Epidemiological Alert
Start of peak dengue season in the Central American Isthmus, Mexico, and the Caribbean

24 May 2024

Considering the significant incidence of dengue registered in the Southern Cone of the Americas during the first half of the year and, in view of the beginning of the season of increased dengue circulation in the Central American Isthmus, Mexico, and the Caribbean, the Pan American Health Organization / World Health Organization (PAHO/WHO) recommends that Member States adopt the necessary measures to prepare the response to the increase in dengue, including the organization of health services to ensure adequate clinical management, prevention of complications, and avoid saturation of specialized care services.

Summary of the situation in the Region[1]

The number of dengue cases reported as of epidemiological week (EW) 19 of 2024 in the Region of the Americas is exceeding the historical record of cases reported, mainly in the Southern Cone subregion. Although there has been a decrease in dengue cases in the Southern Cone and Andean subregions in recent epidemiological weeks, the subregions of the Central American Isthmus and Mexico, and the Caribbean subregion are entering the period of increased dengue circulation, which could significantly increase the number of cases reported in the Region during the second half of 2024.

In the Region of the Americas, between EW 1 and EW 19 of 2024, 8,140,210 suspected cases of dengue were reported, representing an increase of 226% with respect to the same period in 2023 and an increase of 416% with respect to the average of the last five years (**Figure 1**). Of the total number of reported cases, 7,983 corresponded to severe dengue, representing approximately 0.1% of the reported cases *(1)*.

The countries in the Region of the Americas with the highest number of dengue notifications as of EW 19 of 2024, and which concentrate 98% of the cases are: Brazil with 6,803,727 (83%) cases, Argentina 475,743 (6.0%), Paraguay 266,816 (3.3%), Peru 222,950 (2.7%), Colombia 137,175 (1.6%), and Mexico 65,758 (0.8%). For the same period, the countries in the Region that accounted for 98% of the deaths reported were: Brazil with 2,897 deaths (79.4%), Argentina 325 (9.0%), Peru 174 (4.7%), Paraguay 91 (2.5%), Colombia 62 (1.6%) and Ecuador 31 (0.8%). As of EW 19, 3,648 deaths due to dengue have been reported in the entire region, which corresponds to a case fatality rate of 0.045% *(1)*.

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[1] Note: Subregions and corresponding countries and territories follow the divisions described in PLISA Health Information Platform for the Americas, Dengue Portal. Washington, DC: PAHO; 2024 [cited 24 May 2024]. Available from: https://www3.paho.org/data/index.php/es/temas/indicadores-dengue.html

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

Figure 1. Number of dengue cases in 2023, 2024 (as of EW 19) and 5-year average - Americas Region.
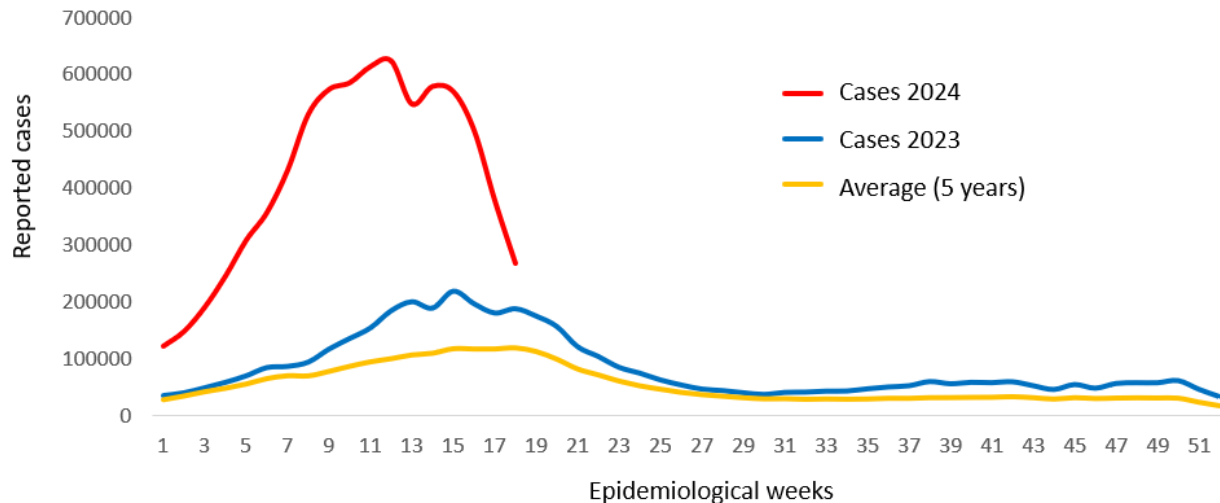
Summary of the situation by subregion

The following is a closer look at the situation in the subregions of the Central American Isthmus and Mexico, as well as in the Caribbean.

