



Pan American
Health
Organization



World Health
Organization
REGIONAL OFFICE FOR THE
AMERICAS

Epidemiological Alert Increase in dengue cases in Central America and the Caribbean

15 September 2023

Due to the increase in dengue cases in countries and territories of Central America and the Caribbean and with the start of the summer season in South America, the Pan American Health Organization / World Health Organization (PAHO/WHO) encourages Member States in South America to review their preparedness and response plans, as well as continue surveillance, early diagnosis, and timely care of dengue and other arbovirus cases, in order to prevent severe cases and deaths associated with these diseases.

Situation Summary in the Region

Dengue is the arbovirus with the highest number of cases reported in the Region of the Americas, and outbreaks occurring cyclically every 3 to 5 years. The highest number of dengue cases ever recorded was reported in 2019, with more than 3.1 million cases, including 28,203 severe cases and 1,823 deaths.

In 2022, between epidemiological week (EW) 1 and EW 52, there were 2,811,433 dengue cases reported, placing 2022 as the third highest year in terms of total dengue cases reported within a year, being surpassed only by 2019 and 2016 (1).

In 2023, between EW 1 and EW 35, there were 3,407,921 dengue cases reported, with a cumulative incidence rate of 343 cases per 100,000 population. The highest cumulative incidence rates were reported in the following subregions¹: The Southern Cone with 931 cases per 100,000 population, the Andean Subregion with 326 cases per 100,000 population, and the Central American Isthmus and Mexico with 124 cases per 100,000 population. This year, of the 3,407,921 dengue cases reported, 1,584,761 (46%) were laboratory confirmed and 4,759 (0.14%) were classified as severe dengue. The highest number of dengue cases were reported in Brazil with 2,569,746 cases, followed by Peru with 235,014 cases (as of EW 32 of 2023) and Bolivia with 137,110 cases (1).

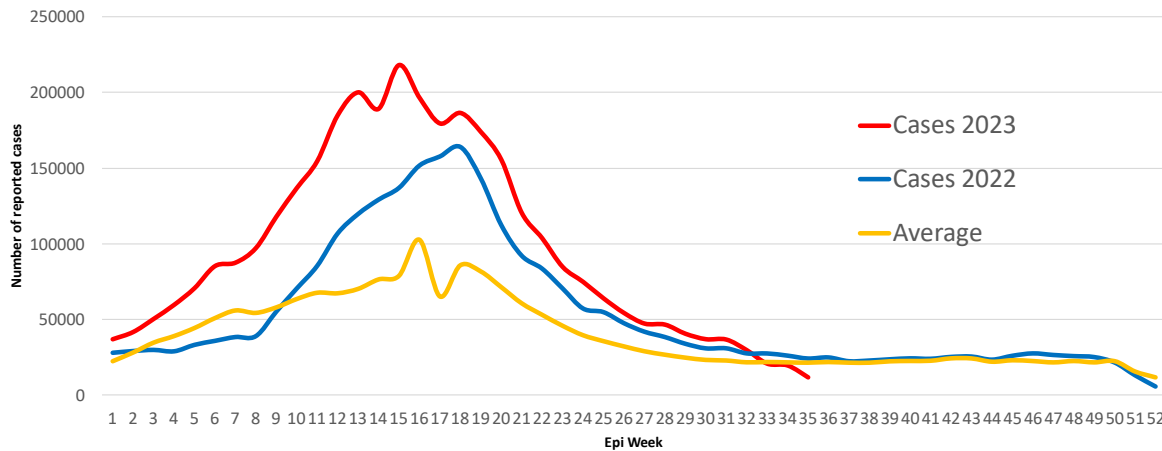
With regard to the severe dengue cases reported in 2023, the highest number of cases were reported in Brazil with 1,396 severe cases, Colombia with 1,071, Peru with 916 (to EW 32), Bolivia with 612, and Mexico with 443. Additionally, during the same period, there were 1,612 deaths were reported in the Region of the Americas (case fatality rate [CFR]: 0.047%).

¹ Note: the subregions and the corresponding countries and territories follow the divisions described in the Health Information Platform for the Americas (PLISA). Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://bit.ly/3IGwSwc>.

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Timely clinical diagnosis, early identification of warning signs, and proper management and treatment of patients is important to avoid serious cases and deaths.

