Pan American Health Organization

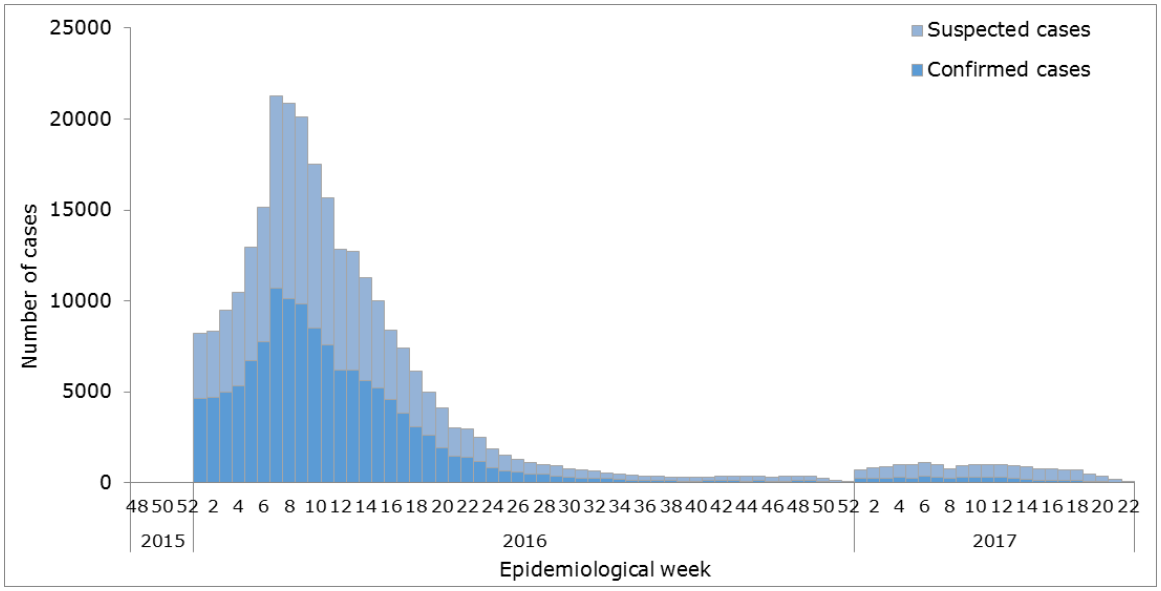
World Health Organization
REGIONAL OFFICE FOR THE Americas

Zika-Epidemiological Report

Brazil

25 September 2017

Figure 1. Suspected and confirmed cases of Zika by epidemiological week. Brazil. EW 48 of 2015 to EW 22 of 2017.[1]



Source: Data provided by the Brazil Ministry of Health to PAHO/WHO[2]

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 Maranhão 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, Brazil authorities informed that 8 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 by RT-PCR in samples taken from the States of Rio Grande do Norte and Bahia. This was the first report of locally-acquired Zika infection in the continental platform of the Americas Region.

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

[2] Reported to PAHO/WHO from Brazil International Health Regulation (IHR) National Focal Point (NFP) on 14 June 2017.

