Pan American Health Organization

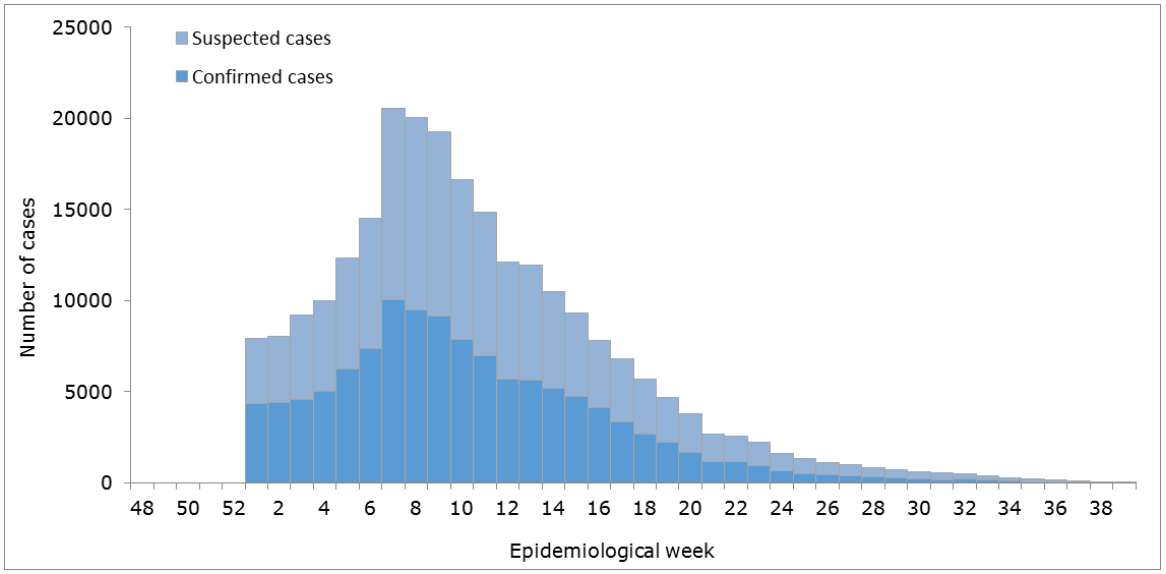
World Health Organization
REGIONAL OFFICE FOR THE Americas

Zika-Epidemiological Report

Brazil

2 November 2016

Figure 1. Suspected and confirmed Zika cases. Brazil. EW 48 of 2015 to EW 39, 2016[1]



Source: Data received from Brazil IHR NFP and reproduced by PAHO/WHO

FIRST AUTOCHTHONOUS VECTOR-BORNE CASES

In epidemiological week (EW) 6 of 2015, the Brazil International Health Regulations (IHR) National Focal Point (NFP) reported that 45 cases of acute febrile illness had been detected in Caxias Municipality in Maranhao State as of EW 3 of 2015. The patients reported symptoms, including rash, fever, myalgia, arthralgia, and headache. No severe cases or deaths were reported. Samples from 25 patients were tested, of which 14 samples resulted positive for dengue and all samples were negative for chikungunya, rubella, and measles.

In EW 17 of 2015, authorities of Brazil informed that eight samples tested at the Bahia State laboratory were positive for Zika virus by RT-PCR, and confirmatory tests from the national reference laboratory were pending. All eight samples were taken from patients with rash illness, with no history of travel in the previous months. In EW 19 of 2015, the national reference laboratory at the Evandro Chagas Institute confirmed positive results for Zika virus by RT-PCR in samples taken from the States of Rio Grande do Norte and Bahia.[2] This was the first report of locally-acquired Zika virus infection in the continental platform of the Americas Region.