Central American Isthmus and Mexico Subregion

In 2024, between EW 1 and EW 19, a total of 132,966 cases of dengue were reported in the Central American Isthmus and Mexico subregion, with a cumulative incidence rate in the subregion of 72 cases per 100,000 population (**Figure 2**). The highest number of dengue cases was reported in Mexico with 65,758 cases, followed by Honduras with 20,563 dengue cases (*1*). The highest cumulative incidence rates were observed in the following countries: Nicaragua with 259 cases per 100,000 population, Honduras with 204 cases per 100,000 population, Costa Rica with 157 cases per 100,000 population, Panama with 132 cases per 100,000 population, and Belize with 127 cases per 100,000 population. In the same period, 21,049 (15.8%) of the total number of cases reported were laboratory confirmed (*1*).

Regarding the number of severe dengue cases reported as of EW 19 of 2024, 724 cases were classified as severe dengue and 48 deaths due to dengue were reported, which corresponds to a case fatality rate of 0.036% for the subregion. The countries with the highest number of severe cases and deaths from dengue in the subregion are Mexico (405 severe cases and 20 deaths) and Honduras (266 severe cases and 10 deaths).

The four dengue virus serotypes (DENV1, DENV2, DENV3 and DENV4) are present in the subregion of Central America and Mexico. In 2024 as of EW 19, simultaneous circulation of all of them has been detected in Costa Rica, Guatemala, Honduras, Mexico, and Panama; while in El Salvador, serotypes DENV1, DENV2, and DENV3 are circulating (*1*).

Figure 2. Dengue cases in 2023, 2024 (as of EW 19) and 5-year average - Central American Isthmus and Mexico.
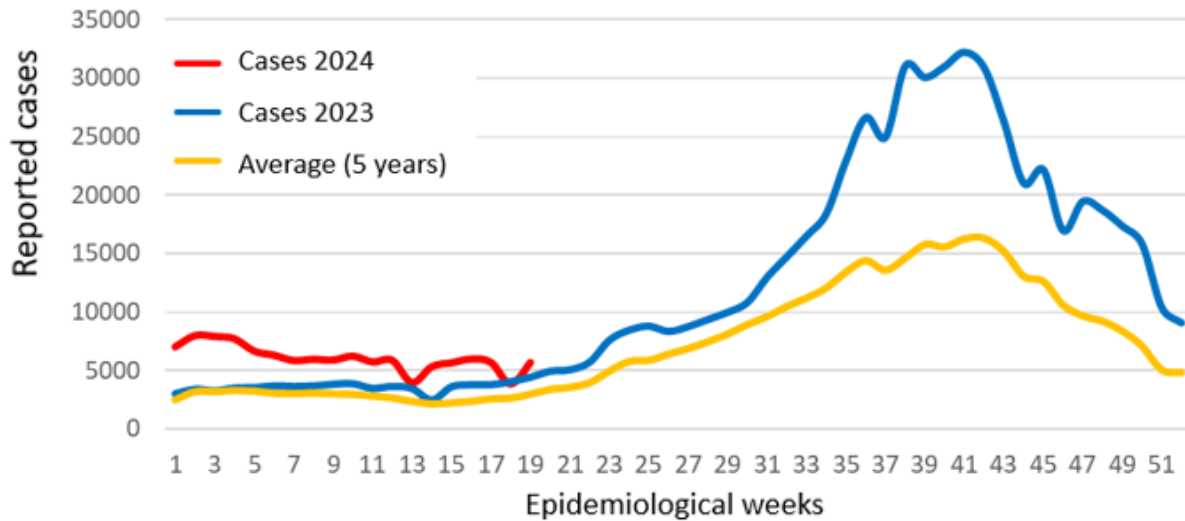
Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Dengue. Washington, DC: PAHO; 2024 [cited 20 May 2024]. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en.html

The following is a summary of the epidemiological situation of dengue in selected countries of the Central American Isthmus and Mexico in alphabetical order:

Guatemala
In 2024, as of EW 14, of the 12,570 dengue cases reported, 1,086 (9.0%) were laboratory-confirmed and 19 (0.15%) were classified as severe dengue. The cases reported as of EW 14 of 2024 represent an increase of 480% compared to the same period in 2023 and 599% compared to the average of the last 5 years (**Figure 3**). In the same period, a total of 9 deaths were reported, corresponding to a case fatality rate of 0.072% *(1)*.