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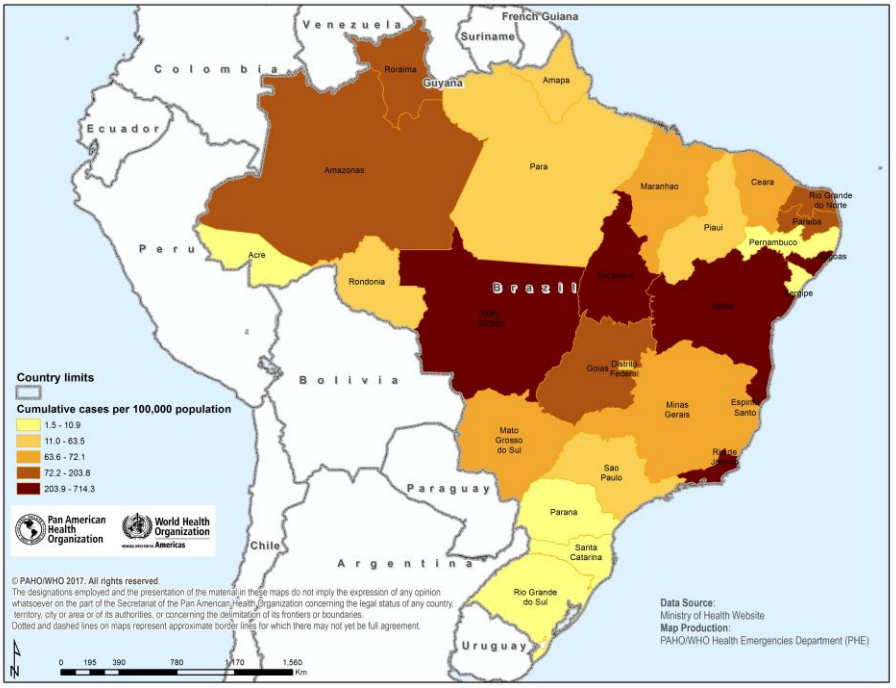
A study[3] based on analyses of viral genomes with ecological and epidemiological data suggests that Zika virus was present in Northeast Brazil by February 2014. Another study[4] based on phylogenetic and molecular clock analyses estimated the introduction of Zika in Brazil to have occurred as early as May 2013.

GEOGRAPHIC DISTRIBUTION

As of EW 33 of 2017, the highest Zika virus incidence rate has been observed in the states located in the North and Central-West region of Brazil, with Mato Grosso state reporting the highest cumulative incidence rate (714 cases per 100,000 population), followed by Rio de Janeiro (419 cases per 100,000), Bahia (349 cases per 100,000), Alagoas (208 cases per 100,000), and Tocantins (208 cases per 100,000), and Goiás (204 cases per 100,000).[5, 6]

Figure 2. Suspected Zika cases per 100,000 population by federal unit. Brazil. EW 1 of 2016 to EW 33 of 2017.



Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[6, 7]

[3] N. R. Faria et al. 2017. Establishment and cryptic transmission of Zika virus in Brazil and the Americas. Nature 546, 406–410. Available at: https://www.nature.com/nature/journal/v546/n7658/pdf/nature22401.pdf.
[4] N. R. Faria et al. 2016. Zika virus in the Americas: Early epidemiological and genetic findings. Science 10.1126/science.aaf5036. Available at: http://science.sciencemag.org/content/sci/early/2016/03/23/science.aaf5036.full.pdf.
[5] Brazil Ministry of Health. Dengue, chikungunya and Zika virus epidemiological bulletin. EW 33 of 2017. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/agosto/23/2017_024-Monitoramento-dos-casos-de-dengue-febre-de-chikungunya.pdf.
[6] Brazil Ministry of Health. Dengue, chikungunya and Zika virus Epidemiological Bulletin. EW 52 of 2016. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/fevereiro/05/2017_002-Dengue%20SE52_corrigido.pdf.

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.[7] Zika virus infection was confirmed in four out of 15 marmosets (*Callithrix jacchus*) and three out of 9 capuchin monkeys (Sapajus libidinosus) captured between July and November 2015 in the state of Ceará, 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 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.