[1] Data is not available for 2015 because Zika disease was not made reportable disease by the Brazil Ministry of Health until 17 February of 2016

[2] A study based on phylogenetic and molecular analysis indicated a single introduction of Zika virus in the Americas, estimated to have occurred between May and November of 2013, more than 12 months prior to the first detection of Zika virus cases in Brazil. The study revealed that the Brazil Zika virus strain shares a common ancestor with the Zika virus strain that circulated in French Polynesia in November, 2013. See full report: http://science.sciencemag.org/content/351/6280/1377.full

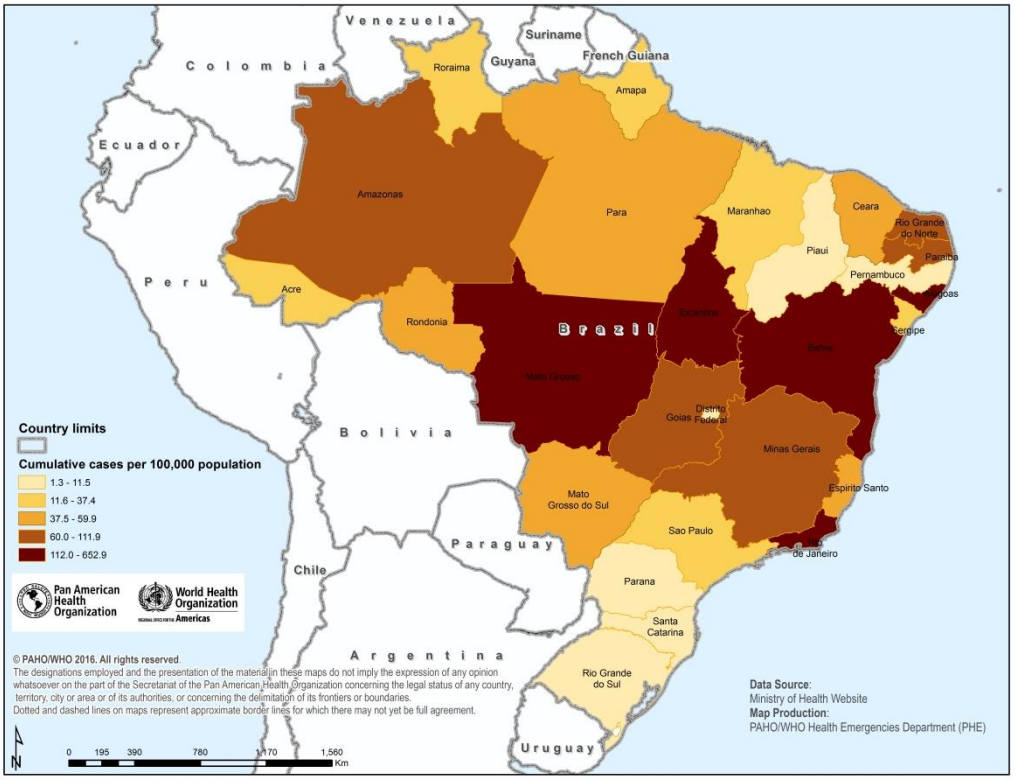
Suggested citation: Pan American Health Organization / World Health Organization. Zika - Epidemiological Report Brazil. November 2016. Washington, D.C.: PAHO/WHO; 2016

A recent phylogenetic and molecular clock analyses estimated the introduction of Zika virus in Brazil as early as May 2013.[3]

GEOGRAPHIC DISTRIBUTION

Between EW 1 and EW 37 of 2016, 2,288 municipalities reported suspected Zika cases in all 27 federal units. The highest incidence rate was observed in the states located in the central part of Brazil, with Mato Grosso state reporting the highest incidence rate (673 cases per 100,000 population), followed by Rio de Janeiro (364 cases per 100,000), Bahia (331 cases per 100,000), Alagoas (198 cases per 100,000), and Tocantins (145 cases per 100,000).

Figure 2. Suspected Zika cases per 100,000 population by federal unit. Brazil. EW 1 to EW 37 of 2016



Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[4]

On 20 April 2016, researchers from Brazil reported the discovery of nonhuman primates infected with Zika virus in the state of Rio Grande do Norte, located in the Northeast region. Zika virus infection was confirmed in 4 out of 15 marmosets (*Callithrix jacchus*) and three out of nine capuchin monkeys (*Sapajus libidinosus*) captured between July and November 2015 in the state of Ceara, an area where Zika virus is circulating. Subsequent sequencing of the virus showed 100% similarity with other Zika virus detected in South America. Further research is needed to determine

[3] N. R. Faria et al., Science 10.1126/science.aaf5036 (2016) http://science.sciencemag.org/content/sci/early/2016/03/23/science.aaf5036.full.pdf.

