Considering the number of dengue cases reported in the first weeks of 2024, with an exponential increase in several countries of the Region of the Americas, following a year in which the highest number of dengue cases reported in recent decades was recorded in the Americas, the Pan American Health Organization / World Health Organization (PAHO/WHO) reiterates to Member States the importance of intensifying efforts and actions to control the *Aedes aegypti* mosquito (the main vector of transmission), in addition to continuing with surveillance, early diagnosis, and the timely treatment of dengue cases. At the same time, PAHO/WHO highlights the importance for essential measures to be taken in organizing the healthcare services network to streamline patient access and ensure effective management, preventing complications and deaths linked to this illness. It is also important to strengthen awareness campaigns to increase community participation, reduce mosquito breeding sites, and encourage seeking timely medical attention.

Situation Summary in the Region of the Americas

The global incidence of dengue has increased considerably over the last two decades, at the global level, and in the Region of the Americas where 80% of cases worldwide are recorded [1].

On 23 March 2023, the World Health Organization (WHO) reported the geographic expansion of dengue cases beyond historical areas of transmission in the Region of the Americas [2]. On 5 December 2023, the Pan American Health Organization / World Health Organization (PAHO/WHO) issued an epidemiological alert regarding the increase of dengue cases in the subregion[1] of the Central American Isthmus and Mexico, highlighting both the identification of serotypes, mainly DENV-3, that had not previously circulated in some areas for several years, and the proximity to the start of the summer season in South America [3].

In 2023, the highest number of dengue cases was reported in the Region of the Americas, with a total of 4,565,911 cases, including 7,653 (0.17%) severe cases and 2,340 deaths (case fatality rate of 0.051%). This high transmission situation has extended into 2024, in which 673,267 cases of dengue were reported from epidemiological week (EW) 1 to EW 5, of which 700 were severe (0.1%) and 102 were fatal cases (case fatality rate 0.015%). This figure represents an increase of 157% compared to the same period in 2023 and 225% compared to the last 5-year average (**Figure 1**) (*4,5*).
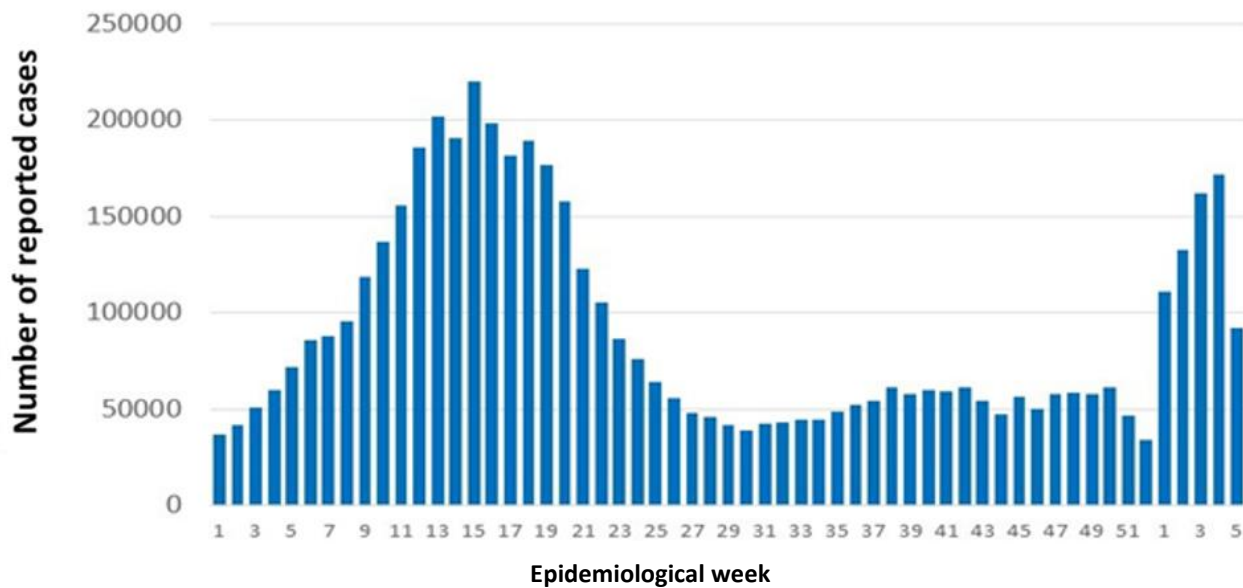
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[1] Note: The subregions and the corresponding countries and territories follow the divisions described in the Pan American Health Organization PLISA Health Information Platform for the Americas, Dengue Portal. Washington, DC: PAHO; 2024 [cited 2024 February 14]. Available in:
https://www3.paho.org/data/index.php/en/dengue.html