Honduras
In 2024, as of EW 19, of the 20,563 dengue cases reported, 1,248 (6.0%) were laboratory-confirmed, and 266 (1.29%) were classified as severe dengue. The cases reported as of EW 19 of 2024 represent an increase of 445% compared to the same period of 2023, and 193% compared to the average of the last 5 years (**Figure 4**). In the same period, a total of 10 deaths were reported, corresponding to a case fatality rate of 0.049% *(1)*.

Mexico

In 2024, as of EW 19, of the 65,758 dengue cases reported, 12,891 (19.6%) were laboratory-confirmed and 405 (0.62%) were classified as severe dengue. The cases reported as of EW 19 of 2024 represent an increase of 272% compared to the same period of 2023, and 382% compared to the average of the last 5 years (**Figure 5**). During the same period, a total of 20 deaths were reported, corresponding to a case fatality rate of 0.03% *(1)*.
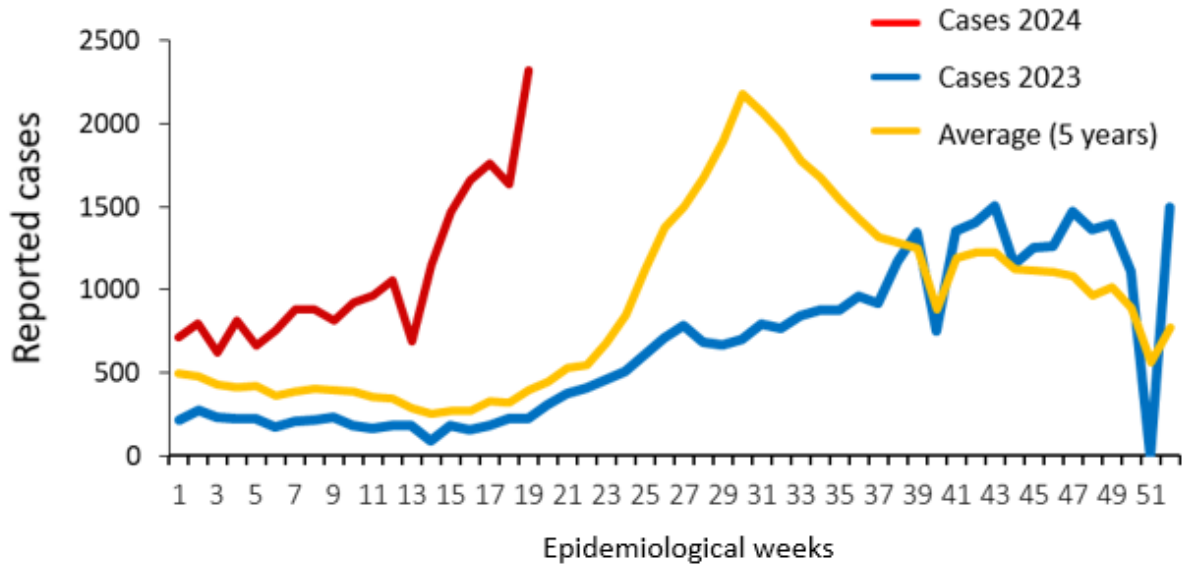
Panama

In 2024, as of EW 18, of the 5,882 dengue cases reported, 4,141 (70%) were laboratory-confirmed, and 27 (0.45%) were classified as severe dengue. The cases reported as of EW 18 of 2024 represent an increase of 155% compared to the same period in 2023, and 288% in relation to the average of the last 5 years (**Figure 6**). In the same period, a total of 9 deaths were reported, corresponding to a case fatality rate of 0.153% *(1)*.