[4] Ministry of Health of Brazil, EW 37, Dengue, chikungunya and Zika virus Epidemiological Bulletin. Available at: http://portalsaude.saude.gov.br/images/pdf/2016/outubro/18/2016-029-Dengue-publicacao-n-34.pdf

the role of these nonhuman primates in the epidemiology of Zika virus, and the prevalence of Zika virus in monkeys and other nonhuman primates remains unknown.[5]

On 21 July, 2016, the Oswaldo Cruz Foundation (Fiocruz) in Brazil informed of the preliminary results of an entomological investigation in the state of Pernambuco which aims to compare the role of different species of mosquitoes in Brazil in transmission of arboviruses. Priority was given to Zika virus due to the ongoing outbreak and its link with microcephaly cases. The preliminary results from Fiocruz indicate that *Culex quinquefasciatus* that were infected with Zika virus was detected in three out of 80 mosquito pools (group of 1-10 mosquitoes collected in each location) that have been analyzed to date. The positive mosquito samples were collected from places based on addresses of reported Zika virus disease cases in the cities of Recife and Arcoverde in the state of Pernambuco. The positive samples were detected in neighborhoods of Cidade Universitária, Iputinga, and Estância. Quantitative RT-PCR was used to detect Zika virus RNA.[6]

TREND

The first Zika cases was reported in Brazil in EW 19 of 2015, nonetheless, distribution by EW of Zika cases is not available for 2015 because Zika cases and associated neurological and congenital syndrome were not made notifiable conditions by the Brazil Ministry of Health until 17 February of 2016.[7] Therefore, temporal trends of Zika virus disease cases are available only since 2016, and retrospective analysis of cases from 2015 is ongoing.

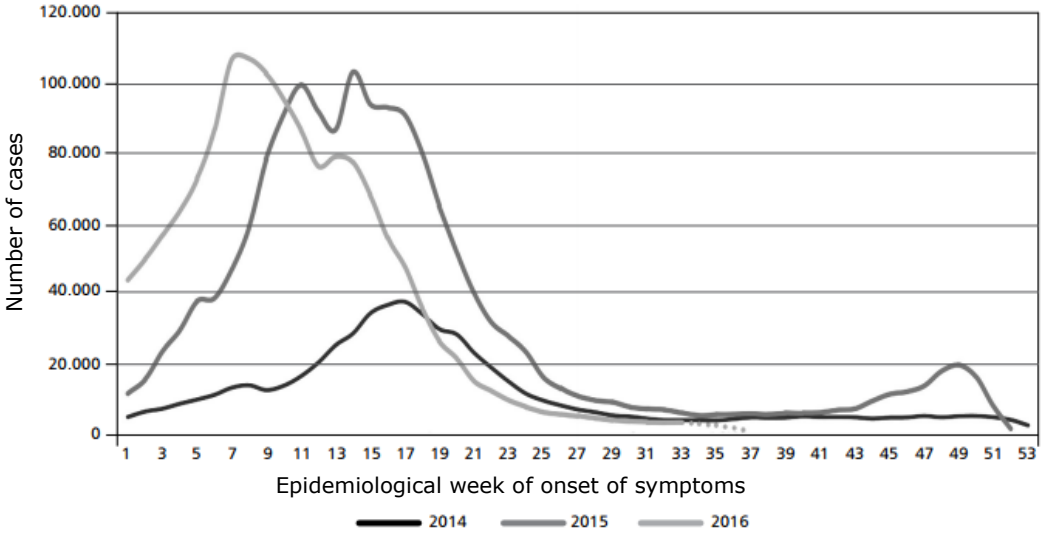
At the national level, between EW 1 and EW 7 of 2016, an increasing trend was observed with a peak in EW 7 (**Figure 1**). Since then, a decrease in Zika virus disease cases was observed with an average of 271 cases per week in the last 8 weeks.

CIRCULATION OF OTHER ARBOVIRUSES

Preceding the introduction of Zika virus, Brazil reported outbreaks of dengue and chikungunya. Between EW 1 to EW 10 of 2016, the number of dengue cases reported in Brazil is greater than the number of cases reported in for the same periods in 2014 and 2015. The peak of dengue cases observed in 2016 (EW 7) occurred earlier than the peak observed in 2014 (EW 15) and 2015 (EW 11) and coincides with the peak of Zika (**Figure 1** and **Figure 3**). After EW 7 and continuing to the present, the number of reported cases has decreased, which coincides also with the trend observed for Zika virus. From EW 18 to EW 37 the number of dengue cases dropped below the reported cases for the same periods in 2014 and 2015.

