Situation summary in the Americas

In the Region of the Americas, between epidemiological week (EW) 1 and EW 52 of 2018, a total of 560,586 cases of dengue were reported (incidence rate of 57.3 cases per 100,000 population), including 336 deaths. Of the total cases, 209,192 (37.3%) were laboratory-confirmed and 3,535 (0.63%) were classified as severe dengue. Cases reported in 2018 were higher than the total reported in 2017 but lower than the historical average reported in the previous 11 years (2006-2016) (**Figure 1**). Similarly, the proportion of cases of severe dengue and dengue with warning signs reported in 2018 was higher than the previous two years, but lower than the preceding ten years, and it remains below 1% which was reached in 2015.

In **Figure 2**, the historical trend in incidence rates by sub-region is shown, with the Southern Cone presenting with the highest rates followed by the Central American Isthmus and Mexico.
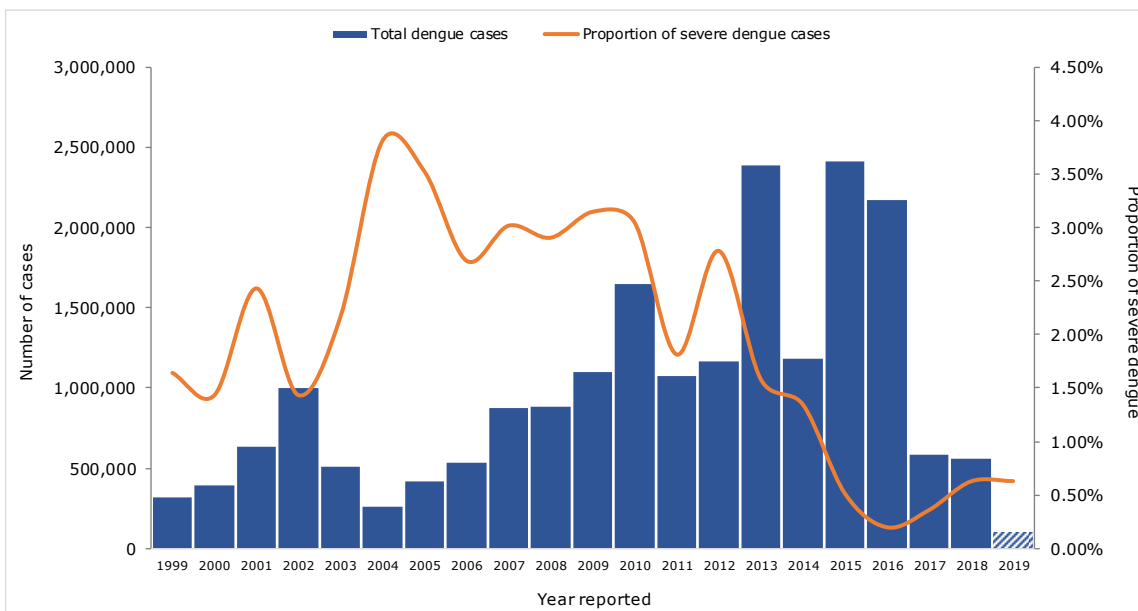
In 2018, 16 countries and territories in the Americas reported an increase in cases nationally or in some areas of the country (compared to the same period in 2017): Antigua and Barbuda, Argentina, Brazil, Chile, Colombia, El Salvador, Guatemala, Guadeloupe, Guyana, Honduras, Jamaica, Martinique, Mexico, Paraguay, Saint Martin, and Venezuela.

In the first six weeks of 2019 in the Region of the Americas, there were 99,998 dengue cases reported (incidence rate of 10.2 per 100,000 population), including 28 deaths. Of the cases reported, 25,333 were laboratory-confirmed and 632 were classified as severe dengue (0.63%).

The four dengue virus serotypes (DENV 1, DENV 2, DENV 3, and DENV 4) are circulating in the Americas, and are circulating simultaneously in several countries. The number of countries and/or territories with simultaneous co-circulation of two or more dengue virus serotypes has increased in the past 20 years (**Figure 3**), which has increased the risk of severe dengue as well as outbreaks in the Americas Region.

Brazil, Guatemala, and Mexico have reported co-circulation of all four dengue virus serotypes. Other countries, such as Bolivia, Colombia, Honduras, and Venezuela have reported co-circulation of serotypes DENV 1, DENV 2, and DENV 3. Four countries reported co- circulation of two serotypes: Costa Rica and Panama (DENV 1 and DENV 2), Paraguay (DENV 1 and DENV 4), and Peru (DENV 2 and DENV 4). In the countries and territories of the Caribbean, the circulation of serotypes DENV 1 and DENV 3 has been reported.

