

Zika virus and the Rio 2016 Olympic and Paralympic Games

Updated in July 2016



Photo: Ministry of Health

CONTENTS

Brazil vs. Zika virus: results	03
Health Protection at Rio 2016.....	04
Number of current cases.....	06
Understanding Zika virus infections.....	07

BRAZIL vs. ZIKA VIRUS: RESULTS

Since autochthonous transmission of Zika virus was confirmed in Brazil in April 2015, the country has quickly and effectively made an "Olympian effort" in taking action to unravel the virus's behaviour and eradicate the vector of the disease, the *Aedes aegypti* mosquito. The results are crystal clear:

- In the first half of 2016, there was a decrease in the number of Zika virus cases in Brazil and, for the first time ever, that decrease happened before the historical peak period for *Aedes aegypti*-transmitted diseases. The number of cases recorded in the country fell 99% between February and May this year, including in Olympic/Paralympic host city Rio de Janeiro. The decline, which in previous years started only in April, happened earlier in 2016.
- The expectation is that there will be less than one case of infection among the 500,000 tourists expected to be coming for the Rio 2016 Olympic and Paralympic Games, according to a study by Cambridge University.
- At an experts meeting in June this year, the World Health Organization (WHO) reaffirmed that the chances of infection among athletes and tourists coming to Brazil for the Games are minimal.
- In about 50 test events held in preparation for Rio 2016, there were no cases of infection by the mosquito.
- The Olympic torch has toured over a hundred cities Since 3 May, and not a single case has been reported.

The risk of Zika virus infection is minimal, first because weather conditions during the Games do not favour proliferation of the mosquito vector – it is winter in Brazil –, and second because the country has set up a task force, coordinated by the Brazilian government in partnership with research institutes, national and international organizations and civil society at large, that has joined forces to overcome challenges through determination, strategy, planning, discipline and teamwork.

In December 2015, Brazil introduced the National Plan to Combat *Aedes* and Microcephaly Infections, aiming to reduce *Aedes aegypti* infestation levels to less than 1% in Brazilian municipalities. The plan included joint efforts supported by the military, popular mobilization, direct action against the mosquito and awareness-raising campaigns in educational institutions:

- The Armed Forces have supported health workers and other entities engaged in the fight against the epidemics, contributing with 220,000 professionals to the task force.
- The Brazilian public healthcare system, which is universal and free of charge, has increased the supply of tests for the detection and diagnosis of the disease twenty-fold, and made the notification of Microcephaly compulsory.
- The number of health workers visiting households to identify mosquito breeding sites, apply larvicides and provide guidance to residents on forms of prevention has increased from 43,900 to 309,900. Visits were held on a monthly basis until February, and have become bimonthly since March.
- Over 90% of households and public/private facilities in the country have been inspected.
- The Brazilian Ministry of Tourism has sent notices to 56,000 hotels, inns and hostels in the country with recommendations on how to prevent the proliferation of the mosquito.
- Mass media campaigns were expanded between December 2015 and June this year, and mobilization activities have been carried out in public schools and federal universities.

- In June this year, the Federal Government announced investments totalling R\$65 million in research that will contribute to the prevention, diagnosis and treatment of Zika virus infections and related diseases.
- Brazilian government investments in scientific studies for the development of vaccines and serums against *Aedes aegypti*-transmitted diseases currently exceed R\$125 million:
 - Of this total, R\$5.6 million will be invested in the development of Zika virus vaccines and on bilateral cooperation projects for research into Zika and Microcephaly involving Brazil's Fiocruz Foundation and the US National Institute of Health.
 - Another R\$10 million are earmarked for research on the Zika virus vaccine being developed by the Evandro Chagas Institute (IEC) in partnership with the University of Texas Medical Branch, in the United States. Preclinical tests (in primates and mice) have been stepped up and will be performed as early as November this year.
 - More advanced research aimed at combating the *Aedes aegypti*, already being tested in some municipalities in the country with positive results, includes the production of radiation-sterilized and transgenic mosquitoes to stop reproduction of the insect.