[5] First detection of Zika virus in neotropical primates in Brazil: a possible new reservoir.
Silvana Favoretto, Danielle Araujo, Danielle Oliveira, Nayle Duarte, FlavioMesquita, Paolo Zanotto, Edison Durigon
bioRxiv 049395; doi: http://dx.doi.org/10.1101/049395 . Full report available at:
http://biorxiv.org/content/early/2016/04/20/049395.full.pdf+html
[6] Fiocruz identifica Culex no Recife com potencial para transmitir o vírus zika. Agência Fiocruz de Notícias. 21 July 2016. Full report available at: https://agencia.fiocruz.br/fiocruz-identifica-culex-no-recife-com-potencial-para-transmitir-o-virus-zika
[7] Brazil Ministry of Health Information Note: Procedures for Zika virus surveillance in Brazil. Available at:
http://portalsaude.saude.gov.br/images/pdf/2016/marco/07/Nota-Informativa-zika.pdf

Figure 3. Probable dengue cases by EW of onset of symptoms. Brazil. 2014 to 2016



Source: Brazil Ministry of Health Epidemiological Bulletin[8] and reproduced by PAHO/WHO

During 2015, the highest rate of dengue was recorded in the Center-West (incidence rate of 1,270 cases per 100,000 population), followed by the South East (1,120 per 100,000), and the Northeast (441 per 100,000); similarly in 2016 (as of EW 32), the highest rate was recorded in Center-West (1,091 per 100,000), followed by the South-East (983 per 100,000) and the Northeast (561 per 100,000).

With regard to chikungunya, the number of reported cases in 2016 to date is greater than for the same period in 2015. Between EW 1 to EW 37 of 2016, 236,287 suspected cases of chikungunya were reported nationwide (116 cases per 100,000 population), of which 116,523 cases were laboratory-confirmed. The geographic distribution of chikungunya cases also increased, with 2,297 municipalities reporting cases in 2016 compared with 696 municipalities reporting probable chikungunya cases in 2015.[9]

ZIKA VIRUS DISEASE IN PREGNANT WOMEN

Between EW 1 and EW 37 of 2016, 6,940 confirmed cases and 9,507 suspected cases of Zika virus disease in pregnant women were reported.

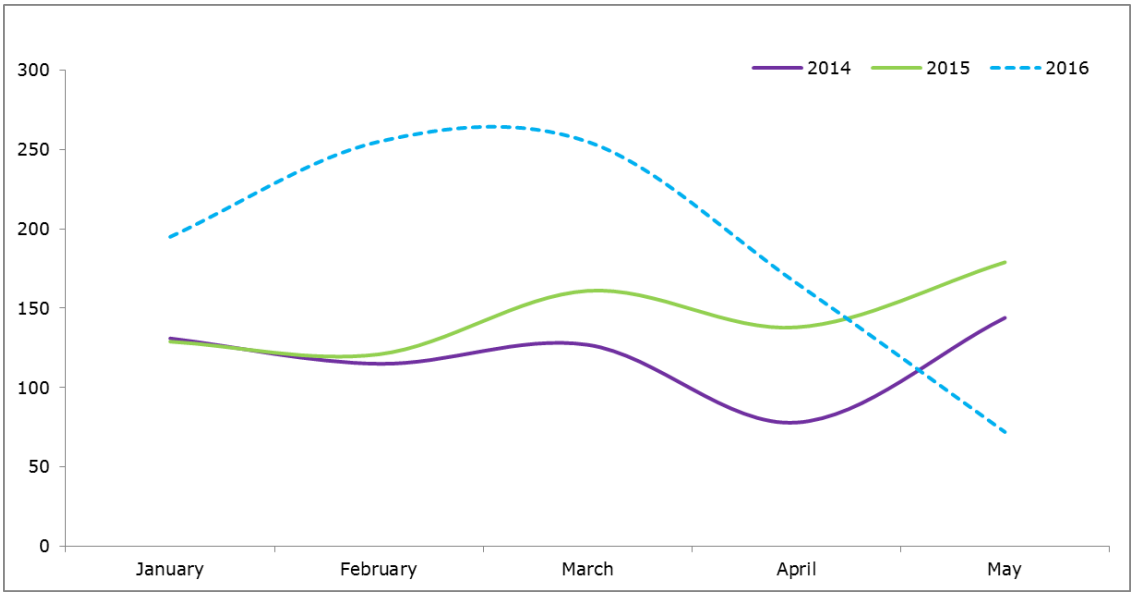
ZIKA COMPLICATIONS

ZIKA-VIRUS-ASSOCIATED GUILLAIN-BARRÉ SYNDROME (GBS)