Of the total cases reported in 2023, the subregion of the Southern Cone accounted for 71% of the Americas cumulative cases, followed by the subregion of the Central American Isthmus and Mexico with 14%, and the Andean subregion with 13% of cases. Compared to 2022, there was a 62% increase in dengue cases reported in 2023. All subregions and the Caribbean reported more cases compared to 2022; the Southern Cone by 38% more cases, the Andean subregion by 219% more cases, the subregion of the Central American Isthmus and Mexico by 169% more cases, Latin Caribbean by 80% more cases, and the non-Latin Caribbean by 556% more cases (**Figure 2**).

The cumulative incidence rate between EW 1 and EW 52 of 2023 was 459 cases per 100,000 population for the entire Region. In the Southern Cone, a cumulative incidence rate of 1,131 cases per 100,000 population was reported, while the Andean subregion reported 415 per 100,000 population; the subregion of the Central American Isthmus and Mexico with 346 cases per 100,000 population, while the Latin Caribbean reported 106 per 100,000 population and the non-Latin Caribbean reported 229 cases per 100,000 population.

In the highlighted subregions, the four dengue serotypes (DENV-1, DENV-2, DENV-3, and DENV-4) circulated simultaneously during 2023. The case fatality rate recorded during 2023 in the Region of the Americas was 0.051%. The highest rate was recorded in the Andean subregion (0.111%), followed by the Latin Caribbean (0.086%), the subregion of the Central American Isthmus and Mexico (0.063%), the non-Latin Caribbean (0.061%), and the Southern Cone (0.038%) *(4,5)*.

Figure 1. Total number of suspected dengue cases 2023 – 2024 (as of EW 5). Region of the Americas.

During 2023, 23 countries and territories registered dengue outbreaks, cases in excess of normal expectancy: Argentina, Belize, Bolivia, Brazil, Colombia, Costa Rica, the Dominican Republic, Ecuador, Grenada, Guadeloupe, Guatemala, Honduras, Saint Martin, Jamaica, Martinique,

Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Barthélemy, and Suriname. Between EW 1 and EW 5 of 2024, the following 11 countries and territories reported increases: Argentina, Brazil, Colombia, Costa Rica, Guatemala, Guadeloupe, French Guiana, Martinique, Mexico, Paraguay, and Peru.

Between EW 1 and EW 5 of 2024, 673,267 dengue cases were reported in the Region of the Americas, with 0.10% of them being severe cases and a case fatality rate of 0.015%. This figure represents an increase of 157% compared to the same period in 2023 and 225% compared to the last 5-year average in the Region *(4)*.

During the first five EWs of 2024, the circulation of the four dengue virus serotypes was identified in the Region of the Americas. Brazil, Costa Rica, Honduras, and Mexico report simultaneous circulation of the four serotypes (DENV-1, DENV-2, DENV-3 and DENV-4). Argentina and Puerto Rico reported simultaneous circulation of DENV-1, DENV2, and DENV-3, Guatemala reported DENV-2, DENV3, and DENV-4, French Guiana DENV-2 and DENV-3, Bolivia and Paraguay DENV-1 and DENV-2, and the French territories of Guadeloupe, Martinique, Saint Barthélemy, and Saint Martin identified DENV-2 *(4)*.

