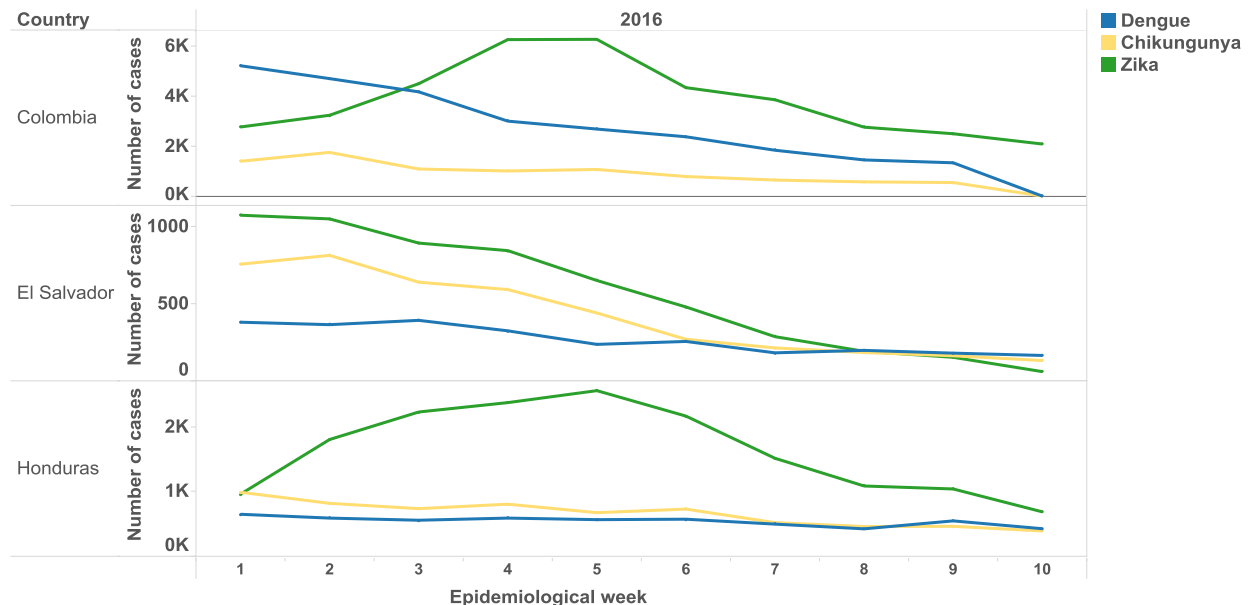


Zika virus – Incidence and trends

Overall, reporting of Zika virus cases in the Region of the Americas is still showing a downward trend which is also observed with the other arbovirus circulating in the Region as shown in Colombia, El Salvador, and Honduras (**Figure 1**). This trend could change due to delays in reporting when retrospective data is received.

Figure 1. Reported cases¹ of dengue, chikungunya, and Zika virus by epidemiological week (EW), **Colombia, El Salvador, and Honduras**, EW 1-10 of 2016