Figure 1. Number of dengue cases in 2022, 2023, and last 5-year average. Region of the Americas. Up to EW 35 of 2023.



Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Core Indicators Portal. Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://opendata.paho.org/en>

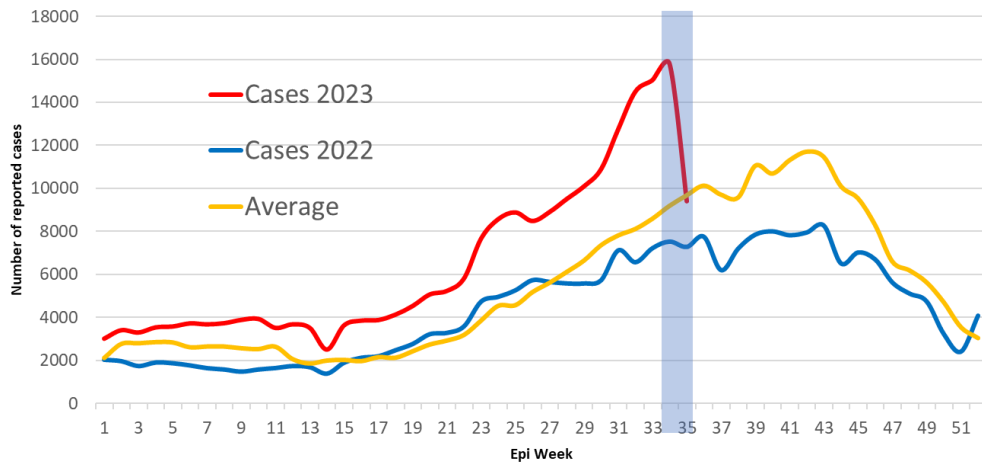
Central American Isthmus and Mexico

In 2023, between EW 1 and EW 35, there were 226,183 dengue cases reported in the Central American Isthmus and Mexico, with a cumulative incidence rate of 123.6 cases per 100,000 population. The highest cumulative incidence rates were reported in: Nicaragua with 1.346,7 cases per 100,000 population, Belize with 1,009 cases per 100,000 population, Panama with 162.2 cases per 100,000 population, and Honduras with 114.6 cases per 100,000 population. This year, of the 226,183 reported dengue cases, 26,017 (11.5%) were laboratory confirmed and 577 (0.26%) were classified as severe dengue. The highest number of dengue cases were reported in Nicaragua with 90,258 cases, followed by Mexico with 86,397 cases, and Guatemala with 14,299 cases (1).

With regard to severe dengue cases reported in 2023, the highest number were reported in: Mexico with 443 severe cases, Honduras with 73, Nicaragua with 10, Guatemala with 36, and Panama with 12. During the same period, there were 66 deaths reported (CFR: 0.029%).

The four dengue virus serotypes (DENV1, DENV2, DENV3, and DENV4) are present in this subregion. In 2023, up to EW 35, the simultaneous circulation of all four was detected in Costa Rica, Guatemala, Honduras, and Nicaragua; while in Panama and Mexico, the serotypes DENV1, DENV2, and DENV3 co-circulate.

Figure 2. Dengue cases in 2022, 2023 and average of the last 5 years – Central American Isthmus and Mexico. Up to EW 35 of 2023.



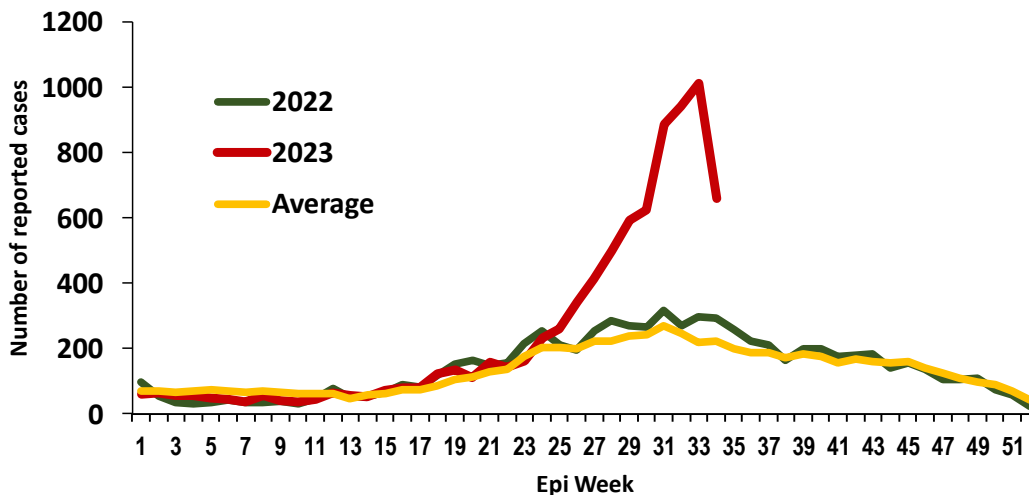
Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Core Indicators Portal. Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://opendata.paho.org/en>