Figure 2. Number of dengue cases by subregion of the Americas, by epidemiological week and year. Period 2014 – 2024 (as of EW 5).
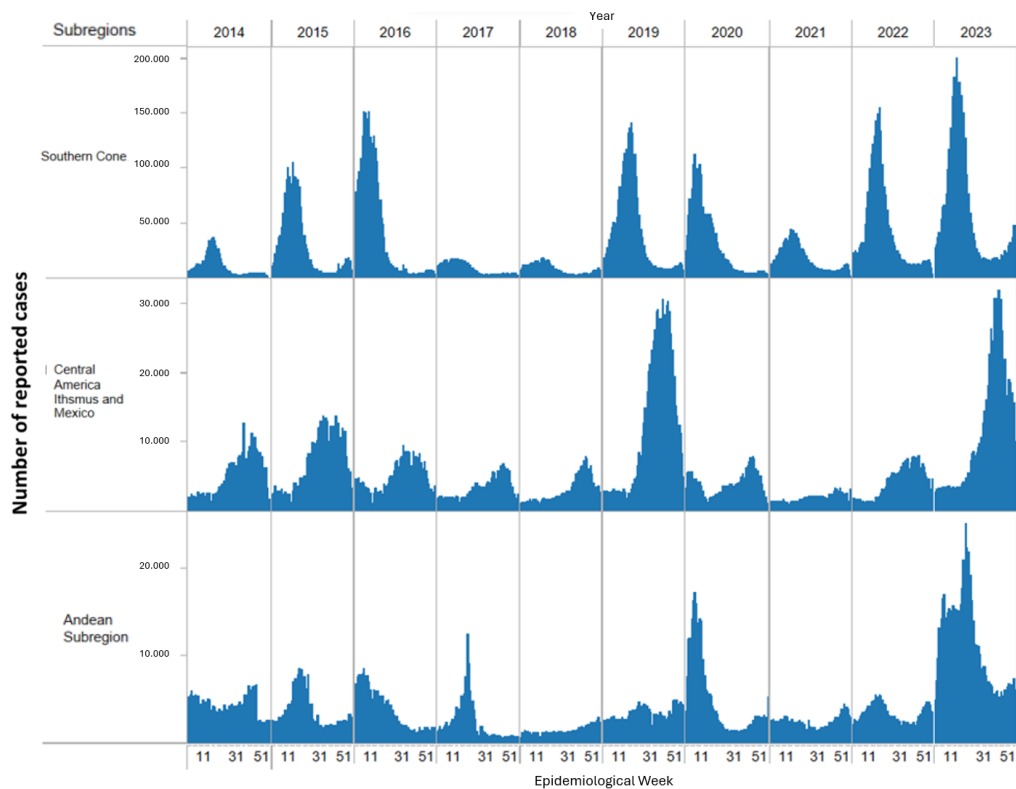
Source: Adapted from the Pan American Health Organization. PLISA Health Information Platform for the Americas, Dengue Portal. Washington, DC: PA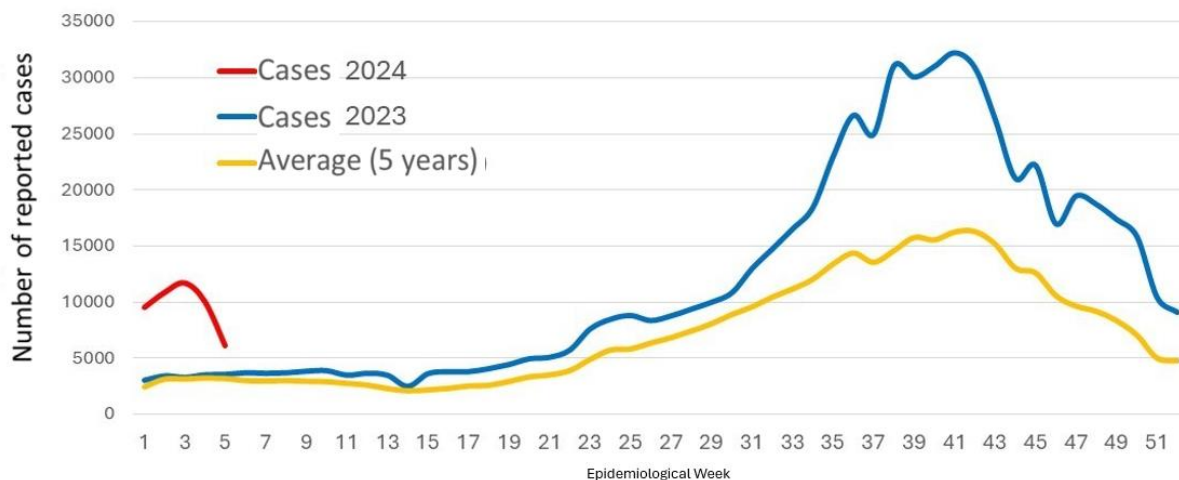HO; 2024 [cited 14 February 2024]. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en.html

Situation summary by subregion[1]

Subregion of the Central American Isthmus and Mexico

Between EW 1 and EW 5 of 2024, 48,945 cases of dengue were reported, representing an increase of 195% compared to the same period in 2023 and 220% compared to the last 5-year average in the subregion (**Figure 3**).

In **Mexico**, during the first five epidemiological weeks of 2024, a 368% increase in dengue cases was reported compared to the same period in 2023. The states that reported the most cases were Quintana Roo, Tabasco, and Guerrero *(4)*. The cumulative incidence rate at EW 5 is 14.7 cases per 100,000 population.