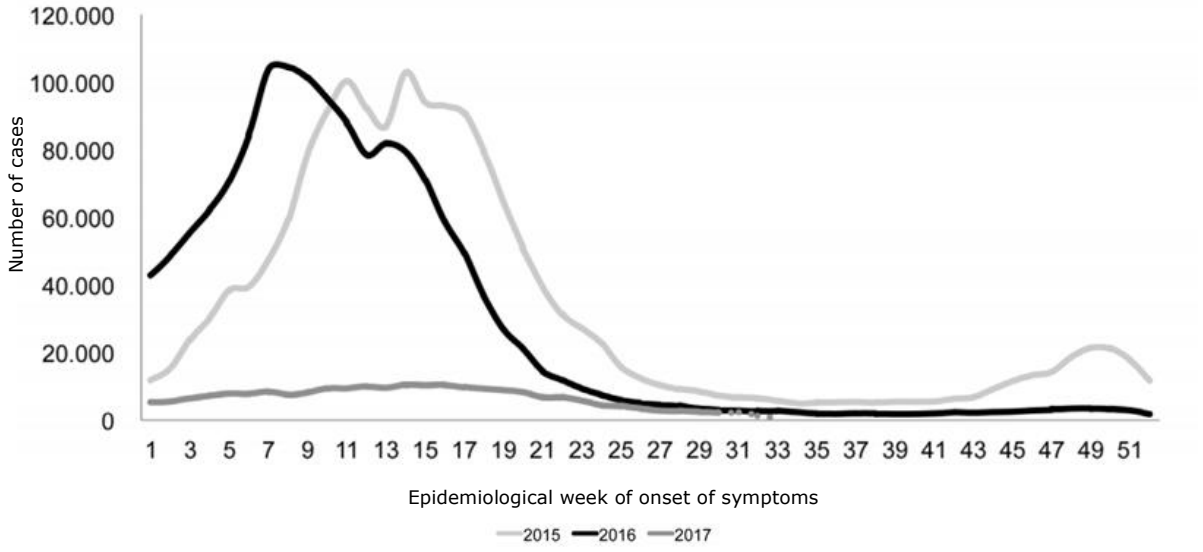
TREND

At the national level during 2016, an increase in the numbers of weekly cases was observed since EW 1, with a peak being reported in EW 7[3]. A decreasing trend was observed since (**Figure 1**). In 2017, a slightly increasing trend can be observed since EW 1, but the weekly case numbers are much lower than those reported for the same period in 2016. Between EW 1 and 22 of 2017, an average of 776 cases was reported, representing a 14 fold decrease compared to the weekly average from the same period in 2016. In the last 8 weeks (EW 15 to EW 22 of 2017), an average of 494 Zika cases per week have been reported.

CIRCULATION OF OTHER ARBOVIRUSES

Between EW 1 to EW 33 of 2017, the number of dengue cases reported in Brazil is lower than the number of cases reported in for the same periods in 2015 and 2016. The peak of dengue cases observed in 2016 (EW 7) occurred earlier than the peak observed in 2015 (EW 15) and coincides with the peak of Zika and chikungunya (**Figure 1**, **Figure 3** and **Figure 4**). Between EW 1 of 2017 and EW 19 of 2017, a slight increase in incidence is observed, which coincides with the slight increasing trend observed for Zika virus.

Figure 3. Probable dengue cases by EW of onset of symptoms. Brazil. 2015 to EW 33 of 2017.

