

Pan American
Health Organization
**Response to the
Epidemic of Zika Virus
in the Americas**

December
2015 - 2016



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE Americas

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Introduction

This report, which covers the period December 2015 – December 2016, outlines the response of the Pan American Health Organization (PAHO), regional office for the Americas of the World Health Organization (WHO), to the epidemic of Zika virus (ZIKV) in the Americas and presents some of the milestones achieved during this period. PAHO's response continues a long tradition of providing dynamic leadership, timely technical support and guidance to its Member States during health emergencies, in coordination with the WHO, other United Nations (UN) agencies, and key partners (both national and international) to ensure value-added joint action. As in a variety of areas, PAHO manages public health emergencies in ways that protect the population, mitigate adverse impacts, and ensure that health services and programs remain functional and effective.

The characteristics of Zika virus in the Americas have presented a difficult challenge, not only in terms of its rapid dissemination, but also in terms of the evolution of our understanding of the virus—its relationship to neurological anomalies and other complications among newborns (including Guillain-Barré Syndrome in adults) and the potential for sexual transmission of the virus.

The medium and long-term consequences of this public health emergency will continue to be assessed over the coming years. This report details PAHO's response from December 2015 – December 2016, (keeping in mind work prior to this period, including issuing alerts to Member States, improving laboratory capacity, and strengthening surveillance and clinical management of neurological disorders).



"In Latin America and the Caribbean, more than 500 million people live in areas at risk of the Zika virus, dengue, or chikungunya, due to the presence of the Aedes aegypti mosquito, which carries these diseases."

Dr. Sylvain Aldighieri,
Zika Incident Manager, PAHO/WHO.

Timeline

of the Response to Zika Virus in the Americas

Zika virus infection is an emerging viral disease, transmitted through the bite of an infected mosquito (primarily *Aedes aegypti*), which also transmits chikungunya, dengue and yellow fever. It was first identified in Uganda in 1947 in monkeys and later identified in humans in 1952 in Uganda and Tanzania. Although the Region of the Americas experienced an explosive epidemic of Zika virus infections between mid-2015 to mid-2016, the etiologic agent was first detected in the Western Hemisphere on Chile's Easter Island in February 2014. This coincided with a series of confirmed Zika virus outbreaks in French Polynesia, New Caledonia, and other Pacific islands, which began in late 2013. Chile's prompt reporting of the presence of Zika virus to PAHO/WHO, under the International Health Regulations (IHR), placed the Organization on alert for the possible introduction of the virus into the continental Americas. At the time, however, this possibility was not viewed with great alarm, as the known effects of the virus were considered to be mild.

February

2014

Zika Virus Appears in the Americas

Autochthonous circulation of Zika virus in the Americas was first confirmed in February 2014 on Easter Island, Chile. One year later, in early February 2015, Brazilian health authorities responded to PAHO's request for information on clusters of cases that were presenting with symptoms of fever, muscle and joint pain, rash, and headache in Maranhão, one of the country's northeastern states. Fourteen of 25 patient samples screened negative for chikungunya, rubella, and measles. However, the laboratory in Maranhão did not have the capacity to screen for Zika virus. In late April 2015, authorities shared a preliminary report from the state laboratory in Bahia, which noted that samples from Maranhão and other northeastern states had tested positive for Zika virus. The national reference laboratory in Belém, the Evandro Chagas Institute, subsequently confirmed these results. On 7 May 2015, PAHO issued its first Epidemiological Alert¹ on Zika virus. In that alert, PAHO described the infection and provided recommendations to Member States for adapting and improving their existing dengue and chikungunya surveillance systems in order to detect possible cases of Zika virus infection.

February
May

2015

The initial Epidemiological Alert also included details on laboratory testing, case management, and prevention and control measures, including recommendations for travelers. Historically, Zika virus infection had been known to produce mild fever and rash. However, during the 2014 outbreak in French Polynesia, 42 patients had been detected with Guillain-Barré Syndrome (GBS), representing a nearly nine-fold increase over the average annual rate. By July 2015 in Brazil's Bahia State, extensive circulation of Zika virus as well as an increasing incidence in neurological anomalies, including GBS,² had been detected. In August 2015, obstetricians and pediatricians from three other northeastern Brazilian states (Pernambuco, Paraíba, and Rio Grande do Norte) reported what they perceived to be an increase in cases of microcephaly among newborns. These anecdotal reports were corroborated in October 2015, when a 70-fold increase in detected cases of microcephaly was confirmed in Pernambuco. Many mothers of babies with microcephaly had reported experiencing a febrile rash during their pregnancies.

July
October

2015

GOARN Team Deployed to Brazil



In response to these findings, in November 2015, PAHO and WHO deployed a team of experts to Brazil under the auspices of the Global Outbreak Alert and Response Network (GOARN)³ to assist national and state authorities in characterizing the event. Based on the preliminary findings of the investigation, the team concluded the following:

- There is an unprecedented increase in the number of cases of microcephaly being reported in Brazil to which the Ministry of Health has rapidly responded.

November
December

2015

1 Pan American Health Organization. Epidemiological Alert, Zika virus infection. 7 May 2015. Online at: <http://bit.ly/1TjebMB>.

2 For more on GBS, consult the WHO fact sheet on Guillain-Barré Syndrome at <http://bit.ly/2mJUd2c>.

3 The Global Outbreak Alert and Response Network (GOARN) is a multidisciplinary network of technical and operational resources from over 200 global, regional and national public health institutions, specialist public health networks in epidemiology, infection control and biomedical sciences, networks of laboratories, many United Nations organizations and international nongovernmental organizations. GOARN harnesses international resources at the request of affected WHO Member States to augment their response to ongoing or potential public health emergencies.

- Based on the clinical findings and testing performed to date, there appears to be a distinct and novel entity causing a fair proportion of the reported microcephaly.
- Current testing capacity in Brazil needs to be strengthened to support immediate diagnostic and research needs.
- Given the degree of current and potentially future neurological abnormalities in the microcephalic infants, the impact of this outbreak will be substantial in the immediate and long-term future.⁴

By the end of December 2015, 11 countries and territories in the Americas were reporting local circulation of Zika virus, from Brazil in the south to Puerto Rico in the north.

December

2015

PAHO Activates the Incident Management System

Following the Brazil-GOARN findings, which indicated a strong link between Zika virus and microcephaly, Dr. Carissa F. Etienne, the PAHO Director, formally activated the Zika Incident Management System (IMS) on 8 December 2015 in order to make the best possible use of the expertise of PAHO staff (in addition to headquarters staff, PAHO country and regional experts were deployed to headquarters to support the efforts). The IMS was fully operational by February 2016. Subsequently, Dr. Sylvain Aldighieri was appointed as the Incident Manager (IM) and Dr. Marcos Espinal, Director of the Department of Communicable Diseases and Health Analysis (CHA), as the spokesperson for the event.

The incident management structure at PAHO included the following departments:

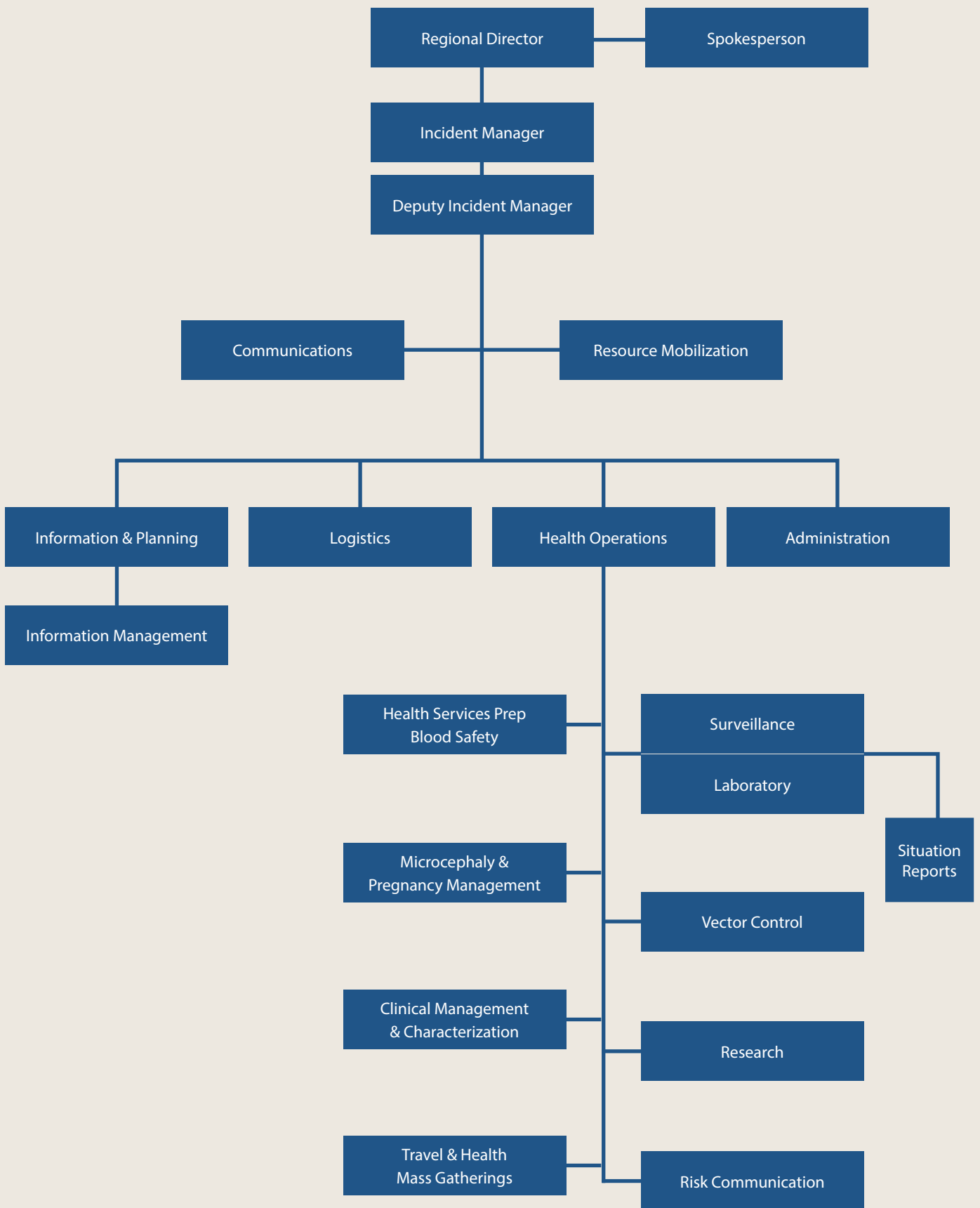
- **Communicable Diseases and Health Analysis**, responsible for:
 - Information sharing and development of information products;
 - Technical cooperation on event-based surveillance;
 - Surveillance of microcephaly and other congenital anomalies possibly associated with Zika virus infection during pregnancy;
 - Development of clinical guidelines for Zika virus, Chikungunya and dengue virus infections;
 - Clinical surveillance and management of severe neurological syndromes;
 - Coordination of WHO Collaborating Centers network for laboratory training and provision of reagents;
 - Support for monitoring vector control activities and insecticide resistance;
 - Support for country procurement of insecticides;
 - Technical cooperation on risk communication to ministries of health;
 - Development of a research agenda and direct technical support to studies.
- **Family, Gender and Life Course**

⁴ Report of the Global Outbreak and Alert Response Network. Microcephaly investigation and response, Brazil, 30 November – 4 December 2015.