Figure 3. Dengue cases in 2023 - 2024 (as of EW 5) and the last 5-year average - Central American Isthmus and Mexico.
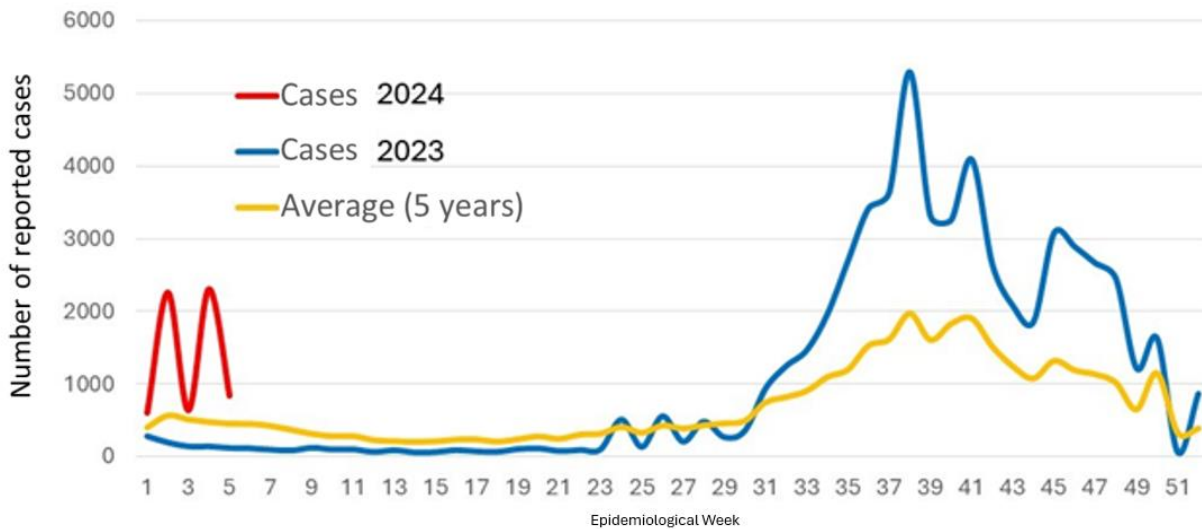

Source: Adapted from the Pan American Health Organization. PLISA Health Information Platform for the Americas, Dengue Portal. Washington, DC: PAHO; 2024 [cited 14 February 2024]. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en.html

Caribbean subregion[2]

Between EW 1 and EW 5 of 2024, 7,952 suspected cases of dengue were reported. The subregion reported an increase of 741% compared to the same period in 2023 and 207% compared to the last 5-year average in the subregion. The non-Latin Caribbean accounts for 89% of this increase. French Guiana represents a 100% increase in cases compared to the first 5 EWs of the previous year (**Figure 4**) *(4)*.

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[2] It includes the countries and territories that belong to the Latin Caribbean and the non-Latin Caribbean according to the divisions described in PLISA Health Information Platform for the Americas, Dengue Portal. Washington, DC: PAHO; 2024 [cited 2024 February 14]. Available in: https://www3.paho.org/data/index.php/es/temas/indicadores-dengue.html

Figure 4. Dengue cases in 2023 - 2024 (as of EW 5) and the last 5-year average. Caribbean subregion.

Andean subregion

Between EW 1 and EW 5 of 2024, 45,985 suspected cases of dengue were reported. The Andean subregion reported a decrease of 8% compared to the same period in 2023, however they are 63% above the last 5-year average in the subregion (**Figure 5**).

Bolivia reported 5,326 cases as of EW 4, representing a 48% increase compared to the last 5-year average for the same period in the country. The municipalities of La Paz, Santa Cruz, and Cochabamba reported the highest number of cases *(4)*.

Colombia reported 27,649 cases as of EW 5, representing an increase of 48% compared to the last 5-year average for the same period in the country *(4)*.

Peru reported 13,010 cases as of EW 5, representing an increase of 151% compared to the last 5-year average for the same period in the country *(4)*.