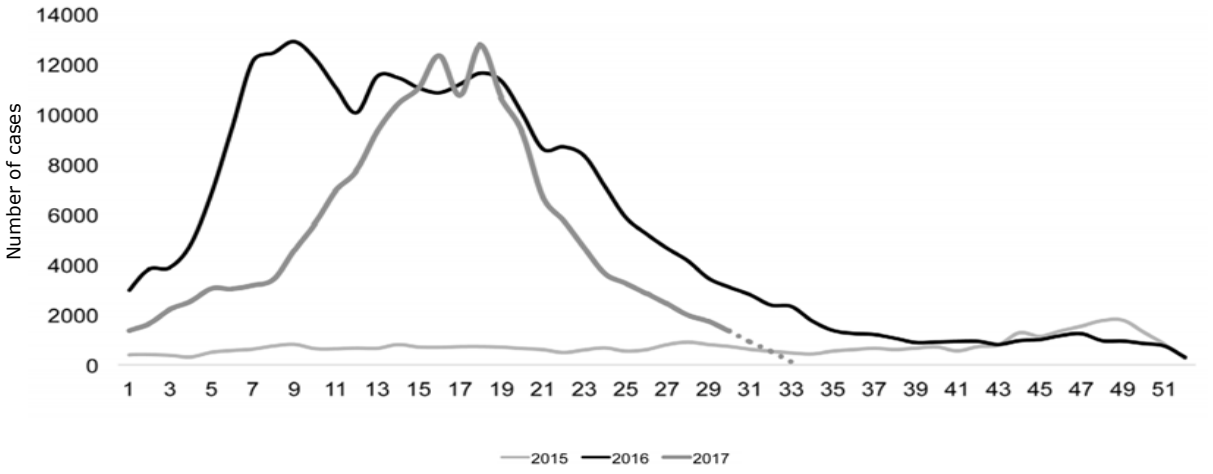


[7] S. Favoretto, et al. First detection of Zika virus in neotropical primates in Brazil: a possible new reservoir. Available at: http://biorxiv.org/content/early/2016/04/20/049395.full.pdf+html.

Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[5]

As of EW 33 of 2017, the regions with the highest rates of dengue are Center-West (411 cases per 100,000), North-East (141 cases per 100,000), and North (115 cases per 100,000).[6] During 2015, the highest rates of dengue were recorded in Center-West (1,429 cases per 100,000 population), South East (1,194 cases per 100,000), and Northeast (554 cases per 100,000). Similarly, in 2016, the highest rates were recorded in Center-West (1,180 cases per 100,000), followed by the South-East (935 cases per 100,000) and the Northeast (462 cases per 100,000).

Figure 4. Probable chikungunya cases by EW of onset of symptoms. Brazil. 2015 to EW 33 of 2017.



Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[5]

With regard to chikungunya, the number of reported cases in 2017 to date is lower than for the same period in 2016. The peak of chikungunya cases observed in 2017 (EW 15- 19) occurred later than the peak observed in 2016 (EW 5 -9) (**Figure 4**). However, in some regions, an increase in incidence rate has been reported between EW 1 and EW 33 of 2017, compared with the same period of 2016 (**Table 1**), particularly in the states of Ceara (from 469 to 1,158 cases per 100,000), Roraima (from 23 to 635 cases per 100,000) and Tocantins (from 77 to 212 cases per 100,000) and Minas Gerais (from 6 to 85 cases per 100,000), which are located in the North-East, North and South-West Regions of the country, respectively.[6] Between EW 1 and EW 33 of 2017, a total of 167,813 suspected cases of chikungunya were reported nationwide (81 cases per 100,000 population).

Table 1. States of Brazil which reported an increase in incidence rate for chikungunya from EW 1 to EW 33 of 2017 compared to same period in 2016

State of Brazil	**2016 (EW 1 to EW 33)**	**2017 (EW 1 to 33)**
Ceara	469	1,158
Roraima	23	635
Tocantins	77	212

ZIKA VIRUS DISEASE IN PREGNANT WOMEN

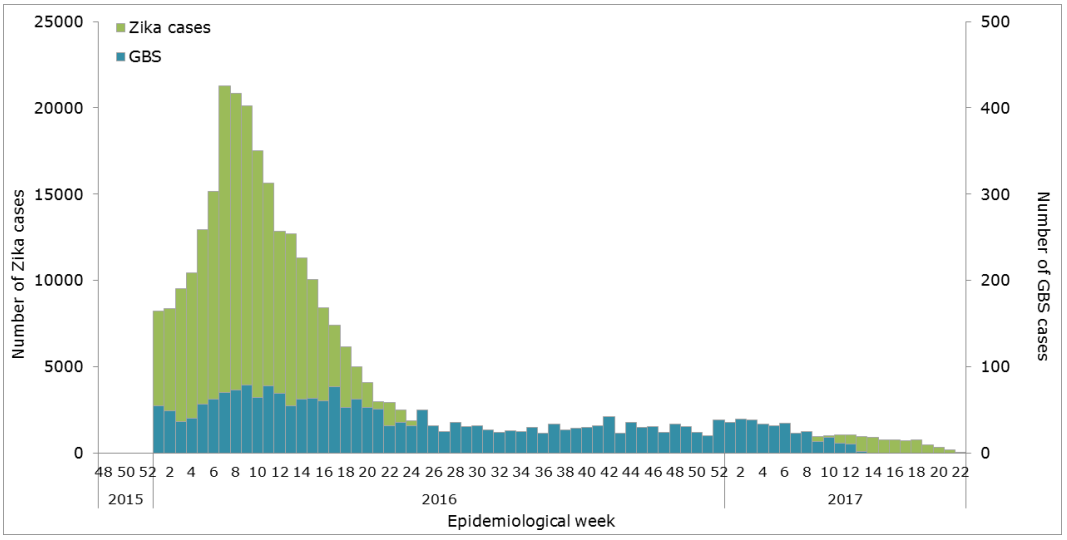
Between EW 1 of 2016 and EW 22 of 2017, a total of 26,066 suspected cases of Zika virus disease in pregnant women were reported, of which 11,546 have been confirmed.[2]