- Recommendations for pregnant women;
- Guidance for surveillance of microcephaly and other congenital anomalies;
- Country guidance to provide adequate and integral care to an unexpected increase of microcephaly infants;
- Recommendations for clinical management and follow-up of infants with microcephaly.
- **Department of Health Emergencies** (formerly Emergency Preparedness and Disaster Relief)
 - Management of the Emergency Operations Center and mobilization of human resources;
 - Health cluster and inter-cluster coordination, facilitating information-sharing and coordinating activities;
 - Availability of health products/medicines for treatment of severe cases or autoimmune complications related to Zika virus infections;
 - Logistics – acquisition, storage and distribution of essential products for Zika virus outbreak response;
 - Provision of a stock of immunoglobulin for emergency treatment of Guillain-Barré Syndrome.
- **Health System and Services**
 - Preparedness of health facilities for triage and management of Zika virus-infected patients (mild disease);
 - Provide guidance on the role/expected responsibilities of key hospital departments, such as ICUs;
 - Work with the World Bank to develop tools to measure the economic impact of the Zika virus on countries in the Region.
- **Communications**
 - Coordination with media, website and other communication materials.
- **External Relations, Partnerships, and Resource Mobilization**
 - Resource mobilization.

The work of Alert and Response Operations (ARO) and the IMS team in collecting, collating, analyzing, confirming, and communicating information notified by Member States was key to supporting countries as the Zika virus spread rapidly through the Region.

Figure 1. Structure of PAHO's Incident Management System for the ZIKV



Link to Congenital Zika Syndrome and other Neurological Complications

As evidence of a link between Zika virus infection and birth defects mounted, in January 2016 PAHO convened internal and external experts on maternal and perinatal health, genetics, epidemiology, surveillance, and pediatric neurology to develop guidelines for both the diagnosis and surveillance of microcephaly (eventually considered as part of the more broadly defined congenital Zika syndrome, or CZS), as well as for the care of pregnant women exposed to Zika virus and newborns with microcephaly/CZS. Guidelines for psychosocial support to pregnant women in areas with Zika virus circulation were also developed and three webinars were organized to help disseminate that information. Other guidelines were produced on issues that included safe blood transfusions and the production of safe blood products within the context of this epidemic. These guidelines are available on PAHO's Zika Virus Portal at <http://bit.ly/1T5hl7z>.

By 29 December 2016, 22 countries and territories in the Americas had reported confirmed cases of congenital syndrome associated with Zika virus infection.

Table 1. Cases of microcephaly or congenital malformations believed to be associated with congenital Zika Virus infection. Source: PAHO/WHO, 29 December 2016. Online at: <http://bit.ly/2np6Cez>

Country or Territory	No. of cases	Country or Territory	No. of cases
Canada	1	Haiti	1
United States	39	Martinique	18
Costa Rica	2	Puerto Rico	10
El Salvador	4	Bolivia	14
Guatemala	15	Colombia	22
Honduras	2	Brazil	2289
Nicaragua	2	Argentina	4
Panama	5	Paraguay	2
Dominican Republic	22	Grenada	1
French Guiana	16	Suriname	2
Guadeloupe	6	Trinidad	1

PAHO/WHO published interim case definitions based on data obtained from the current epidemic in the Region. These case definitions include:

- Suspected case of Zika virus disease and in geographic areas without autochthonous transmission and where no vectors are present;
- Probable and confirmed cases of Zika virus disease;
- Suspected and confirmed case of Zika virus-associated Guillain-Barré Syndrome;
- Suspected, probable and confirmed cases of congenital syndrome associated with Zika virus;
- Suspected Zika-virus-associated abortion or stillbirth;
- Confirmed Zika virus-associated abortion or stillbirth;
- Suspected vertical transmission (without congenital syndrome).

Consult these case definitions at: <http://bit.ly/2mlSqjR>. Browse through a photo gallery on Flickr of children and their families in Recife (Brazil) affected by microcephaly at: <http://bit.ly/2l55g8O>.

EL SALVADOR

The Effects of Microcephaly Last a Lifetime

"There are between 10,000 and 11,000 babies born each year in this hospital. Last year [2015] we had five born with microcephaly, and this year we have had two, all without any association to Zika. The percentage is minimal but not insignificant because the neurological effects of microcephaly last a lifetime, and those children will require support throughout their entire lives. Since the alert last November (2015), we are more aware, we are more vigilant of those mothers who have experienced rashes or have confirmed medical data, and that makes us pay closer attention to those deliveries at this hospital."⁵

Ana Lorena Parada, Head of Neonatology,
National Women's Hospital in El Salvador.



World Health Organization Declares a Public Health Emergency of International Concern

Serious public health events that endanger international public health may be determined under the International Health Regulations⁶ to be public health emergencies of international concern (PHEIC).⁷ The responsibility of determining whether an event constitutes a public health emergency of international concern lies with the WHO Director-General. An Emergency Committee advises the Director General on the recommended measures to be taken, on an emergency basis. These are known as temporary recommendations. Temporary recommendations include health measures to be implemented by countries experiencing the PHEIC, or by other national actors, to prevent or reduce the international spread of disease and avoid unnecessary interference with international traffic and trade.

Due to the growing link between Zika virus infection and severe complications, particularly microcephaly, WHO convened a meeting of the IHR Emergency Committee in February 2016 to consider whether the Zika epidemic met the criteria for a public health emergency of international concern. The committee concluded that the Zika-associated clusters of microcephaly

February

2016

⁵ This statement was issued between February-March 2016. By August 2016, the situation in El Salvador had changed.

⁶ According to the World Health Organization, the International Health Regulations, or IHR (2005), represent an agreement between 196 countries, including all WHO Member States, to work together for global health security. Through the IHR, countries have agreed to build their capacities to detect, assess and report public health events. WHO plays the coordinating role in IHR and, together with its partners, helps countries to build capacities. Read more about the IHR at <http://bit.ly/1swe3c6>.

⁷ The term Public Health Emergency of International Concern is defined in the IHR (2005) as "an extraordinary event which is determined to constitute a public health risk to other States through the international spread of disease; and to potentially require a coordinated international response." This definition implies a situation that is serious, unusual or unexpected; carries implications for public health beyond the affected State's national border; and may require immediate international action. The International Health Regulations 2005 are online at: <http://bit.ly/2lwJlKf>.

did meet the IHR criteria, prompting the WHO Director-General to formally declare a PHEIC and to call for urgent international coordination and collaboration to better understand the full impact of the Zika virus and its associated complications.

The declaration of the PHEIC led to an urgent and coordinated response in 2016, providing the understanding that Zika virus infection and associated consequences represent a highly significant long-term problem that must be managed by WHO and its Regional Offices, Member States and other partners in a way that other infectious disease threats are managed. Over the following months, the Emergency Committee (EC) was updated on the latest developments regarding the geographic spread of the Zika virus; its natural history and epidemiology; microcephaly and other neonatal complications associated with Zika virus; Guillain-Barre Syndrome (GBS); and current knowledge on the sexual transmission of Zika virus. While the Committee felt that Zika virus and its associated consequences remained a significant enduring public health challenge requiring intense action, it concluded that they no longer represented a PHEIC as defined under the IHR. After reviewing the recommendations made at previous meetings, and acknowledging that WHO and partners had addressed their advice, the EC reviewed and agreed to the WHO Zika transition plan outlined to establish the longer-term response mechanism. Based on the Committee's advice, the WHO Director-General declared the end of the PHEIC on 18 November 2016.⁸

February

2016

A Regional Response Strategy to Combat the Zika Virus

In February 2016, PAHO developed a regional strategy for enhancing the capacity of its Member States to respond to Zika virus in the Americas. The objectives of the strategy include:

- **Detect:** detecting the introduction of the Zika virus in a timely manner and monitoring the evolving epidemic, including the detection of rare and severe outcomes associated with the virus.
- **Prevent:** reducing the risk posed by high vector density, thus minimizing opportunities for transmission.
- **Respond:** providing tools and guidance to manage the response; preparing facilities and healthcare workers for surges in demand of specialized care; and building on existing capacity in risk communication and mass gatherings.

March

2016

Development of a Research Agenda

PAHO published the *PAHO/WHO Regional Research Agenda related to Zika Virus Infection* to guide the international response to better characterize the Zika virus outbreak and respond to this public health emergency, specifically directed to the cluster of congenital malformations and other neurological complications. A modified Delphi survey was used to develop consensus among experts working in Zika virus around high-priority research areas. Over 52 experts repre-

⁸ Consult the WHO report on the Fifth meeting of the Emergency Committee under the International Health Regulations (2005) regarding microcephaly, other neurological disorders and Zika virus <http://bit.ly/2fE4Qmf>.

senting 28 international public health and research institutions participated in the final Delphi consensus activity to set the final PAHO regional research priorities.

The Regional Research Agenda has been used to coordinate the activities of key institutions interested in conducting research related to the Zika virus. It assists organizations to make informed choices between competing research options and allows funders to consider how to best use their research dollars to seek the maximum utility and focus on areas of high interest and priority. The PAHO/WHO Regional Research Agenda is available at <http://bit.ly/2IROs4S>.



Meeting "Towards the development of a Research Agenda on Zika" in Washington DC with the participation of the PAHO/WHO Spokesperson, the Director for International Affairs FioCruz Brazil, the Director of the Institut Pasteur Dakar and the CDC Incident Commander for Zika, March 2016.

Ethics in the Context of Zika

The serious threat posed by Zika virus to pregnant women and their unborn babies, in combination with the limited scientific knowledge about the virus, its pathogenesis, and resulting effects, raised difficult ethical issues for health authorities and health care providers. In order to provide much-needed guidance in this area, in April 2016 PAHO convened an international consultation that brought together ethicists and other professionals from ministries of health, PAHO, and WHO involved in the Zika response. Among the recommendations that emerged from the consultation are the following:

- All women should have access to comprehensive sexual and reproductive information and services, including family planning, maternal health, prenatal testing, safe termination of pregnancy, counseling, and postnatal care services.
- Women should receive adequate social support for their reproductive decisions and assistance with handling difficulties related to Zika virus infection and congenital Zika syndrome (CZS).
- Health authorities should strive to minimize discrimination and stigmatization by continuously informing the public about the importance of respecting different beliefs, values, and choices.
- Advancing research on Zika is an ethical imperative, and researchers have an ethical duty to share data and research findings.⁹

⁹ http://iris.paho.org/xmllui/bitstream/handle/123456789/28425/PAHOKBR16002_eng.pdf?sequence=11

FLUXO
APÓS O USO

The laboratory of the Oswaldo Cruz Foundation Magalhães Research Center in Pernambuco performs tests to diagnose the presence of the Zika virus in blood samples of pregnant women with rash and itching. Research is also being conducted to better understand the biology of the virus.

Achievements by Strategic Objectives

Objective 1. Detect and monitor Zika Virus

Through the end of December 2016, 48 countries and territories in the Americas¹⁰ reported confirmed autochthonous, vector-borne transmission of Zika virus (see Figure 2). In addition, five countries reported non-vector-borne transmission of ZIKV, likely through sexual contact (Argentina, Chile, Canada, Peru and the United States).