Source: Ministry of Health of Colombia, El Salvador, and Honduras

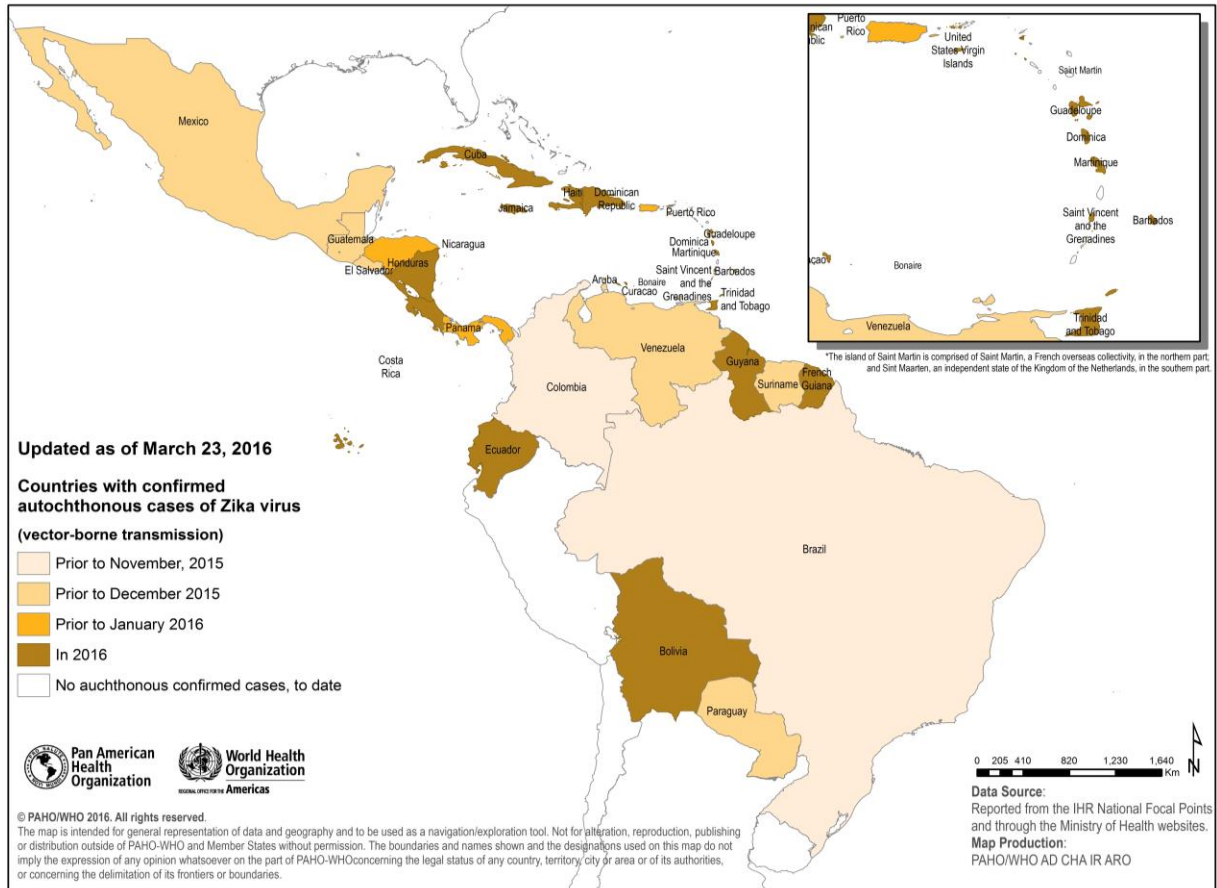
According to available data provided from Member States in the Region², the majority of cases of Zika virus (98%) are suspected cases. In comparison, the laboratory-confirmed cases of Zika virus are only 2% of the total reported cases. There are various factors that could explain the difference, including the different surveillance systems in countries, challenges in detecting Zika virus RNA in serum samples during the short phase of viremia, and the lack of serological tests available for the diagnosis during the convalescent phase, among others.

¹ Suspected and confirmed cases are included.

² Reported by the International Health Regulations (IHR) National Focal Points (NFPs) and through the Ministry of Health websites.

Since the last Epidemiological Update on 17 March, no new countries or territories reported autochthonous (vector-borne) cases of Zika virus infection (**Figure 2**). There are currently 33 countries or territories reporting local, vector-borne transmission of Zika virus in the Region of the Americas.

Figure 2. Countries and territories in the Americas with confirmed autochthonous (vector-borne) Zika virus cases, 2015-2016 (as of 24 March 2016)



Reported increase of congenital microcephaly and other central nervous system disorders

First report of microcephaly and other congenital malformation in Panama

On 19 March, the Ministry of Health of Panama confirmed Zika virus in a newborn at 31 weeks gestation that was diagnosed with microcephaly and occipital encephalocele. The newborn died on 17 March within a few hours after birth. Samples from the umbilical cord tested positive for Zika virus by RT-PCR. Samples from the mother tested negative for Zika virus. Furthermore, the mother had no history of Zika virus related illnesses during her pregnancy.