Figure 3. Dengue cases in 2023, 2024 (as of EW 14) and average of the last 5 years - Guatemala.
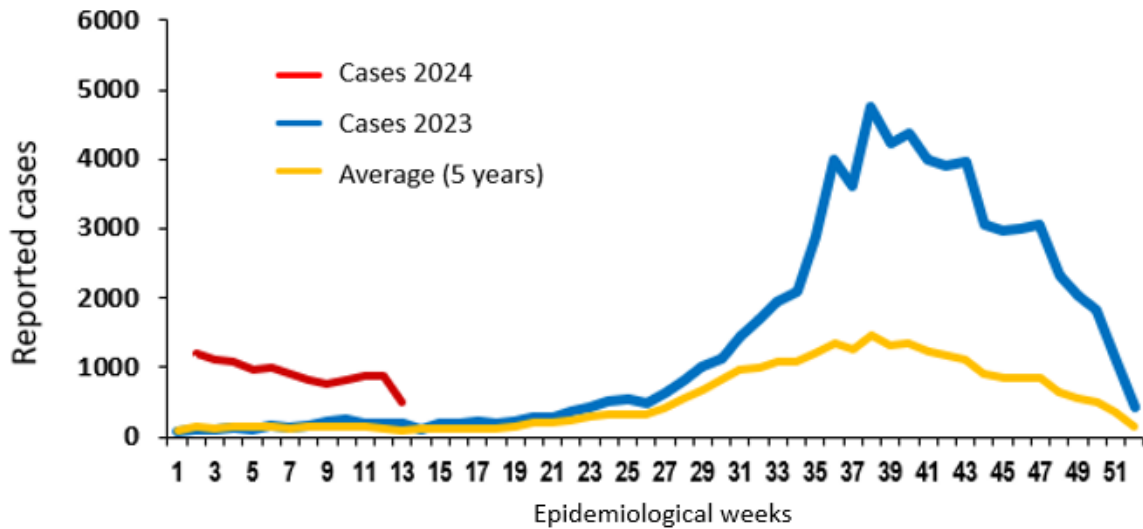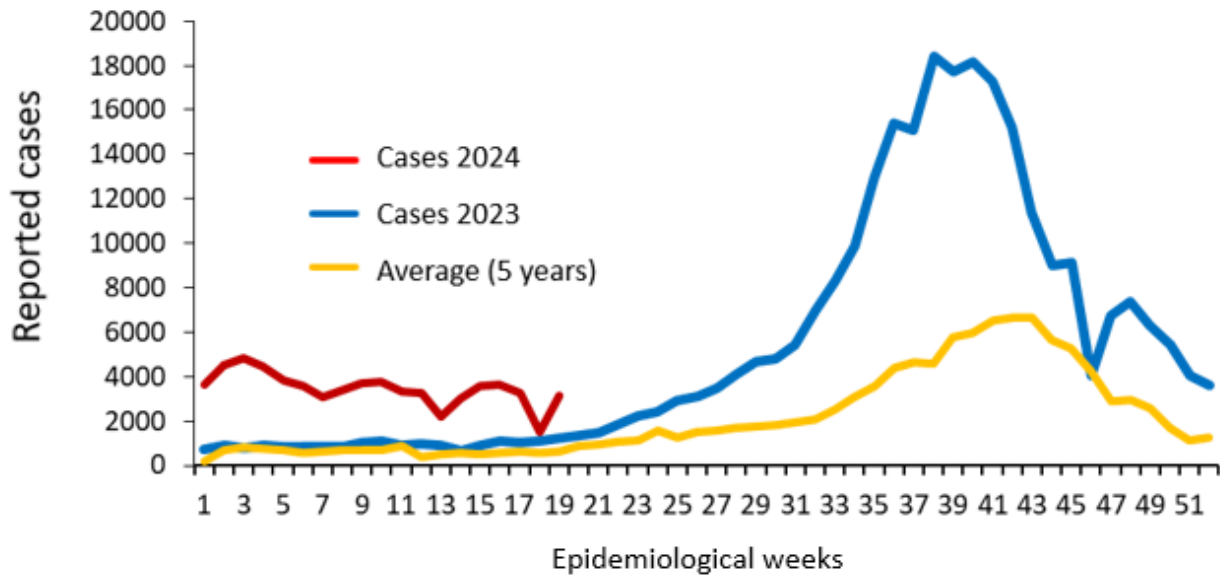

Source: Adapted from Pan American Health Organization. PLISA Health Information Platform for the Americas, Dengue. Washington, DC: PAHO; 2024 [cited 20 May 2024]. Available from: https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en.html

Figure 4. Dengue cases in 2023, 2024 (as of EW 19) and average of the last 5 years - Honduras.

Figure 5. Dengue cases in 2023, 2024 (as of EW 19) and average of the last 5 years - Mexico.