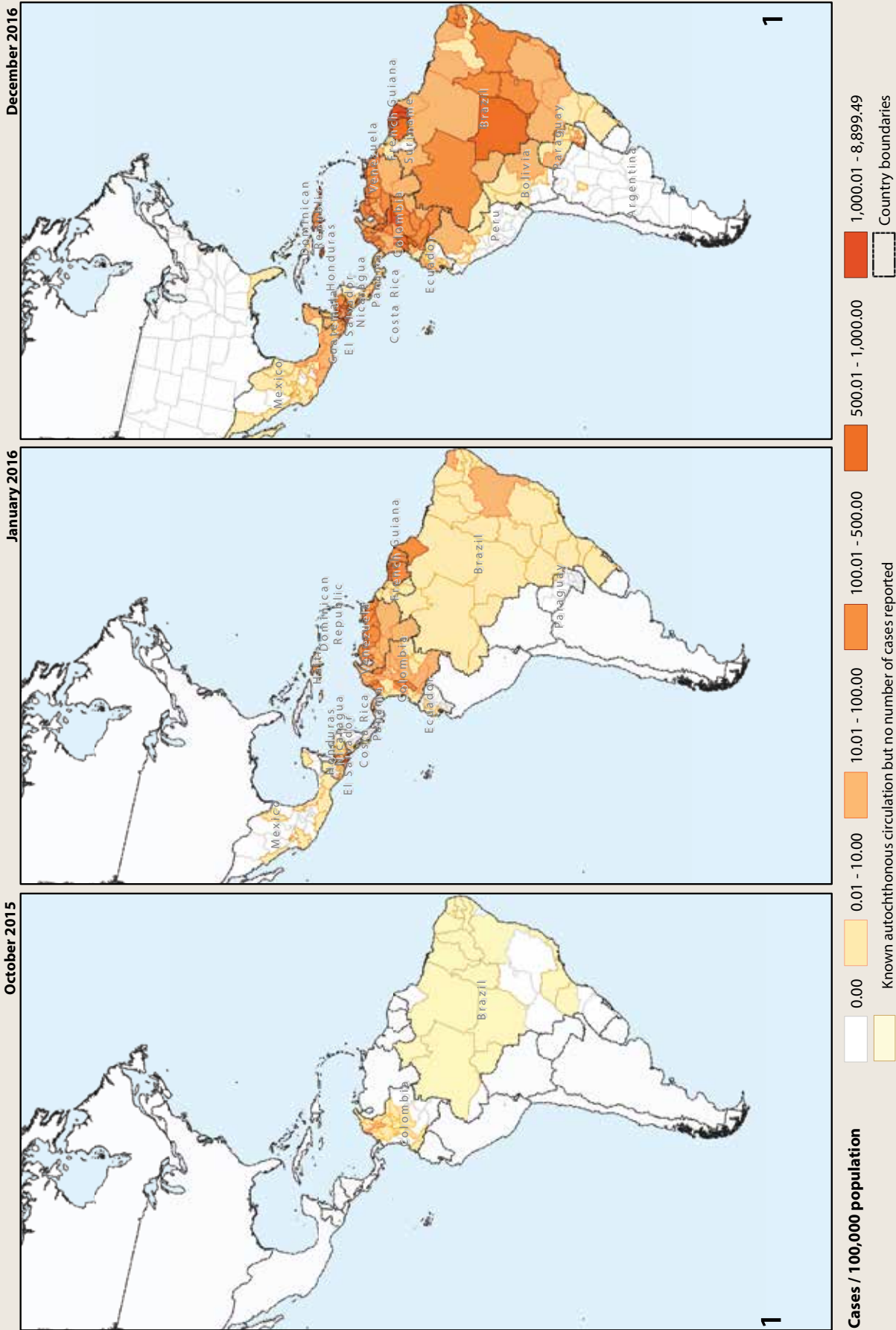
By the end of 2016, the cumulative number of suspected Zika cases had reached more than 712,167.¹¹ Twenty-two countries and territories in the Americas also reported confirmed cases of congenital syndrome associated with Zika virus infection, as reported by the IHR Focal Points to PAHO/WHO and through the websites of the ministries of health:¹²

10 Anguilla; Antigua and Barbuda; Argentina; Aruba; the Bahamas; Barbados; Belize; Bolivia; Bonaire, Sint Eustatius, and Saba; Brazil; the British Virgin Islands; Cayman Islands; Colombia; Costa Rica; Cuba; Curaçao; Dominica; the Dominican Republic; Ecuador; El Salvador; French Guiana; Grenada; Guadeloupe; Guatemala; Guyana; Haiti; Honduras; Jamaica; Martinique; Mexico; Montserrat; Nicaragua; Panama; Paraguay; Peru; Puerto Rico; Saint Barthélemy; Saint Kitts and Nevis; Saint Lucia; Saint Martin; Saint Vincent and the Grenadines; Sint Maartin; Suriname; Trinidad and Tobago; Turks and Caicos Islands; the United States of America; the U.S. Virgin Islands; and Venezuela.

11 Source: Center for Disease Control and Prevention. Online at: <http://bit.ly/2hGi3NI>.

12 For a breakdown by geographical region and additional statistics, consult the PAHO/WHO report of cumulative Zika cases as of 29 December 2016 at <http://bit.ly/2hxwqSF> or consult Annex 1.

Figure 2. Countries and territories in the Americas with confirmed autochthonous (vectorborne) Zika virus cases, 2015-2016.



Note
of Zika virus disease at the subnational level was not available, the national incidence rate was used for the entire country/territory. Zika virus is not necessarily present throughout the areas shaded in the maps.

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The designations employed and the presentation of the material in these maps do not imply the expression of any opinion whatsoever on the part of the Secretariat of the Pan American Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Sources
Ministry of Health Countries' Websites
National Statistics Census Offices' Website
Map production
PAHO/WHO Health Emergencies

Pan American Health Organization
REGIONAL OFFICE FOR THE AMERICAS

World Health Organization
REGIONAL OFFICE FOR THE AMERICAS

For highlights of the epidemiological situation by countries and subregions in Latin America and the Caribbean, consult the last PAHO Epidemiological Update for 2016 at <http://bit.ly/2hxt8P9>.¹³

Objective 1 seeks to detect the introduction of the virus in a timely manner and to monitor the evolution of the epidemic. The key activities related to this objective include:

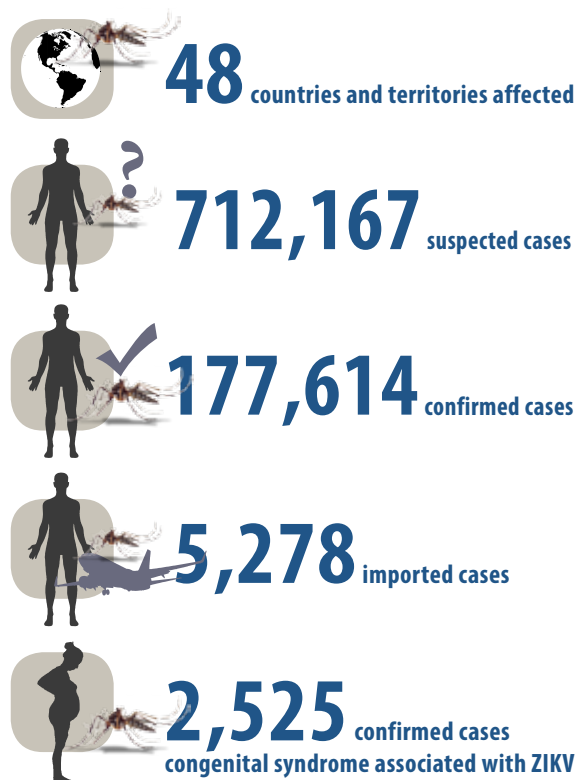
- Supporting Member States to implement Zika Surveillance in the context of circulation of other arboviruses of public health importance as dengue, chikungunya and others;
- Providing guidance to Member States on surveillance of complications of Zika virus infection and sequelae;
- Disseminating information about the epidemic and its consequences through IHR channels and on PAHO's website;
- Enhancing laboratory capacity in Member States;
- Supporting the implementation of event-based surveillance as a complement to indicator-based surveillance.

Guidance on an Integrated Surveillance and Control Strategy

As outlined in its ZIKV strategy, PAHO supports Member States to implement integrated arbovirus surveillance¹⁴. In September 2016, during the 55th PAHO Directing Council, ministers of health from Latin America and the Caribbean approved a regional Strategy for Arboviral Disease Prevention and Control.¹⁵ This strategy guides countries as they develop national action plans to strengthen surveillance, diagnosis and case management. The strategy calls for:

- An integrated approach for arboviral disease surveillance, prevention and control;
- Strengthening the capacity of health services for the differential diagnosis and clinical management of arboviral diseases;

A Snapshot of Zika Virus in the Americas as of 29 December 2016



Zika Surveillance Guidelines

Published on 1 April 2016

<http://iris.paho.org/xmlui/handle/123456789/28405>.

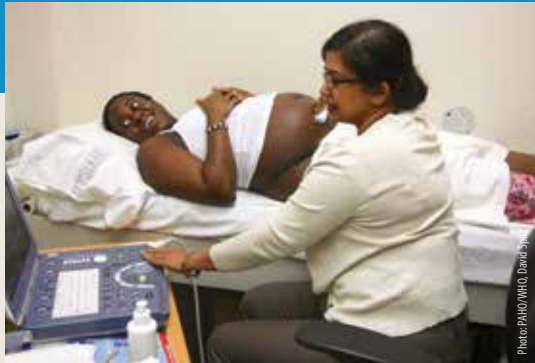
13 Pan American Health Organization. Zika - Epidemiological Update 29, December 2016. Online at: <http://bit.ly/2hxt8P9>.

14 Arthropod-borne viruses (arboviruses for short) are transmitted to humans primarily through the bites of infected mosquitoes, ticks, sand flies, or midges. Other modes of transmission for some arboviruses include blood transfusion, organ transplantation, perinatal transmission, breastfeeding, and laboratory exposures.

15 Pan American Health Organization. 55th Directing Council (scroll down to document CD55/16 Regional Strategy for Arboviral Disease Prevention and Control). Online at: <http://bit.ly/2ce1BRu>.

In November 2016, experts from the Americas were at PAHO/WHO headquarters for World Radiology Day, discussing the important role of obstetric ultrasound in the screening and monitoring of abnormalities.

PAHO recommends obstetric sonography as one tool for screening and monitoring fetal/neonatal brain abnormalities associated with ZIKV. Although ultrasonography is a



safe technology, it requires extensive knowledge of maternal-fetal anatomy and acquiring and interpreting images.¹⁷

Women can be infected with Zika virus during any trimester of their pregnancy, which has caused increasing concern for maternal-fetal transmission of the virus. Structural brain anomalies, such as microcephaly, intracranial calcifications, and malformation of cortical development, have been reported in babies with congenital Zika virus infection.

- Evaluating and strengthening country capacity for surveillance and integrated vector control;
- Establishing and strengthening the technical capacity of the Arbovirus Diagnosis Laboratory Network of the Americas (RELDA)¹⁶.

In October 2016, more than 30 countries and territories met in La Havana, Cuba to discuss the epidemiological situation of Zika and to develop a comprehensive approach for surveillance and control of arboviral diseases, based on the resolution of the PAHO Directing Council CD 55/16¹⁵.



October 2016, meeting of Regional Stakeholders in La Havana, Cuba with the participation of Cuban Minister of Health, PAHO Director, US Secretary of Health and Barbados Minister of Health.

¹⁶ RELDA (Spanish-language acronym) was initially the Dengue Laboratory Network in the Americas, created in 2008.

¹⁷ Press Release. Experts at PAHO present imaging findings to detect Zika abnormalities, November 2016. Online at: <http://bit.ly/2e5SweC>.

Improved Laboratory Capacity

PAHO worked closely with countries in the Americas to strengthen the capacity of their national laboratories. PAHO's support helped ensure that the laboratories were properly equipped with diagnostic kits and critical reagents, and that health workers were trained to better detect cases. This support began prior to the outbreak, through joint initiatives between PAHO/WHO and the U.S. Centers for Disease Control and Prevention (CDC), which in 2014 supported countries in responding to the regional chikungunya epidemic and in 2015 developed the report "Caribbean Guidance on the Stepwise Improvement Process for Strengthening Laboratory Quality Management Systems", based on minimum and mandatory requirements for medical laboratories. In 2016, laboratory assessments were performed to evaluate installed capacities, general laboratory management, quality assurance policies, and the availability of equipment and reagents in national reference laboratories in certain priority countries.

Regional and subregional workshops on laboratory diagnosis of ZIKV infection, with emphasis on molecular detection and serology interpretation, took place in January, (Belem, Brazil), February (Managua, Nicaragua), April (Trinidad & Tobago) and October 2016 (Lima, Peru). In addition, national level training (theoretical and practical) on molecular diagnosis for Zika was conducted in Brasilia, Brazil (September 2016) with the participation of five state laboratories. Twenty-two countries from the Caribbean, Central and South America took part in the workshops, with instructors from PAHO, consultants and experts from the WHO Collaborating Center (Arboviral Diseases Branch Division of Vector-Borne Diseases, Centers for Disease Control and Prevention located in Fort Collins, Colorado and CDC Dengue Branch, Puerto Rico). The workshops sought to review the background and the current situation of ZIKV infection in the Region; review the fundamentals, interpretation and limitations of the available laboratory diagnosis for ZIKV; and to provide training in using



Laboratory Assessments Identify Strengths and Needs

Assessment missions were conducted in 15 countries to identify strengths and opportunities for improvement of national laboratories, including reagents and supplies needed to better optimize the use of available resources. PAHO facilitated the purchase of reagents and supplies for the timely diagnosis of arbovirus (particularly ZIKV). See Annex 3 for a list of reagents sent to Member States in 2016.