From January to May in 2015, 728 hospitalizations for Guillain-Barré syndrome (GBS) was reported at the national level compared to 595 hospitalizations in the same period in 2014. This represents a 22% increase between 2014 and 2015 (**Figure 4**). In 2016, between January and May a total of 943 hospitalizations were reported, representing a notable increase compared to 2015.

[8] Ministry of Health of Brazil, EW 37, Dengue, chikungunya and Zika virus Epidemiological Bulletin. Available at: http://portalsaude.saude.gov.br/images/pdf/2016/outubro/18/2016-029-Dengue-publicacao-n-34.pdf
[9] Ministry of Health of Brazil, EW 37, Dengue, chikungunya and Zika virus Epidemiological Bulletin. Available at: http://portalsaude.saude.gov.br/images/pdf/2016/outubro/18/2016-029-Dengue-publicacao-n-34.pdf

Figure 4. Hospitalizations for GBS by month. Brazil. January to May in 2014 to 2016



Source: Data shared by the Brazil Ministry of Health and reproduced by PAHO/WHO

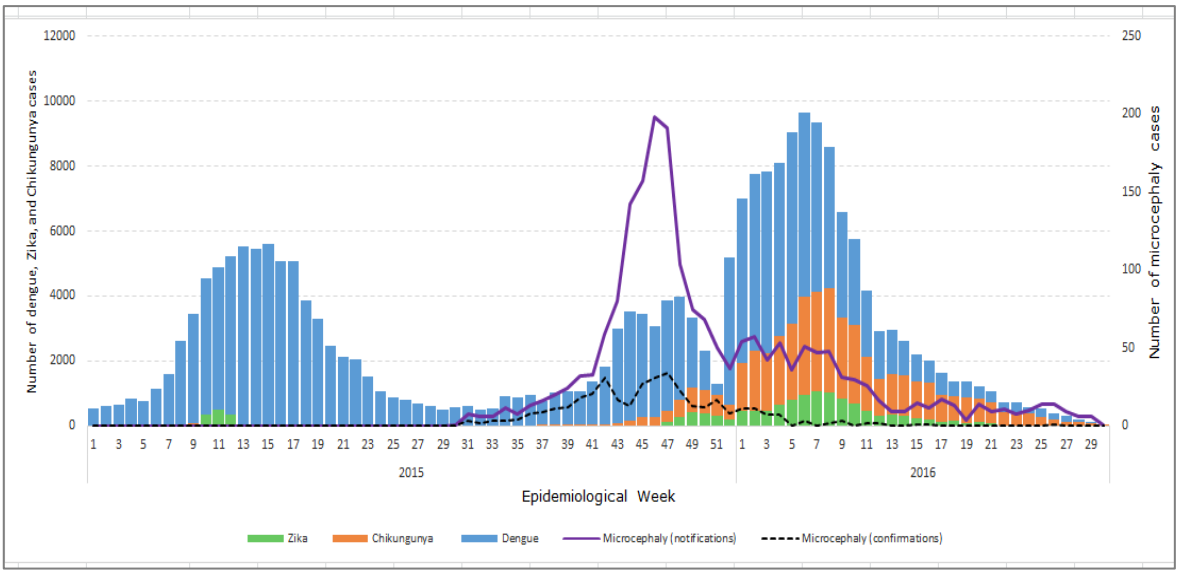
CONGENITAL SYNDROME ASSOCIATED WITH ZIKA VIRUS INFECTION

According to the Ministry of Health of Brazil, between EW 42 of 2015 and EW 40 of 2016, a total of 9,814 suspected cases of microcephaly and other congenital malformations of the central nervous system (CNS) have been reported in accordance with the definitions established in Brazil's Surveillance and Response Protocol.[10] Of these, the Brazil Ministry of Health has subsequently confirmed 2,033 cases of microcephaly by clinical, radiological, and/or laboratory methods (381 have been confirmed by laboratory criteria). The highest number of confirmed and suspected cases has been reported from Northeast Region, followed by Southeast, Center-West, North, and South Region. Of the total reported cases, 4,726 cases have been discarded as being due to non-infectious causes or not fitting the case definition, and 3,055 remain under investigation. The confirmed cases occurred in 688 out of 5,570 municipalities, located in all of the Federal Units in Brazil. Out of 486 fetal deaths after birth or during pregnancy (miscarriage or stillbirth) reported in the country, 170 have been confirmed for microcephaly and/or other CNS malformations.

