



CDC/IDSA Clinician Call


August 28, 2024

Welcome & Introductions



Dana Wollins, DrPH, MGC
Senior Vice President, Strategy
Infectious Diseases Society of America

- About the Clinician Call: Initiated in 2020 as a forum for information sharing among frontline clinicians caring for patients with COVID-19. Now expanded to address timely topics in infectious diseases—all from a clinical perspective.
- The views and opinions expressed here are those of the presenters and do not necessarily reflect the official policy or position of the CDC or IDSA. Involvement of CDC and IDSA should not be viewed as endorsement of any entity or individual involved.
- This webinar is being recorded and can be found online at www.idsociety.org/cliniciancalls.



CDC/IDSA Clinician Call:
Update on Dengue & Other
Vector Borne Diseases

1. Dengue Virus Update



Situational Update on Dengue

Joshua M. Wong, MD

Medical Officer Dengue Branch

Division of Vector Borne Diseases

U.S. Centers for Disease Control and Prevention



Dengue in Puerto Rico: A Federally Qualified Health Center Experience

Hector Villanueva, MD

Senior Clinical Advisor

HealthproMed

San Juan, Puerto Rico

2. West Nile Virus & Oropouche Update



J. Erin Staples, MD, PhD

Lead for Surveillance, Epidemiology, and Clinical Care Task Force

Oropouche in 2024 Dengue-Oropouche Response

U.S. Centers for Disease Control and Prevention

3. Q&A/Discussion – All Presenter Plus



Bonnie Word, MD, FIDSA

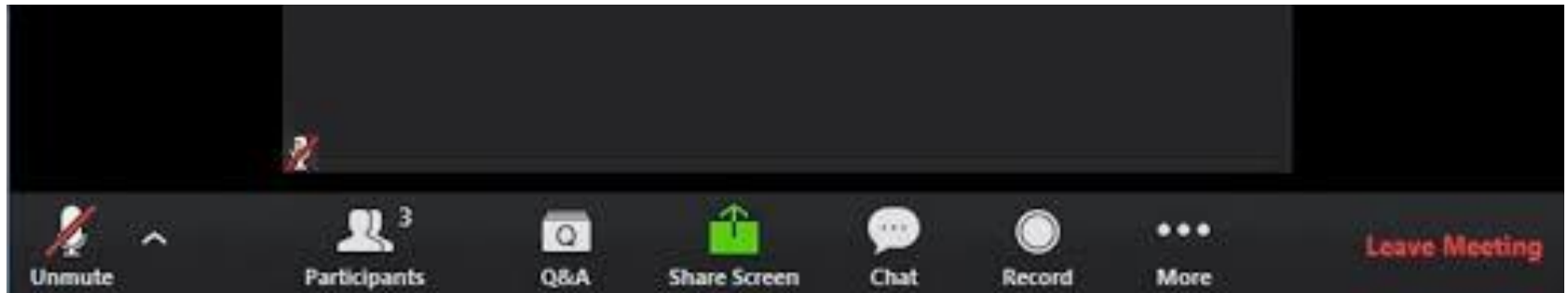
Member, IDSA Board of Directors

Houston Travel Medicine Clinic

Question?
Use the “Q&A” Button



Comment?
Use the “Chat” Button



Dengue Virus Update

Joshua M. Wong, MD

U.S. Centers for Disease Control & Prevention

Hector Villanueva, MD

HealthproMed



Situational Update on Dengue

Joshua M Wong, MD

Medical Officer, Dengue Branch, Division of Vector Borne Diseases, NCEZID, CDC

IDSA Conference Call

Aug 28, 2024

Why should we care about dengue?

 NPR

Dengue fever is — unfortunately — having a banner year. Can it be quelled?

In the Americas alone, almost 10.4 million suspected cases of dengue, a mosquito-borne viral disease, were reported to the World Health...


1 week ago



 Africa News

Burkina Faso: more than 350 deaths from dengue fever in a month

An epidemic of dengue fever, a mosquito-borne disease, claimed 356 lives in Burkina Faso between mid-October and mid-November, bringing the...

 Reuters

Dengue outbreak in Argentina on track to break records

A major outbreak in Argentina of dengue, a mosquito-borne illness that can be fatal, is on track to smash previous records, reflecting wider...

Mar 21, 2024



Our Discussion Today

- Dengue virus review
- Dengue epidemiology globally and in the U.S.
- Steps to prepare for increased dengue cases:
 - Recognize dengue in your clinical practice
 - Know the ▲ warning signs▲ for progression to severe dengue
 - Test appropriately for dengue

Dengue Review

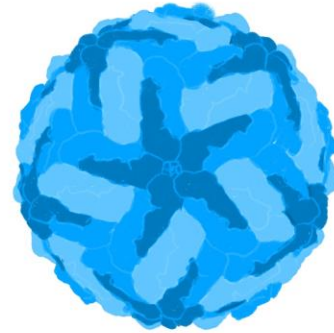
Dengue Viruses (DENVs)

- DENV-1, 2, 3, 4

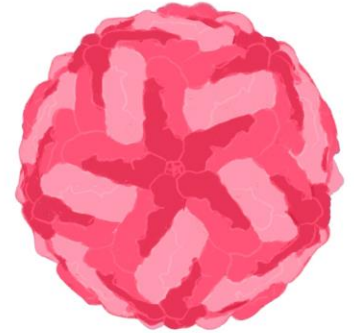
- **Lifelong** DENV type-specific immunity
- **Short-term** cross-immunity (~1–2 years)
- Individuals can be **infected up to 4 times** in their life.