Critical reagents (molecular and serology assays, and positive controls) and supplies were purchased and distributed through PAHO regional and countries offices, or delivered directly to the reference laboratories in 23 countries.

Thanks to these supplies, used in diagnosis protocols, the number of confirmed cases steadily grew in Jamaica, Cuba and Haiti. Also, congenital syndromes associated to ZIKV infection have been confirmed in Haiti as well as Guillain-Barré Syndrome in Jamaica.

Colombia

Now persons can receive a correct diagnosis within 24 hours. "We will be the first department at the national level that has the capacity to process Zika tests. Prior to this, the national-level laboratory was the only entity in Colombia with the capacity to offer a laboratory-confirmed diagnosis of the Zika virus and the results could take up to three weeks. Now that we have this capacity at the departmental level, a pregnant woman, a child or anyone else with risk factors can have a correct diagnosis in 24 hours. What I do is to advise whether a Zika test is positive or negative. It is very rewarding to help to get faster results, which helps people to make decisions. I have always liked to be involved in research and neglected diseases. I believe that one of the fundamental missions in this world is to help others. In my case, I like to do it through science."

Carlos Daza, Microbiologist, Public Health Laboratory,
Department of Valle del Cauca, Colombia.



and interpreting serologic methods for diagnosis of Zika virus in the context of other arboviruses. The workshops' conclusions included:

- Microcephaly cases and neurological syndromes associated with ZIKV infection must be prioritized for testing in national laboratories;
- Despite the limitations (both, technical and biological), immunoglobulin (IgM) detection using ELISA methods¹⁸ in newborns presenting congenital syndromes is necessary to infer intra-uterine infection and the association with ZIKV;
- Reagents for ZIKV surveillance, for the confirmation of complicated cases and for the timely detection of other (emerging) arboviruses, should be available and regularly distributed.

Additionally, 21 technical missions were conducted in 15 countries to support and advise countries on the establishment of Zika detection and differential diagnosis with other arboviral diseases. During these missions, laboratory algorithms and protocols were reviewed and implemented in accordance with regional guidelines.

Consult the PAHO guidelines for the serological diagnosis of Zika virus infection (2016) online at: <http://bit.ly/2eq0axI>.

18 ELISA (enzyme-linked immunosorbent assay) is a plate-based assay technique designed for detecting and quantifying substances such as peptides, proteins, antibodies, and hormones.

Objective 2. Prevent Reduce the Risk Posed by Vector Presence

The second objective of PAHO's strategy to improve country capacity to respond to the Zika virus epidemic seeks to reduce the risk posed by high vector density, thus minimizing opportunities for transmission. Activities related to this objective include:

- Expanding the integrated vector management strategy to improve current vector control programs, including improved collaboration within the health sector and other sectors;
- Continuing to strengthen surveillance of insecticide resistance and vector infestation;
- Communicating timely, accurate information on the Zika virus, addressing public health concerns, and providing information regarding possible health problems related to this disease;
- Continuing to encourage changes in individual behavior and community participation to control the vector and its domestic breeding sites.

Developing a Strategy and Expanding the Vector Control Network

PAHO has supported Member States as they improve their capacity to respond to the Zika virus epidemic through stepped-up vector control activities, both at the governmental level and through individual efforts. The focus of the former is on control of breeding sites collection of garbage and removal of standing water sites. Families can and should do the same: for example, taking care of containers they use to collect water (the household collection of water is a common practice in many parts of the Americas).

With a view to maximizing the results of vector control efforts, a Technical Advisory Group in Public

Key Achievements in Vector Control

- Entomology Technical Group meets in Washington D.C.
- Draft terms of reference prepared for a regional entomo-virological surveillance network.
- Workplans developed for vector control in pilot countries and ministry of health staff trained to use GIS for entomology surveillance and vector control interventions.
- Outline prepared for a manual on Insecticide Resistance Procedures and Resistance Management Guidelines.
- Materials developed for course on outbreak investigation and management of VBDs.
- Mobile app developed to promote elimination of mosquito larvae through individual actions.

How to prevent mosquito breeding sites in and around your home

The *Aedes* mosquito can transmit dengue, chikungunya and Zika

1. Make sure all tanks, water deposits and containers are covered and sealed to keep out mosquitoes
2. Change the water and brush the insides of sinks and water barrels at least once a week
3. Pour out water from flower pots and planters and replace with damp sand
4. Turn over containers that cannot be thrown away and protect them from rain
5. Change the water in flowers vases at least once a week, pouring the used water out over the ground
6. Safely dispose of any unused containers and objects that can accumulate water and serve as breeding sites
7. Keep swimming pools adequately treated with recommended products and frequency
8. Change the water in pet bowls at least once a week
9. Clean all drains and gutters
10. Keep grass short and weed-free, and keep your patio clean

**No breeding sites,
no mosquitoes,
no dengue, chikungunya or Zika**

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www.paho.org #FightAedes



Health Entomology¹⁹ met in March 2016 to discuss vector control and prevention actions in the context of the epidemic of Zika virus infections in the Americas and to review and analyze actions that have a positive impact in the medium and long term for the prevention and control of vectors.

The meeting's recommendations included enhancing mosquito control and surveillance and increasing training in these areas; developing a new protocol for monitoring insecticide resistance; and evaluating the impact and cost-effectiveness of current vector control methods as well as new and supplemental tools, such as genetically modified sterile mosquito technologies and wolbachia spp infected mosquitoes. The group also emphasized the need for stronger intersectoral action, especially through partnerships with communities and with relevant productive sectors to develop, implement, and sustain effective and economically viable actions to reduce mosquito populations.

Encourage Behavioral Change and Community Participation

Since mosquito control is one of the most effective ways to stop the transmission of Zika virus, PAHO and its partners supported countries in implementing active vector control and environmental management interventions. These activities included direct work with the community and schools in order to encourage changes in individual behavior. PAHO's work focused on protecting individuals, especially pregnant women, and women and girls of reproductive age. This has been and continues to be achieved by improving communication and supporting equitable access to sexual and reproductive health commodities and services; preventing infection and unintended pregnancies; and helping them make informed decisions about their health.

¹⁹ Read the report of the March 2016 meeting of the Technical Advisory Group on Public Health Entomology (TAG PHE) at <http://bit.ly/2lHO1XF>.

El Salvador

"We all sleep under mosquito nets. In my community, we cover ourselves. We have mosquito nets in the four rooms of the house to protect ourselves from Zika. We all sleep under mosquito nets. The doctors advise us to get rid of containers and not remove the mosquito nets, even if it gets hot under them. They say prevention is better, even if we feel warm." Adriana Soriano, 37 weeks pregnant, is hospitalized in the perinatology ward of the National Women's Hospital in El Salvador. She sleeps under one of the 1,500 mosquito nets that the country's health authorities set up at health centers to prevent mosquito bites. March 2016.



Colombia

In this auto body shop in Barranquilla, Colombia, water that has accumulated in unused tires is a typical mosquito-breeding site. The female *Aedes aegypti* mosquito lays its eggs in spots with standing water, thus multiplying the vector. It is therefore very important to store unused tires under cover.

In Barranquilla, initiatives such as 'Mi Cuadra sin Dengue' — my neighborhood free of dengue — help mobilize health workers to educate the population on how to eliminate mosquito breeding sites. In this photo, workers inspect the auto body shop and old tires are removed, while serviceable tires are placed indoors.





Objective 3. Respond

Support the Management of the Response to ZIKV

This objective seeks to support the response by providing tools and guidance for emergency response management, including appropriate handling of cases; preparing facilities and healthcare workers for a surge in demands for specialized care; resource mobilization; and building on existing capacity in risk communication.

- Providing direct guidance to Member States on arboviral / ZIKV surveillance, case management of GBS, ZIKV among pregnant women, and cases of microcephaly or other neurological anomalies;
- Supporting Member States in the preparation of healthcare networks and facilities to assist in providing specialized care;
- Providing support to Member States, and Brazil in particular, regarding the measures to be adopted in relation to the Rio 2016 Olympics;
- Supporting Member States to strengthen surveillance of birth defects (focused on microcephaly) and to design and implement comprehensive health services for the affected infants;
- Purchasing and maintaining an emergency stock of essential products for complicated cases; and shipment and delivery;
- Building capacity in risk communications, developing tools, and providing training.

Guidance to Ministries of Health

PAHO developed a new assessment tool for evaluating a country's capacity to respond to the Zika epidemic and related complications, building on the Organization's previous experience in strengthening health systems and Ebola preparedness. PAHO's matrix includes three elements:

- Prevention levels and response to ZIKV-related complications;

- Integrated health systems delivery networks and ZIKV;
- Structural conditions (norms and regulations).

The instrument was applied in many countries in the Region and helped national health authorities identify areas for strengthening.

International Cooperation in the Response to ZIKV

A number of international partners collaborated on aspects of the response to ZIKV in the Americas. Following are highlights of their contributions to these efforts.

- As of 15 December, 2016, in collaboration with the GOARN, 86 missions had been conducted in 30 countries and territories during which technical experts, including epidemiologists, entomologists, and virologists, worked with national and local authorities to implement Zika virus control and prevention measures. Assistance was provided to PAHO countries for the implementation of comprehensive health care and social services for infants with congenital abnormalities. The U.S. Centers for Disease Prevention and Control and Prevention (CDC), in collaboration with PAHO/WHO, distributed diagnostic tools, including Trioplex kits for molecular detection and reagents for serologic testing, to 26 countries and territories. Multicountry workshops were organized to provide training in surveillance and laboratory diagnosis.
- The following international partners participated in GOARN missions: the U.S. Centers for Disease Control and Prevention; the Institut Pasteur International Network; the University of Texas Medical Branch at Galveston; the Public Health Agency of Canada, the Robert Koch Institute, Berlin, Germany; and the University of New South Wales, Sydney, Australia and the Evandro Chagas Institute, Belem, Brazil.
- UNICEF collaborated in developing messages in school settings through their work in water and sanitation. In an effort to bridge hospital and home care, PAHO and UNICEF developed "Guidelines for care and support of children affected by Zika Congenital Syndrome" to help establish criteria for the adequate follow-up of the children affected by the various disorders of congenital Zika virus syndrome (CZS). These documents seek to provide a framework and key elements to provide information on risk factors for Zika virus infection in the care of newborns and children, to recognize the clinical presentation forms, and to systematize a rational approach to diagnosis and management of associated complications.
- As part of the WHO and PAHO global Zika Strategic Response Framework and Joint Operations Plan,²⁰ UNFPA helped lead efforts to care for women and families affected by Zika and educate communities about transmission and the risks that accompany the virus. UNFPA developed information kits about Zika prevention and care that primarily target pregnant women and women who plan to conceive.
- OCHA seconded a liaison officer for a four-month period to the PAHO Incident Management System to collaborate in the monitoring and management of Zika response indicators and the production of situation reports, internal summary briefs and information products on the 4Ws (Who is Where, When, doing What).

In addition, PAHO's Health Systems and Services Department partnered with the World Bank (WB) and the Inter-American Development Bank (IDB) to develop an assessment and costing tool to identify gaps in the response capacity of national health systems and estimate the cost of necessary actions. This inter-agency tool analyzes nine areas of work and seven spending categories related to the ZIKV emergency. In addition to assessing the overall areas involved in the response, it also estimates the costs associated with the ZIKV emergency.