Figure 1. Reported cases of dengue and proportion of severe dengue cases by year of report. Region of the Americas, 1999-2019 (as of EW 6 of 2019).

Source: Health Information Platform for the Americas (PLISA, PAHO/WHO) by the Ministries and Institutes of Health of the countries and territories in the Americas.

Figure 2. Reported dengue incidence rates by year and sub-region[1]. Region of the Americas, 2014-2019 (as of EW 6 of 2019).
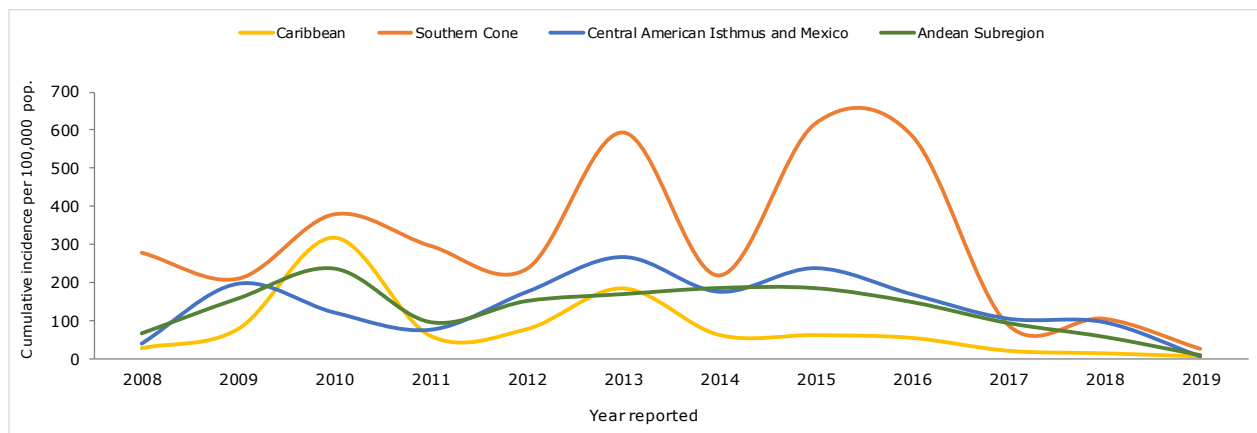
Source: Health Information Platform for the Americas (PLISA, PAHO/WHO) by the Ministries and Institutes of Health of the countries and territories of the Region.

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[1] **Caribbean**: Anguilla, Antigua and Barbuda, Aruba, the Bahamas, Barbados, Bermuda, Bonaire and Saint Eustatius, the Cayman Islands, Cuba, Curacao, the Dominican Republic, Dominica, French Guiana, Grenada, Guadeloupe, Guyana, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, Saint Barthelemy, Saint Kitts and Nevis, Saint Lucia, Saint Martin, Saint Vincent and the Grenadines, Sint Maarten, Suriname, Trinidad and Tobago, Turks and Caicos Islands, the British Virgin Islands, and the U.S. Virgin Islands.
Central American Isthmus and Mexico: Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, and Panama.
Andean Subregion: Bolivia, Colombia, Ecuador, Peru, and Venezuela (Bolivarian Republic of).
Southern Cone: Argentina, Brazil, Chile, Paraguay, and Uruguay.

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Figure 3. Number of dengue serotypes circulating in countries and territories in the Region of the Americas, 1995-2018.
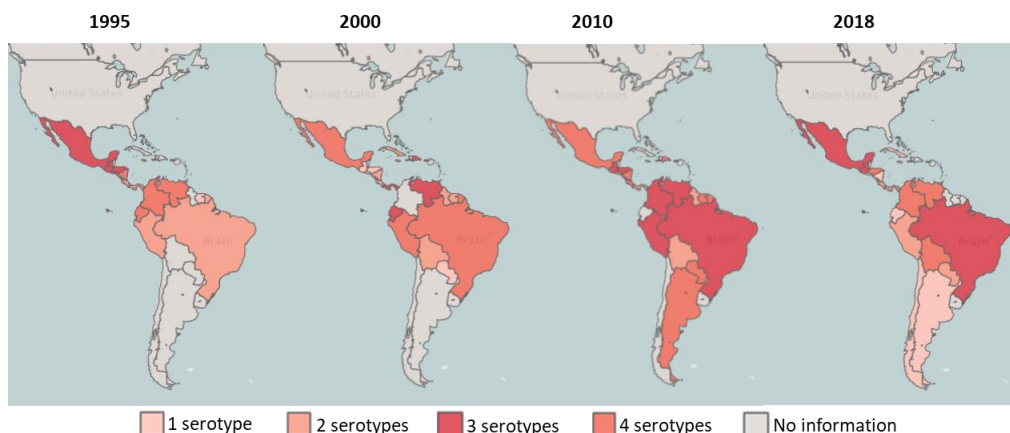
**Source**: Epidemiological reports sent by the countries to PAHO/WHO.