Similar to what has been observed at the national level, the epidemiological curve for reported microcephaly cases in the state of Pernambuco available up to EW 29 of 2016 shows an increasing trend from EW 30 to a peak in EW 46 of 2015, followed by a decreasing trend up to EW 29 of 2016 (**Figure 5**). The trend in reported microcephaly cases parallels the pattern of reported cases of three arboviruses: dengue, chikungunya and Zika virus, during 2015 and 2016. The first confirmed cases of microcephaly associated with Zika virus appear 7 to 8 months after the first detection of Zika virus disease cases, reaching a peak in EW 46 of 2015.

[10] Brazil Ministry of Health. Microcephaly cases in Brazil, EW 33 of 2016. Available at: http://portalsaude.saude.gov.br/images/pdf/2016/agosto/24/Informe-Epidemiol--gico-n---40--SE-33-2016--23ago2016-14h23.pdf

Figure 5. Chikungunya, dengue, Zika and microcephaly cases reported in the state of Pernambuco, by EW. Brazil. 2015 to EW 29 of 2016



Source: Data provided by the Pernambuco Secretary of Health and reproduced by PAHO/WHO

DEATHS AMONG ZIKA CASES

In 2015 and 2016, six Zika virus disease-related deaths have been registered in Brazil. In 2015, three patients with laboratory-confirmed Zika virus infection died in Maranhao, Para, and Rio Grande do Norte. The median age of the deaths in 2015 was 20 years of age. In 2016, three deaths among Zika cases were reported.

NATIONAL ZIKA SURVEILLANCE GUIDELINES

Enhanced surveillance guidelines were issued on 17 February 2016, per the "Procedimentos a serem adotados para a vigilância da Febre do vírus Zika no Brasil." The complete document is available at:

http://portalsaude.saude.gov.br/images/pdf/2016/marco/07/Nota-Informativa-zika.pdf

Surveillance guidelines for cases of neurological manifestation associated with the Zika virus have been developed, entitled: "Protocolo de Vigilância dos Casos de Manifesstações Neurologicas Com Histórico de Infecção Viral Prévia." The complete guidelines are available at:

http://portalsaude.saude.gov.br/images/pdf/2016/fevereiro/05/Protocolo-de-vigilancia-de-manifestacoes-neurologicas.pdf

Clinical guidelines by the Brazil Ministry of Health for the occurrence of microcephaly are available at:

http://portalsaude.saude.gov.br/images/pdf/2016/marco/29/Protocolo-SAS-versao-3.pdf

LABORATORY CAPACITY

The diagnosis of Zika virus is performed at five National Reference Laboratories in Brazil: Fiocruz Rio de Janeiro; Fiocruz Paraná; Fiocruz Pernambuco; Instituto Evandro Chagas; and Instituto Adolfo Lutz (IAL). All institutes are associated with the Ministry of Health, except for IAL, which belongs to

the São Paulo State Health Secretariat. The National Reference Laboratories perform molecular detection (real time RT-PCR) and serological detection (ELISA IgM, PRNT). In addition, 11 State Laboratories (LACEN) have the capacity to perform real-time RT-PCR for Zika virus.

INFORMATION-SHARING

Information is received by PAHO/WHO from the Brazil IHR NFP on a weekly basis. At the time of this report, the latest information on Zika virus and microcephaly was available up to EW 39 and EW 40 of 2016, respectively.

Between 28 July and 23 September of 2016, PAHO/WHO had implemented enhanced surveillance and information sharing mechanisms with the Brazil IHR NFP in light of the 2016 Summer Olympics™ in Rio and Rio 2016 Paralympic Games™.

Suggested citation: Pan American Health Organization / World Health Organization. Zika - Epidemiological Report Brazil. November 2016. Washington, D.C.: PAHO/WHO; 2016