- **Clinical Course**

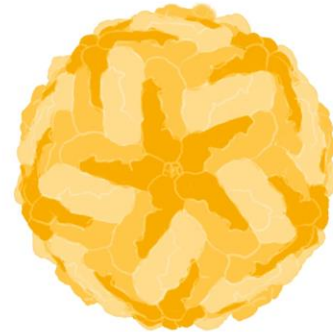
- ~3 in 4 DENV infections are **asymptomatic**.
- If symptomatic, onset occurs abruptly after an **incubation period of 5–7 days** (Range: 3–10).
- Early clinical findings are **nonspecific**
 - Can be difficult to distinguish from other pathogens.
- Can be life-threatening
- Specific “warning signs” predict progression to severe disease



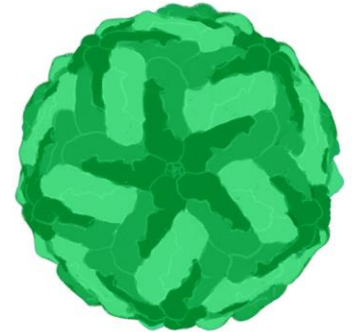
Dengue 1



Dengue 2



Dengue 3



Dengue 4

DENV Transmission

- Vector-borne
 - Saliva of infected *Aedes spp.* mosquito
- Other modes
 - Perinatal
 - Blood transfusion or organ transplantation
 - Needle stick, mucocutaneous, or hospital/laboratory accident
 - Breast milk



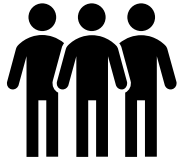
Aedes aegypti



Aedes albopictus

Dengue Globally

2024 Global Dengue by the Numbers



- **>10 million cases** reported worldwide

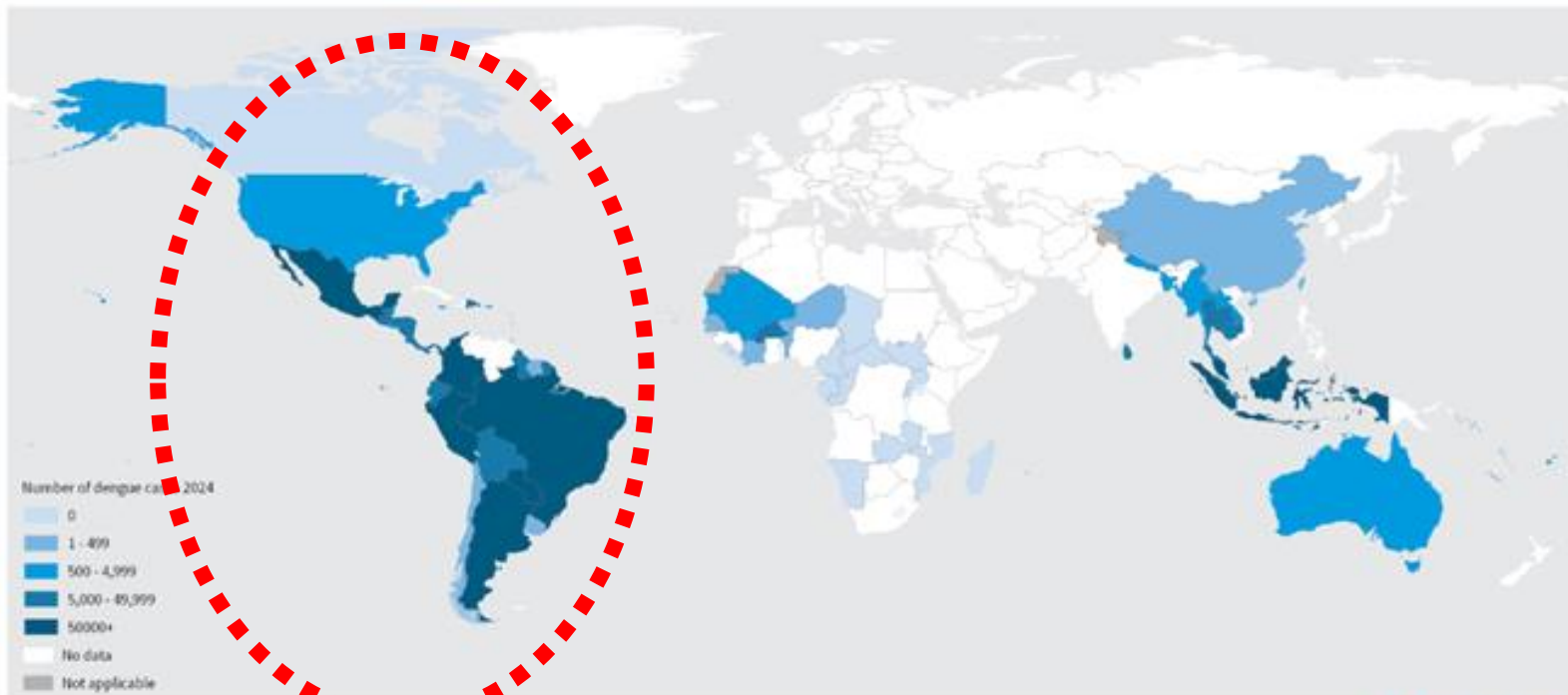


- **103 countries/territories** reporting cases
 - All 6 WHO regions



- **>20 countries** reporting outbreaks

Geographical distribution of dengue cases as reported to WHO from January to April 2024