ZIKA COMPLICATIONS

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

Between EW 1 and EW 13 of 2017, a decrease in Guillain-Barre syndrome (GBS) cases was reported when compared to the same time period in 2016 (**Figure 5**).[3]

Figure 5. Total cases of Zika and GBS by EW. Brazil. EW 1 of 2016 to EW 22 of 2017.



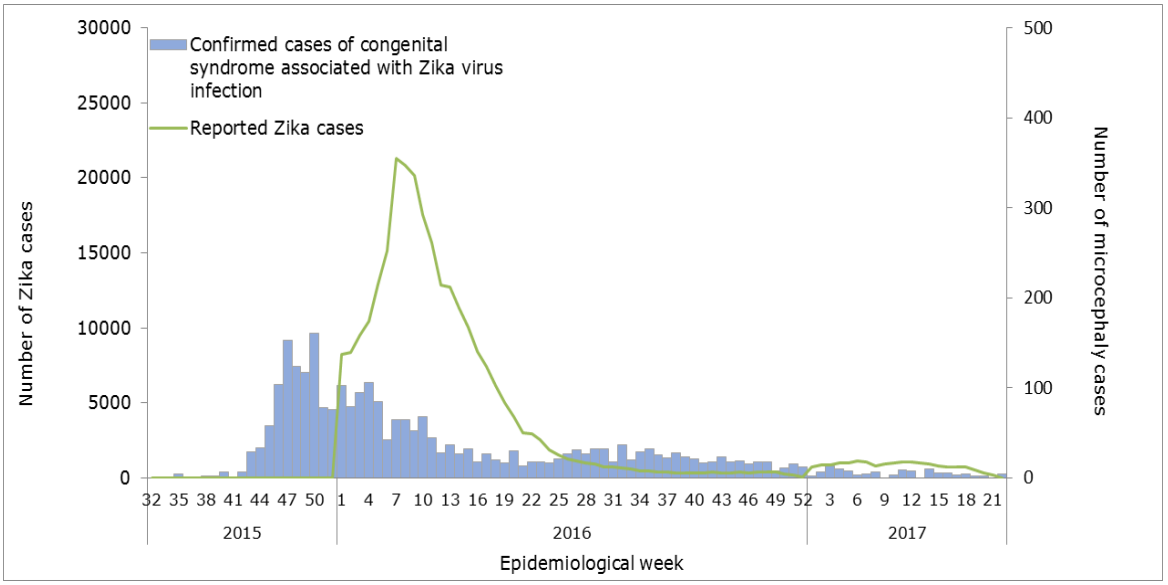
Source: Data provided by the Brazil Ministry of Health to PAHO/WHO[3]

CONGENITAL SYNDROME ASSOCIATED WITH ZIKA VIRUS INFECTION

According to the Ministry of Health of Brazil, between EW 32 of 2015 and EW 28 of 2017, a total of 14,558 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, of which 1,851 were reported during 2017.[8] Of these, the Brazil Ministry of Health has subsequently confirmed 2,952 cases of microcephaly by clinical, radiological, and/or laboratory methods (1,023 have been confirmed by laboratory criteria, RT-PCR or serological test) **(Figure 6)**.[9,9] In 2016, the confirmed cases occurred in 1,837 out of 5,570 municipalities, located in all of the Federative Units in Brazil.[10] In 2016, out of 582 fetal deaths after birth or during pregnancy (miscarriage or stillbirth) reported in the country, 200 have been confirmed for microcephaly and/or other CNS malformations.