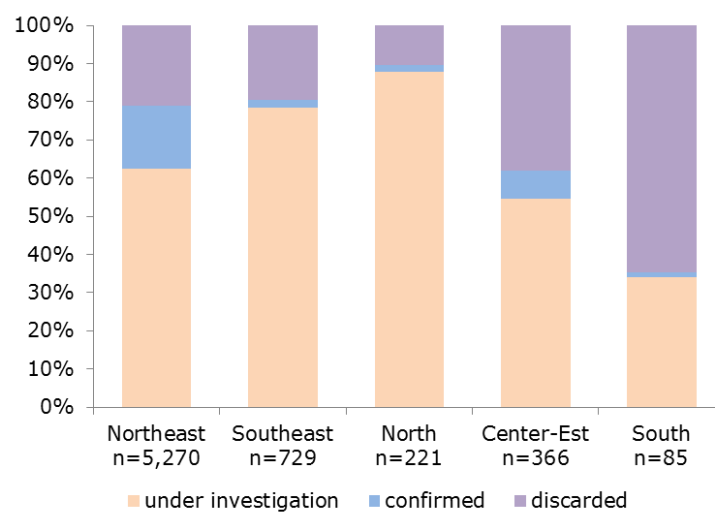
Ultrasonography performed at 19 weeks gestation had indicated deficits in the development of neural tube and microcephaly. These findings indicate the ability of the virus to cross the transplacental barrier, and reinforce the hypothesis of vertical transmission.

Congenital microcephaly in Brazil

According to the Ministry of Health of Brazil, as of EW 11 of 2016, 6,671 suspected cases of microcephaly or other nervous system malformation among newborns have been reported since 22 October 2015. Of these, 2,378 cases (36%) had been investigated, revealing 907 confirmed cases of microcephaly and/or other central nervous system (CNS) malformations with evidence suggestive of congenital infection. Out of the total reported cases, 1,471 cases were discarded as being due to non-infectious causes or not fitting the case definition, and 4,293 remain under investigation.

The confirmed cases of microcephaly are distributed in 19 out of 27 Federal Units, but 97% of confirmed cases and 79% of total cases are reported from the Northeast region (**Figure 3**).

Figure 3: Cases of microcephaly by classification and sub-national region of Brazil, EW 2 to 11 of 2016