20 Online at: <http://bit.ly/2sRiZPV>.

PAIS EVALUADO:

Areas	Nro	Linea de trabajo/Indicador/Estándar	Rating	Acciones según el tiempo	Costo: FASE I Respuesta Rapida	Costo: FASE II Sustentabilidad	Total Costos
I. Inteligencia en salud - Vigilancia epidemiológica	1	El sistema de vigilancia epidemiológica para arbovirosis está funcionando (Dengue, Chikungunya)	3	11	50,000	50,000	100,000
	2	El sistema de vigilancia epidemiológica para el Zika está instalado y en funcionamiento	3	11	10,000	50,000	60,000
	3	Existe un sistema de Vigilancia epidemiológica comunitaria (dengue, chikungunya) que está funcionando adecuadamente.	1	13	0	20,000	20,000
	4	Existe un sistema de alerta temprana para el Dengue, Chikungunya y Zika que está funcionando.	3	12	150,000	300,000	450,000
	5	Existen suficientes epidemiólogos formados que han sido capacitados en el control de enfermedades vectoriales.	2	13	0	450,000	450,000
	6	Existen suficientes Entomólogos formados que han sido capacitados en el control de enfermedades vectoriales.	2	11	0	315,000	315,000
	7	Existe una Guía Nacional para vigilancia del Dengue, y la Chikungunya	3	12	10,000	10,000	20,000
	8	Existe una Guía nacional para la vigilancia del Zika y ésta ha sido diseminada.	3	12	5,000	10,000	15,000
	9	El costo de un Sistema de vigilancia epidemiológica adaptado al país ha sido estimado y el país puede financiarlo.	2	11	25,000	100,000	125,000
	Sub Total			22/45		250,000	1,305,000
	10	Está definido el Laboratorio de referencia para arbovirosis en el país o fuera del país.	4	13	5,000	10,000	15,000
	11	El alcance y extensión de la red de laboratorios es satisfactoria.	3	13	15,000	15,000	30,000

IOAC Mission Assesses Implementation of Zika Response

The Independent Oversight and Advisory Committee (IOAC) for WHO's Health Emergencies Program suggested country visits to assess WHO performance in crisis situations. Priority was given to countries affected by yellow fever and Zika virus and the IOAC chose Colombia, which was the second country after Brazil to report an epidemic. The assessment took place in November 2016.

The IOAC recognized that Colombia's Ministry of Health and Social Protection (MSPS) led the response, as it had long-standing experience working with UN agencies, NGOs and other partners. The PAHO/WHO Country Office in Colombia had previously-established and solid working relationships with local partners on the ground. PAHO played a key role in monitoring the epidemiological situation, providing technical support with guidelines and capacity building, setting global norms and standards and facilitating multi/bilateral country cooperation.

Based on Colombia's experience with epidemics of dengue and chikungunya, the MSPS focused efforts on risk communication and community mobilization. A strategy to control hotspots was widely disseminated and implemented by 840 municipalities and door-to-door surveys were carried out to sensitize communities and engage them in the elimination of mosquito breeding sites.

The strong presence of the Colombian Red Cross across the country, with 30,000 trained volunteers who had a clear understanding of Zika response mandate, was an important part of the response efforts. They served as community educators, using Government guidelines and WHO messaging on the nature of Zika infection and vector control. They were guided by technical assistance and information from PAHO/WHO. Read the complete mission report at: <http://bit.ly/2tLYXAB>.

Joint missions of experts from the three institutions (PAHO, WB, IDB) were deployed to Dominica, Honduras and Colombia to pilot test this new instrument. It has since been applied in El Salvador, Grenada, Guyana, Haiti, Nicaragua, Panama, and two states in Brazil.

Technical Expertise and Training

The evolving nature of the Zika virus required agile mechanisms to respond to the PHEIC affecting most of the Member States and territories in the Americas. Using knowledge gained through PAHO's response to other arbovirus outbreaks (particularly to chikungunya, dengue, and urban yellow fever) and analyzing the emerging information from Brazil, the Organization deployed multidisciplinary technical field missions, in some cases on multiple occasions. This involved the mobilization of over 180 staff and external experts, including through the GOARN and WHO Collaborating Centers. These teams included experts in a wide array of technical areas.

In addition:

- Eight regional meetings (on bioethics, clinical surveillance, congenital syndrome associated with Zika virus infection, pregnancy management, public health entomology, research, reproductive and sexual health, and risk communication).
- Twelve subregional workshops were held: seven on vector control and surveillance, pregnancy management, surveillance, response management, laboratory, clinical management of severe neurological complications associated with Zika virus infections, and risk communications in the Caribbean and five on surveillance, vector control, and laboratories in Central and South America.



Health Services and Systems

- Use tools to identify systems gaps and reprogram resources.
- Capacity building including imaging and blood services.
- Activate Strategic Fund and deploy iGm to countries to respond to increase in GBS.
- Review capacity of health services to rapidly adapt and respond to disease outbreaks (increased resilience).
- Strengthen the response capacity of specialized medical and social services (neurology, rehabilitation, etc.).

Colombia - We sought training so we could inform families

"We visit families once a month to chat with them, to make them aware, to understand their concerns. We are a group of 12 community mothers from different neighborhoods and we take care of 12 families. We also give talks on how to prevent diseases such as Zika. We receive training so that we can share information with the families because sometimes people do not do what they are supposed to do. We have stressed the importance of keeping the water tanks clean so the mosquito cannot breed in them. It's very beautiful because it is work that comes from the heart. We learn from them and they learn from us."

Rosa Chona, from the Alto Pamplonita neighborhood in Cúcuta, Colombia



Strengthening Health Services and Systems

Considering the evolving effects of the Zika virus, health professionals were trained to implement standardized clinical management practices and provide advice and specialized counseling to those affected by Zika virus disease. Support for clinical management included providing treatment options, such as immunoglobulin, to manage patients with Guillain-Barré Syndrome related to Zika virus infection. To that end, PAHO created a regional stockpile, located strategically in Panama and in Barbados, for ease of distribution. In addition, the Organization mediated agreements between neighboring countries, when necessary, as another option to make treatment available quickly for severely ill patients in countries where immunoglobulin was not available. Lastly, recognizing the important role of national health systems, PAHO worked with Member States to step up family planning and antenatal care services as well as social services for families affected by Zika.

During multidisciplinary missions to support the response to ZIKV, PAHO received many requests for tools and guidelines to strengthen first-level care of patients with Zika virus. Given the special characteristics of this situation, which was an emergency for many health systems, PAHO/WHO prepared operational recommendations to strengthen primary healthcare in responding to Zika.

Community members play an important role as first-line providers of information, as evidenced in the interview from Colombia (at left).

Preparedness for the 2016 Summer Olympics

In response to the ZIKV outbreak in Brazil, and in view of the numbers of athletes and fans attending the Olympic Games in Rio de Janeiro, PAHO prepared a report for consideration at the IHR Emergency Committee meeting (June 2016). The report provided information gathered during a series

of missions to Brazil, in which PAHO's IMS team advised national health authorities on emergency preparedness for the Olympics in areas including information management, alert and response triggering, command and control across key levels of government (municipal, state, and federal), transparency and sharing of health information.

PAHO worked with the International Olympic Committee (IOC) and Brazilian authorities to reduce the risk of ZIKV infections including the deployment of PAHO experts during the games.²¹ Recommendations included fumigation and indoor spraying to decrease adult mosquito populations; eliminating potential breeding sites; distribution of insect repellents; and distribution of health promotion materials to visitors and athletes. Also suggested was systematic outreach to Olympic delegations to inform them about the measures being implemented and any changes in the epidemiological situation.

Capacity Building in Risk Communication

During 2016, significant efforts were made to ensure that effective, consistent, and trustworthy public health risk communication materials were shared with key stakeholders in the form of updated information. News and social media channels were monitored and analyzed to identify audience concerns, knowledge gaps, rumors, and misinformation. Key messages were shared through a range of channels, including public service announcements, partner networks, and media briefings.

PAHO/WHO technical support in risk communication during the Zika outbreak focused on strengthening the capacities of the national teams to ensure timely communication with populations affected by ZIKV. The PAHO/WHO response centered primarily on four strategic lines, based on the countries' needs:



1. STRENGTHENING HEALTH CAPACITIES



2. SOCIAL MOBILIZATION AND COMMUNITY ENGAGEMENT



3. SOCIAL RESEARCH - LISTENING AND FEEDBACK



4. COORDINATION

21 The IHR Committee reviewed information provided and concluded that there was a very low risk of further international spread of Zika virus as a result of the Olympic and Paralympic Games hosted by Brazil, which were held during the Brazilian winter when the intensity of autochthonous transmission of arboviruses, such as dengue and Zika viruses.



By the end of this reporting period, 20 Member States received overall technical support from PAHO risk communications, considering multi-hazard approach. The ministries of health led the process, with multi-sectoral participation. This enabled the countries to advance or finalize risk communication strategies and to strengthen the capacity of their health personnel, institutions and key actors from a variety of sectors.



Vector Control Officer performing entomological surveillance, Trinidad & Tobago, 2016.

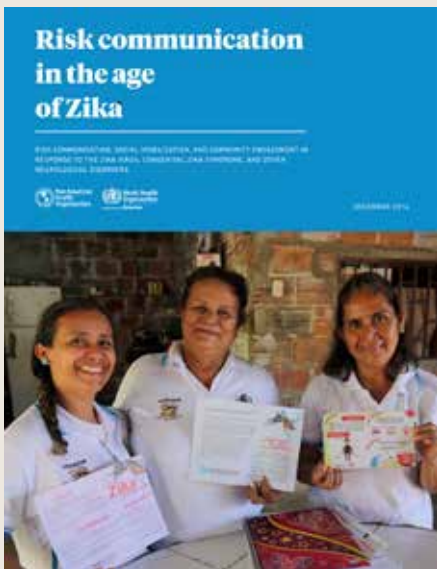
During this reporting period, 27 countries in the Americas celebrated “Mosquito Awareness Week” to sensitize the community, healthcare professionals and authorities and other key parties on the associated risks and diseases transmitted by the *Aedes aegypti* mosquito. Mosquito Awareness Week was the first event of its kind in the Region, revealing the countries’ interest and political commitment to this new initiative. Senior government officials participated in the events, among them the Ministers of Health of Argentina, Cuba, and Panama; the Vice Ministers of Health of Colombia, Paraguay, Peru, and Guatemala; and the president of Bolivia, who issued a statement in observance of the Week.

Mosquito Week’s activities were held in locations with the highest incidence of vector-borne diseases and involved widespread social and community participation. Many educational and entertainment activities with an intercultural approach were held, respecting the customs and beliefs of the communities involved. This fostered widespread local participation, especially among schoolchildren. With regard to the Zika outbreak, the campaign focused on eliminating the vector and preventive personal protection measures against the Zika virus. Caribbean countries and territories celebrated the first Mosquito Awareness Week from 9-15 May, while Latin American countries celebrated during the pre-summer or rainy season months between August and November.



A Jamaican public health nurse prepares to share information with health workers and patients on the Zika virus and microcephaly. Jamaica's Ministry of Health is advising people, especially pregnant women, to take special precautions to avoid the bites of *Aedes aegypti*, the mosquito that transmits Zika as well as dengue, chikungunya and yellow fever.

Other innovative means were used to reach a diverse audience and raise awareness. For example, in the Caribbean, Trinidadian singer-songwriter Darryl Gervais recorded a song about the need to fight *Aedes aegypti*. The song, Do Your Part, serves as a musical public service announcement set to an electro-Caribbean melody. It was broadcast by 112 media outlets in 24 Caribbean countries. Listen to this tune on PAHO's Zika website at: <http://bit.ly/2fg6sTz>. Browse through a collection of photos on Flickr from Mosquito Awareness Week at: <http://bit.ly/2lYI8II>.



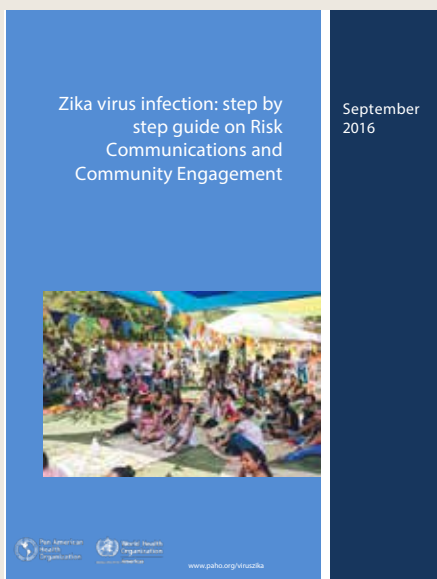
Tools and Guidance

A dedicated space on PAHO's Zika website hosts a wide variety of risk communications materials, developed at headquarters and in country offices in Latin America and the Caribbean: guidelines, reports, posters that are suitable for reproduction, video stories and more. All of this information is available in English and Spanish at: <http://bit.ly/276fbKA>. Following are some of the highlights.