Figure 6. Dengue cases in 2023, 2024 (as of EW 18) and average of the last 5 years - Panama.
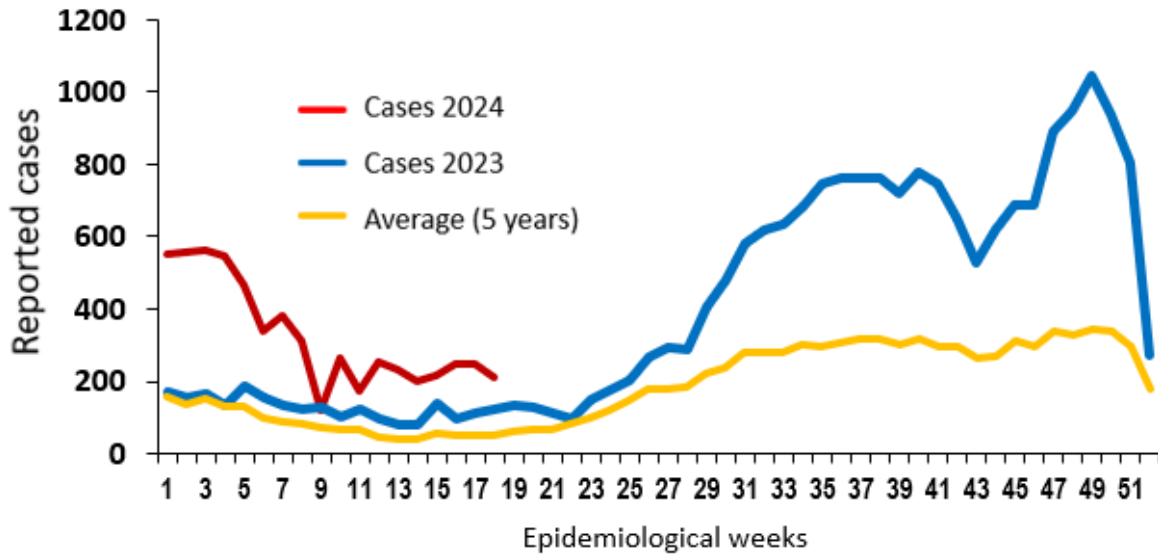
Figure 7. Dengue cases in 2023, 2024 (as of EW 19) and average of the last 5 years - Caribbean Subregion.
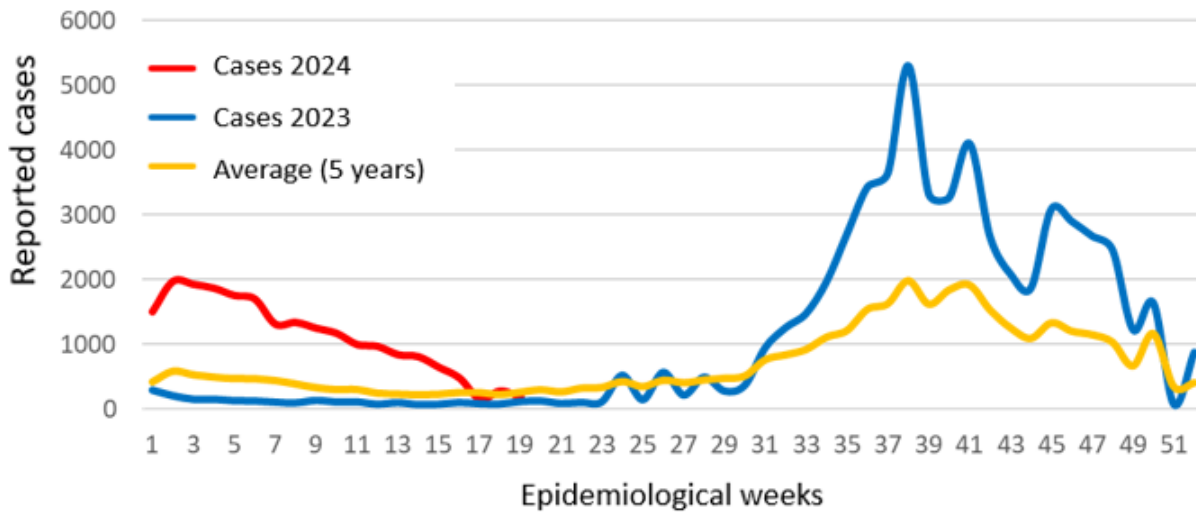
Caribbean Subregion

Between EW 1 and EW 19 of 2024, 21,458 suspected cases of dengue were reported, 3,091 (14.4%) cases were laboratory-confirmed in the Caribbean subregion. Of the total number of reported cases, 111 (0.51%) were classified as severe dengue and no deaths from dengue were reported. The subregion recorded an increase of 468% compared to the same period in 2023. (**Figure 7**) *(1)*. Three serotypes (DENV1, DENV2, DENV3) are currently circulating in the subregion *(1)*.

Guidance for national authorities

Given the high incidence and deaths from dengue fever recorded during the first half of 2024 in the Southern Hemisphere and given the beginning of the peak transmission season for dengue fever and other mosquito-borne diseases in the Central American Isthmus, Mexico and the Caribbean, the Pan American Health Organization / World Health Organization (PAHO/WHO) urges Member States to continue to strengthen surveillance, triage, diagnosis, and timely and appropriate management of cases of dengue fever and other mosquito-borne diseases in the Southern Hemisphere, the Pan American Health Organization / World Health Organization (PAHO/WHO) urges Member States to continue strengthening surveillance, triage, diagnosis and timely and appropriate management of cases of dengue and other arboviruses, as well as vector control actions. At the same time, a call is made to intensify actions to prepare health care services to facilitate access and adequate management of patients with these diseases.