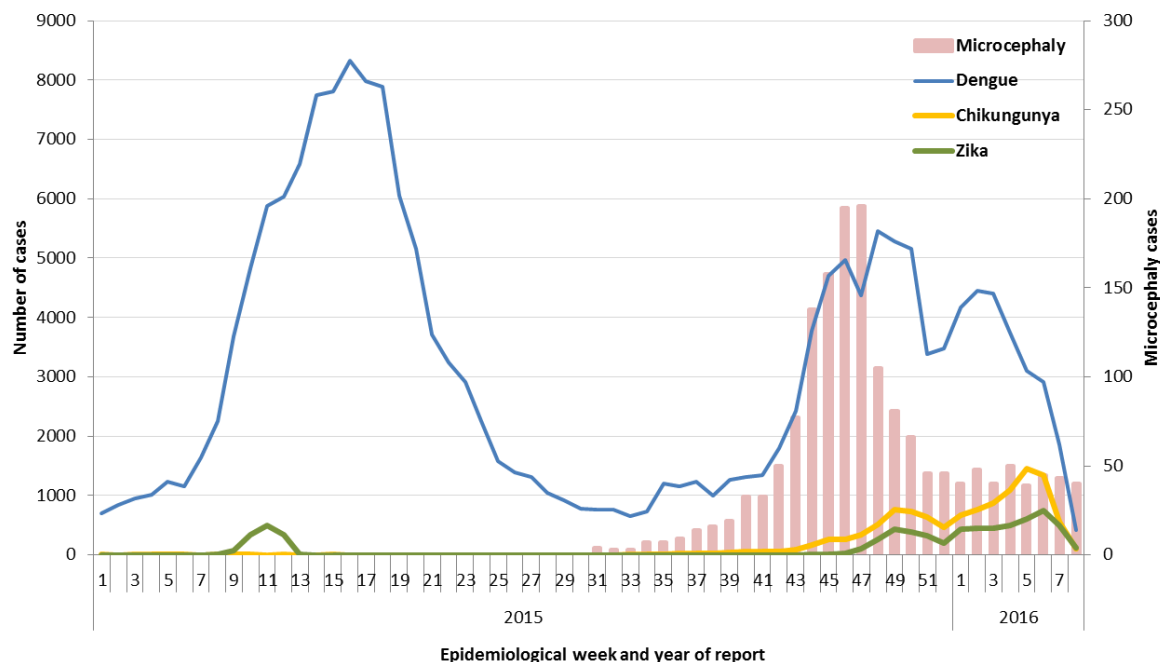


Source: Brazil Ministry of Health

There have been 198 deaths (including miscarriages or stillbirths) reported cases of microcephaly and/or CNS malformation, of which 46 has been confirmed as suggestive of congenital infection. [See full report.](#)

In this Epidemiological Update we are presenting the trends of reported cases of all three arboviruses circulating in Pernambuco (chikungunya, dengue, and Zika) and the reported cases of microcephaly. As indicated in **Figure 4**, increases of microcephaly cases are registered 7-8 months after the first detection of Zika virus cases. It is noteworthy that a large number of dengue-like-illness was registered in the dengue surveillance system during the first detection of Zika virus. Reports of microcephaly cases started decreasing on EW 48 of 2015, and between EW 51 and EW 8 of 2016, a weekly average of 44 microcephaly cases were registered.

Figure 4: Reported cases of dengue, chikungunya, Zika virus and microcephaly in Pernambuco state, Brazil by EW, 2015 to 2016



Source: Pernambuco State Secretary of Health

Guillain-Barré syndrome (GBS) and other neurological disorders

To date, six countries and territories in the Region have reported an increase in cases of Guillain-Barré syndrome (GBS) (Brazil, Colombia, El Salvador, Honduras, Suriname, and Venezuela). Five other countries and territories have identified Zika virus-associated cases of GBS (French Guiana, Haiti, Martinique, Panama, and Puerto Rico) (**Table 1**). Guadeloupe has also detected one case of myelitis with Zika virus detected in cerebrospinal fluid (CSF). Honduras reported GBS in a pregnant woman who tested positive for Zika virus and experienced a miscarriage at 9 weeks of gestation.

In this Epidemiological Update, information is available on the observed increase of GBS in Colombia, El Salvador, and the state of Pernambuco in Brazil.

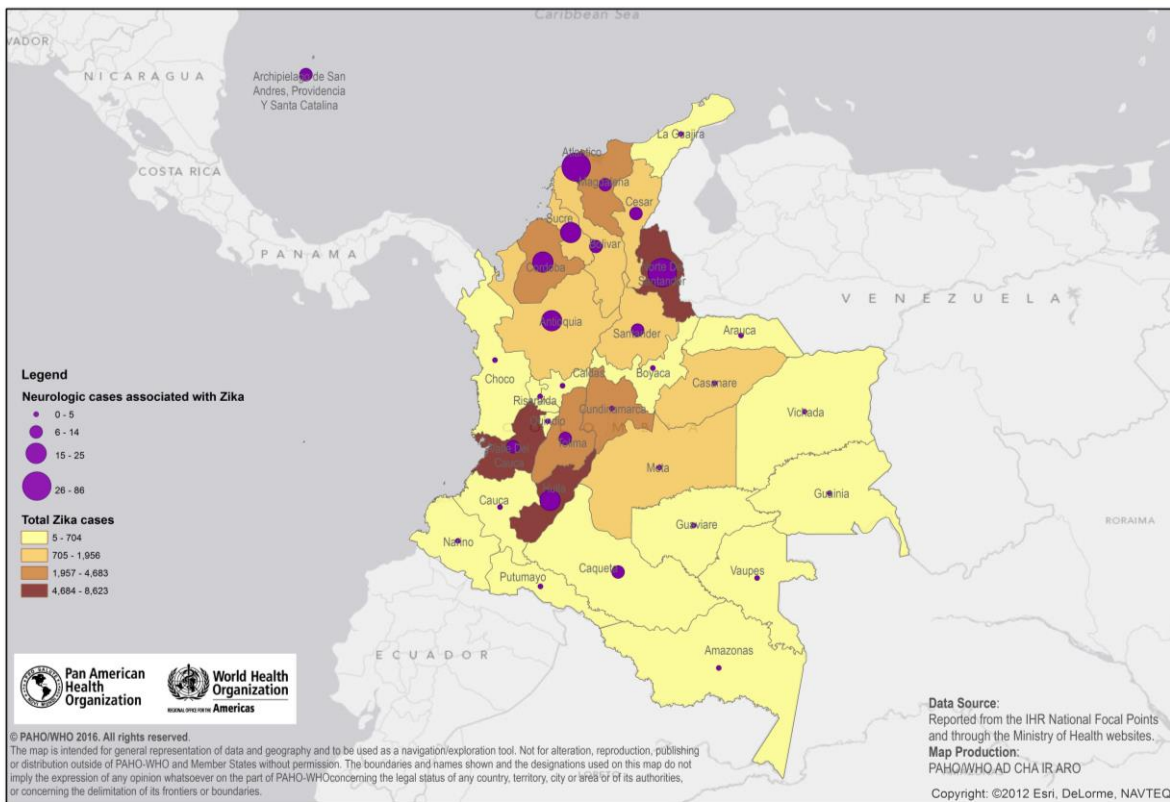
Table 1: Countries and territories in the Americas with GBS in the context of Zika virus circulation (as of 24 March 2016)