The following is a summary of the epidemiological situation in select countries.

In **Brazil**, between EW 1 and EW 52 of 2018, a total of 264,262 probable cases of dengue were reported (incidence rate of 126.7 per 100,000 population); this is higher than reported in 2017 (115.3 cases per 100,000 population) but lower than reported annually in the preceding ten years (2007-2016).

The highest incidence rates of probable cases were reported in the Central West and Northeast regions (634.5 and 118.0 cases per 100,000 population, respectively). The states with the highest incidence rates are: Goiás (1,246.9 cases per 100,000 population), Rio Grande do Norte (667.8 cases per 100,000 population), and Acre (796.0 cases per 100,000 population).

Of the total cases reported in 2018 (426,326), 176,814 (38.2%) were confirmed, of which 323 (0.2%) were severe dengue and 3,669 (2.1%) were dengue cases with warning signs. A total of 160 dengue deaths were confirmed. The number of severe dengue, cases with warning signs, and fatal dengue cases reported in 2018 was higher than reported during the same period in 2017.

Figure 4. Reported cases of dengue by epidemiological week. Brazil, 2018.
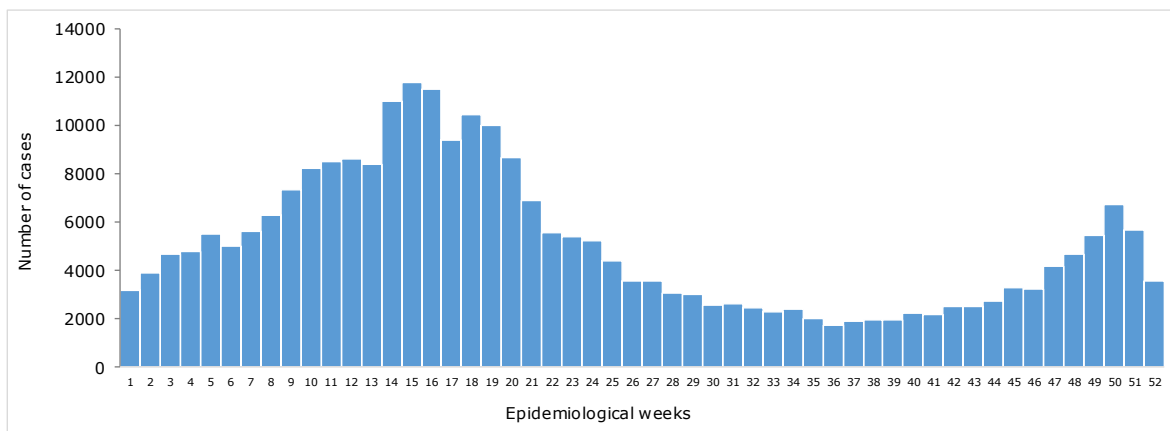
Source: Notification of Injury Information System (SINAN, as per its acronym in Portuguese), Brazil Ministry of Health, and reproduced by PAHO/WHO

In **Colombia**, between EW 1 and EW 52 of 2018, a total of 44,825[2] cases of suspected dengue (179.9 cases per 100,000 population at-risk) were reported. Of these, 526 (1.2%) were severe dengue cases and 23,057 (51.4%) were dengue cases with warning signs. As of EW 52 of 2018, 176 probable deaths due to dengue have been reported, of which 23 have been confirmed for dengue. In 2018, the number of reported dengue cases and the proportion of severe dengue cases and dengue with warning signs are higher than reported during the same period in 2017 but lower than reported in 2016, 2015, and 2014.

The highest incidence rates of suspected cases were reported in the departments of Guaviare (1,242.1 cases per 100,000 population), Meta (575.1 cases per 100,000 population), Putumayo (523.8 cases per 100,000 population), Norte de Santander (472.8 cases per 100,000 population), Casanare (459.5 cases per 100,000 population), Córdoba (404.2 cases per 100,000 population), Tolima (339.9 cases per 100,000 population), Cundinamarca (320.2 cases per 100,000 population), Arauca (308.1 cases per 100,000 population), La Guajira (265.7 cases per 100,000 population), Cesar (256.3 cases per 100,000 population), and Magdalena (241.4 cases per 100,000 population).

