Pan American Health Organization

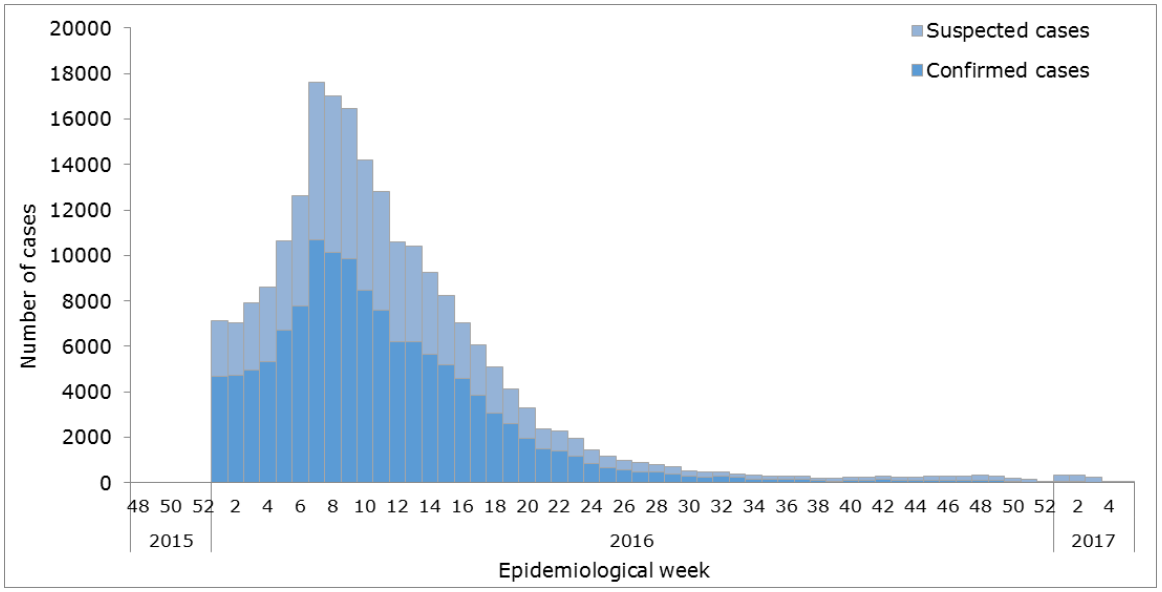
World Health Organization
REGIONAL OFFICE FOR THE Americas

Zika-Epidemiological Report

Brazil

2 March 2017

Figure 1. Suspected and confirmed cases of Zika. Brazil. EW 1 of 2015 to EW 5 of 2017[1]



Source: Data reported by the Brazil Ministry of Health[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 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.[3] 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 a reportable disease by the Brazil Ministry of Health until 17 February of 2016
[2] Reported to PAHO/WHO from Brazil International Health Regulation (IHR) National Focal Point (NFP) on 13 February 2017
[3] 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.

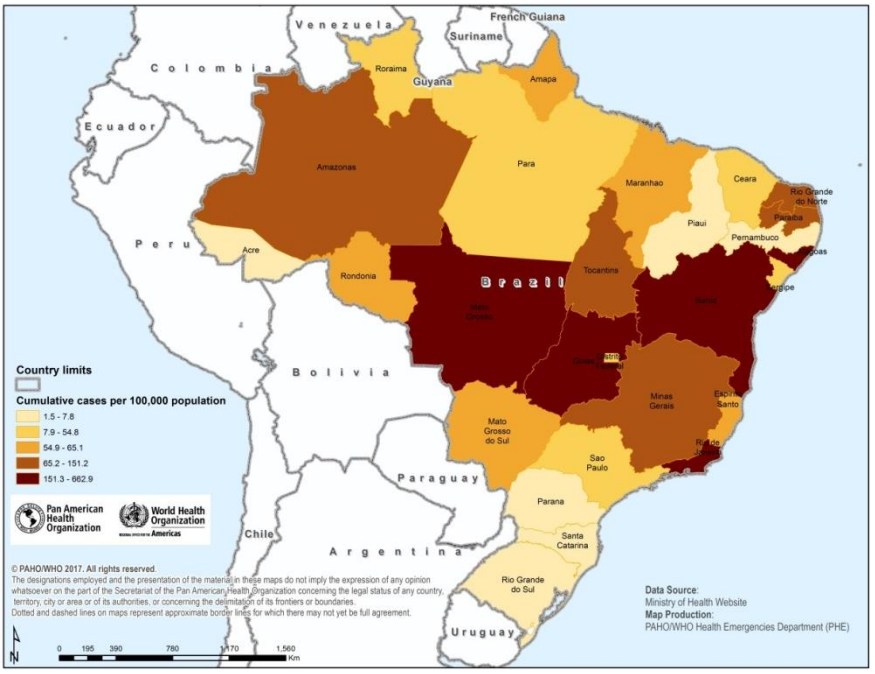
Suggested citation: Pan American Health Organization / World Health Organization. Zika - Epidemiological Report Brazil. March 2017. Washington, D.C.: PAHO/WHO; 2017