Report on PAHO Activities 2016

Pan American Health Organization. **Risk Communication in the Age of Zika**. December 2016.

This report presents an overview of the risk communication activities and results from around the Americas, emphasizing social mobilization and community engagement. It takes an interesting look at how social media networks were used and what can be done to maintain the momentum as countries continue to strengthen risk communication.



Guidelines

Pan American Health Organization. **Zika Virus Infection: Step-by-Step Guide on Risk Communication and Community Engagement**

This document presents suggested risk communication actions in relation to Zika virus infection and other health issues linked to this disease. It is directed toward ministers of health and other health sector actors who, with their national (multi-disciplinary) teams for communication and social mobilization, will be able to adapt the provided information to the needs of their countries and audiences.



Key Messages and FAQs

Posters, radio spots (in mp3), photos and video stories, information about the awareness campaigns, interactive tools and more are available at <http://bit.ly/276fbKA>.

Be sure to visit PAHO's Zika photo collections on Flickr at: <http://bit.ly/1RKzMiO>.

Major Communications Partners Join the Fight Against Zika Virus

Sesame Workshop, the nonprofit organization behind Sesame Street, used Street Muppets Elmo and Raya to tackle ZIKV, helping to raise awareness and share critical information to reduce the spread of the mosquito-borne virus. The Muppet friends appear in two public service messages, sharing tips for avoiding mosquito bites with families in Latin America and the Caribbean as part of a joint effort with PAHO/WHO. Children are taught not to let standing water accumulate, to empty and cover water bowls and basins, and to cover trash containers, all to eliminate mosquito breeding grounds. The second PSA focuses on prevention: Elmo and Raya give children tips such as wearing long sleeves and pants, using repellent, and keeping doors and windows screened. Watch the PSA at <http://bit.ly/2uGS7Dt>.

Cartoon Network Latin America also joined forces with PAHO/WHO and UNICEF to develop the educational campaign "Mission Zika," which enlists several Cartoon Network characters, such as the Powerpuff Girls and Ben 10, to inform and empower children to help prevent Zika. Mission instructions call on young 'superheroes' to help stop the spread of the virus and protect themselves, their families and neighborhoods. "Your mission is to organize a team to search for all types of recipients that can contain water in your home, your garden and your neighborhood: from barrels and tires to flowerpots and pet bowls, cover them or empty them weekly," the Public Service Announcement instructs. Watch the PSA at <http://bit.ly/2lnenRj>.



Research on vectors: In a home, an entomologist installs a trap designed to capture adult mosquitoes. Later, the specimens are taken to a laboratory to study their behavior and patterns of change, such as resistance to insecticides



Research

Activities to Advance Knowledge Related to the Zika Virus Outbreak

PAHO plays an active role in the generation of evidence needed to strengthen essential public health guidance and actions to prevent and limit the impact of Zika virus and its complications. PAHO continues to work collaboratively to address challenges related to the Zika virus outbreak and support activities and functions that are required to ensure research coordination, management, funding, and quality. Specifically, PAHO contributes to research activities by assisting in the development of high quality methodological research and by providing technical assistance to countries engaging in their own research initiatives to further understand the Zika virus.

PAHO published the *PAHO/WHO Regional Research Agenda related to Zika Virus Infection* in order to identify critical areas of research. A modified Delphi survey was used to develop consensus around high priority research areas. Over 52 experts representing 28 international public health and research institutions participated in the process. The group identified critical research gaps that needed to be implemented in the short-term in topics such as: virus, vectors and reservoirs; epidemiology; disease pathogenesis and consequences of infection; public health interventions and clinical management; health systems and services; and research and development of products.

The Regional Research Agenda coordinates the activities of key institutions interested in conducting research related to the ZIKV. It additionally assists public health and research institutions to make informed choices between competing research options. Download the Zika Research Agenda at: <http://bit.ly/2lROs4S>.

PAHO also created PAHO Zika virus research platform²² to house research protocols that detail current and ongoing research related to the Zika virus. Protocols have been (and continue to be) included in the platform if they include research on the Zika virus or research related to the outcomes of microcephaly, Guillain-Barré Syndrome or Miller Fisher Syndrome and were registered between 2010 and 2016. Protocols in the database have been reviewed in detail and information is available regarding the type of study, institution, research location, study population and methodological characteristics.

PAHO has identified over 400 research protocols related to the ZIKA virus, with a vast majority of the protocols developed in 2016. The majority of the research protocols come from research institutions in Brazil and Colombia. The most common type of study design included cross sectional, cohorts and case control studies. There were few study protocols on experimental development or clinical trials and in basic research. The most represented subtopics

(according to the PAHO/WHO Regional research agenda subtopics) were epidemiology and clinical management, followed by disease pathogenesis and consequences of infection. Additional information regarding the study protocols and author correspondence can be found on the Zika virus platform.

With the goal to encourage the development of strong epidemiological research, PAHO, together with WHO, Institut Pasteur, International Network, Fiocruz, and ISARIC, generated six standardized clinical and epidemiological research protocols and questionnaires to address the most pressing public health questions related to the Zika virus. Utilization of these protocols will assist researchers in developing high-quality, usable data that will be used to update and refine public health recommendations. These research protocols encourage standardization and harmonization of case definition and endpoints so that information from these protocols can be eventually by collected and shared rapidly in a format that can be easily aggregated, tabulated and analyzed across many different settings globally.

The six protocols that were developed include:

- Case-control study to assess potential risk factors related to microcephaly including Zika virus infection during pregnancy.
- Prospective longitudinal cohort study of newborns and infants born to mothers exposed to Zika virus during pregnancy.
- Prospective longitudinal cohort study of women and newborns exposed to Zika virus during the course of pregnancy.
- Prospective longitudinal cohort study of Zika-infected patients to measure the persistence of Zika virus in body fluids.
- Case-control study to assess potential risk factors related to Guillain-Barré Syndrome including Zika virus infection.
- Cross-sectional seroprevalence study of Zika virus infection in the general population.

22 Consult the list of research projects in the database at: <http://www.paho.org/zika-research>.

Furthermore, PAHO/WHO played an active role in providing technical support to the ongoing cohort studies in the Region and is a consortium member of the Zika virus individual participant data meta-analysis (IPD-MA). PAHO/WHO, through the Zika virus research platform, identified all cohort studies that measure both ZIKV infections during pregnancy and adverse perinatal outcomes. The IPD-MA is an initiative with WHO, CDC, NIH and FIOCRUZ and the goal is to estimate the relative and absolute risk of microcephaly and other components of congenital Zika syndrome. This is the first instance where a prospective IPD-MA has been used to address public health concerns in the context of an emerging pathogen.

PAHO's Research Agenda

PAHO's research agenda targets knowledge gaps, including:

- Defining the absolute risk of neurological malformation in a fetus by gestational age;
- Describing the clinical spectrum of the Zika congenital syndrome;
- Understanding the role of different modes of transmission: sexual, vector;
- Characterizing the dynamics of arboviruses co-circulating in same subregion;
- New serological tests to improve detection in the context of high circulation of other flaviviruses;
- New vector control tools;
- Financing and coordination needs.

The Oswaldo Cruz University Hospital in Recife, one of the first to detect an increase in children born with congenital anomalies, serves as a reference center on care and monitoring of newborns with microcephaly.



Lessons

Learned from the Zika Virus Emergency Response

- As the spread of ZIKV progressively unfolds, the virus is unveiling its multifaceted public health implications and challenges. The response has required coordination at the national, regional, and global levels, spanning across disciplines and sectors. The Organization has likewise reinforced linkage with United Nations agencies (UNICEF, OCHA, UNFPA, UN Women, among others) to provide a multifaceted technical response and to leverage strengths in mobilizing resources for addressing this public health emergency. PAHO and Member States must continue to build and strengthen these in-country and external partnerships in order to better address and prepare for the current and anticipated impact of this virus.
- Similar to the 2009 H1N1 Pandemic, the spread of Zika virus is testing the application of the International Health Regulations and again emphasizing that efficient responses to rapidly-emerging and evolving risks require resilient health systems.
- Although many aspects of this Zika epidemic have reinforced PAHO's ongoing technical cooperation priorities and approaches, they also simultaneously suggest the need for changing emphases in other areas. This is certainly the case regarding vector control and management. The current Zika epidemic, the large

“We have achieved much over these past 12 months, despite the numerous and newly emerging challenges that we have encountered along the way,” said PAHO/WHO Director Carissa F. Etienne during the opening session of the 55th Directing Council in September 2016. “I have absolutely no doubt that these achievements were made possible because of the hard work of PAHO/WHO staff in catalyzing public health action, the unwavering political and financial commitments of governments, the unstinting dedication and persistent work of healthcare workers in all of our Member States, and the synergistic contributions of our numerous partners, donors, and nongovernmental organizations who together have contributed to extend the reach of our technical cooperation.”



and recurrent outbreaks of dengue fever over the past three decades, and the recent emergence and rapid spread of chikungunya virus have underscored the magnitude of the *Aedes aegypti* infestation in the Region and have also exposed the challenges of countries to control this vector of major public health importance.

- A central lesson learned is that mosquito populations and human exposure are associated with many environmental determinants. Therefore, vector control programs must be comprehensive, integrated, intersectoral, and participatory. Another key lesson is that resources devoted to vector control efforts must be sustained at appropriate levels, even when such efforts lose high visibility and attention because of their own success. At the same time, innovation is essential for developing new and more effective ways of controlling mosquito populations. Although the specific lessons learned relating to vector control are not new, the Zika epidemic has provided added impetus for their urgent application.
- A related lesson is the need for integrated surveillance, prevention, and control of arboviral diseases of public health importance. This is particularly true for dengue, chikungunya, yellow fever, and Zika, which are all transmitted by the same mosquito vector. These integrated efforts should include epidemiological surveillance, laboratory surveillance and entomological surveillance.
- The Region’s Zika experience has also demonstrated the critical need for frontline health providers to be on high alert for atypical clinical presentations and events, in order to ensure the timely detection of an emerging disease. At the regional level, the same judgment and awareness are required when reviewing data generated by event-based surveillance and when responding appropriately even in the absence of strong confirmatory evidence. PAHO’s guiding principle in responding to Zika has been to act with caution but with commensurate urgency, relying on the best evidence available. In this context, well-tai-

lored risk communication activities are essential for truthfully and transparently conveying uncertainties in a manner that merits and preserves the public's trust.

- Regarding risk communications, PAHO's response to the Zika epidemic has galvanized solid inter-programmatic collaboration and has produced new synergies between technical programs, including departments dealing with communicable disease surveillance and control, emergency preparedness and response, health systems and services, and women's and children's health, among others.
- Like chikungunya before it, Zika has highlighted persisting weaknesses and gaps in the capacity of national vector control programs and health systems to adapt to new threats. In this context,

the epidemic has reinforced the overarching emphasis that PAHO has placed on building strong, resilient health systems and advancing universal access and coverage. It has also highlighted other technical cooperation priorities such as achieving full compliance with the IHR and integrating surveillance, prevention, and control of arboviral diseases of public health importance.

- In regard to the regulatory approval of a diagnostic, the main challenge is that each country has internal regulations on the authorization and commercial use of available tests. Nevertheless, regulation should consider formal evaluation and validation from non-profit institutions or laboratories as minimum requirements and for quality assurance purposes.

PAHO Incident Manager in Brazil presenting the Zika situation room to PAHO Director, Dr. Carissa F. Etienne, Brasilia, February 2016.