At the national level, the epidemic curve was at the alarm threshold during EW 42 to EW 51 of 2018 with respect to historical reports (2009-2017) (**Figure 5**).

In 2018, co-circulation of serotypes DENV 1, DENV 2, and DENV 3 was detected, which also was reported in 2017. DENV 4 was last reported in 2016.

Figure 5. Reported dengue cases and the national endemic channel, Colombia, 2018.
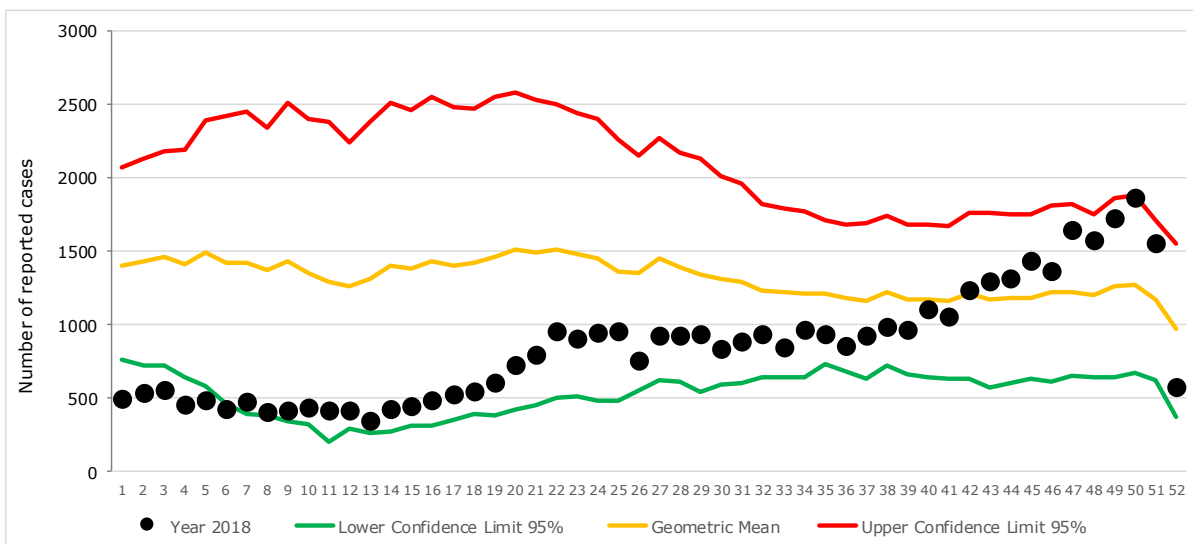
Source: Colombia National Institute of Health (INS-SIVIGILA), Vector-borne and Zoonosis Disease Team and updated by the Ministry of Health and Social Protection, Directorate of Epidemiology and Demography, and reproduced by PAHO/WHO

In **Jamaica**, between EW 1 and EW 52 of 2018, there were 986 suspected and confirmed dengue cases (incidence rate of 34 cases per 100,000 population), including 15 deaths; this is higher than reported during the same period in 2017 (215 reported cases and 6 deaths),

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[2] Colombia National Institute of Health, data entered in the Public Health Surveillance System (SIVIGILA as per its acronym in Spanish).

but lower than in 2016. In 2019 (as of EW 6), there were 981 suspected or confirmed dengue cases (incidence rate of 34 cases per 100,000 population), including 7 deaths. In 2018, serotype DENV 3 was the predominant serotype identified among confirmed cases and serotype DENV 2 was identified in one case. In 2015, serotype DENV 4 was circulating, DENV 3 and DENV 4 in 2016, and DENV 3 in 2017. Of note, DENV 2 had not circulated in Jamaica since 2010.

In the French departments of the Caribbean, **Guadeloupe, Martinique, and Saint Martin**, an increase of dengue cases was observed in the final weeks of 2018 and beginning of 2019.

In **Guadeloupe**, between EW 1 and EW 51 of 2018, there were 513 suspected cases of dengue reported and, during EW 46, EW 47, and EW 48, the cases were over the seasonal threshold. Of the total reported cases, 3 were hospitalized and no deaths were reported.

In **Martinique**, between EW 1 and EW 52 of 2018, there were 400 suspected cases of dengue reported, of which 4 were confirmed. There were no hospitalizations or deaths reported.

In **Saint Martin**, between EW 1 and EW 51 of 2018, there were 104 suspected cases of dengue reported, of which 9 were confirmed. There was an increase in cases starting in EW 46 of 2018. No hospitalizations or deaths were reported.

In Guadeloupe and Saint Martin, serotype DENV1 is circulating and in Martinique, serotypes DENV 1 and DENV 3 are circulating.