A recent phylogenetic and molecular clock analyses estimated the introduction of Zika virus in Brazil as early as May 2013.[4]

GEOGRAPHIC DISTRIBUTION

Between EW 1 of 2016 and EW 4 of 2017, 2,306 municipalities reported suspected Zika cases in all 27 federal units. As of EW 4 of 2017, the highest incidence rate was observed in the states located in the central-West region of Brazil, with Mato Grosso state reporting the highest incidence rate (663 cases per 100,000 population), followed by Rio de Janeiro (412 cases per 100,000), Bahia (339 cases per 100,000), Alagoas (205 cases per 100,000), and Goias (154 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 4 of 2017



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

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%

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

[4] 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.

[5] Brazil Ministry of Health, EW 4, Dengue, chikungunya and Zika virus Epidemiological Bulletin. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/fevereiro/17/Monitoramento-dos-casos-de-dengue--febre-de-chikungunya-e-febre-pelo-v--rus-Semana-Epidemiologica-4-2017.pdf

[6] Brazil Ministry of Health, EW 52, Dengue, chikungunya and Zika virus Epidemiological Bulletin. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/fevereiro/05/2017_002-Dengue%20SE52_corrigido.pdf

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.[7]

TREND

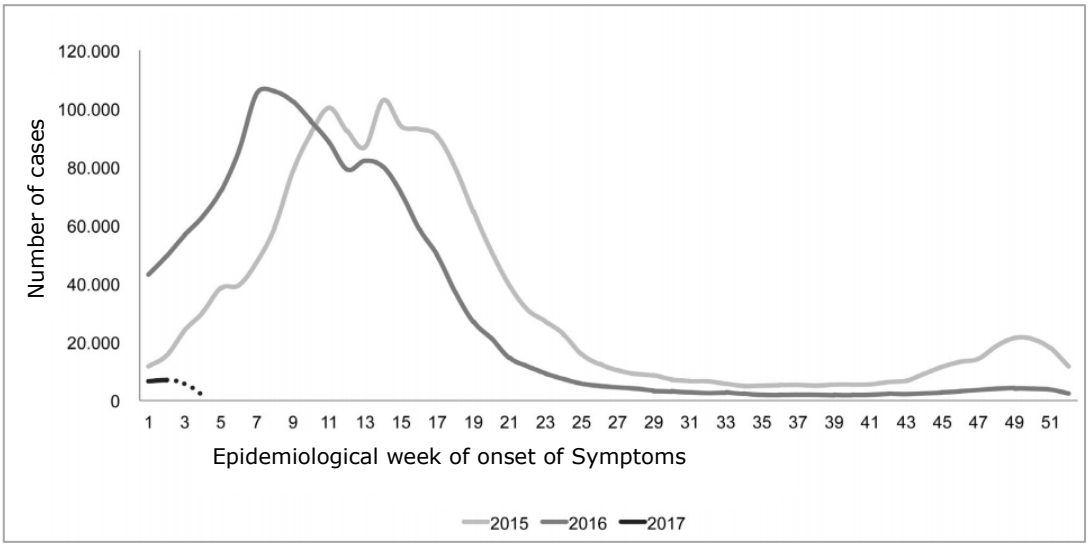
The first Zika cases was reported in Brazil in EW 19 of 2015, nonetheless, distribution by EW of Zika cases is not available for 2015 because Zika cases and associated neurological and congenital syndrome were not made notifiable conditions by the Brazil Ministry of Health until 17 February of 2016.[8]

At the national level, between EW 1 and EW 7 of 2016, an increasing trend was observed with a peak in EW 7 of 2016. Since then a decrease in trend was observed (**Figure 1**). Over the past eight weeks (EW 49 of 2016 to EW 4 of 2017) the Brazil IHR NFP reported an average of 205 cases of Zika per week.[2]

CIRCULATION OF OTHER ARBOVIRUSES

Between EW 1 to EW 4 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 11) and coincides with the peak of Zika (**Figure 1** and **Figure 3**). As of EW 5 of 2017, a continuing decrease in trend of cases is observed after EW 52 of 2016, the number of reported cases has decreased, which coincides with the trend observed for Zika virus.