[8] Reported to PAHO/WHO from Brazil International Health Regulations (IHR) National Focal Point (NFP) on 8 September 2017.
[9] Reported to PAHO/WHO from Brazil International Health Regulation (IHR) National Focal Point (NFP) on 16 June 2017
[10] Brazil Ministry of Health. Microcephaly cases in Brazil, EW 52 of 2016. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/janeiro/12/Informe-Epidemiologico-n57-SE-52_2016-09jan2017.pdf

Figure 6. Total confirmed cases of congenital syndrome associated with Zika virus infection by EW. Brazil. EW 32 of 2015 to EW 22 of 2017.



Source: Data provided by the Brazil Ministry of Health to PAHO/WHO[10]

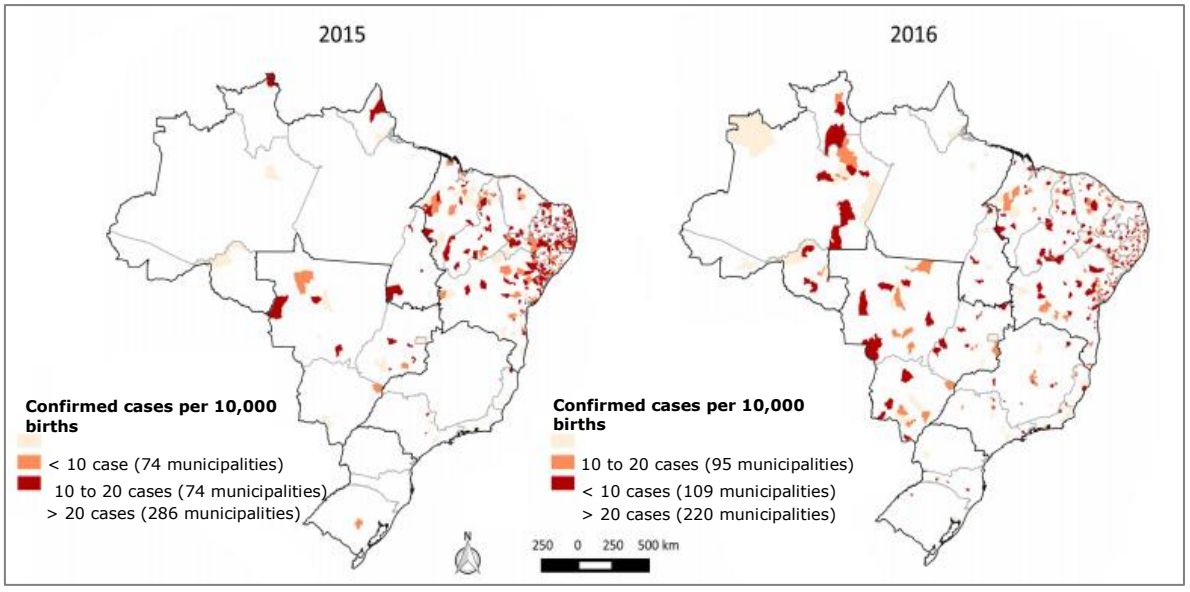
In 2015, municipalities with reported high numbers (>20 cases per 10,000 municipalities) of confirmed cases (per 10,000 live births) of newborns and children with changes in growth related to Zika virus infection and other infectious etiologies were concentrated in the Northeast region, with some additional municipalities in the states of Mato Grosso, Goiás, São Paulo, Tocantins, Amapá and Roraima.[11] In 2016, there was a greater dispersion of cases, with municipalities in the states of Mato Grosso, Paraíba, Piauí and Sergipe reporting the highest occurrence of confirmed cases (**Figure 7**). As of EW 28 of 2017, municipalities in the sates of Bahia, Rio de Janeiro and Maranháo reported the highest occurrence of confirmed cases.[12]