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

Data Source: WHO
Map Production: World Health Emergencies
Map Date: 28 May 2024

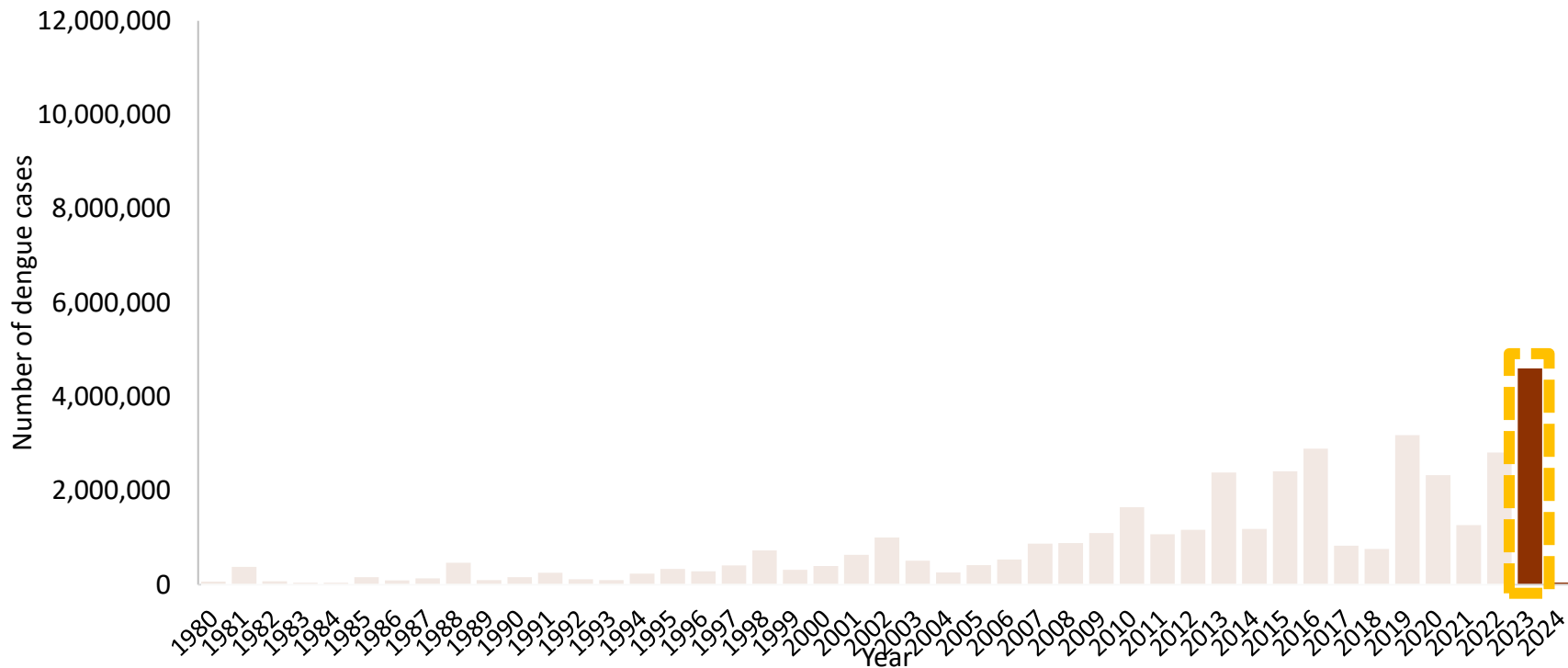
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Dengue cases in the Americas, 1980–2023*