Challenges

- Zika virus has gained a foothold in the Region and therefore has a strong potential of becoming endemic in the Region. As the spread of ZIKV progressively unfolds, with its multifaceted public health implications and challenges, the epidemic offers the opportunity to integrate the surveillance of arboviruses of public health importance and to revive the integrated vector control efforts outlined in the proposed PAHO Strategy for Arboviral Disease Prevention and Control (see footnote 15).
- More evidence is needed to accurately estimate the current and anticipated impact of this virus on the health of the Region's populations. Existing evidence has allowed for limited assessment and projection of future health, social, and economic repercussions. Congenital Zika Syndrome (CZS) is expected to continue to leave hundreds of infants with long-term developmental disabilities. Patients afflicted with GBS require sustained social support and care from healthcare professionals. Affected households, especially those living in vulnerable situations, will face long-term financial and emotional challenges. National authorities are encouraged to analyze the needs of their populations and prioritize the responses accordingly to ensure that national and social protection systems are able to support affected households and patients, particularly noting that complications may arise after the initial onset of symptoms.
- The design of a strong epidemiological study is required to evaluate the relationship between Zika virus infection and congenital brain abnormalities and

address causality for other conditions, including the autoimmune-mediated neurological disorder Guillain-Barré Syndrome. In addition, well-designed multi-centered epidemiological studies are also needed to determine accurate incidence and risk rates. It has been a challenge for countries to carry out those studies in the midst of responding to the emergency.

- The major challenge associated with research and development of a diagnostic is the lack of a reliable test (in terms of high specificity and sensitivity), especially during the convalescent phase of the disease (serological diagnosis). Research towards ZIKV specific antigens and antibodies should be addressed. Moreover the development of point-of-care (POC) reliable tests is a priority.
- Multinational and multi-disciplinary research collaborations and partnerships are extremely valuable in the context of public health emergencies. Learn lessons from this experience and those of previous public health emergencies should be reviewed and systematically evaluated to determine the best practices for effective research collaboration and for better resource utilization.
- In most of the countries, Zika surveillance has been implemented based on what already exists. Since most countries have surveillance systems for vector-borne diseases in place, they have carried out Zika surveillance using those systems. In addition, Zika emerged at a time when countries in the Americas were building capacity for the potential occurrence of an Ebola outbreak and part of the capacity that had been built was used to advance Zika surveillance capacity. However, in many aspects, Zika has presented in the Region of the Americas a more complex preparedness challenge than Ebola, due to the high level of uncertainty surrounding the virus, its vectors, modes of transmission, and potential complications.



PAHO/WHO expert visits a patient with Guillain-Barré syndrome (GBS) in a hospital in Cúcuta, Colombia. Zika has been associated with an increase in GBS in a number of countries in the Region. An auto-immune syndrome, GBS attacks peripheral nerves, causing muscular weakness and paralysis, and can cause serious complications if it affects respiratory muscles. Most patients make a full recovery.

Looking Forward

- Going forward, PAHO, WHO and partners are planning for a longer-term response to Zika including the development of a vaccine. As the spread of ZIKV will most likely continue for the foreseeable future, the global community will need to adjust its response from an emergency response to long-term management. WHO and partners must provide support to countries most vulnerable to Zika cases and with the least resources to address it, in order to develop capacity to manage long-term complications; undertake and support additional research to better understand Zika; and reorient themselves to respond to Zika virus infection and its complications as a long-term programmatic issue.²³
- New research proposals on Zika will be conducted in Latin America and the Caribbean in 2017 and going forward, to identify solutions to address this virus. The 17 research projects—ranging from the identification of transmission risk factors to evaluating diagnostic tools and examining the use of prenatal counseling and contraceptives—are part of a joint initiative between PAHO and two World Health Organization programs: the Special Program for Research and Training in Tropical Diseases and the Special Program for Research, Development

23 World Health Organization. Zika Strategic Response Plan Quarterly Update 25 October 2016. Online at: <http://bit.ly/2f2ecbn>.

and Training in Research in Human Reproduction. Leading academic institutions and non-governmental organizations in Brazil, Colombia, Honduras, Jamaica, Mexico, Peru and Venezuela will carry out the research projects. Each project is due to receive up to US \$20,000 from the WHO small grants program. In total, the initiative received 78 proposals from 19 countries.

- PAHO and partners are preparing updated guidelines in the context of the Zika epidemic.
 - PAHO's Departments of Health Emergencies (PHE), Family, Gender and Life Course (FGL) and UNICEF have begun work on guidelines for primary healthcare professionals on the care

of newborns and babies with CZS. The guidelines aim to cover the spectrum of care from hospital to home. The guidelines are slated for validation in mid- 2017. They will include key elements of CZS case management, such as detection, clinical assessment and management, rehabilitation and support, and referral for specialized care.

- PAHO is updating its *Guidelines for surveillance of Zika virus disease and its implications* using feedback from Member States regarding the technical guidance documents developed in March 2016.

February 2016: PAHO/WHO activates a situation room to coordinate regional response to the Zika outbreak. Similar situation rooms were subsequently activated in PAHO offices throughout the Region as in Brazil on this picture, where PAHO/WHO experts monitor the evolution of the epidemic and carry out strategies to reduce mosquito populations, minimize outbreaks, and ensure appropriate care for the affected.



Annexes

Annex 1

Zika Cases by Country through 29 December 2016

Zika cases and congenital syndrome associated with Zika virus reported by countries and territories in the Americas, 2015 - 2016
Cumulative cases

Data as of 29 December 2016 2:00 PM EST

Country/Territory	Autochthonous cases ^a		Imported cases	Incidence Rate ^b	Deaths among Zika cases ^c	Confirmed congenital syndrome associated with Zika virus infection ^d	Population X 1000 ^e
	Suspected	Confirmed					
North America							
Bermuda	0	0	5	0.00	0	0	71
Canada	0	0	421	0.00	0	1	36,286
United States of America ^f	0	217	4,592	0.07	0	39	324,119
Subtotal	0	217	5,018	0.06	0	40	360,476
Latin America and the Caribbean							
Latin America							
Mexico	0	7,335	15	5.70	0	0	128,632
Central American Isthmus							
Belize	756	68	0	224.52	0	0	367
Costa Rica	3,840	1,581	32	111.61	0	2	4,857
El Salvador ^g	11,413	51	0	186.53	0	4	6,146
Guatemala ^h	3,343	788	0	24.78	0	15	16,573
Honduras	31,936	298	0	393.58	0	2	8,190
Nicaragua	0	2,053	3	33.38	0	2	6,150
Panama ⁱ	2,570	652	42	80.75	0	5	3,990
Subtotal	53,858	5,491	77	127.98	0	30	46,373
Latin Caribbean							
Cuba	0	3	30	0.03	0	0	11,393
Dominican Republic ^j	4,903	331	0	49.15	0	22	10,649
French Guiana ^k	9,700	483	10	3689.49	0	16	276
Guadeloupe ^l	30,845	379	0	6629.30	0	6	471
Haiti	2,955	5	0	27.29	0	1	10,848
Martinique ^m	36,680	12	0	9265.66	0	18	396
Puerto Rico	0	35,870	1	974.46	5	10	3,681
Saint Barthélemy ⁿ	975	61	0	11511.11	0	0	9
Saint Martin ^o	3,115	200	0	9208.33	0	0	36
Subtotal	89,173	37,344	41	335.06	5	73	37,759
Andean Area							
Bolivia (Plurinational State of)	741	156	4	8.24	0	14	10,888
Colombia ^p	96,649	9,799	0	218.79	0	72	48,654
Ecuador ^q	2,678	853	15	21.55	0	0	16,385
Peru	1,395	382	18	5.66	0	0	31,374
Venezuela (Bolivarian Republic of) ^r	59,235	2,380	0	195.49	0	0	31,519
Subtotal	160,698	13,570	37	125.54	0	86	138,820
Brazil ^s	211,770	109,596	0	153.35	9	2,289	209,568
Southern Cone							
Argentina ^t	1,821	26	29	4.21	0	1	43,847
Chile	0	0	33	0.00	0	0	18,132
Paraguay ^u	555	14	0	8.46	0	2	6,725
Uruguay	0	0	1	0.00	0	0	344
Subtotal	2,376	40	63	3.50	0	3	69,048
Non-Latin Caribbean							
Anguilla ^v	23	18	1	241.18	0	0	17
Antigua and Barbuda	465	14	2	509.57	0	0	94
Aruba	676	28	7	617.54	0	0	114
Bahamas	0	22	3	5.60	0	0	393
Barbados	699	46	0	256.01	0	0	291
Bonaire, St Eustatius and Saba ^w	0	85	0	340.00	0	0	25
Cayman Islands	211	30	10	422.81	0	0	57
Curaçao	0	820	0	550.34	0	0	149
Dominica	1,150	79	0	1660.81	0	0	74
Grenada ^x	314	111	0	382.88	0	1	111
Guyana	0	37	0	4.80	0	0	771
Jamaica	7,052	186	0	258.22	0	0	2,803
Montserrat	2	5	0	140.00	0	0	5
Saint Kitts and Nevis	549	33	0	1119.23	0	0	52
Saint Lucia	822	50	0	531.71	0	0	164
Saint Vincent and the Grenadines	508	83	0	579.41	0	0	102
Saint Maarten (Dutch part) ^y	168	62	0	560.98	0	0	41
Suriname	2,758	723	0	635.22	4	2	548
Trinidad and Tobago	0	643	1	47.11	0	1	1,365
Turks and Caicos Islands	179	17	3	384.31	0	0	51
Virgin Islands (UK)	74	52	0	370.59	0	0	34
Virgin Islands (US)	1,028	877	0	1849.51	0	0	103
Subtotal	16,678	4,021	27	201.08	4	4	7,364
TOTAL	534,553	177,614	5,278	71.36	18	2,525	998,040

SOURCE: Cases reported by the IHR National Focal Points to the WHO IHR Regional Contact Point for the Americas and through the Ministry of Health websites, 2016

NOTES: Data is shared in an effort to transparently disseminate available information reported by Member States. Any subsequent interpretation and analysis of this data should consider differences in surveillance systems and reporting requirements. Information may change as Member States review and integrate retrospective data.

^a PAHO/WHO Case definitions for suspected and confirmed Zika cases is available at: http://www.paho.org/hq/index.php?option=com_content&view=article&id=11117&Itemid=41532&lang=en

^b Incidence rate (autochthonous suspected + autochthonous confirmed) / 100,000 pop.

^c Deaths among Zika cases do not include deaths related to Guillain-Barré syndrome (GBS) or congenital malformations associated with Zika virus infection. As of 12 May 2016, previously reported deaths related to GBS were removed from this total.

^d Confirmed congenital syndrome associated with Zika virus infection case definition: Live newborn who meets the criteria for a suspected case of congenital syndrome associated with Zika virus AND Zika virus infection was detected in specimens of the newborn, regardless of detection of other pathogens. Case definitions for congenital syndrome associated with Zika virus infection is available at: http://www.paho.org/hq/index.php?option=com_content&view=article&id=11117&Itemid=41532&lang=en

^e Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2015 Revision, <http://esa.un.org/unpd/wpp/index.htm>, July 2015. Processed and revised by PAHO. Core Basic Indicators 2016. <http://www.paho.org/data/index.php/en/indicators/demographics-core/106-cat-data-en.html> Accessed on August 16, 2016.

^f International Programs Center, Population Division, U.S. Census Bureau, DB Release Date: December 2013. <http://www.paho.org/data/index.php/en/indicators/demographics-core/106-cat-data-en.html> Accessed on August 16, 2016.

^g Population source for Saint Barthélemy and Saint Martin available at: Populations légales 2011 des collectivités d'outre-mer <http://www.insee.fr/fr/ppp/bases-de-donnees/recensement/populations-legales/france-departements.asp?annee=2011#com> Accessed on August 16, 2016.

^h Population source for Bonaire, Sint Eustatius and Saba available at: Caribisch Nederland; bevolkingontwikkeling, geboorte, sterfte, migratie - 12 augustus 2015 <http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=80539ned&D=0-1,9-10&D2=axd3=axHDR=T&TB=G1,G2&CHARTTYPE=1&VW=T> Accessed on August 16, 2016.