Following is a summary of the dengue epidemiological situation in select countries from the Central American Isthmus and Mexico, reflected in alphabetical order:

Costa Rica (2)

In 2023, up to EW 34, there were 8,261 dengue cases reported, of which 918 (11.1%) were laboratory confirmed. The cases reported up to EW 34 of 2023 are 42% higher than those reported for the same period of 2022 and 45% higher than the 5-year case (**Figure 3**). During the same period, no deaths were reported.

Figure 3. Dengue cases in 2022, 2023 and average of the last 5 years – Costa Rica. Up to EW 34 of 2023.

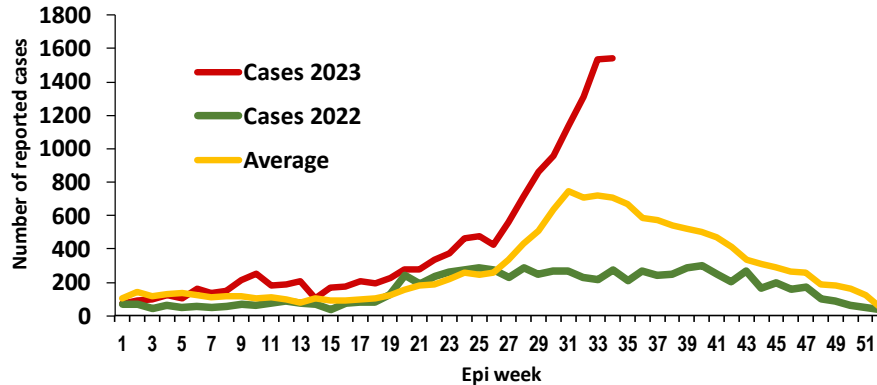


Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Core Indicators Portal. Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://opendata.paho.org/en>

Guatemala (3)

In 2023, up to EW 34, there were 14,299 dengue cases reported, of which 2,031 (14.2%) were laboratory confirmed and 36 (0.25%) were classified as severe dengue. The cases reported as of EW 34 of 2023 are 2.8 times greater than the numbers reported for the same period of 2022 and 37% higher than the 5-year case average (**Figure 4**). During the same period, there were 28 deaths reported (CFR: 0.19%).

Figure 4. Dengue cases in 2022, 2023 and average of the last 5 years – Guatemala. Up to EW 34 of 2023.

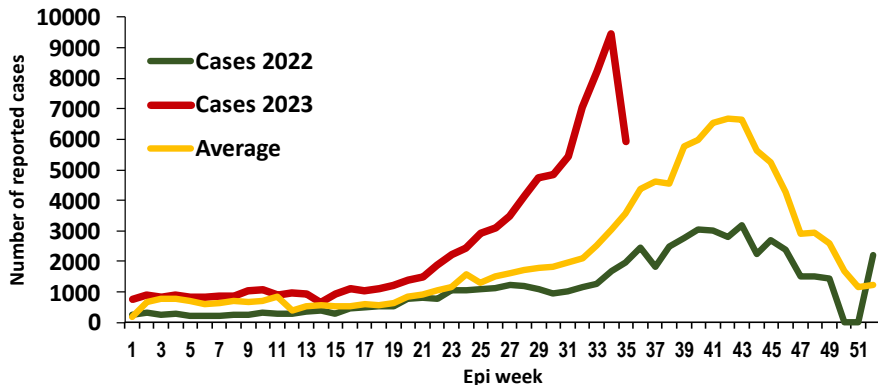


Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Core Indicators Portal. Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://opendata.paho.org/en>

Mexico (1)

In 2023, up to EW 35, there were 86,398 dengue cases reported, of which 14,972 (17.3%) were laboratory confirmed and 445 (0.51%) were classified as severe dengue. The cases reported up to EW 35 of 2023 triple those reported in the same period of 2022 and double the average of the last 5 years (**Figure 5**). During the same period, there were 30 deaths reported (CFR: 0.035%).