In Guadeloupe, an epidemic of DENV 4 with DENV 2 co-circulation occurred in 2005. DENV 2 subsequently predominated from 2006–2007 and was replaced in 2008 by DENV 1 as the predominant strain with DENV 2 co-circulation and sporadic cases of DENV 3. DENV 1 was also predominant in 2010 with DENV 4 co-circulation.

In Saint Martin, from 2002–2005, DENV 3 was the only serotype in circulation. In 2006, DENV 2 became predominant, with co-circulation of DENV 3 and DENV 4. From 2007 to 2008, DENV 1 was predominant (with co-circulation of DENV 2 during a 2008–2009 epidemic). In 2009, the predominant serotype reverted to DENV 2 (with co-circulation of DENV 4 during a 2008–2009 epidemic), and in 2010, the predominant strain was DENV 1 with co-circulation of DENV 2.

In **Mexico**, between EW 1 and 52 of 2018, there were 12,706 confirmed dengue cases, which is lower than reported during the same period in 2017 (14,490 cases). However, upon analyzing the characteristics of the disease based on the clinical presentation, the total number of cases of severe dengue in 2018 was higher than what was observed in 2017 (858 and 382, respectively); similar characteristics were observed among cases with warning signs, surpassing what was reported in 2017 (3,619 and 2,548, respectively). With respect to fatal cases with confirmed dengue infection (45 deaths), a decrease was observed in comparison with 2017 (65 deaths). In 2018, 73% of the total of deaths occurred in the state of Chiapas.

The states of Chiapas, Veracruz, Jalisco, Nuevo León, and San Luis Potosí accounted for 82% of the confirmed cases.

In descending order, the three highest incidence rates were reported in the states of Chiapas (62 cases per 100,000 population), Veracruz (33 cases per 100,000 population), and Jalisco (32 cases per 100,000 population), surpassing the national rate (10 cases per 100,000

population). In these states, there was co-circulation of the 4 serotypes DENV 1, 2, 3 and 4 with a predominance of DENV 2.

In Chiapas, the highest proportion of cases is among pre-school and school-aged children, with the highest incidence rate being among 5 to 9-year-olds.

In **Venezuela**, between EW 1 and EW 52 of 2018, a total of 19,118 probable cases of dengue were reported (incidence rate 60.07 per 100,000 population), of which 2,440 were confirmed and 101 (4%) were classified as severe dengue. These data demonstrate an increase compared to that reported during the same period in 2016 and 2017. In 2018, there were 23 deaths due to dengue reported nationally.

During 2018, all federal entities in the country reported cases, with incidence rates ranging from 8.7 to 199.4 cases per 100,000 population (in Portuguesa and Delta Amacuro, respectively). Between EW 2 and EW 11 of 2018, an initial increase in cases was observed and, since EW 20, the increase in cases has been maintained, with an average of 612 cases reported weekly between EW 33 and EW 44. Circulation of serotypes DENV 1, DENV 2, and DENV 3 were detected. All age groups have been affected, particularly those under 15-year-old. In 2017, only serotype DENV 1 circulated, while in 2016, all four serotypes circulated– DENV 1, DENV 2, DENV 3, and DENV 4.

Figure 6. Distribution of reported dengue cases by epidemiological week. Venezuela, 2018.
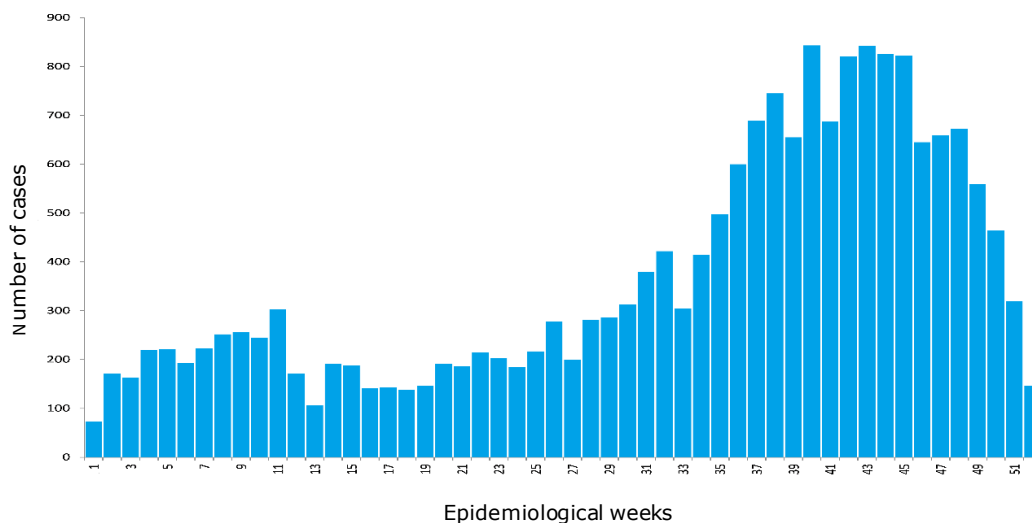
Source: Venezuela Ministry of the Popular Power for Health and reproduced by PAHO / WHO