ⁱ Confirmed cases in the United States of America includes one laboratory acquired case. Available at: <http://www.cdc.gov/zika/guo/united-states.html>

^j After retrospective review, laboratory-confirmed cases was adjusted by the El Salvador IHR National Focal Point as of 25 August 2016.

^k On 24 October, the Guatemala IHR National Focal Point provided an update indicating that there were 15 laboratory-confirmed cases of microcephaly associated with Zika virus infection. They have explained that the retraction of two cases is due to erroneous information posted by the Ministry of Health where two of the mothers who tested positive for Zika virus had been included in the total count; but no samples were obtained of the two infants with microcephaly. For this reason, the total was changed by Guatemala to 15.

^l After retrospective review, laboratory-confirmed cases were re-classified as imported cases as of 25 August 2016.

^m As of 6 October, suspected Zika cases were adjusted by the Dominican Republic Ministry of Public Health after retrospective review. As of 20 October, confirmed Zika cases were adjusted by the Dominican Republic Ministry of Public Health after retrospective review.

ⁿ Per the Circ Antilles Guyane Bulletin the epidemiological situation is classified in four level phases: Level 1 absence of autochthonous circulation; Level 2 initial autochthonous transmission; Level 3 epidemic; Level 4 end of epidemic and results. In this instance that a territory reaches Level 3, the data on all confirmed cases is no longer included in the epidemiological bulletin. Martinique was classified as Level 3 since 20 January 2016. Parts of French Guiana were classified as Level 3 on 22 January 2016 and 1 April 2016. Guadeloupe was classified as Level 3 since 28 April 2016.

^o On 9 December a joint publication between the National Institute of Health of Colombia, the US-CDC National Center on Birth Defects and Developmental Disabilities and the Colombia Ministry of Health reported that between 31 January and 12 November 2016, a total of 147 microcephaly cases in fetus and infants had laboratory evidence of Zika virus infection by real-time reverse transcription-polymerase chain reaction (RT-PCR) or immunohistochemistry.

^p After retrospective review by Ecuador Ministry of Public Health, only laboratory-confirmed cases were included in the confirmed Zika cases for Ecuador; previously reported non-laboratory-confirmed cases were included in the suspected Zika cases as of 18 August; Data is consistently modified as Ecuador reviews and integrates retrospective data.

^q After retrospective review, laboratory-confirmed cases was adjusted by the Venezuela (Bolivarian Republic of) IHR National Focal Point as of 25 August 2016.

^r Brazil Ministry of Health case definition for confirmed cases of congenital syndrome associated with Zika virus infection includes confirmed and probable cases per PAHO's case definition. As of EV 50 of 2016, 469 cases were confirmed for Zika virus by laboratory criteria. Information on Suspected and confirmed Zika cases is available at: <http://portalsaude.saude.gov.br/images/pdf/2016/outubro/18/2016-029-Dengue-publicacao-n-34.pdf> As of 11 November, suspected Zika cases were adjusted by the Brazil Ministry of Public Health after retrospective review.

^s As of 23 December 2016, two cases of congenital syndrome in Argentina, whose mothers acquired the Zika infection in Bolivia, were initially classified as confirmed cases by the Argentina Ministry of Health and then reclassified as probable cases. http://www.msal.gov.ar/images/stories/boletines/boletin_integrado_vigilancia_N339-SE48.pdf http://www.msal.gov.ar/images/stories/boletines/boletin_integrado_vigilancia_N339-SE50.pdf

^t As of 29 December 2016, the number of suspected cases decreased based on the modification by the Paraguay Ministry of Health

^u As of 29 December 2016, the number of suspected cases decreased based on the modification by the Anguilla Ministry of Health and Social Development

^v The data provided herein is the sum of cases reported for Bonaire (60), Sint Eustatius (16) and Saba (9).

^w After retrospective review, suspected cases were adjusted by the Grenada Ministry of Health as of 13 October 2016

^x Per information shared by the Netherlands IHR NFP to PAHO/WHO, the confirmed Zika cases was adjusted for Sint Maarten.

^y Report Production: PAHO/WHO AD CHA IR ARO

Suggested citation: Pan American Health Organization / World Health Organization. Zika suspected and confirmed cases reported by countries and territories in the Americas Cumulative cases, 2015-2016. Updated as of 29 December 2016. Washington, D.C.: PAHO/WHO; 2016. Pan American Health Organization • www.paho.org • © PAHO/WHO, 2016

Annex 2

List of Acronyms

Acronym	Meaning
ARO	Alert and Response Operations
CDC	Centers for Disease Control and Prevention
CZS	Congenital Zika Syndrome
EBS	Event-based Surveillance
ELISA	Enzyme-Linked Immunosorbent Assay
GOARN	Global Outbreak Alert and Response Network
IgM	Immunoglobulin M
IDB	Inter-American Development Bank
IHR (2005)	International Health Regulations (2005)
IOC	International Olympic Committee
IMS	Incident Management System
PAHO	Pan American Health Organization
PHEIC	Public Health Emergency of International Concern
VBDs	Vector-borne diseases
UNFPA	UN Population Fund
UNICEF	UN Children's Fund
WB	World Bank
WHO	World Health Organization
ZIKV	Zika virus infection

Annex 3

Member States participating in Laboratory Strengthening Workshops and receiving Reagents from PAHO in 2016

Country	Serology workshops	Molecular workshop	Laboratory PAHO Expert missions ¹	Serology reagents		Molecular reagents ²	
				CDC in-house ³	Commercial ⁴	Primers & probes	Enzymes
Argentina						Yes	Yes
Bahamas		Workshop T&T (CARPHA)					
Barbados		Workshop T&T (CARPHA)	2			Yes	
Bolivia	Workshop Belem, Brazil	Workshop Belem, Brazil	1	Yes		Yes	Yes
Brazil	Workshop Belem, Brazil	Workshop Belem, Brazil		Yes		Yes	
Chile						Yes	
Colombia		Workshop Managua, Nicaragua	1	Yes	Yes	Yes	Yes
Costa Rica	Workshop Belem, Brazil Workshop Lima, Peru	Workshop Managua, Nicaragua		Yes	Yes	Yes	
Cuba				Yes	Yes	Yes	Yes
Dominican Republic	Workshop Lima, Peru	Workshop Managua, Nicaragua	1	Yes		Yes	Yes
Ecuador	Workshop Belem, Brazil Workshop Lima, Peru	Workshop Belem, Brazil	1	Yes		Yes	Yes
El Salvador	Workshop Lima, Peru Workshop El Salvador	Workshop Managua, Nicaragua	2	Yes	Yes	Yes	Yes
Grenada		Workshop T&T (CARPHA)		Yes		Yes	
Guatemala		Workshop Managua, Nicaragua	1	Yes	Yes	Yes	Yes
Guyana		Workshop T&T (CARPHA)	2		Yes	Yes	Yes
Haiti			2		Yes	Yes	
Honduras	Workshop Lima, Peru	Workshop Managua, Nicaragua	2	Yes	Yes	Yes	Yes
Jamaica		Workshop T&T (CARPHA)	1		Yes	Yes	Yes
Mexico		Workshop Managua, Nicaragua					
Nicaragua		Workshop Managua, Nicaragua				Yes	Yes
Panama	Workshop Lima, Peru Workshop El Salvador	Workshop Managua, Nicaragua		Yes	Yes		
Paraguay	Workshop Belem, Brazil	Workshop Belem, Brazil	2	Yes	Yes	Yes	Yes
Peru	Workshop Belem, Brazil Workshop Lima, Peru	Workshop Belem, Brazil	1	Yes		Yes	Yes
Suriname		Workshop T&T (CARPHA)	1	Yes	Yes	Yes	
Uruguay	Workshop Lima, Peru		1	Yes		Yes	Yes
Venezuela	Workshop Lima, Peru			Yes		Yes	Yes

Workshop IEC Belem, Brazil	January 18-22, 2016
Workshop CNDR Managua, Nicaragua	February 02-04, 2016
Workshop CARPHA Trinidad & Tobago (T&T)	April 25-29, 2016
Workshop El Salvador	June 09-10, 2016
Workshop INS Lima, Peru	October 24 - 26, 2016

- 1 Lab missions include serology and molecular implementation and providing of additional material
- 2 Zika primers and probes based on CDC protocols (Lanciotti et al.) Also, RNA extraction kits have been provided
- 3 ELISA reagents (CDC protocol) were provided during the workshops, once the training were carried out.
- 4 ELISA IgM Euroimmune.

Annex 4

Global Contributions to the Regional Zika Virus Response through 31 December 2016

Source of Funding	Amount in US\$
Bill and Melinda Gates Foundation	\$700,935
Canada (Global Affairs Canada) -	\$186,422
Canada (Public Health Agency of Canada)	\$700,675
United Kingdom (Department for International Development—DFID)	\$1,641,830
DFID (through WHO)	\$1,000,000
Inter-American Development Bank (IDB)	\$211,500
Norway (Department of Foreign Affairs)	\$517,000
WHO Contingency Fund for Emergencies	\$2,015,000
Spain (AECID)	\$109,940
United States (Centers for Disease Control and Prevention—CDC)	\$1,160,000
United States (U.S. Agency for International Development—USAID) [through WHO]	\$25,836
USAID	\$7,000,000
Grand Total	\$15,269,138

Annex 5

Partner Institutions for the Zika regional response December 2015 – December 2016

Secretaria de Vigilância em Saúde, Ministério da Saúde, Brasília, DF, Brasil

FioCruz, Rio de Janeiro, Brasil

FioCruz, Recife, Pernambuco, Brasil

Instituto Evandro Chagas, Belem, Para, Brasil

Hospital Universitario Oswaldo Cruz, Recife, Pernambuco, Brasil

Microcephaly Epidemic Research Group, Recife, Pernambuco, Brazil

Federal University of Rio Grande do Norte, Natal, Brazil

CDC Ft Collins, CO, USA

CDC Atlanta, GA, USA

CDC Puerto Rico, PR, USA

NIH, Bethesda, MD, USA

University of Texas Medical Branch, Galveston, TX, USA

London School of Hygiene and Tropical Medicine, UK

Institut Pasteur, Paris, France

Institut Pasteur, Dakar, Senegal

Institut Pasteur, Guyane Française

Institut Pasteur, Guadeloupe

University of the French West Indies, Guadeloupe

Laveran Hospital, French Army Medical Services, Marseille, France

Instituto Pedro Kouri, La Havana, Cuba

Instituto Julio Maiztegui, Pergamino, Argentina

Instituto Nacional de Salud, Bogota, Colombia

Instituto Gorgas, Panama

CNDR, MINSA, Managua, Nicaragua

InDRE, Ministry of Health, Mexico

Instituto Nacional de Salud Pública, México

Public Health Agency Canada, Ottawa, Canada

CIHR, Montreal, Canada

University of West Indies, Jamaica

University of West Indies, Barbados

CARPHA, Port of Spain, Trinidad & Tobago

Direction de la Santé, Tahiti, Polynésie Française

Columbia University, New York, USA

University of Aix-Marseille, France

University of New South Wales, Sydney, Australia

Robert Koch Institute, Berlin, Germany

ISARIC, Oxford, UK

Raigmore Hospital, Inverness, UK

Hospital Dr. Horacio Oduber, Aruba

Hospital Universitario Rey Juan Carlos / Hospital Universitario Infanta Elena, Spain

Universidad Nacional de Colombia, GIN

Iberoamérica, Bogotá, Colombia

Johns Hopkins University, Baltimore, USA

Hospital de la Santa Creu i Sant Pau, Barcelona, Spain

Hospital del Salvador, Universidad de Chile, Santiago, Chile

Hospital Universitario Quirónsalud / Hospital Rúber Juan Bravo, Madrid, Spain

Clínica Alemana, Santiago, Chile

Clínica Las Condes / Universidad de Chile, Santiago, Chile

OCHA, Regional Office for the Americas, Panama

UNICEF, New York

UNICEF, Latin America and Caribbean Office, Panama

WHO, Geneva, Switzerland

GOARN, Geneva, Switzerland



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE Americas

Health Emergencies

www.paho.org/emergencies

emergencies@paho.org