Increase in GBS	Increase in GBS plus Zika virus lab confirmation in at least one case of GBS	Zika virus lab confirmation in at least one case of GBS
Colombia	Brazil	French Guiana
	El Salvador	Haiti
	Honduras	Martinique
	Suriname	Panama
	Venezuela	Puerto Rico

Increase of GBS and other neurological disorders in Colombia

During the period of enhanced surveillance for neurological syndrome from December 2015 up to EW 10 of 2016, Colombia detected 352 cases of neurological syndrome with history of Zika virus symptoms including 248 cases of GBS and other similar neurological conditions such as ascending polyneuropathy. Of these, 57.1% were male (201 cases) and the highest number of cases were in the age group of > 69 years (42 cases) followed by 45-49 years (36 cases). The highest number of cases of neurological syndrome is reported from Norte Santander (74 cases), where there is the highest number of Zika virus cases in the country (**Figure 5**). High number of neurological cases is also reported from Barranquilla (55 cases) and Atlántico (31 cases) in the Caribbean region in Colombia, where the first Zika virus outbreaks were detected in the country. The geographic distribution of cases of neurological syndrome by Departments indicates that there is a spatial association with states also reporting high number of Zika virus cases. In addition, a temporal association has also been observed (See [Epidemiological Update](#) – 10 March 2016).

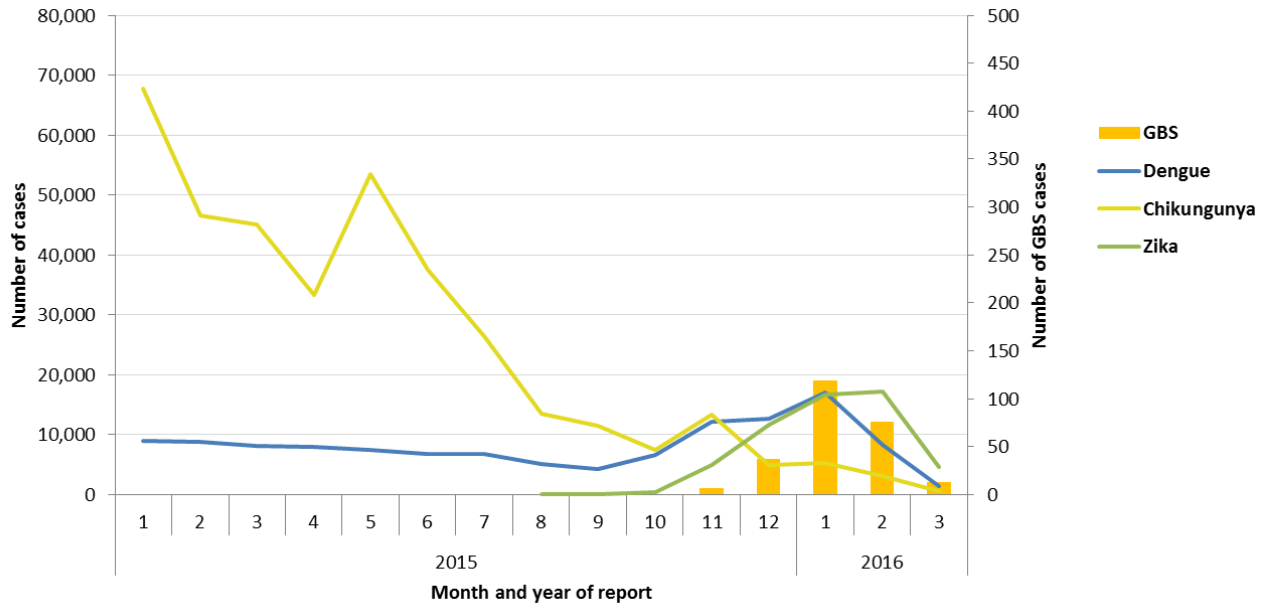
Figure 5. Territorial Entities with reported Zika virus cases and neurological syndrome, Colombia, December 2015 to 12 March 2016