Advice to national authorities

In light of the increase in dengue cases and severe dengue cases in several countries and territories of the Region of the Americas, the Pan American Health Organization / World Health Organization (PAHO/WHO) encourages Member States to implement preparedness and response activities. The following is a summary of the key recommendations regarding outbreak preparedness and response, case management, laboratory diagnosis, risk communication, and integrated vector management.

Outbreak preparedness and response

As part of outbreak preparedness and response, it is recommended that Member States:

- intensify surveillance of the disease, including laboratory diagnosis;

- review emergency plans;

- strengthen and intensify vector surveillance and control;

- ensure that healthcare professionals are properly trained for appropriate clinical diagnosis and clinical management of patients with dengue or other arboviruses;

- involve the community in prevention and control activities;

- ensure outbreak response performance is monitored and documented, including the establishment of a situation room; and

- adapt risk communication according to the epidemiological scenario.

In countries with the presence of dengue vectors, but without dengue virus circulation, the preparedness and response plans should focus on strategies to reduce risk of transmission. Rapid investigation of all clinically suspected cases should be carried out as well as laboratory testing for confirming the presence of dengue virus.

Situation Room

The situation room is a key tool for informed decision making in which a multi-disciplinary team analyzes health information to support healthcare management. It has the key role in the response to a health emergency and in the case of dengue, the situation room is where the key aspects of intersectoral response are followed, bringing together the information of all sectors involved in the emergency. The activities to be carried out by the situation room include, but are not limited to:

- Analysis and continuous assessment of the current and prospective situation.

- Integration of epidemiological information, including laboratory diagnosis, vector control, and case management, aimed to:
   - Early detection of cases and outbreaks
   - Monitor trends and incidence
   - Know the dynamics of viral circulation

- Guide and maintain data collection, including data quality control

- Monitor actions and impact of intervention measures

- Produce periodic, concise, and tailored situation reports to support the coordination of the emergency or outbreak response. The situation reports must:

- o Provide a snapshot of current needs, of the response and gaps in the outbreak or emergency.
- o Be a tool for mobilizing resources.

- Manage key aspects of logistics in the ongoing prevention and control response.

Case management

The disease caused by dengue virus is systemic and dynamic; infection can occur asymptomatically or involve a broad spectrum of clinical manifestations, ranging from mild to severe forms that can lead to death if the patient does not receive timely and appropriate treatment.

While the manifestations of the disease are complex, their treatment is relatively simple, inexpensive, and very effective in saving lives, if timely and adequate clinical management is provided. Early recognition of the warning signs in the different phases of the disease is critical for providing the necessary attention and thus prevent the progression to severe forms of the disease.

Between dengue, chikungunya, and Zika, dengue is the arbovirus with higher case fatality rate, especially during the acute phase of the disease. Therefore, when the initial clinical picture is evocative of dengue, chikungunya, or Zika, patients (particularly children) should be managed as dengue case and monitored daily or at least every 48 hours in order to detect warning signs of severe dengue, especially during the critical phase of the disease[3].

> ## Warning Signs of Dengue
>
> 1. Intense abdominal pain or tenderness.
> 2. Persistent vomiting.
> 3. Clinical accumulation of liquids.
> 4. Bleeding from mucous membranes.
> 5. Lethargy or irritability.
> 6. Postural hypotension (lipothymia)
> 7. Hepatomegaly greater than 2 centimeters.
> 8. Progressive increase in hematocrit.

Clinical management and treatment of patients suspected with dengue should be initiated without waiting for laboratory confirmation of dengue. The initial clinical diagnosis is sufficient to offer timely and adequate medical care and treatment.

As part of patient care, healthcare providers should complete the notification form for any suspected case.

Organization of healthcare services and referral of patients

The main objective of the prevention and control measures during dengue outbreaks is to prevent deaths. Consequently, timely and adequate care of patients, as well as strengthen of healthcare services should be promoted. As dengue cases increase, healthcare providers should consider expanding healthcare services and ensure there are sufficient supplies,

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[3] PAHO/WHO Dengue Guidelines for Patient Care in the Region of the Americas, 2nd Edition, 2016. Available at: http://iris.paho.org/xmlui/handle/123456789/31207

equipment, medication, clinical support tests, hospitalization beds; it is also necessary to ensure adequate patient monitoring, as well as the use of a patient tracking forms.