All this collective effort will be a legacy for the country and the world. Brazil was able to organize quickly and efficiently because it is one of the few countries that have a public health system that provides universal, integrated and free-of-charge care to the population. The country has strong, internationally recognized research institutions such as the Oswaldo Cruz Foundation (Fiocruz), recognized for its ability to put science, technology, innovation, education and the technological production of strategic services and inputs at the service of promoting the health of the population.

In addition, Brazil is recognized by its historical fight against the *Aedes aegypti*. In the early twentieth century, the identification of this mosquito as the primary vector of urban yellow fever boosted the implementation of strict control measures that led to the eradication of the vector in the country in 1955. In 1958, the Pan American Health Organization (PAHO) declared Brazil free of the mosquito. Eradication was not definitive only because it was brought back by people traveling from/to the continent.

HEALTH PROTECTION AT RIO 2016

To ensure the health of tourists, athletes and the entire population during the Rio 2016 Olympic and Paralympic Games, the Brazilian government has implemented the following strategic measures:

- 24-hour monitoring of health notifications in the six cities where the Games will be held (Rio de Janeiro, São Paulo, Brasília, Belo Horizonte, Salvador and Manaus), with professionals trained and qualified to respond to emergencies. The Integrated Joint Health Operations Centre (CIOCS), which will be open from 29 July to 26 September, will identify risk scenarios and the demand for health care, and use that information to assist in organizing the healthcare network. From the Ministry of Health alone, 125 professionals will be working exclusively in these actions, which also have the support of the states and municipalities involved in the Games.
- About 3,500 professionals have been trained in the city of Rio to fight the *Aedes aegypti*.

- São Paulo, Minas Gerais, Bahia, the Federal District and Amazonas, in addition to Rio de Janeiro, take regular action to combat the mosquito - such as inspections and the use of larvicides - in competition areas as well as in Olympic Villages and surrounding areas.
- The arenas and facilities hosting the delegations and the press are also being monitored and inspected as part of a non-stop effort that will continue throughout the tournament.
- 2,500 temporary health professionals will be hired, including physicians, nurses and professionals from other areas, to enhance care in federal hospitals in the state of Rio de Janeiro.
- The Ministry of Health has provided 146 ambulances that will cater exclusively to the public of the Games.
- For emergency cases with multiple victims, 235 spare hospital beds have been made available in the city of Rio de Janeiro alone (135 are in federal hospitals, 50 in municipal hospitals and 50 in state hospitals).
- In addition to the physical facilities, SUS National Force teams will be on hand in Rio de Janeiro to meet any demands, including doctors, nurses and nursing technicians, at the Afonos Air Base, with capacity to set up three medical tents and seven ICU beds.
- The National Health Surveillance Agency (Anvisa) will conduct inspections at ports, airports and borders as well as in health and food facilities.

Rio 2016 will provide medical services within the security perimeter and offer private external health care to athletes and delegations. Those who need to be removed to health units will be treated at hospitals associated with the Organizing Committee. Over 90% of cases are expected to be resolved on site.

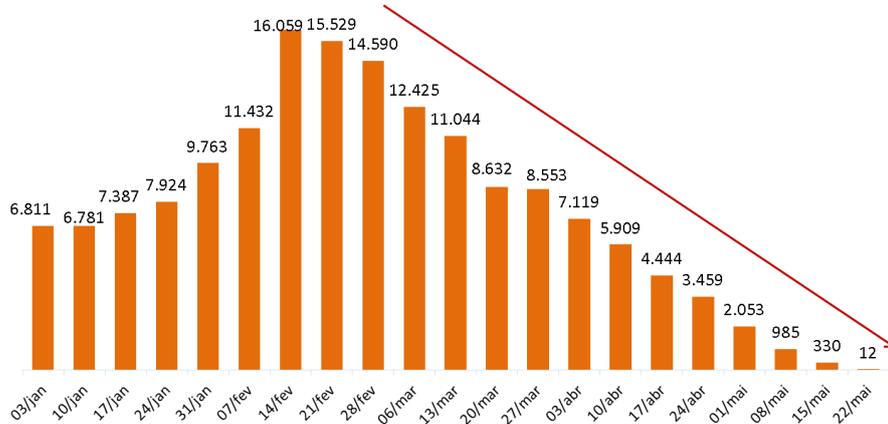
Tourists in competition areas will be served by the healthcare facilities set up by Rio 2016 and, in serious cases, referred to reference hospitals in the six host cities of the Games. Health care facilities will also be set up in live performance and broadcast areas.