Geographically, between EW 45 of 2015 and EW 52 of 2016, nearly one third (33%) of the municipalities in Brazil in all 27 federal united reported at least one suspected case of microcephaly linked to Zika virus.[12] However, less than half (41%) of the municipalities reported confirmed cases (**Figure 8**). The regions with higher number of municipalities reporting cases of microcephaly associated with Zika virus between EW 45 of 2015 and EW 52 of 2016 were Northeast (1,049 municipalities), Southeast (381 municipalities), and North (170 municipalities). The regions reporting the most number of municipalities with confirmed cases of microcephaly associated with Zika virus between EW 45 of 2015 and EW 52 of 2016 were Northeast (569 municipalities), Southeast (74 municipalities), and Central-West (53 municipalities).

[11] Brazil Ministry of Health. Health Surveillance Secretariat Epidemiological Bulletin, Volume 48, No. 6, 2017. Integrated Monitoring of changes in growth and development related to Zika virus infection and other infectious etiologies, from EW 45 of 2015 to EW 2 of 2017. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/fevereiro/27/2017_003.pdf
[12] Integrated monitoring of changes in growth and related to Zika virus infection and other infectious etiologies, until epidemiological week 28 of 2017. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/agosto/16/BE-2017_024-Monitoramento-integrado-de-alteracoes-no-crescimento-e-desenvolvimento-relacionadas-a-infeccao-pelo-virus-Zika.pdf

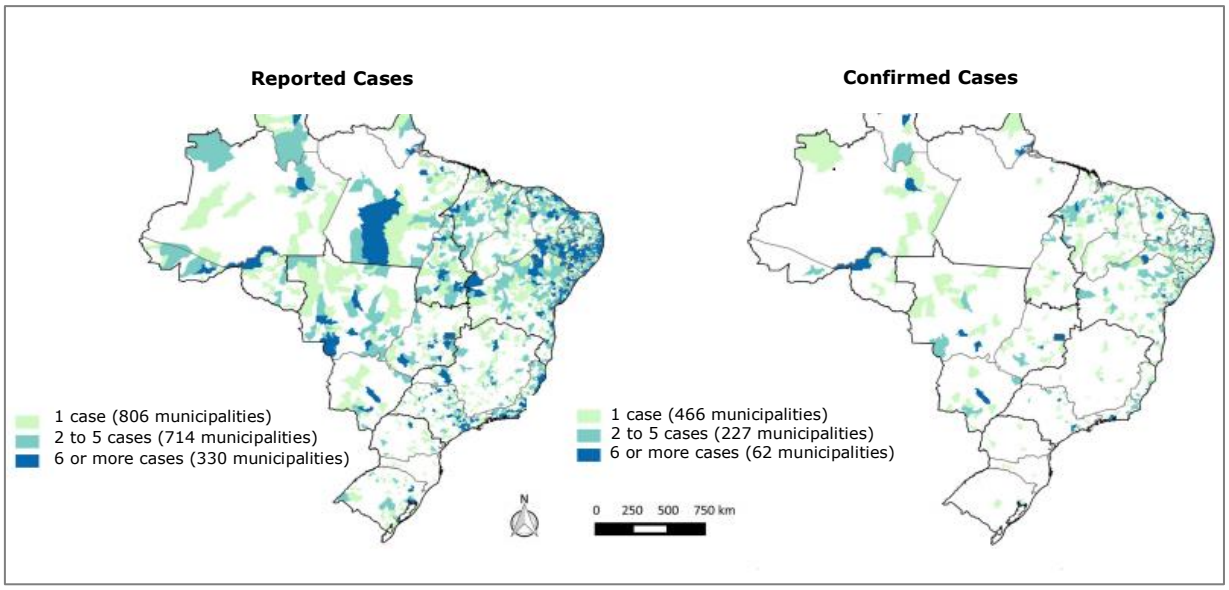
Similar to what has been observed at the national level, the epidemiological curve for reported microcephaly cases in the state of Pernambuco available up to EW 29 of 2016 shows an increasing trend from EW 30 to a peak in EW 46 of 2015, followed by a decreasing trend up to EW 29 of 2016 (**Figure 9**). The trend in reported microcephaly cases parallels the pattern of reported cases of dengue, chikungunya, and Zika virus during 2015 and 2016. The first confirmed cases of microcephaly associated with Zika virus appear 7-8 months after the first detection of Zika virus disease cases, reaching a peak in EW 46 of 2015.