The **primary level of healthcare** is key in the dengue case management, as this is the level in which the first contact with patients occurs and where most of the cases receive medical attention. Therefore, the primary level of healthcare should consider the following:

- Have sensitized and trained personnel for triage of cases upon arrival at the healthcare service. These personnel could provide guidance to patients and / or family members on how to identify the warning signs of dengue and to seek the nearest healthcare service as soon as such signs occur.

- Have healthcare personnel trained to detect patients in waiting room areas who present warning or severe signs and ensure immediate care.

- Establish *dengue units* for the management of dengue cases with warning signs.

- Ensure continuous clinical monitoring for those patients with specialized medical care needs, co-morbidity, pregnant women, concomitant conditions or persons whose social situation makes it difficult to access the necessary care (examples: people who live in remote places, refugees, displaced persons, among others).

- Establish referral and counter-referral systems for severe cases of dengue between the different levels of healthcare services. Severe cases of dengue should be referred to a higher-level unit (secondary and tertiary levels of healthcare), after stabilization of the patient and coordination between health units.

- All primary level healthcare units should have flow charts and guidelines for dengue clinical management, available to all medical and paramedical personnel.

The **secondary and tertiary levels of healthcare** must be designed for the management of severe cases of dengue. In this way, overwhelming these units is avoided and they can provide specialized healthcare for those cases that require more specialized management.

As part of the organization of health systems in an emergency or an outbreak, the following should be considered:

- A group of highly qualified physicians is formed and is available to provide medical guidance on the diagnosis and management of dengue cases, mainly for physicians in remote areas.

- Establishment of a free hotline manned by a strong team of medically trained operators to support healthcare personnel in peripheral areas.

- The healthcare personnel in health units have access to clinical guidelines and flowcharts on the care of dengue cases.

- Continuous education in the health units is ensured, particularly in relation to the management of severe and difficult-to-manage cases, as well as the analysis of dengue deaths.

A timely approach, the correct classification of cases, and case management are key elements of care to prevent patient deaths due to dengue. A delay in medical care is often related to cause of death.

Laboratory diagnosis

The diagnosis and etiological confirmation of dengue infections can be performed through virological assays (viral isolation, detection of genetic material, detection of NS1 protein, or immunohistochemistry) or by serological tests for the detection of IgM antibodies.

Virological diagnosis

- *Molecular detection*: During the first 5 days from the onset of symptoms (acute phase, viremic period), viral RNA from a serum sample could be detected by using molecular techniques such as conventional or real-time reverse transcription polymerase chain reaction (RT-PCR). A positive PCR result (with appropriate controls) confirms the diagnosis.

- *Viral isolation*: Can be done by intracerebral inoculation in mice or in cell culture. However, due to its complexity, this is rarely used as a routine diagnostic test and is recommended only for research or additional characterization to complement public health surveillance.

- *Protein NS1*: The nonstructural protein 1 (NS1) of the dengue virus can be detected by the ELISA up to 9 days after the onset of symptoms. However, since it is a protein produced at an early stage of infection, it is likely to be detected between the first 3 to 5 days after the onset of symptoms.

- *Post-mortem diagnosis*: In fatal cases, it is recommended to take tissue samples (preferably liver, spleen and kidney) in buffered formalin for histopathological and immunohistochemical assay. Additionally, molecular methods (RT-PCR) from fresh tissue samples (taken in dry tube and preserved in refrigeration) or preserved in paraffin, can also be used for the confirmation of fatal case associated with dengue or to conduct the differential diagnosis.

Serological diagnosis

A positive IgM result using the ELISA technique (MAC-ELISA or any other immunoassay) in a sample taken after the fifth day of symptom onset is presumptive of recent dengue infection. A single serum in the acute phase is considered presumptive, so it is recommended that a second sample be taken between one and two weeks after the first sample to demonstrate seroconversion (negative to positive) or increase up to four times the antibody titer (with one quantitative assay).

Cross-reactivity with other flaviviruses (mainly in secondary infections) should be considered in areas where co-circulation with other flaviviruses (e.g., Zika, yellow fever, St. Louis Encephalitis, etc.) is documented and there is a likelihood that the population has been previously infected.