In addition, Member States are reminded that the guidance published in the June 10, 2020 Epidemiological Update on dengue and other arboviruses, available at: https://www.paho.org/es/documentos/actualizacion-epidemiologica-dengue-otras-arbovirosis-10-junio-2020 *(2)*, remains in effect.

Integrated Surveillance

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

Since clustering of cases is common in these diseases (dengue, chikungunya and Zika), efforts should be made to analyze the spatial distribution of cases to enable a rapid response at the local level in the most affected areas. Information from the hotspots of the three diseases should be targeted for intensive vector control.

Sentinel entomological surveillance will help assess changes in vector-borne disease risk and the impact of vector control measures.

Case management

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

Capacity building at the primary health care level is needed to prevent progression to severe forms of dengue and dengue deaths. To this end, health care workers should make an early clinical diagnosis and recognize the warning signs of dengue (such as intense and sustained abdominal pain or pain on palpation of the abdomen, persistent vomiting, clinical fluid accumulation, mucosal bleeding, lethargy, restlessness, liver enlargement > 2 cm below the costal margin and progressive increase in hematocrit) in order to initiate appropriate management according to the recommendations published in PAHO clinical guidelines. In cases where dengue is suspected, health care workers should provide clear guidance to patients and/or families to monitor for warning signs and seek immediate medical attention if at least one of these signs is present. These measures will also help reduce the number of patients who need to be referred to hospitals, thus avoiding overcrowding of these facilities and intensive care units.

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

It is important that prior to the season of increased transmission of dengue (and other arbovirosis), health personnel in charge of the clinical care of these cases be properly trained. PAHO has a virtual course on dengue for this purpose, available free of charge on its Virtual Public Health Campus (3). 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 *(4)* and in the Tool for the diagnosis and care of patients with suspected arbovirosis *(5)*, both published by PAHO.

PAHO reiterates the recommendations for technical teams in charge of malaria control, which also apply to personnel involved in arbovirosis care, available at: https://iris.paho.org/handle/10665.2/52079 *(6)*.

Adequacy of health care services

In view of the current increase in the incidence of dengue in the Region, Member States are urged to adapt their health services to provide a timely and correct response to the population at all levels of care.

- Organize screening, patient flow and clinical surveillance and hospitalization areas in each institution, at the different levels of care.
- Reorganize health services in outbreak/epidemic situations at different levels of patient care to avoid overcrowding of hospitals.
- Strengthening of patient care networks for clinical diagnosis, management, follow-up, as well as referral and counter-referral of patients with suspected dengue, chikungunya or Zika.

Laboratory confirmation

It is important to keep in mind that the initial diagnosis of dengue virus (DENV) infection is clinical, and adequate suspicion can guide the confirmation protocol. Laboratory results should be analyzed with clinical 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, detection of NS1 antigen by ELISA, and in some cases viral isolation in culture for further characterization) and serological (IgM detection) tests. However, virological assays that demonstrate the presence of the whole virus, its genetic material or its proteins should be prioritized for case confirmation. Virological assays for dengue are performed on serum samples taken during the first 5 days after the onset of symptoms (acute phase) (**Figure 8**) *(7)*.

On the other hand, serological assays based on IgM detection should be analyzed with care, taking into account the time that antibodies circulate in the blood after infection, as well as the possibility of cross-reactivity with other flaviviruses (including Zika, yellow fever and others) and nonspecific detection. Thus, a single IgM result in a patient indicates only one contact with the virus, and these cases are 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) that allows to demonstrate seroconversion or increase in antibody titer, can be useful to clarify the diagnosis (**Figure 9**) *(7)*.

It is important to have a clear laboratory algorithm for early detection. Although multiple molecular methodologies (*multiplex* PCR) are useful when there is no clear clinical suspicion, when a case of dengue meets the established definitions and where the clinical picture is compatible, it is suggested to prioritize protocols for specific detection (*singleplex*) of the virus *(7)*.

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

On the other hand, the use of immunochromatographic tests, also known as rapid tests (NS1 and/or antibodies) is not recommended since, due to their low sensitivity, false negative results may be obtained; their 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. To the extent possible and according to the capabilities of each laboratory, it is recommended that 100% of severe and fatal dengue cases be sampled, while only a proportion of those cases without alarm signs will be necessary for surveillance (10-30% or a maximum number of samples according to the installed capacity).