Figure 7. Confirmed cases (per 10,000 live births) of newborns and children with changes in growth related to Zika virus infection and other infectious etiologies, by municipalities of mother's residence. Brazil. 2015 and 2016.



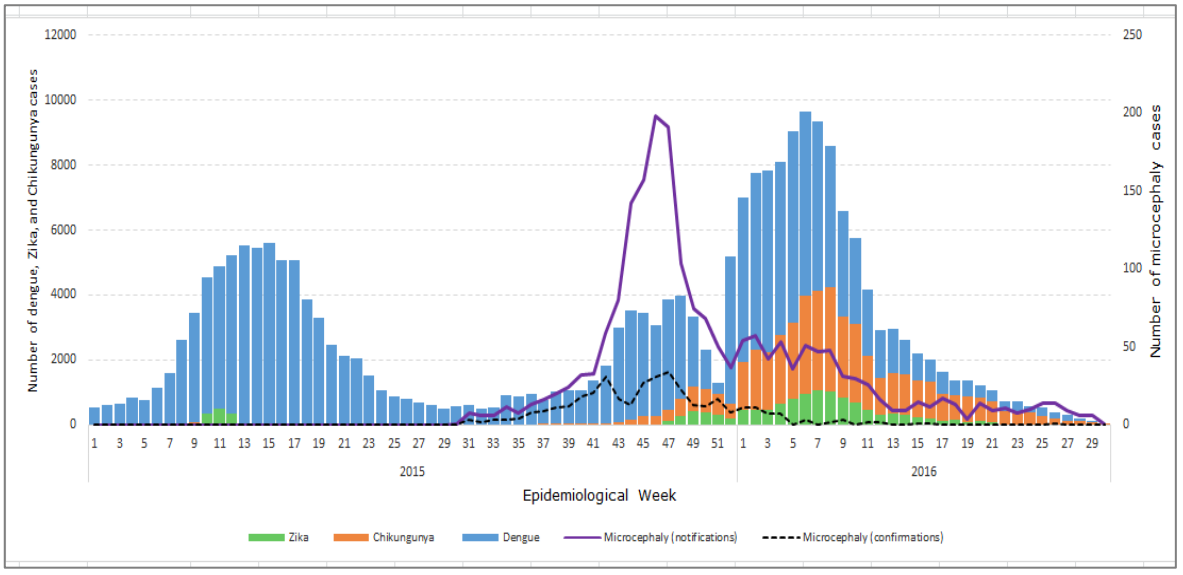
Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[12]

Figure 8. Number of municipalities in each state with reported and confirmed cases related to Zika virus infections and other etiological infections. Brazil. EW 45 of 2015 to EW 52 of 2016



Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[12]

Figure 9. 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[13]

DEATHS AMONG ZIKA CASES

As of EW 33 of 2017, eleven Zika virus disease-related deaths have been registered in Brazil.[6, 7] 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, eight deaths among Zika cases (four in Rio de Janeiro, two in Espirito Santo, one in Maranhão and one in Paraiba).As of EW 35 of 2017,no deaths were reported by the Brazil Health Authorities to PAHO/WHO.

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 on the Zika virus situation is provided periodically by the Brazil IHR NFP to PAHO/WHO. In addition, the Brazil Ministry of Health also publishes a weekly Dengue, chikungunya and Zika virus epidemiological bulletin on its website. At the time of this report, the latest available information regarding Zika virus cases by EW and congenital syndrome cases by EW shared by the Brazil IHR NFP was from EW 22 of 2017 and EW 34 of 2017 respectively. The latest epidemiological bulletin available at the time of this report was from EW 33 of 2017.