Figure 5. Dengue cases in 2023 - 2024 (as of EW 5) and the last 5-year average. Andean subregion.
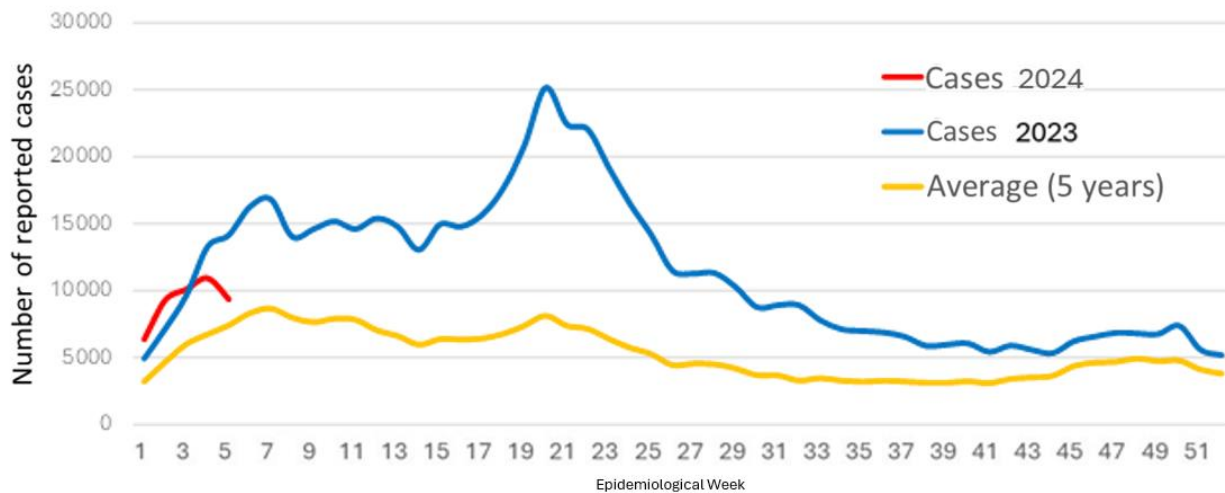
Source: Adapted from the Pan American Health Organization. PLISA Health Information Platform for the Americas, Dengue Indicators Portal. Washington, DC: PAHO; 2024 [cited 14 February 2024]. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en.html

Southern Cone

Between EW 1 and EW 5 of 2024, 570,756 suspected cases of dengue were reported in the Southern Cone. This represents an increase of 193% compared to the same period in 2023 and 254% compared to the last 5-year average in the subregion (**Figure 6**).

In **Argentina,** 21,850 cases were reported in the first five epidemiological weeks of 2024. In the last week, 17% more cases were reported than the previous week *(4)*.

In **Brazil,** the number of cases reported in the first five EWs of 2024 was 455,525, representing an increase of 218% compared to the last 5-year average for the same period in the country (4).

In **Paraguay**, the number of cases reported in the first five EWs of 2024 was 95,381, which represents an increase of 425% compared to the last 5-year average for the same period in the country. The highest number of cases was recorded in the municipalities of Central, Asunción, and Itapúa. Of the total number of cases reported nationwide, 21% occurred in children under 15 years of age *(4)*.

Figure 6. Dengue cases in 2023 - 2024 (as of EW 5) and the last 5-year average. Southern Cone.
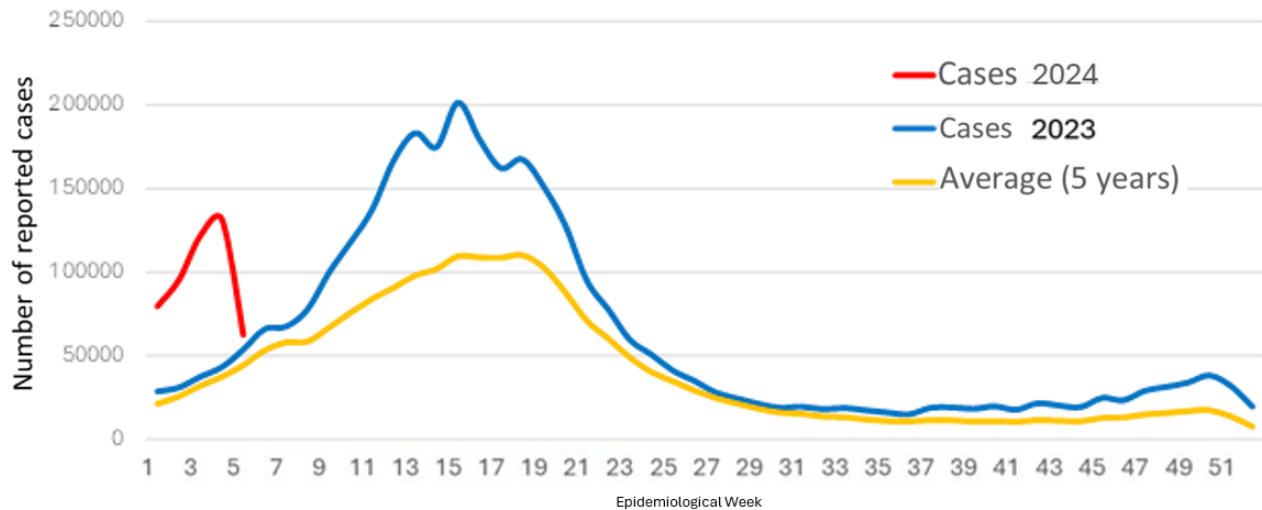
Source: Adapted from the Pan American Health Organization. PLISA Health Information Platform for the Americas, Dengue Indicators Portal. Washington, DC: PAHO; 2024 [cited 14 February 2024]. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en.html

Guidance for national authorities

PAHO/WHO reminds Member States of the same guidance published in the Epidemiological Update of 10 June 2020 on dengue and other arboviruses, available at: https://www.paho.org/en/documents/epidemiological-update-dengue-and-other-arboviruses-10-june-2020 *(5)*.