Figure 5. Dengue cases in 2022, 2022 and average of the last 5 years – Mexico. Up to EW 35 of 2023

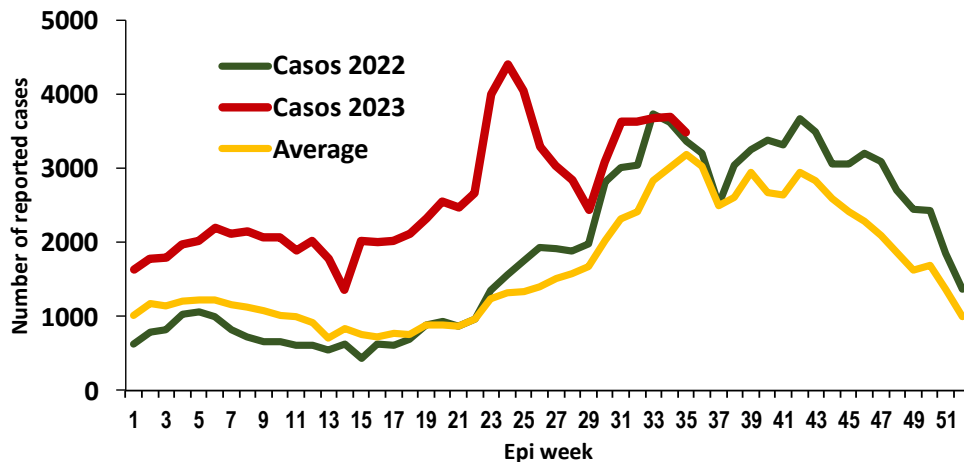


Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Core Indicators Portal. Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://opendata.paho.org/en>

Nicaragua (4)

In 2023, up to EW 36, there were 94,576 dengue cases reported, of which 2,797 (2.95%) were laboratory confirmed and 12 (0.01%) were classified as severe dengue. The cases reported up to EW 36 of 2023 are 83% higher than those of the same period of 2022 and 1.87 times higher compared to the 5-year case average (**Figure 6**). During the same period, there was one death reported (CFR: 0.001%).

Figure 6. Dengue cases in 2022, 2023 and average of the last 5 years – Nicaragua. Up to EW 36



Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Core Indicators Portal. Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://opendata.paho.org/en>

Caribbean subregion²

Between EW 1 and EW 35 of 2023, in the Caribbean Subregion, there were 14,985 dengue cases reported, with a cumulative incidence rate of 20.7 cases per 100,000 population in the Latin Caribbean Subregion and 47.8 cases per 100,000 population in the non-Latin Caribbean. The highest cumulative incidence rates were reported in the following countries and territories (1): Martinique with 1,205 cases per 100,000 population, Saint Barthélemy with 1,142 cases per 100,000 population, Guadeloupe with 904 cases per 100,000 population, and Grenada with 499 cases per 100,000 population. In 2023, there were 14,985 dengue cases reported, of which 2,595 (17.3%) were laboratory confirmed and 94 (0.62%) were classified as severe dengue. The highest number of dengue cases were reported in the Dominican Republic with 4,663 cases, followed by Martinique with 4,519 cases, and Guadeloupe with 3,616 cases. Additionally, in an official statement issued by the Government of Barbados on 8 September 2023, there was an increase in dengue associated with a change in circulating serotypes reported: in August 2023, with five positive dengue cases reported (three cases of DENV2 and two cases of DENV3); and as of 8 September 2023, four positive cases of the virus (two cases of DENV2 and two cases of DENV3) had been reported. These serotypes differ from those detected earlier in 2023, when DENV1 and DENV3 were the main circulating serotypes in Barbados (5).

² Includes countries and territories belonging to the Latin Caribbean and the non-Latin Caribbean as per the divisions described in the Health Information Platform for the Americas (PLISA). Washington, DC: PAHO; 2023 [cited 12 September 2023]. Available from: <https://bit.ly/3IGwSwc>.