Therefore, the detection of antibodies for other flaviviruses (e.g., IgM for Zika) by ELISA should be conducted in parallel. A positive result for dengue IgM in the absence of IgM for Zika

(negative) is presumptive for dengue infection, while a negative IgM result for dengue with Zika-positive IgM will be presumptive for infection by the latter. However, a positive result for the two viruses indicates a recent flavivirus infection, and therefore, it will not be possible to confirm an etiologic agent. For this reason, obtained results should be analyzed, taking into account the clinical characteristics and the epidemiological context of the case.

Rapid tests

Immunochromatography-based rapid tests have been widely used for the diagnosis of dengue. However, in addition to the challenges observed by cross-reactivity, these types of tests have shown low sensitivity, so the negative predictive value is very low and a negative result will not rule out a case. Due to this, implementation and use of these types of tests for public health purposes should be carefully assessed.

Risk Communication

Risk communication and information to the public is essential during outbreaks to reduce the impact, decrease domestic breeding sites, and for affected persons to seek timely medical assistance, and therefore prevent severe cases and deaths from dengue. Communication messages should focus on the identification of warning signs and obtaining timely medical assistance.

In addition, communication campaigns should raise public awareness on the importance of vector control interventions at home; identification of febrile cases; vector control measures, specifically intra and peri-domiciliary breeding sites; and personal protection.

Integrated vector management

The objective of integrated vector management is to improve efficiency and achieve sustainability in vector prevention and control actions, and includes the following:

- Selection of control methods based on current knowledge of the biology of the vector, transmission of disease, and morbidity.

- Use of multiple interventions, often in combination and in a synergistic and synchronized manner.

- Collaboration of the health sector with other public and private sectors linked to the management of the environment, whose work impacts or could have an impact on the reduction of the vector.

- Integration of individuals, families, and other key partners (education, finance, tourism, water and sanitation, and others).

- Establishment of a legal framework that permits an integrated and intersectoral approach.

Given the high infestation by *Aedes aegypti* and the presence of *Aedes albopictus* in the Region, prevention and control measures should be aimed at reducing the density and adopting such measures through community acceptance and collaboration.

Prevention and control measures by national authorities should include the following:

- Strengthen environmental management by eliminating vector breeding sites in every home and in common areas of neighborhoods and cities (parks, schools, cemeteries, etc.).

- Organize mass environmental sanitation campaigns for the elimination of breeding sites in specific areas where routine garbage collection has been interrupted.

- Implement breeding site control measures through the use of physical, biological, and / or chemical methods with community involvement.

- Identify the areas of high risk of transmission (risk stratification) and prioritize those where there are concentrations of people (e.g., schools, transportation terminals, hospitals, health centers, etc.). In these areas the presence of the mosquitoes must be removed in a diameter of at least 400 meters around. Special attention should be given to health units, so that these are free of the presence of the vector and its breeding places so that they do not become irradiating points of the virus.

- In areas where active transmission is detected, it is suggested to use adulticide treatment (mainly through spraying) to remove infected adult mosquitoes in order to interrupt transmission. It is important to take into account that this action is only effective when executed by properly trained personnel following internationally accepted technical guidelines and when performed concomitantly to other proposed actions. Spraying is the main action to interrupt transmission when it intensely occurs and facilitates gaining time to consolidate the actions to eliminate physical breeding sites. The greatest impact is achieved with intra-domiciliary spraying, using individual equipment.

- Select appropriate insecticide (in accordance with PAHO/WHO recommendations), verify the product label and formula, and consider the susceptibility of mosquito populations to that insecticide.

- Maintain and use spraying equipment in an appropriate manner and maintain insecticide reserves.

- Ensure intensified monitoring actions (e.g., quality control) of field work operators both during larval control and during adulticide treatment (spraying).

- Integrated (simultaneous or coordinated) actions for vector control, in space and time, (e.g., adulticidal and larval control by trained personnel, coupled sanitation and the promotion of community actions), is essential to achieve a greater impact and in the shortest amount of time.

Personal Prevention Measures

Patients infected with the dengue virus are the reservoir of infection for other people both at home and in the community. Therefore, public health measures to minimize the exposure of patients to mosquitoes are critical in preventing the spread of the virus / disease.

Patients, their household members, and other affected community members must be informed about the risk of transmission to others and ways to minimize this risk by reducing the vector population and human-vector contact.

The following actions are recommended to minimize patient-vector contact:

- The patient must rest under mosquito nets, impregnated, or not, with insecticide.

- The patient, as well as other members of the household, must wear long sleeves to cover extremities, while the patient is at home.

- Apply repellents containing DEET, IR3535, or Icaridine to exposed skin or clothing; its use must be in strict accordance with the instructions on the product label.

- Use wire-mesh / mosquito nets on doors and windows.

These personal prevention measures are also effective in preventing the transmission of the virus to healthy people.

Sources of Information

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