Science Media Centre Factsheet

Zika virus

Zika virus is spread by mosquitoes and is usually associated with mild symptoms lasting up to a week. Severe symptoms are uncommon but there are suggestions of an association between infection of pregnant women and birth defects and autoimmune disorders.

Background

- Zika virus was first identified in Uganda in 1947 in monkeys and then in humans in 1952. It was mainly confined to areas of Africa, Southeast Asia and the Pacific Islands, but from 2015 parts of Central and South America have been identified as being affected.
- Zika virus is a flavivirus transmitted by the bite of the *Aedes* genus of mosquitoes which also carry dengue and yellow fever. *Aedes* generally bite during the day. *Aedes aegypti* is thought to be the species primarily responsible for the current outbreak in Brazil.
- There is some evidence from case studies suggesting that transmission through sexual contact is possible, and the virus has been isolated in semen.
- Symptoms of Zika are similar to those for other viral diseases such as dengue and may include a rash, itching, fever, muscle pain, conjunctivitis and possibly nausea, vomiting and headaches.

Prevention and treatment

- Potential vaccines are in pre-clinical development with phase I healthy volunteer trials possible as early as summer 2016. Trials in the regions could then start after the vaccines have been shown to be safe and early indications of efficacy are strong enough.
- The World Health Organization has stated that: “Mosquito control works if implemented well”. This included targeting breeding sites of mosquitoes with insecticides, or making them less attractive by removal of standing water and other measures.
- Physical barriers such as mosquito nets and long clothing can also offer personal protection, as can mosquito repellent.
- There is no specific treatment and as the Zika virus is usually mild, bed rest, fluids and relief of pain and fever are typically all that is prescribed, and most patients will recover within a week.
- Strategies involving the release of mosquitoes which have been infected with parasites, or have been irradiated or genetically modified to produce sterile offspring which cannot survive, are under investigation and trials reported that the techniques could lower the mosquito population by more than 80%. Such techniques are not specific to fighting Zika but rather to reducing the mosquito vector, and so could reduce transmission of a number of diseases.

Complications following infection

- Though no definitive causal link has been made, two conditions which are associated with Zika infection are especially worrying.

Guillain-Barré syndrome (GBS)

- There are reports both from previous outbreaks, including in Polynesia, and the current outbreak that around 2-5 patients for every 10,000 infected with Zika will go on to develop GBS. This autoimmune condition causes muscle-weakening as it attacks the nervous system.

- Several viruses and bacteria are known to be associated with GBS and it is not yet clear if the increased incidence seen is dramatically different from what might be expected in association with certain other viral or bacterial infections. Treatment of GBS is supportive, in severe cases the respiratory muscles can be affected and patients may need support with their breathing in an intensive care setting. Immunoglobulin can be used to treat GBS and may reduce the duration and severity of symptoms but is not effective in all patients. Most patients make a full recovery, but some may have lasting weakness and others may suffer complications. Mortality rates for GBS are considered to be <5% where adequate intensive care facilities are available.

Microcephaly

- An increase in cases of microcephaly has been reported in Brazil since the current outbreak began, and evidence is mounting of the association between microcephaly and Zika virus. Microcephaly is a birth defect where babies are born with smaller than normal heads, which is associated with incomplete brain development.
- Research based on a previous Zika virus outbreak has estimated that the babies of around 1 in every 100 pregnant women who are infected with Zika will go on to develop microcephaly.
- The reported numbers of suspect cases of microcephaly are larger than might normally be expected but these suspected cases include a variety of categories for reporting. For this reason all reported suspect cases must be formally assessed before the true increased incidence of microcephaly in Brazil can be known. In Brazil there have been 1749 microcephaly and /or CNS malformation cases suggestive of congenital infections or potentially associated with a Zika virus infection (figures up until 28 July 2016).
- The WHO defines microcephaly as a head circumference greater than 2 standard deviations below the mean. However, the size of the head must be taken in the context of the size of the infant in general and the head circumference should be measured at several intervals to determine the head is not growing adequately and remains consistently greater than 2 standard deviations below the mean.
- The prognosis for children with microcephaly is very varied and depends on the severity, underlying cause of the microcephaly and associated underlying brain abnormality. Some children with microcephaly may have a good prognosis with minimal impact on their development, others may have significant global developmental delay and yet others may have chronic seizure disorders.
- While further research is required if Zika is proven to be associated with microcephaly in order to determine at what stage of pregnancy the damage may occur, the development of microcephaly in association with other viral infections known to cause congenital malformations usually occurs when infection with the virus occurs during the first trimester of pregnancy (the first 12 weeks) and up to the mid second trimester. This is because this is when the infant is rapidly developing and is most susceptible to insults and interruptions in development. However, possible damage to the unborn child caused by Zika at any stage of pregnancy has not been ruled out.

Sources / further information

Centers for Disease Control and Prevention page

European Centre for Disease Prevention and Control rapid risk assessment

Genetic Expert News Service factsheet

Journal of General Virology review article of Zika virus

Microbiology Society – What is Zika virus?

Oxitec field trial of suppression of Aedes aegypti in Brazil through release of sterile males

UK government guidance

SMC expert reaction: Guillain-Barré syndrome and Zika virus

SMC expert reaction: microcephaly and Zika virus

Wellcome Trust Zika Q&A on the Rio Olympics

World Health Organization fact sheet

World Health Organization: mosquito control

World Health Organization Zika virus situation reports

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