With regard to severe dengue cases reported in 2023, the highest number were reported in the Dominican Republic with 52 severe cases, Puerto Rico with 21, Guadeloupe with 11, Martinique with 6, and Grenada with 4. Additionally, during the same period, there were 12 deaths reported in the Region (CFR: 0.08%).

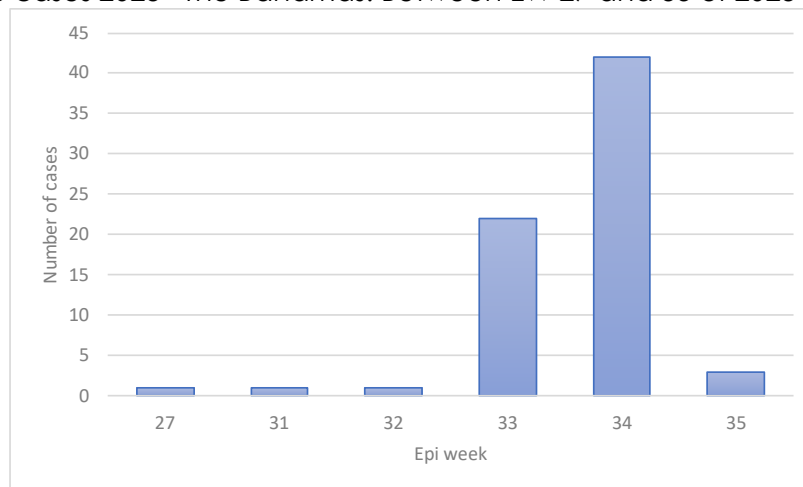
Three of the four dengue virus serotypes (DENV1, DENV2, DENV3) have been identified in the Caribbean subregion. Up to EW 35 of 2023, co-circulation of the three serotypes has only been reported in Puerto Rico. Meanwhile, in the Dominican Republic and Guadeloupe, serotypes DENV1 and DENV2 co-circulate; in Suriname, serotypes DENV2 and DENV3; and only serotype DENV2 in Antigua and Barbuda and Martinique.

The following is a summary of the epidemiological situation of dengue in selected Caribbean countries in alphabetical order:

Bahamas (6)

In 2023, up to EW 35 of 2023, the Bahamas International Health Regulations (IHR) National Focal Point (NFP) had reported 70 dengue cases, all laboratory-confirmed, of which 34.2% (n=24) had no travel history. Of the total cases, 8 required hospitalizations and no deaths were reported. 94% of cases (n=66) were reported during the month of August. **(Figure 7)**

Figure 7. Dengue cases 2023– The Bahamas. Between EW 27 and 35 of 2023



Source: Adapted from: Bahamas International Health Regulations (IHR) National Focal Point (NFP). Nasau; 2023. Unpublished.

Dominican Republic (7)

As of EW 32 of 2023, of the 4,663 reported dengue cases, 25 (0.54%) were laboratory confirmed and 52 (1.12%) were classified as severe dengue. In EW 32, 573 dengue cases were reported, of which 39% (221/573) were confirmed in the province of Santo Domingo. Between EW 29 and EW 32 of 2023, there were 1,663 dengue cases reported, representing an increase of 59% compared to the same period in 2022. During the same period, there were five deaths confirmed (CFR: 0.87%).

United States of America

In addition to the cases reported in Puerto Rico, described under the Caribbean, a breakdown of the data reported in the United States, in relation to the detection of autochthonous cases in the states of Florida and Texas is provided below.

United States of America (8)

During 2023, 794 cases of dengue were reported in 44 jurisdictions in the United States. Of these, 374 (47.1%) were locally acquired cases in the jurisdictions of Puerto Rico (n=360), Florida (n=13) and Texas (n=1). In Florida in 2023, 212 cases of dengue who reported a recent history of travel were reported, along with 13 cases without a travel history.

Guidance for national authorities

According to the seasonal pattern of dengue and the current rainy season, during the second half of 2023, there has been a significant increase in dengue in several countries of the Region of the Americas, especially in Central America and the Caribbean. In addition, a significant increase in the reporting of cases of local transmission has been reported in places such as The Bahamas and the state of Florida in the United States. As anticipated, this increase in the incidence of the disease has placed an additional burden on health systems in the affected areas, leading to the declaration of health emergencies in some countries. Therefore, it is crucial to take appropriate measures to prepare health systems to cope with the increase in cases in the upcoming summer season.