Integrated Surveillance

PAHO/WHO encourages continued epidemiological surveillance and sharing reports of suspected and confirmed cases of dengue, chikungunya, and Zika.

Given that the clustering of cases is common in these diseases (dengue, chikungunya, and Zika), efforts should be made to analyze the spatial distribution of cases to allow for rapid response at the local level of the most affected areas. Information gathering on the hotspots of these three diseases should be utilized for intensive vector control.

Sentinel entomological surveillance assists with assessing changes in the risk of vector-borne diseases and the impact of vector control measures.

Case Management

Measures to ensure proper clinical management of suspected dengue cases should be a priority.

Capacities must be strengthened at the level of primary health care and, from this level, avoid progression to severe forms and deaths from dengue. This requires early clinical diagnosis and recognition of warning signs in dengue (such as severe and sustained abdominal pain or

tenderness of the abdomen, persistent vomiting, clinical fluid accumulation, mucosal bleeding, lethargy, restlessness, liver enlargement >2 cm below the costal ridge and enlargement progressive hematocrit) in order to initiate an adequate management according to the recommendations published in the PAHO clinical guidelines. In cases where dengue is suspected, healthcare workers should provide clear guidance to patients and/or families to monitor for warning signs and seek immediate medical attention should they occur. These measures will also help reduce the number of patients who must be referred to hospitals, thus avoiding the saturation of these facilities and intensive care units.

At the same time, all second and third level hospitals must be prepared to handle dengue cases with warning signs and cases of severe dengue.

More information on the clinical management of dengue cases is available in the Guidelines for the Clinical Diagnosis and Treatment of Dengue, Chikungunya and Zika *(6)* and the Instrument for the Diagnosis and Care of Patients with Suspected Arbovirus *(7)*, both published by PAHO.

PAHO reiterates the recommendations for technical teams in charge of malaria control, which also apply to personnel involved in arbovirus care, available at: https://iris.paho.org/handle/10665.2/52080 *(8)*.

Adequacy of health-care services

Considering the current increase in the incidence of dengue fever in areas of the Region, Member States are urged to adapt their health services to provide a timely and correct response all levels of care to their populations.

- Organize in each institution, by levels of care, the screening, patient flow and clinical surveillance and hospitalization areas,
- Reorganize healthcare services in outbreak/epidemic situations at different levels of patient care.
- Strengthen patient care networks in the clinical diagnosis, management, and follow-up of patients with suspected dengue, chikungunya, or Zika.

Laboratory confirmation

It is important to note that the initial diagnosis of DENV infection is clinical, and proper suspicion may guide the confirmation protocol. Laboratory results should be analyzed with clinical information and according to epidemiological context, for surveillance and not for clinical decision-making.

Laboratory confirmation of dengue infection is based on virological (RT-PCR, detection of NS1 antigen by ELISA, and in some cases viral isolation in culture for further characterization) and serological (detection of IgM) tests. However, for the confirmation of cases, virological assays that demonstrate the presence of the complete virus, its genetic material or its proteins should be prioritized. Virological assays for dengue are performed on serum samples taken during the first 5 days after symptom onset (acute phase) (**Figure 7**).

On the other hand, serological assays based on the detection of IgM should be analyzed carefully, accounting for the time that antibodies circulate in the blood after an infection, as well as the possibility of cross-reaction with other flaviviruses (including Zika, yellow fever, and

others) and non-specific detection. Thus, a single IgM result in a patient only indicates contact with the virus, with these cases being defined as a probable case of dengue. A second sample taken at least one week apart, processed in parallel with the first and with a quantitative serological assay (PRNT, for example) to demonstrate seroconversion or increased antibody titer, may be useful in clarifying the diagnosis (**Figure 8**).

It is important to have a clear laboratory algorithm that allows early detection. Although multiple molecular methodologies (*multiplex* PCR) are useful when there is no clear clinical suspicion, in a case of dengue that meets the established definitions and where the clinic is compatible, it is suggested to prioritize protocols for specific detection (*singleplex*) of the virus *(9)*.

In fatal cases, tissue samples (liver, spleen, kidney) should be considered both for detection of genetic material (RT-PCR) and for histopathological and immunohistochemical study. Taking biopsies from a patient with suspected dengue is completely contraindicated.

