and up-to-date as possible. If you would like more information on the source material and references the author used to write this document, please contact Encephalitis International. None of the authors of the above document has declared any conflict of interest, which may arise from being named as an author of this document.

Support our information

With our support, no one has to face encephalitis alone. Our advice and information is available free of charge to everyone affected but we are truly grateful when supporters feel able to contribute a little to the cost of these resources. Please make a donation today by visiting www.encephalitis.info/donate or text the word DOCTOR to 70085 to donate £5.

Thank you!

Encephalitis International, 32 Castlegate, Malton, North Yorkshire, YO17 7DT, UK

Administration: +44 (0) 1653 692583 **Support:** +44 (0) 1653 699599

Email: mail@encephalitis.info **Website:** www.encephalitis.info

Encephalitis International is the operating name of the Encephalitis Support Group.

Registered Charity England and Wales No: 1087843; Registered Charity in Scotland No: SC048210

Charitable Company registered in England and Wales No: 04189027