Given this situation, the Pan American Health Organization/World Health Organization (PAHO/WHO) urges Member States to take measures to have a surveillance system that allows detecting the alteration of the epidemiological pattern in a timely manner, implement appropriate measures at the level of patient care services, including triage, diagnosis, and timely and appropriate treatment of cases of dengue, chikungunya, and other arboviruses. Simultaneously, it calls for intensified preparedness actions of health care services to facilitate access and proper management of patients with these diseases.

PAHO/WHO reminds Member States that the same guidance published in the Epidemiological Update of 10 June 2020 on Dengue and Other Arboviruses, available in Spanish from: <https://bit.ly/3dRrUZR>.

Adequacy of health-care services

Due to the recent increases in the incidence of dengue in some areas of the Region, Member States are urged to adapt their health care services to provide timely and adequate response to the population at all levels of care.

- 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 diagnosis, management and follow-up of patients with suspected chikungunya (including the chronic phase of the disease) or dengue.

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 both diseases (dengue, chikungunya), efforts should be made to analyze the spatial distribution of cases to allow rapid response at the local level of the most affected areas. Information from dengue and chikungunya hotspots should be directed towards intensive vector control.

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

Laboratory confirmation

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

Laboratory confirmation of dengue infection is based on virological (RT-PCR, NS1 antigen detection, and in some cases viral isolation in culture for further characterization) and serological (IgM and/or IgG detection) 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. In general, virological assays for dengue are performed on serum samples taken during the first 5 days after symptom onset (acute phase), although highly sensitive molecular methodologies can detect viral RNA for up to 7 days depending on viremia (**Figure 8**).

On the other hand, serological assays based on the detection of IgM (or IgG) should be analyzed carefully, taking into account 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 nonspecific detection. Thus, a single IgM result in a patient only indicates a possible recent contact with the virus, but it may have occurred up to 6 months ago. 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 increase in antibody titer, may be useful to clarify the diagnosis (**Figure 9**).

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**).

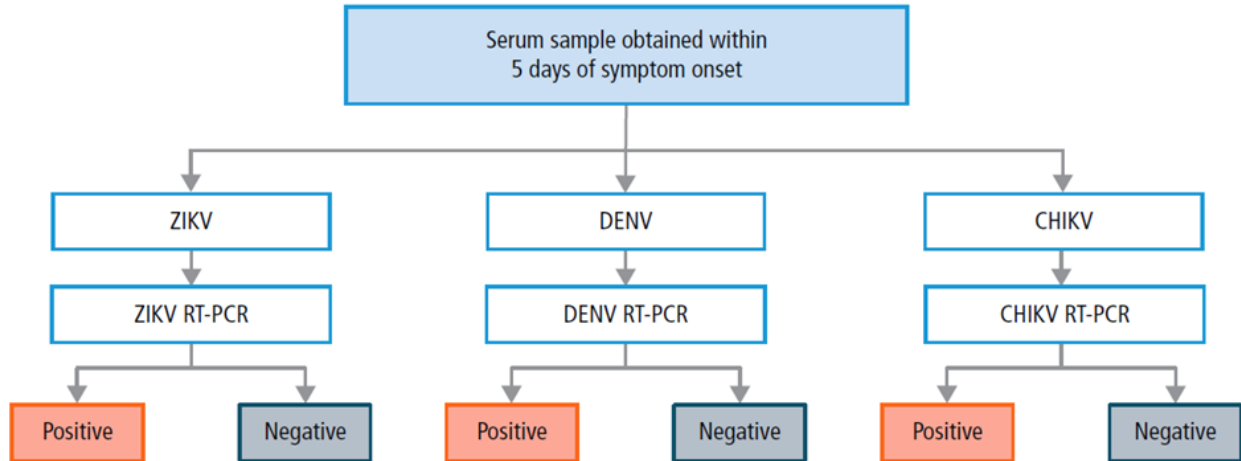
In fatal cases, tissue samples (liver, spleen, kidney) should be considered both for detection of genetic material (RT-PCR) and for histopathological and immunohistochemical study. Taking biopsies from a patient with suspected dengue is completely contraindicated.