On the other hand, the use of immunochromatographic or rapid tests (NS1 and/or antibodies) is not recommended since their low sensitivity can lead to false negative results. Its use should be limited to community studies under established protocols but not to rule out infection or to implement medical behaviors.
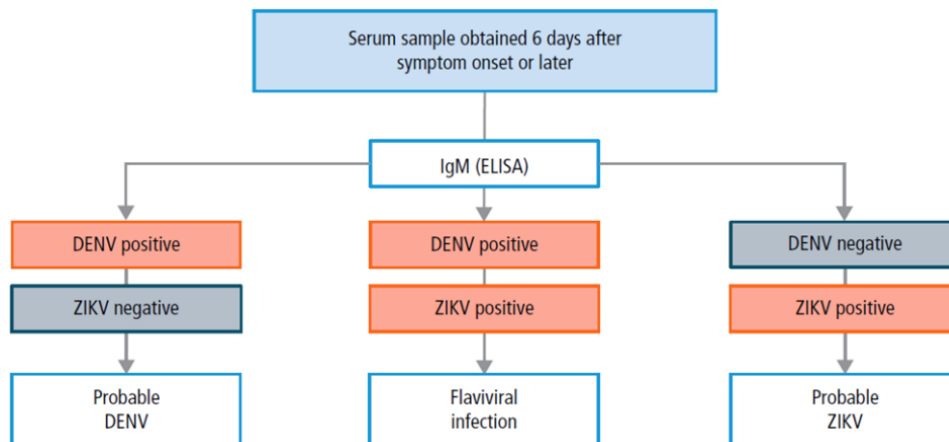
Since laboratory services are a key component of dengue epidemiological and virological surveillance, timely detection and characterization in appropriate samples should be maintained. To the extent possible and depending on the capacities of each laboratory, it is recommended that 100% of severe and fatal cases of dengue be sampled, while only a proportion (10-30% or a maximum number of samples depending on the installed capacity) of those cases without warning signs will be required for surveillance.

Figure 7. Algorithm for virological testing in suspected cases of dengue, chikungunya, and Zika
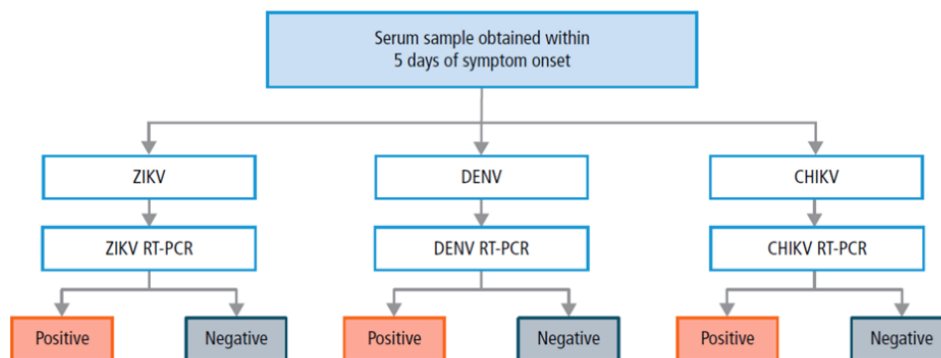
Source: PAHO/WHO. Recommendations for Laboratory Detection and Diagnosis of Arbovirus Infections in the Region of the Americas. 29 August 2022. Available from: https://iris.paho.org/handle/10665.2/57555

Figure 8. Algorithm for Serological Testing in Suspected Cases of Dengue and Zika

Aedes prevention and control measures

PAHO/WHO urges the effective use of available resources to prevent and/or control vector infestation in affected areas and in health services. This will be achieved through the implementation of integrated vector control strategies in emergencies, which include the following processes:

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

- Use of multiple interventions, often in combination and synergistically.

- Collaboration of the health sector with public and private sectors linked to environmental management whose work impacts the reduction of vectors.

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

- Strengthening of the legal framework that allows an integrated and intersectoral approach.

Given the high infestation by *Aedes aegypti* and the presence of *Aedes albopictus* in the Region, it is recommended that prevention and control measures aim to reduce the density of the vector and have the acceptance and collaboration of the local population. Prevention and control measures for implementation by national authorities should include the following:

- Strengthen environmental management actions, mainly the elimination of vector breeding sites in homes and common areas (parks, schools, cemeteries, etc.).

- Reorganize solid waste collection services to support breeding site disposal actions in areas of greatest transmission and, if necessary, plan intensive actions in specific areas where regular garbage collection has been interrupted.