Figure 3. Probable dengue cases by EW of onset of symptoms. Brazil. 2015 to EW 4 of 2017.



Source: Data published by the Brazil Ministry of Health

[7] First detection of Zika virus in neotropical primates in Brazil: a possible new reservoir.
Silvana Favoretto, Danielle Araujo, Danielle Oliveira, Nayle Duarte, Flavio Mesquita, 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

[8] 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

During 2015, the highest rate of dengue was recorded in the Center-West (incidence rate of 1,429 cases per 100,000 population), followed by the South East (1,194 per 100,000), and the Northeast (554 per 100,000); similarly in 2016, the highest rate was recorded in Center-West (1,322 per 100,000), followed by the South-East (1,001 per 100,000) and the Northeast (573 per 100,000).[5] As of EW 4 of 2017, the highest rate of dengue was recorded in Center-West (23 per 100,000), followed by the North (14 cases per 100,000), and the South-East (11 per 100,000).

With regard to chikungunya, the number of reported cases in 2017 to date is lower than for the same period in 2016. Between EW 1 to EW 4 of 2017, 3,754 probable cases of chikungunya were reported nationwide (2 cases per 100,000 population).[5]

ZIKA VIRUS DISEASE IN PREGNANT WOMEN

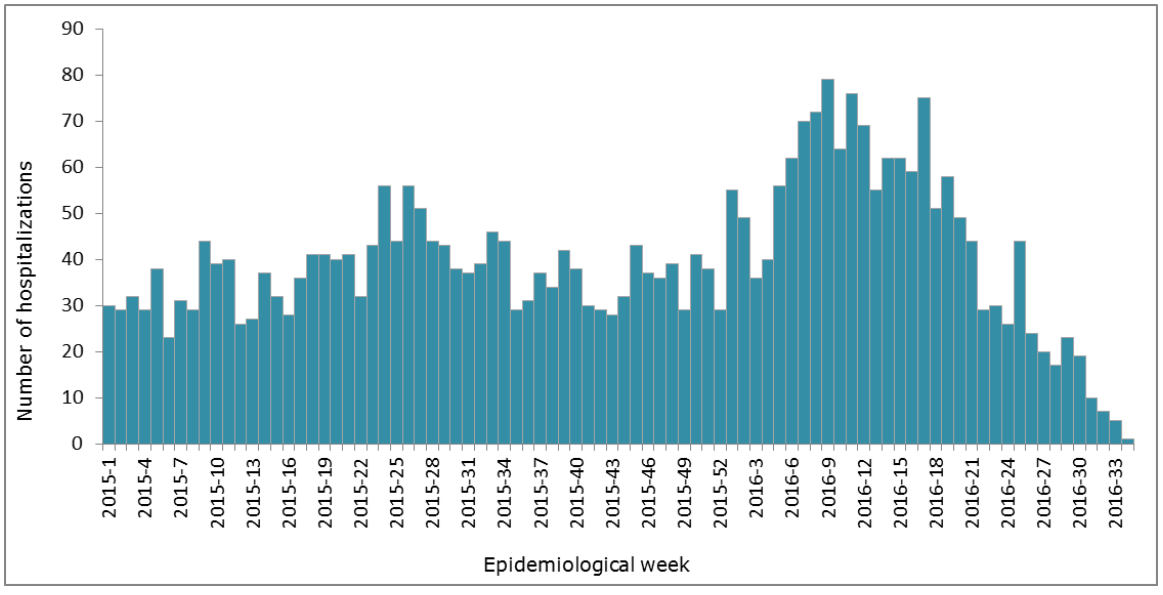
Between EW 1 of 2016 and EW 4 of 2017, a total of 17,069 suspected cases of Zika virus disease in pregnant women were reported of which 11,059 have been confirmed.[5]

ZIKA COMPLICATIONS

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

Between EW 6 and EW 21 of 2016, an increase in Guillain-Barre syndrome (GBS) hospitalizations were reported when compared to the same time period in 2015 (**Figure 4**).[9] The increase in GBS cases observed between EW 5 to EW 12 of 2016 coincides with the Zika peak in the same period (**Figure 5**). No cases of GBS have been reported in 2017 to date.