On the other hand, the use of 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 in no case 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. Where possible and depending on the capacities of each laboratory, confirmation

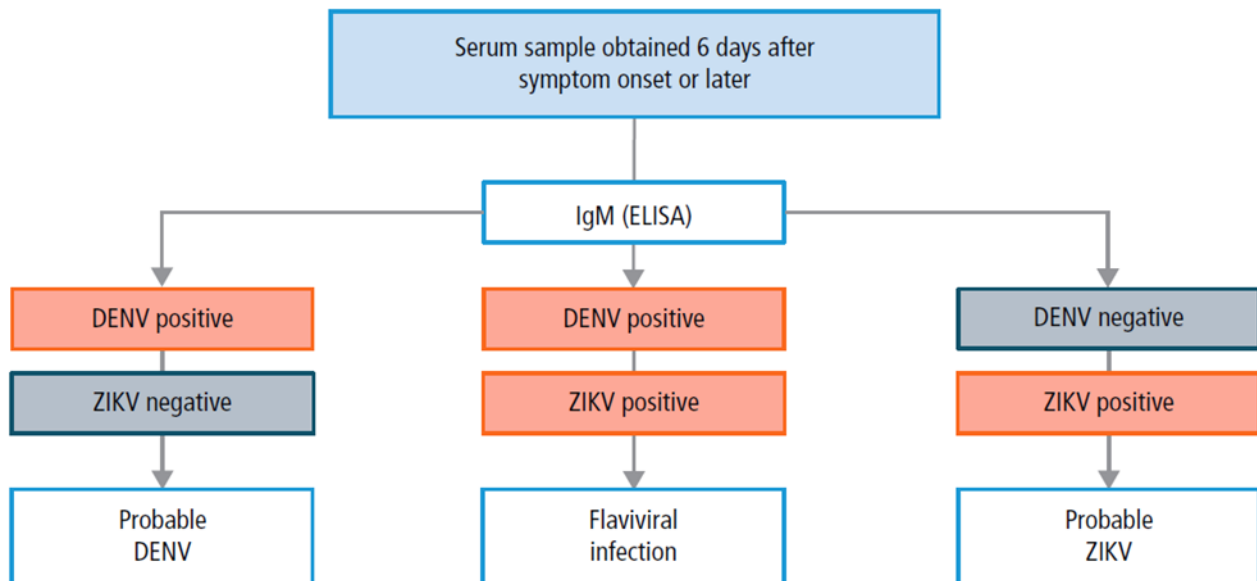
of all severe and fatal dengue cases is recommended, while only a proportion (10-20% or a limited number of samples depending on installed capacity) of those cases without warning signs will be necessary for surveillance.

Figure 8. Algorithm for virological testing in suspected cases of dengue, chikungunya, and Zika



Source: Pan American Health Organization. Recommendations for Laboratory Detection and Diagnosis of Arbovirus Infections in the Region of the Americas. Washington, DC: PAHO; 2023. Available from: <https://iris.paho.org/handle/10665.2/57555>

Figure 9. Algorithm for serological testing in suspected cases of dengue and Zika



Source: Pan American Health Organization. Recommendations for Laboratory Detection and Diagnosis of Arbovirus Infections in the Region of the Americas. Washington, DC: PAHO; 2023. Available from: <https://iris.paho.org/handle/10665.2/57555>

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 (10) and the Instrument for the Diagnosis and Care of Patients with Suspected Arbovirus (11), 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://bit.ly/3Zucrpk>.

Community Involvement

Every effort should be made to gain community support for the prevention of dengue.

Simple Information, Education, and Communication (IEC) materials can be disseminated through various media (including social media).

Household members should be encouraged to eliminate both residential and peri domiciliary sources of mosquito breeding.

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

Local teams often know how to convey this information more effectively, and in many cases national campaigns and messages are not as effective as local initiatives.

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 (12) 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) (13) 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 infested adult mosquitoes (active transmission) through indoor spraying, using individual equipment added 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 performed 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 control of *Aedes aegypti* (14) and the document Control of *Aedes aegypti* in the scenario of simultaneous transmission of COVID19 (15).

- 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 of the operators' field work (quality control) during both the focal treatment and in the adulticide treatment (fumigation), 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.
- Patients, as well as other household members, must wear long sleeves (if there are sick people in the house) to cover the extremities.
- 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.

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Additional resources

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