- Apply measures for the control *(10)* of breeding sites through the use of physical, biological and / or chemical methods, while actively involving individuals, families, and the community.

- Define the high-risk transmission areas (risk stratification) *(11)* and prioritize those with high concentrations of people (schools, terminals, hospitals, health centers, etc.). In these facilities, the presence of mosquitoes must be eliminated in a diameter of at least 400 meters. It is important to pay special attention to health care units, and to ensure that these are free of the presence of the vector and its breeding sites so that they do not become spreading sources of the virus.

- In areas where active transmission is detected, implementing measures aimed at eliminating infected adult mosquitoes (mainly through the use of insecticides) is suggested in order to stop and cut transmission. This action is of an exceptional nature and is only effective when conducted by well-trained personnel under internationally accepted technical guidelines, and when it is carried out simultaneously with the other proposed actions. The main action to interrupt intensive transmission is the elimination of adult mosquitoes infected with the Dengue virus (active transmission) through indoor spraying, using individual equipment or space fumigation using heavy equipment mounted on vehicles, in addition to the destruction and/or control of vector breeding sites within households *(12)*.

- An effective modality of adult control that can be used, considering the available operational capabilities, is indoor residual spraying, which should be applied selectively to the resting places of *Aedes aegypti,* avoiding the contamination of storage containers of water used for drinking or cooking. This intervention preformed in treated areas is effective for a period of up to 4 months; it can be used in shelters, homes, health services, schools and others. For more information, consult the PAHO Manual for applying indoor residual spraying in urban areas for the *Aedes aegypti* control *(13)* and the guidance on Control of *Aedes aegypti* in the scenario of simultaneous transmission of COVID-19 *(14)*.

- Correctly choose the insecticide to be used (following PAHO/WHO recommendations), regarding its formulation and be aware of which mosquito populations are susceptible to this insecticide *(15)*.

- Guarantee the proper functioning of fumigation equipment and its maintenance and ensure insecticide reserves.

- Intensify the actions of supervision (quality control and coverage) of the field work of the operators, both actions of in-home fumigation with individual equipment, and of the tasks of space fumigation with heavy equipment mounted on vehicles, ensuring compliance with personal protection measures.

Personal prevention measures

Patients infected with dengue, chikungunya, and/or Zika virus are the reservoir of infection for others both in their households and in the community. It is necessary to communicate to the sick, their families, and the affected community about the risk of transmission and ways to

prevent contagion by decreasing the vector population and contact between the vector and people.

To minimize vector-patient contact it is recommended:

- Patients should rest under mosquito nets, impregnated, or otherwise, with insecticide.

- Sick people, as well as other household members, should wear long sleeves to cover their limbs.

- Repellents containing DEET, IR3535 or Icaridin, can be applied to exposed skin or clothing, and must be used in strict accordance with the instructions on the product label.

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

Communication and community engagement

Establishing and implementing a rapid communication action plan focused on the following is recommended:

- Measures to prevent the formation of vector breeding sites and their elimination to prevent transmission, and

- Information on symptoms and warning signs of dengue when the epidemiological situation of the country requires it, such as an increase in cases or cases of death due to dengue.

Consider the main audiences should be: individuals, communities, neighborhood committees, municipalities, public and private sectors: messages on measures to prevent the formation of vector breeding sites and their elimination to avoid the transmission of arboviruses.

Audiences:

- Individuals, communities, neighborhood committees, municipalities, public and private sectors: messages on measures to prevent the formation of vector breeding sites and their elimination to avoid the transmission of dengue and other arboviruses. Also, information about the warning signs of dengue to seek immediate medical attention.

- Health care workers (including nurses, doctors, and primary care staff and hospitals) and vector control program technicians: information on dengue symptoms and warning signs that are present or increasing in the country.

Every effort should be made to enlist community support for dengue prevention.

Simple Information, Education, and Communication (IEC) materials can be disseminated through various means of communication (including social media or closed-circuit television in primary care health units).

Household members should be encouraged to eliminate sources of mosquito breeding, both at home and around the home. This is everyone's job: the family, the community, the public and private sector.

Highly productive mosquito breeding sites, such as water storage containers (drums, elevated tanks, clay pots, etc.) should be subject to preventive measures against vector reproduction. Other breeding sites, such as roof gutters and other water retention containers, should also be cleaned periodically.

Health care workers and affected communities should be encouraged to be aware of the symptoms of dengue, as well as its warning signs and how to act in the event of such manifestations.

Working with local teams is encouraged, as they know how to make this information more effective, and in many cases national campaigns and messages are not as effective as local initiatives *(10)*.

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Additional resources

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