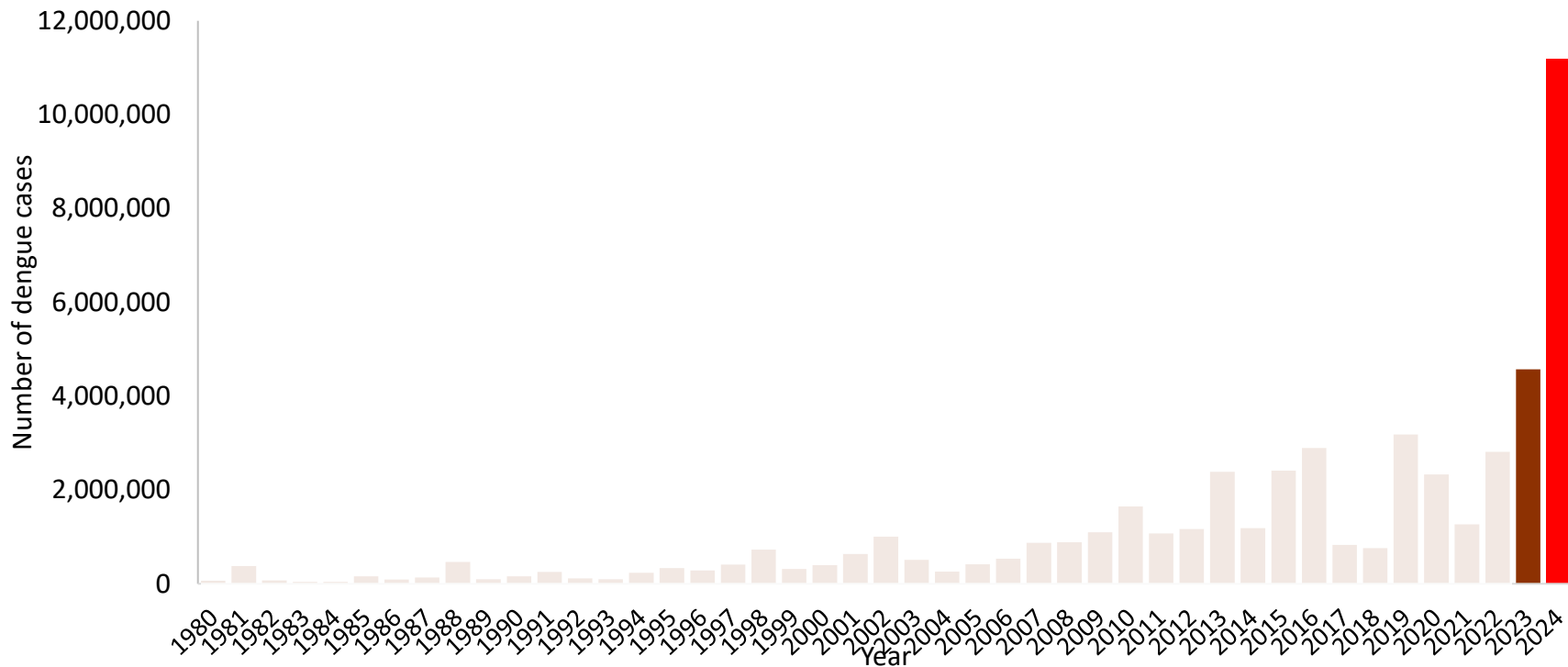
More than 4.6 million cases reported in 2023



*Data from PAHO PLISA Health Information Platform for the Americas

Dengue cases in the Americas, 1980–2024*

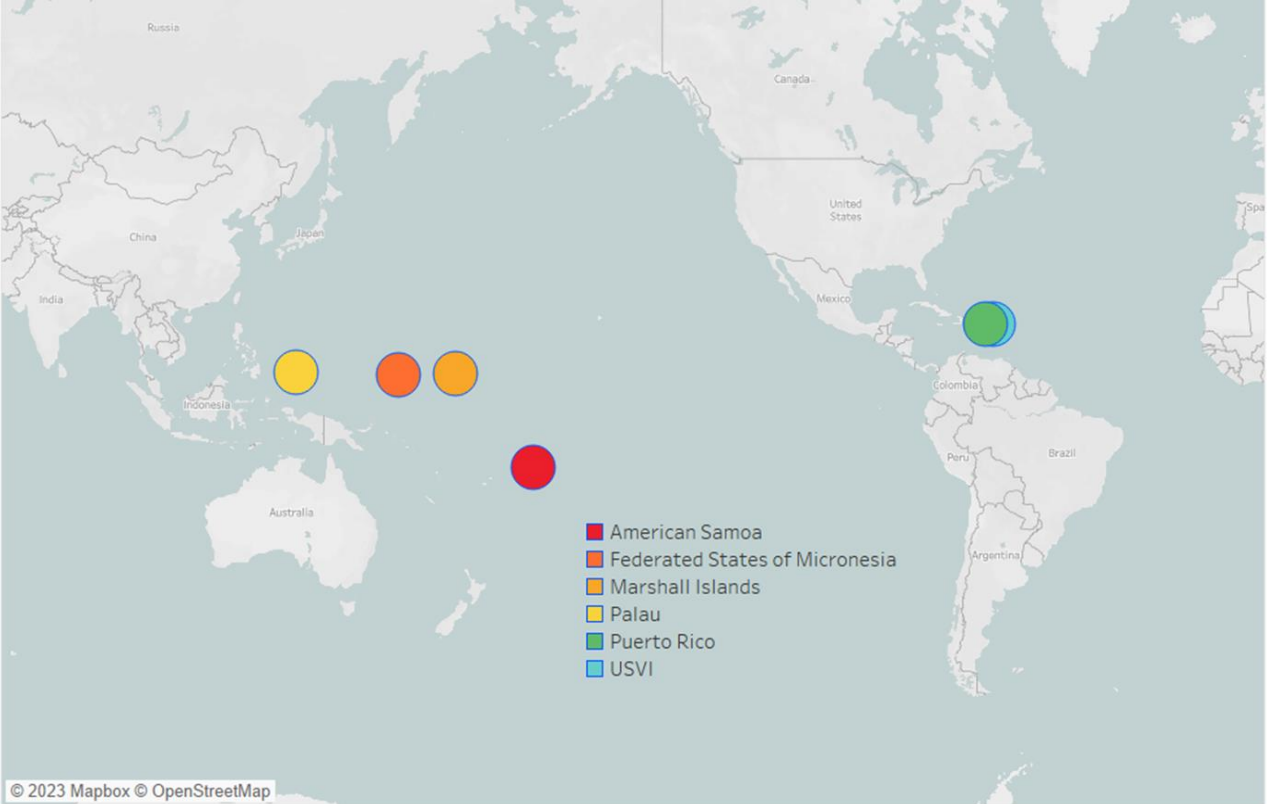
More than **11 million** cases reported as of Aug 13, 2024