Before the introduction of Zika virus to the Region of the Americas, dengue and chikungunya virus were circulating in the Region. All three arboviruses share a common mosquito vector. The first evidence of autochthonous transmission of chikungunya in the Region of the Americas was recorded in December 2013. The trends of reported cases of all three arboviruses and the reported cases of GBS can be seen in Colombia in **Figure 6** and in El Salvador in **Figure 7**.

A decreasing number of cases of chikungunya is observed in the first nine months of 2015, following a large outbreak of chikungunya after its introduction to Colombia in September 2014. In August of 2015, the first laboratory confirmed cases of Zika virus were recorded in Colombia. When comparing the dynamics of dengue, chikungunya, and Zika virus with the incidence of GBS cases which peaked in January and February of 2016, a temporal correlation between GBS and Zika virus peak is observed.

Figure 6. Reported cases of chikungunya, dengue, Zika virus, and GBS in **Colombia** by month, 2015 to 2016



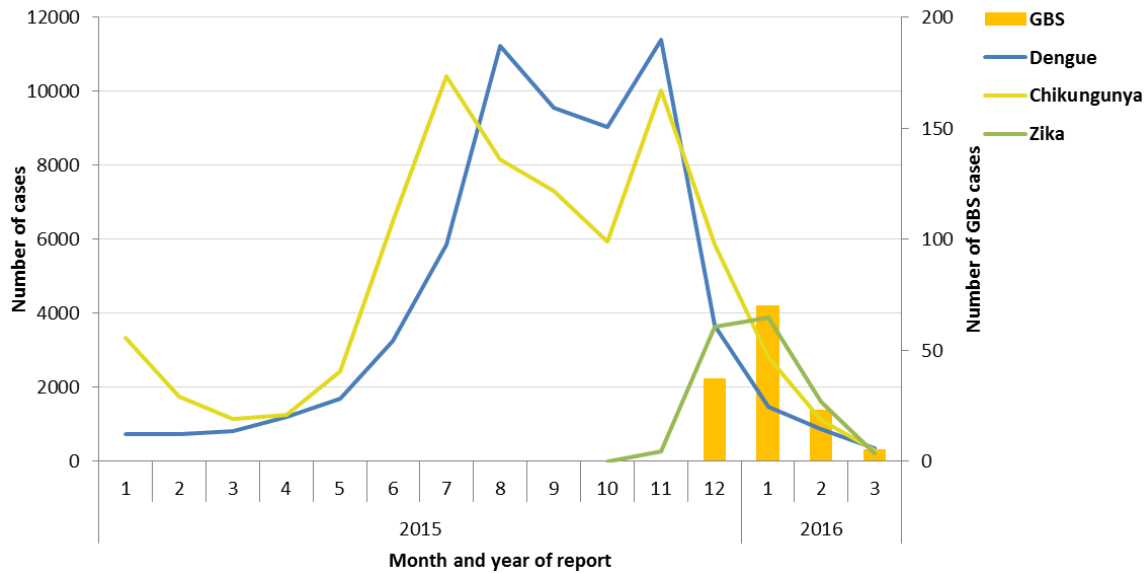
Source: Colombia Ministry of Health

Increase of GBS and other neurological disorders in El Salvador

Following the first cases of autochthonous transmission of chikungunya being recorded in El Salvador in June 2014, an increase in dengue and chikungunya cases was observed in the second semester of 2015, corresponding with the higher dengue circulation in Central America (**Figure 7**). In El Salvador, the first cases of Zika virus were recorded in October of 2015.