Outside competition areas, travellers should seek the nearest public health service to receive care and guidance. The *Guardiões da Saúde* (“Health Guardians”) app, available for free on web (www.guardioesdasaude.org) and smartphone/tablet versions at the Google Play Store and iOS App Store, uses GPS to show the location of nearby Emergency Care Units (UPAs). Travellers can also find out the location of these services at RioTur information booths.

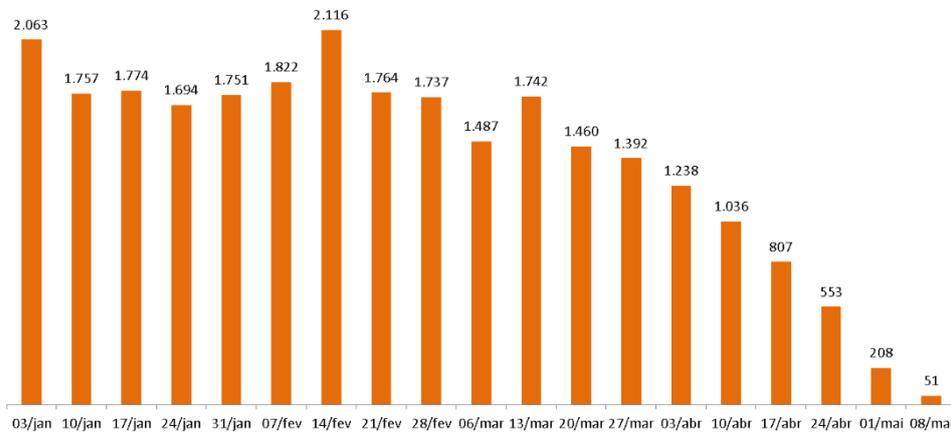
The Brazilian Ministry of Health also provides the Traveller’s Health website (<http://portalsaude.saude.gov.br/index.php/o-ministerio/principal/secretarias/svs/viajante-en>), with tips and information in Portuguese, English, Spanish and French to help visitors protect their health.

NUMBER OF CURRENT CASES

Zika cases reported in Brazil per epidemiological week



Zika cases reported in the municipality of Rio de Janeiro per epidemiological week*



* Between 15 and 28 May there were no reports of new Zika cases in the city

Microcephaly - From October 2015 to 13 July this year, Brazil had 1,687 confirmed cases of Microcephaly and other disorders of the nervous system in foetuses that were suggestive of congenital infection. The cases were reported in 592 municipalities, comprising all states and the Federal District. A total 3,142 suspected cases of Microcephaly across the country are currently under investigation. Microcephaly can be caused by various infectious agents besides the Zika virus, such as Syphilis, Toxoplasmosis, other infectious agents, Rubella, Cytomegalovirus, and HSV. However, the Ministry of Health believes that most of the mothers who had babies with a final diagnosis of Microcephaly had been infected by Zika virus.

In the world

This is a completely new scenario in terms of global public health and for the international scientific community. Between 2007 and 30 March 2016, autochthonous circulation (contamination) or indications of virus transmission was confirmed in 61 countries and territories, 50 of them since January 2015. Four of these countries (French Polynesia, Easter Island (Chile), New Caledonia and the Cook Islands) have reported that the Zika outbreak has ended.

The virus was detected for the first time in the Americas, with autochthonous transmissions recorded in 33 countries and territories in the continent. Brazil is currently the country most affected by Zika virus outbreaks in the world, followed by Colombia.