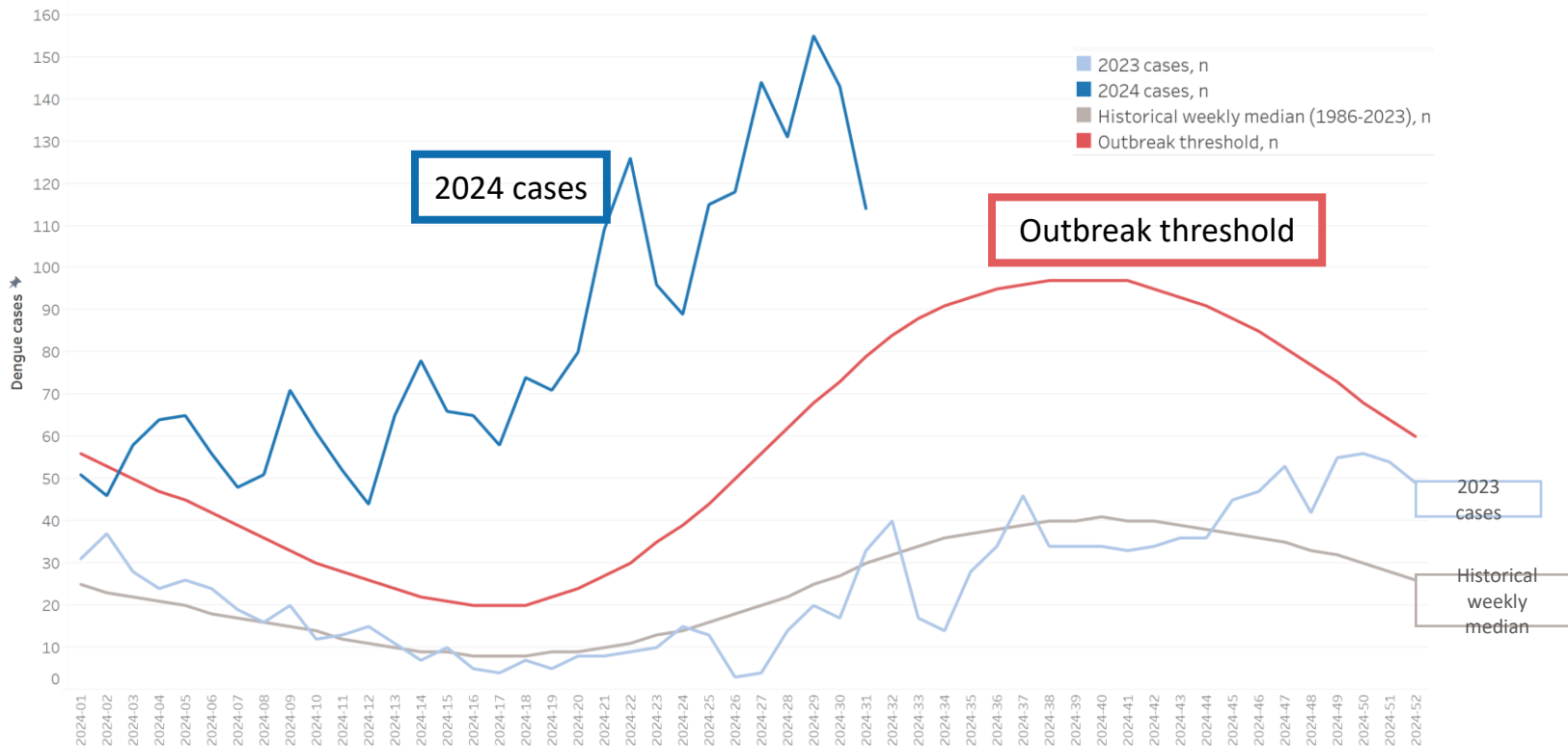
*Data from PAHO PLISA Health Information Platform for the Americas

Dengue in the US

In the United States, dengue is endemic in **6 U.S. territories and freely associated states.**