When comparing the dynamics of dengue, chikungunya, and Zika virus with the incidence of GBS cases which peaked in the first few weeks of 2016, a similar temporal correlation, as observed in Colombia, is seen in El Salvador with a peak of reports of Zika virus between December 2015 and January 2016.

Figure 7. Reported cases of chikungunya, dengue, Zika virus and GBS in **El Salvador** by month, 2015 to 2016



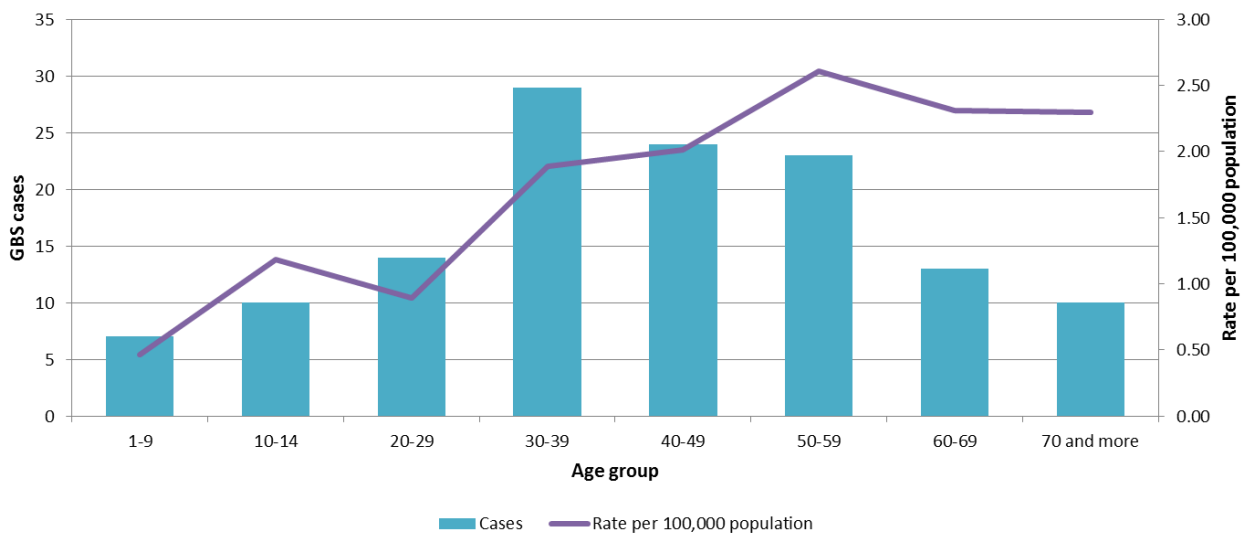
Source: El Salvador Ministry of Health

Increase of GBS and other neurological disorders in the state of Pernambuco, Brazil

According to the Pernambuco State Secretary of Health in Brazil, an increase in GBS has been observed between EW 13 and EW 20 of 2015. On average, Pernambuco registers 94 cases annually, however, in 2015, a total of 130 cases of GBS were reported.

Analysis of age-specific rate for GBS in Pernambuco shows that the highest rate is observed in the age group 50-59 years, followed by age groups of 60 years or more (Figure 8). According to Figure 8, older age groups are more likely to be affected by GBS than younger age groups.