UNDERSTANDING ZIKA VIRUS INFECTIONS

ZIKA VIRUS INFECTION	
Forms of transmission	<ul style="list-style-type: none"> • Bite by an infected female <i>Aedes aegypti</i> mosquito. • Sexual contact (confirmed last March by the World Health Organization). • Under study: breast milk, saliva and urine.
Period of greater infestation	<ul style="list-style-type: none"> • Summer: high temperatures and increased rainfall favour the hatching of the mosquito's eggs. • Infestation peak in Brazil: historically between February and May, with a significant decline between July and September.
Vector habits and behaviour	<ul style="list-style-type: none"> • Feeds preferably during the day. Bites more frequently in the early morning and late afternoon. • Lives in urban areas. • In Brazil, about 80% of larvae breeding sites are found indoors • The eggs resist up to 450 days in a dry environment, allowing them to survive until the next rainy and warm season. • Life span of adult mosquitoes: up to 50 days • Only the female bites humans to suck blood. One female can create 1.5 billion offspring during its lifetime.
Incidence rate	<ul style="list-style-type: none"> • 78.5 cases per 100,000 persons
Main symptoms	<ul style="list-style-type: none"> • Itchy rashes. • Low and intermittent fever. • Bloodshot eyes. • Joint pain. • Headache. • Body swelling, sore throat, cough and vomiting (less frequent) <p><i>* It is asymptomatic in 80% of cases. Symptoms appear three to seven days after infection and can last up to 7 days. Joint pain may persist for up to a month.</i></p>
Diagnosis	<ul style="list-style-type: none"> • Blood test (PCR) during the period in which the patient presents symptoms. • 3-in-1 test (under development) to detect <i>Aedes aegypti</i>-transmitted diseases (Dengue Fever, Zika and Chikungunya)

	<ul style="list-style-type: none"> • Serology test to detect Zika antibodies (under study).
Possible sequelae	<ul style="list-style-type: none"> • Microcephaly in fetuses and children of infected mothers, and other congenital malformations. • Guillain-Barré syndrome: the immune system of the infected person begins to attack its own nerves. The symptoms are muscle weakness in the legs, trunk, arms and face, with reduced or absent reflexes. • Miscarriage and stillbirths.
Treatment	<ul style="list-style-type: none"> • Acetaminophen (paracetamol) and dipyrrone for fever control and pain management. • Antihistamines in case of pruritic rashes. • Zika virus vaccine (under study). There are at least 15 companies and academic institutions committed to developing Zika vaccines. The vaccines under study will take at least 18 months to be tested on a large scale. • Serology tests to detect antibodies to Zika, including after elimination of the virus, are under study. <p><i>* It is inadvisable to use or prescribe acetylsalicylic acid and other anti-inflammatory drugs. Every suspected case should be referred to a health service.</i></p>
Prevention and control	<ul style="list-style-type: none"> • Remove standing water from indoor containers and brush them weekly to eliminate eggs. • Keep tanks and any location that can hold water covered. • Apply larvicides into compartments where water needs to be stored, such as cisterns and pools. • Apply fogging in case of epidemics. • Use repellents and reapply them throughout the day as directed on the label. • Wear light-coloured clothes, pants and long-sleeved shirts. • Selective collection and proper disposal of garbage. • Use mosquito nets while sleeping. • Use mosquito screens in apartment windows and stay in places with mosquito screens in the windows. • Call the city government if you suspect a mosquito breeding site next to where you live.
Vector combat	<ul style="list-style-type: none"> • The most efficient way, so far, is to avoid <i>Aedes aegypti</i> breeding sites and eliminate the larvae. • There is ongoing research, with positive partial results, on the production of infertile mosquitoes to prevent reproduction of the species.

What remains to be discovered about the Zika virus
Presence in the body after the symptomatic period
Probability of women infected before pregnancy transmitting the virus to the foetus when they get pregnant
Probability of pregnant women infected during pregnancy transmitting the virus to the foetus
Proportion of pregnant women infected with the virus in the population that will have babies with Microcephaly
Possible factors associated with Zika virus that lead to Microcephaly (Example: gestational age; prior infection by other viruses or diseases; use of medication)
Possible sequelae for children and adults
Transmission routes other than the <i>Aedes aegypti</i> mosquito