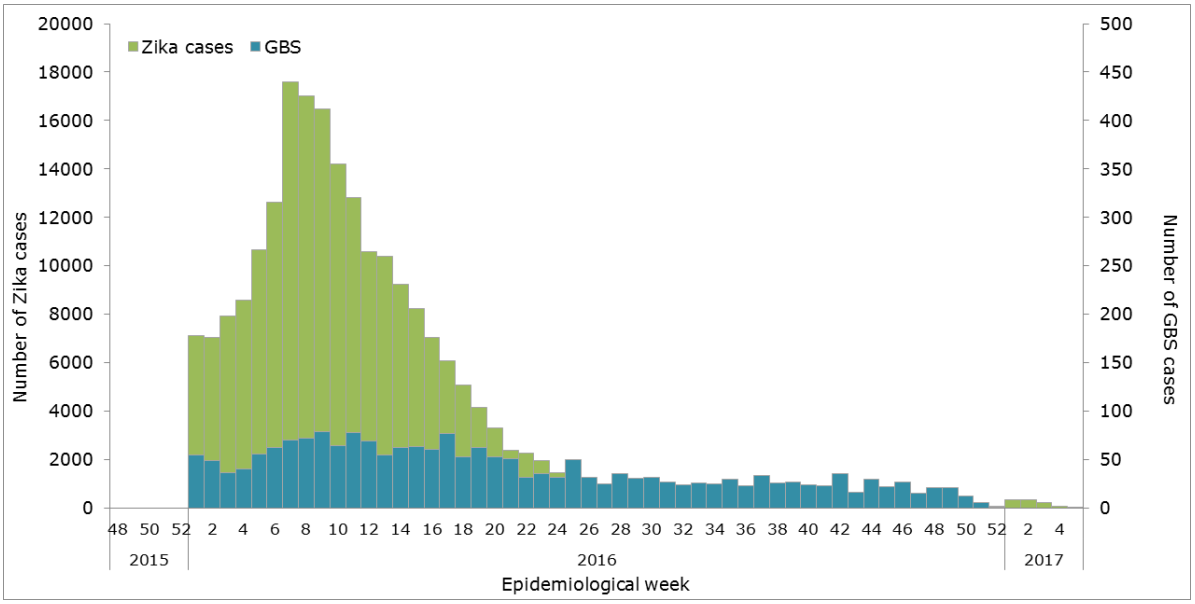
Figure 4. Number of hospitalizations for GBS by epidemiology week. Brazil. 2015 to 2016 (up to EW 34)



Source: Data published by the Brazil Ministry of Health and reproduced by PAHO/WHO[8]

[9] Brazil Ministry of Health. Guillain-Barre syndrome Hospilizations in Brazil. Accessed 21 December 2016. Available at: http://www2.datasus.gov.br/DATASUS/index.php?area=0901&item=1&acao=25

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



Source: Data reported by the Brazil Ministry of Health

CONGENITAL SYNDROME ASSOCIATED WITH ZIKA VIRUS INFECTION

According to the Ministry of Health of Brazil, between EW 45 of 2015 and EW 52 of 2016, a total of 10,867 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 2,336 cases of microcephaly by clinical, radiological, and/or laboratory methods (697 have been confirmed by laboratory criteria, RT-PCR or serological test). 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, 5,269 cases have been discarded as being due to non-infectious causes or not fitting the case definition, and 3,183 remain under investigation. The confirmed cases occurred in 1,837 out of 5,570 municipalities, located in all of the Federal Units in Brazil. 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.