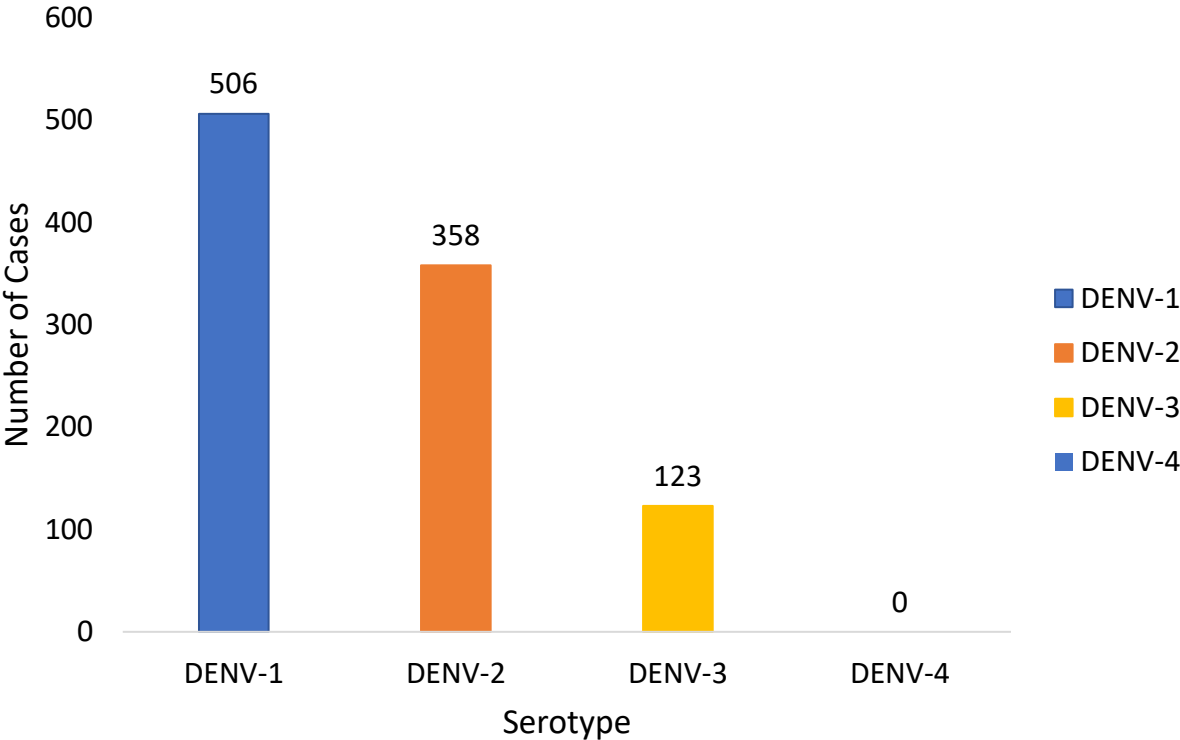


Puerto Rico locally acquired dengue cases reported by week, 2024 compared to the historical median (1986-2023)¹

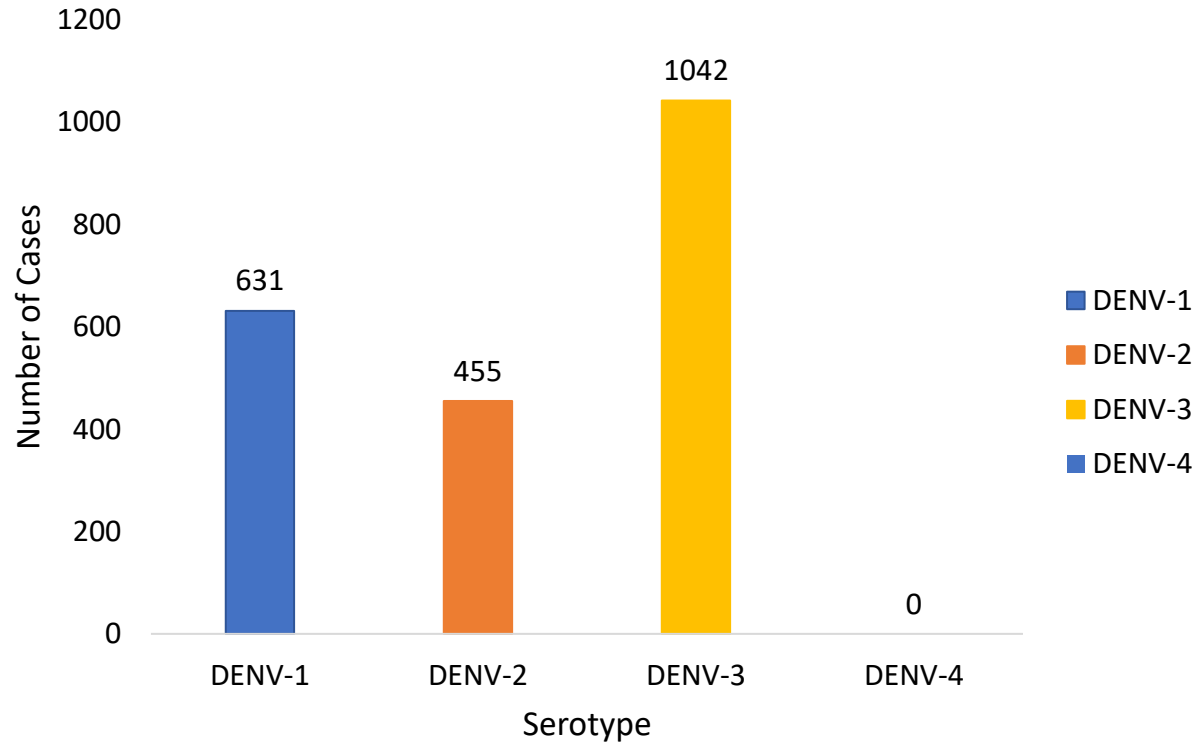


*Data from: [Data and Statistics on Dengue in the United States | Dengue | CDC](#). Accessed 8/4/2024. Cases for 2023 and 2024 are preliminary.