Figure 8. Algorithm for virological testing in suspected cases of dengue, chikungunya and Zika**.**
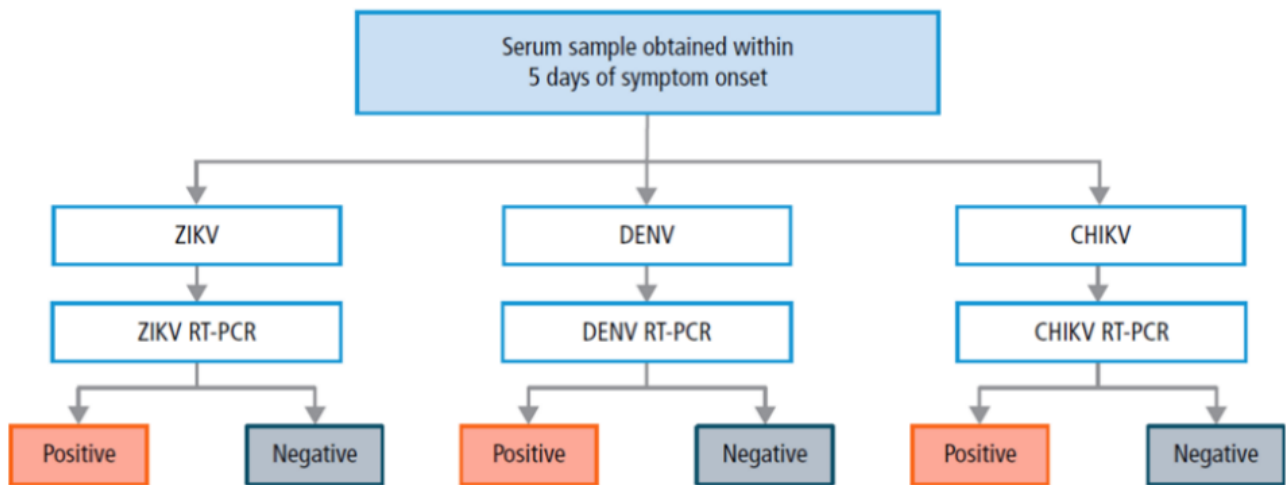
Source: Pan American Health Organization. Recommendations for the detection and laboratory diagnosis of arbovirus infections in the Region of the Americas. Washington, D.C., PAHO; 2022. Available from: https://iris.paho.org/handle/10665.2/57555.

Figure 9. Algorithm for serological testing in suspected cases of dengue and zika**.**
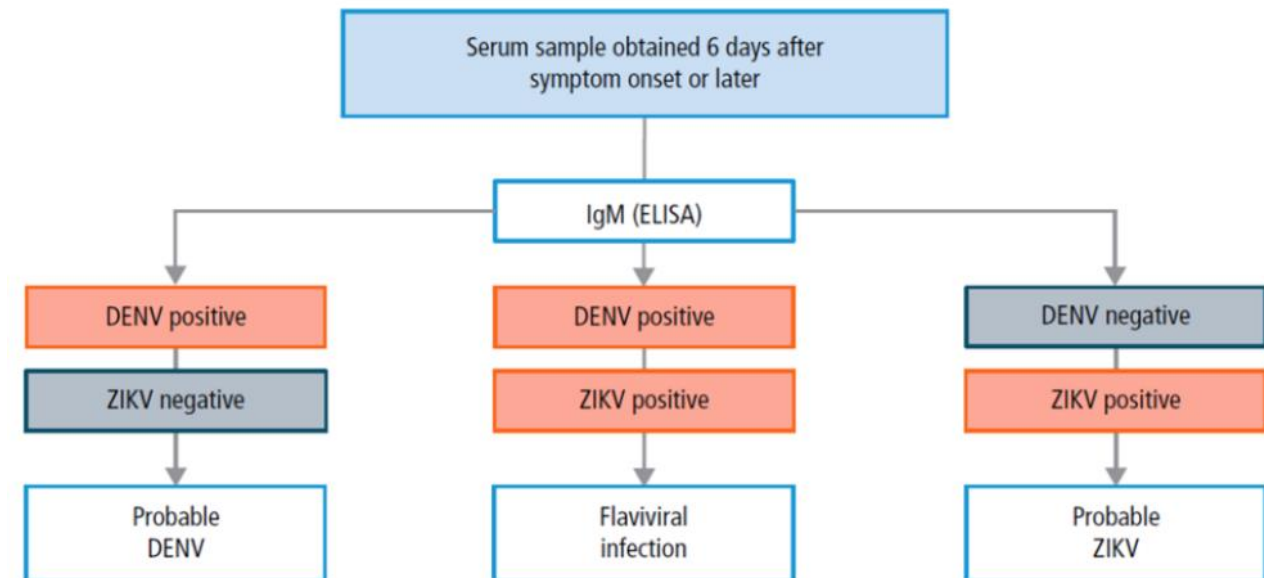
Source: Pan American Health Organization. Recommendations for the detection and laboratory diagnosis of arbovirus infections in the Region of the Americas. Washington, D.C.: PAHO; 2022. Available from: https://iris.paho.org/handle/10665.2/57555.