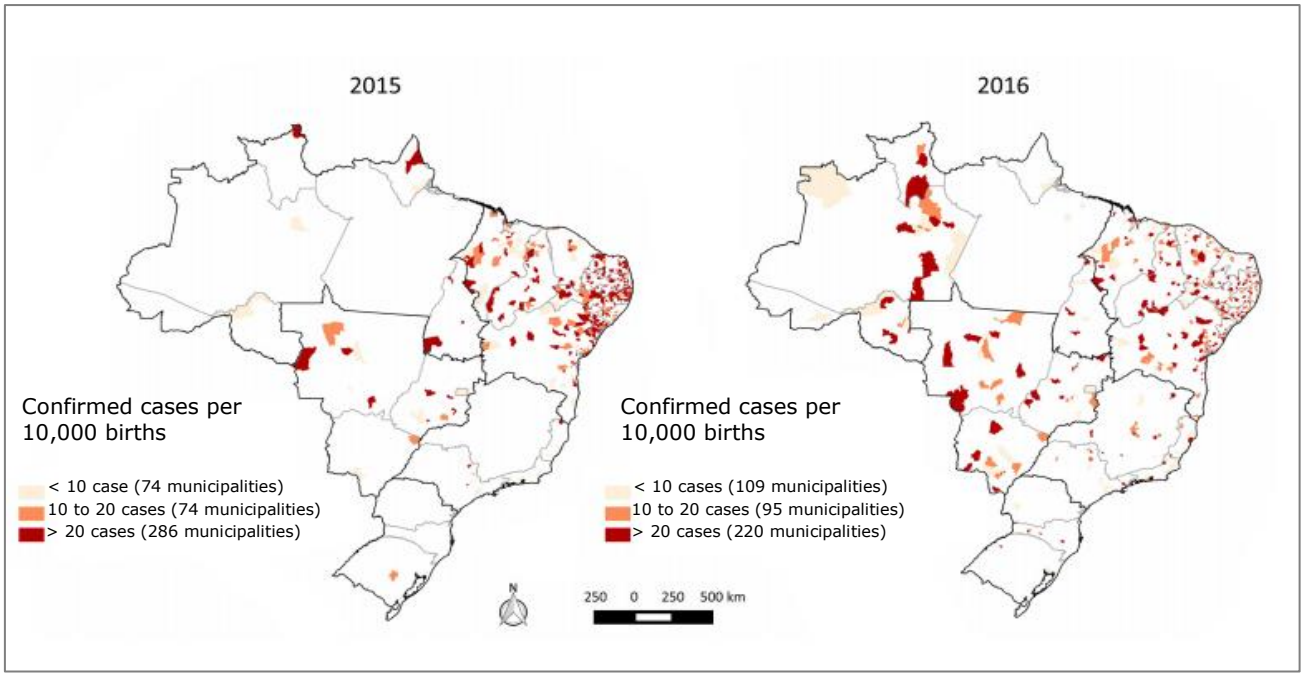
In 2015, municipalities with high report (> 20 Cases per 10,000 municipalities) of confirmed cases (per 10,000 live births) of newborns and children with changes in growth related to Zika virus infection and other infectious etiologies were concentrated in the Northeast region, with some additional municipalities in the states of Mato Grosso, Goiás, São Paulo, Tocantins, Amapá and Roraima. In 2016, there was a greater dispersion of cases with the municipalities in the states of Mato Grosso, Paraíba, Piauí and Sergipe reporting the highest occurrence of confirmed cases (**Figure 6**).

[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

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. However, less than half (41%) of the municipalities reported confirmed cases (**Figure 7**). 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]

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 8**). 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. As of EW 4 of 2017 no new data is available regarding.

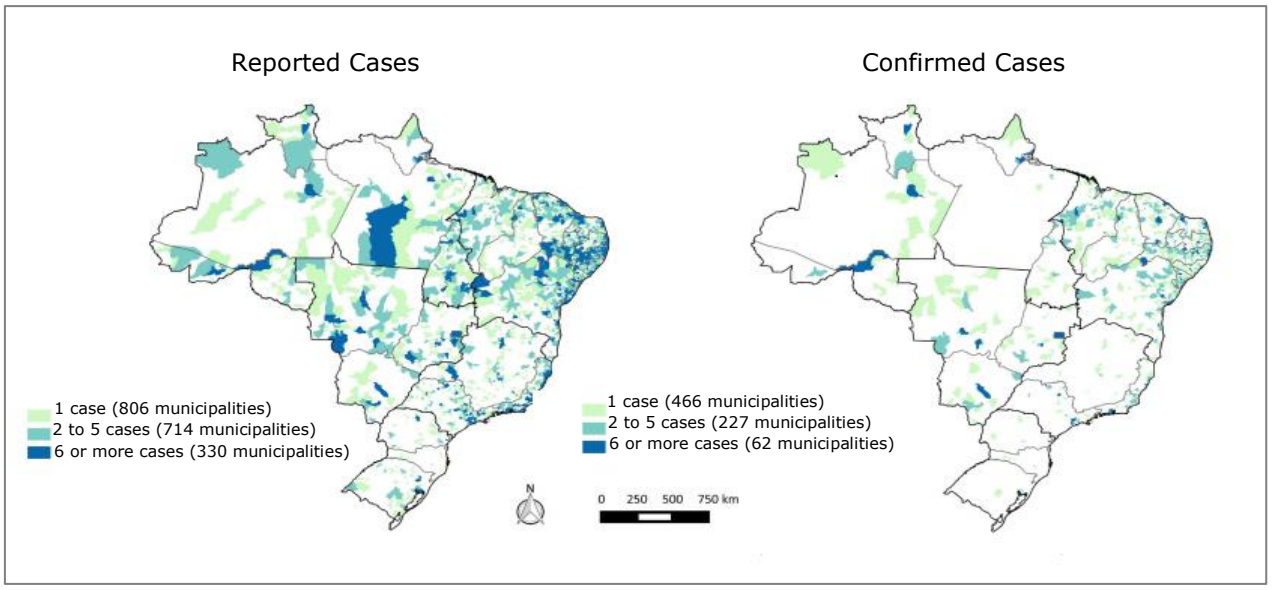
Figure 6. Confirmed cases (per 10,000 live births) of newborns and children with changes in growth related to Zika virus infection and other infectious etiologies, by municipalities of mother's residence. Brazil. 2015 and 2016.