In 2023, **DENV-1** was the predominant serotype in PR.



As of August 2024, **DENV-1** and **DENV-3** now account for most new infections in PR.



Puerto Rico declared a public health emergency due to dengue on March 25, 2024.

Salud declara emergencia de salud pública por dengue en Puerto Rico

La última epidemia de dengue fue en 2012

Wilmarielys Agosto, El Vocero
25/03/2024



CDC activated a **program level** dengue emergency response in April and escalated to **center level** in July 2024.



A dengue health advisory was released in the health alert network on June 25.

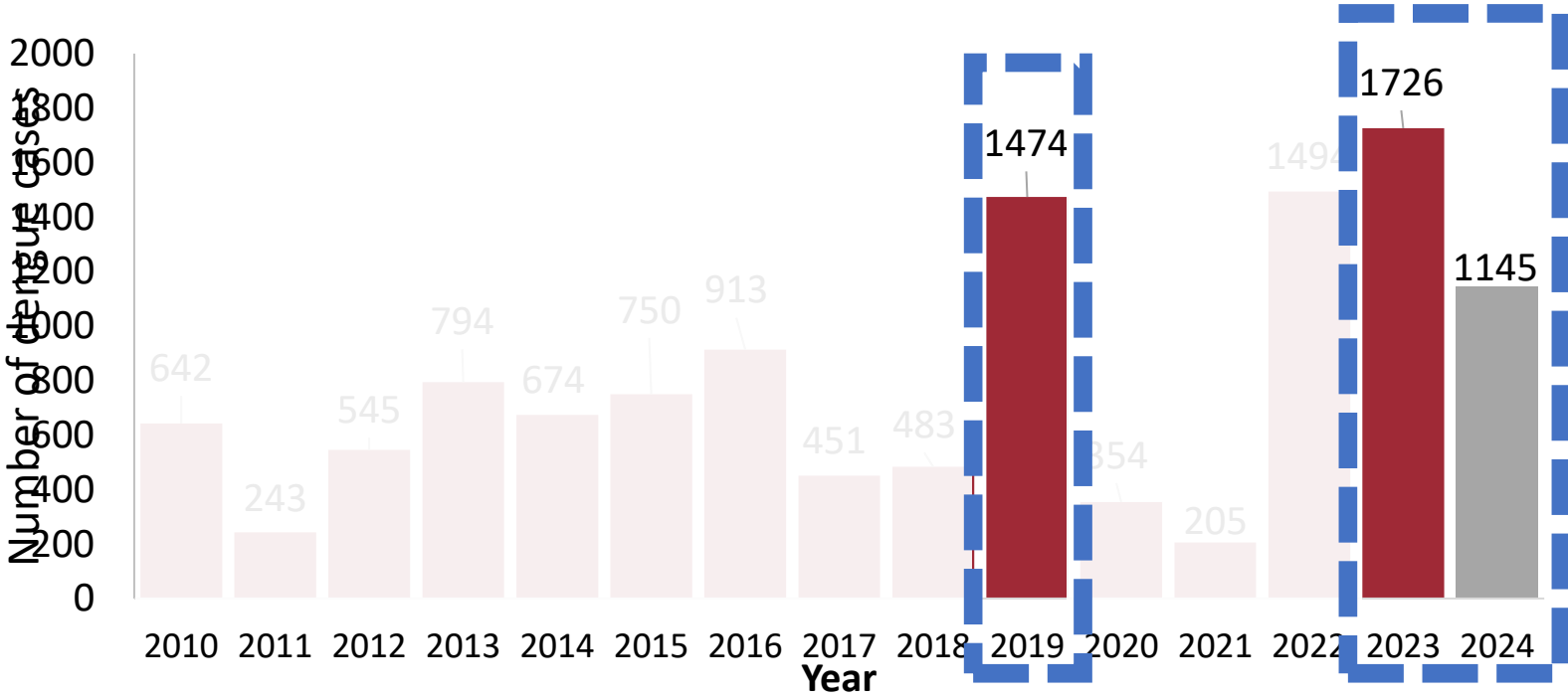


HAN available at: <https://emergency.cdc.gov/han/2024/han00511.asp>



Among dengue cases reported to ArboNET from 2010–2022,
**most dengue cases in U.S. states (>94%) were
associated with travel to endemic areas.**