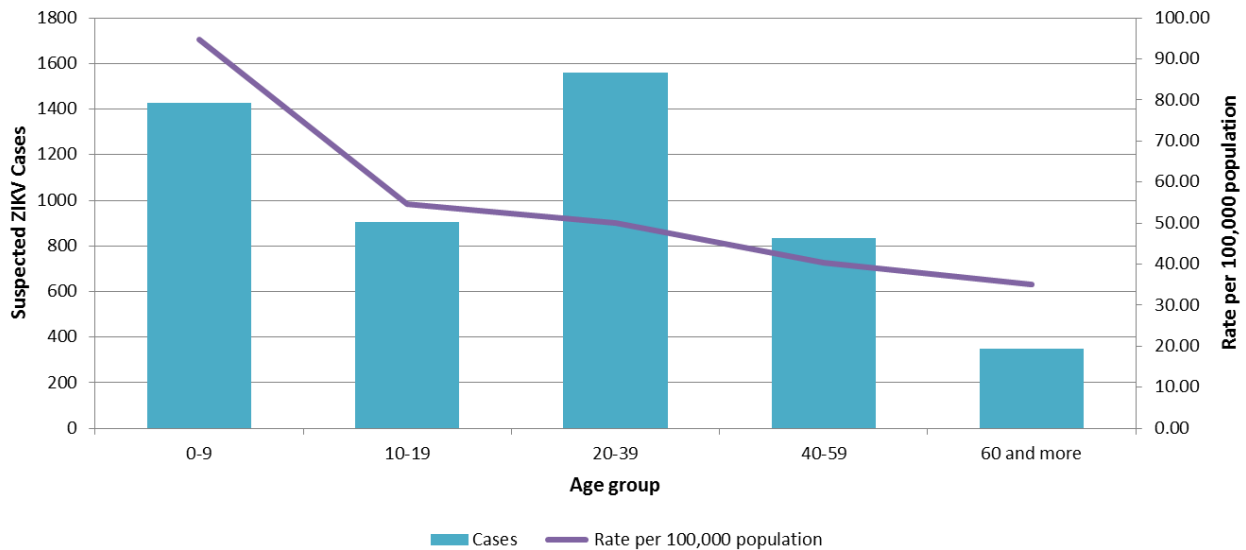
Figure 8: GBS cases by age group and age-group specific rates, **Pernambuco**, 2015 (n=130)



Source: Pernambuco State Secretary of Health

In comparison, the analysis of age-specific incidence rates for suspected Zika virus infection in Pernambuco indicates a significantly higher rate for children in the age group 0-9 years (**Figure 9**). Younger age groups are more likely to be affected with Zika virus infection than older age groups. Previous analysis of age-specific incidence rates for suspected Zika virus infection in El Salvador and Colombia indicate that the highest rate is observed in adults aged 20-39 in Colombia and 20-49 in El Salvador (See [Epidemiological Update](#) – 17 March 2016).

Figure 9. Suspected Zika virus cases by age group and age group-specific incidence rates, Pernambuco, 2015-2016 (n=5,077)



Source: Pernambuco State Secretary of Health

Novel Findings

Early epidemiological and genetic findings on the introduction of Zika virus in the Americas

A recently published study based on phylogenetic and molecular analysis indicated a single introduction of Zika virus in the Americas, estimated to have occurred between May-November 2013, more than 12 months prior the first detection cases of Zika virus 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.

A phylogenetic, epidemiological, and population mobility data was used to quantify Zika virus evolution and to explore the introduction of the virus into the Americas. Seven complete Zika virus genome from Brazil were sequenced using next generation sequencing. The samples were collected during the outbreak from four cases, one blood donor, one fatal adult case from Maranhão state, and one newborn with microcephaly and congenital malformations from Ceará state.

In addition, mingling of Zika virus isolates from Brazil with those from different countries reveals that there has been movement of Zika virus within the Americas since its introduction to the continent. [See full report.](#)

Note: PAHO/WHO encourages Member States to conduct retrospective analysis in samples of patients with Zika-compatible symptoms.

Genetic analysis of discordant twins

On 3 March, researchers at the University of São Paulo (USP) in Brazil reported that a study is being conducted in twins where only one of the babies was born with microcephaly to investigate whether some fetuses carry genes that protect or facilitate malformation in context of the Zika virus. So far, three cases of discordant twins, in which one has microcephaly, have been reported. Geneticists will compare the genome of the twins and parents to check for any genes linked to microcephaly. [See full report.](#)