Source: Data published by the Brazil Ministry of Health[13]

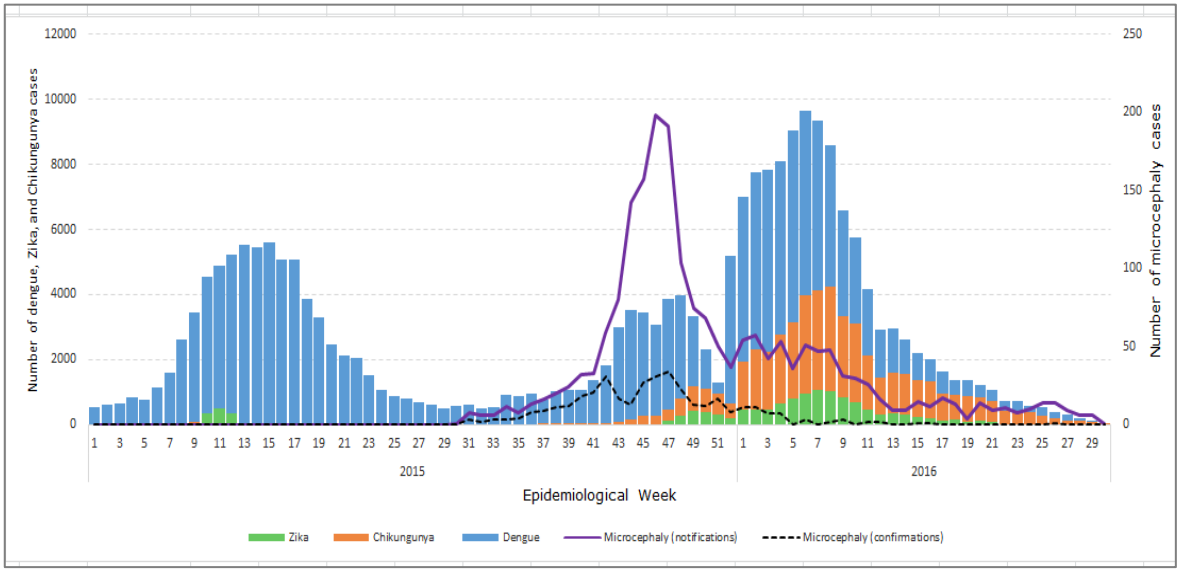
[11] Brazil Ministry of Health. Health Surveillance Secretariat Epidemiological Bulletin, Volume 48, No. 6, 2017. Integrated Monitoring of changes in growth and development related to Zika virus infection and other infectious etiologies, from EW 45 of 2015 to EW 2 of 2017. Available at: http://portalarquivos.saude.gov.br/images/pdf/2017/fevereiro/27/2017_003.pdf

Figure 7. 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 0f 2016.



Source: Data published by the Brazil Ministry of Health [13]

Figure 8. 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

DEATHS AMONG ZIKA CASES

As of EW 4 of 2017, eleven 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, seven

deaths among Zika cases (four in Rio de Janeiro, two in Espirito Santo, one in Maranhão and one in Paraiba) occurred between January and August.[5,6]

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 5 of 2017 and EW 52 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™.