Aedes prevention and control measures

PAHO/WHO urges Member States to make effective use of available resources to prevent and/or control vector infestations in affected areas and health services. This will be achieved through the implementation of integrated vector control strategies, 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 has an impact on vector reduction.

- 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 to enable an integrated and intersectoral approach.

Given the high infestation of *Aedes aegypti* and the presence of *Ae. albopictus* in the Region, it is recommended that prevention and control measures be aimed at reducing the density of the vector and that they be accepted and collaborated with by the local population. Prevention and control measures to be implemented 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 the elimination of breeding sites in areas of high transmission and, if necessary, plan intensive actions in specific areas where regular garbage collection has been interrupted.

- Apply measures for the control *(8)* of breeding sites through the use of physical, biological and/or chemical methods that actively involve individuals, the family and the community.

- Define areas at high risk of transmission (risk stratification) *(9),* and prioritize those where there are concentrations of people (schools, terminals, hospitals, health centers, etc.). In these facilities, the presence of the mosquito should be eliminated within a diameter of at least 400 meters. It is important to pay special attention to health units, so that they are free of the presence of the vector and its breeding sites and do not become virus radiating points.

- In areas where active transmission is detected, it is suggested to implement measures aimed at eliminating infected adult mosquitoes (mainly through the use of insecticides) in order to stop and interrupt transmission. This action is exceptional in nature and is only effective when carried out by properly trained personnel under internationally accepted technical guidelines; and when performed concomitantly with the other proposed actions. The main action to interrupt transmission when it occurs intensively is the elimination of adult mosquitoes infected with the Dengue virus (active transmission) by intradomiciliary spraying, using individual equipment or spatial spraying using heavy equipment mounted on vehicles, in addition to the destruction and/or control of vector breeding sites inside homes *(10).*

- An effective adult control modality that can be used, considering the available operational capacities, is indoor residual spraying, which should be applied selectively to the resting places of *Ae. aegypti,* taking care not to contaminate food, drinking water storage containers or those used for cooking. This intervention in treated areas is effective for up to four months and can be used in shelters, homes, health services, schools and others. For more information, consult PAHO's Manual for Indoor Household Residual Spraying for *Aedes aegypti* Control in Urban Areas *(11)* and the document Control *of Ae. aegypti* in the COVID-19 Simultaneous Transmission Scenario *(12).*

- Adequate choice of the insecticide to be used (following PAHO/WHO recommendations), its formulation and knowledge of the susceptibility of *Aedes* populations to the insecticide *(13).*

- Ensure the proper functioning of spraying equipment and its maintenance and ensure insecticide reserves.

- Intensify supervision actions (quality control and coverage) of operators' field work, both for intradomiciliary spraying actions with individual equipment, as well as for space spraying tasks with heavy equipment mounted on vehicles, ensuring compliance with personal protection measures.

Personal preventive measures

Patients infected with dengue, chikungunya and/or Zika viruses are the reservoir of infection for others in their homes and in the community. It is necessary to communicate to patients, their families and the affected community about the risk of transmission and ways to prevent transmission by reducing the vector population and vector-human contact.

To minimize vector-patient contact it is recommended:

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

- Sick people, as well as other members of the household, should wear long sleeves to cover the extremities.

- Repellents containing DEET, IR3535 or Icaridin may be applied to exposed skin or clothing, and their use must be in strict accordance with product label instructions.

- Use mosquito netting/netting on doors and windows.

Communication and community participation

It is recommended to establish and implement a rapid communication action plan focused on:

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

- Information on symptoms and warning signs of dengue when the epidemiological situation of the country so requires, for example, in the event of an increase in the number of cases or deaths due to dengue.

It is recommended to consider as main 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 arbovirus transmission.

Hearings:

- 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. In addition, information on the warning signs of dengue to seek immediate medical attention.
- Health workers (including nurses, physicians, primary care and hospital staff) and vector control program technicians: information on symptoms and warning signs of dengue that are present or increasing in the country.

Every effort should be made to obtain community support for dengue prevention and control.

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

The population and household members should be encouraged to eliminate sources of mosquito breeding, both household and peri-household. This is everyone's task: 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 targeted for prevention of vector breeding. Other breeding sites, such as roof gutters and other water retention containers, should also be cleaned periodically.

Both health care personnel and affected communities should be encouraged to know 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 *(8)*.

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