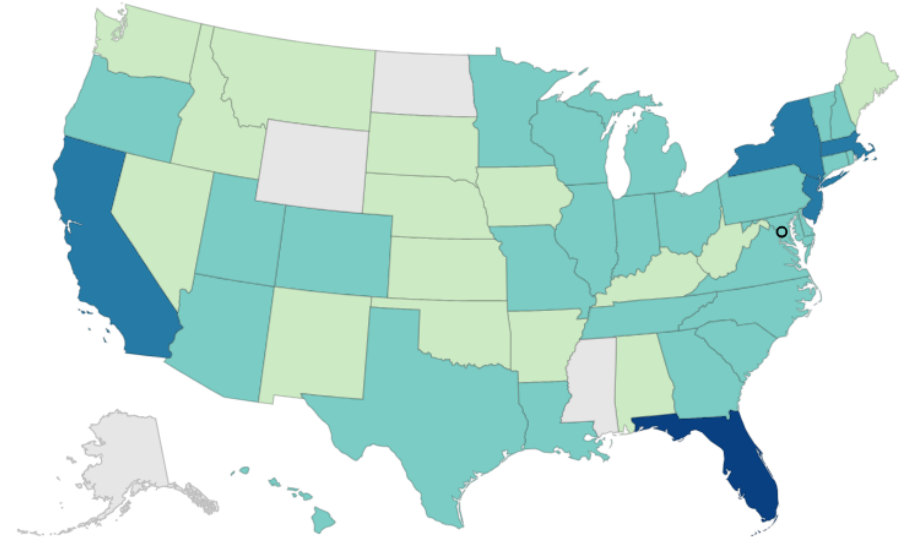
Travel associated dengue cases (N = 12,057) reported in the US by year, 2010–2024*



*Data from: <https://www.cdc.gov/dengue/statistics-maps/data-and-maps.html>. Accessed 8/19/2024. Cases for 2023 and 2024 are preliminary.

Travel associated dengue cases, Jan 1–Aug 19, 2024 (n=1,145)

- Travel associated cases reported from 50 jurisdictions
- Highest case numbers:
 - Florida (n=261)
 - New York (n=169)
 - California (n=88)

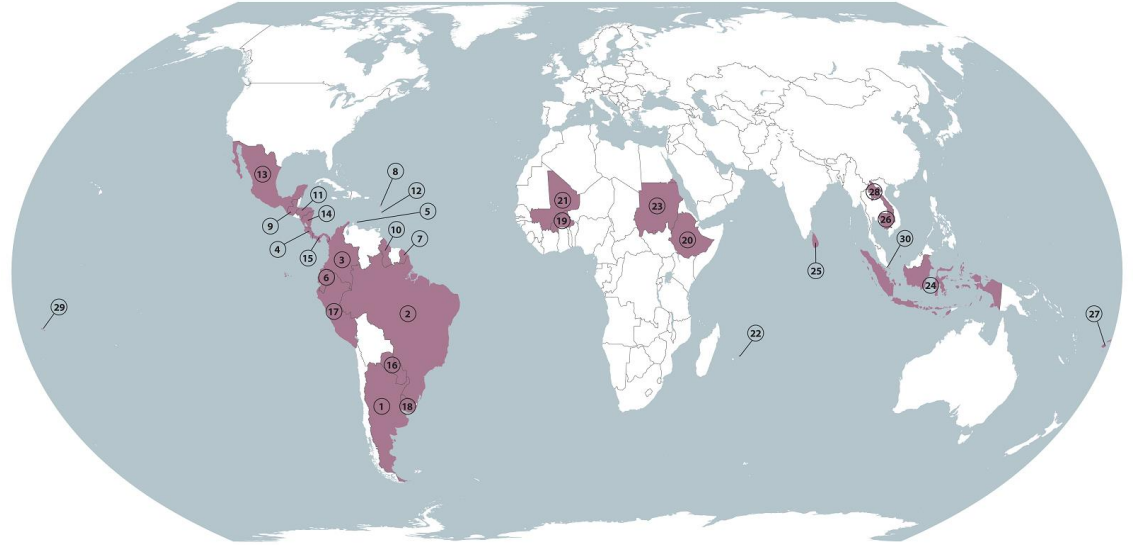


AS GU PR VI MP FM PW MH

○ No reported cases ● 1 to 4 ● 5 to 49 ● 50 to 249 ● 250+

New Global Dengue Webpage Travel Health Notices

<https://wwwnc.cdc.gov/travel/notices/level1/dengue-global>



Dengue THN by WHO Region

AMERICAS

1. Argentina
2. Brazil
3. Colombia
4. Costa Rica
5. Curaçao
6. Ecuador
7. French Guiana
8. Guadeloupe
9. Guatemala
10. Guyana
11. Honduras
12. Martinique
13. Mexico
14. Nicaragua
15. Panama
16. Paraguay
17. Peru
18. Uruguay

AFRICA

19. Burkina Faso
20. Ethiopia
21. Mali
22. Mauritius
23. Sudan

SOUTH-EAST ASIA

24. Indonesia
25. Sri Lanka

WESTERN PACIFIC

26. Cambodia
27. Fiji
28. Laos
29. Samoa
30. Singapore

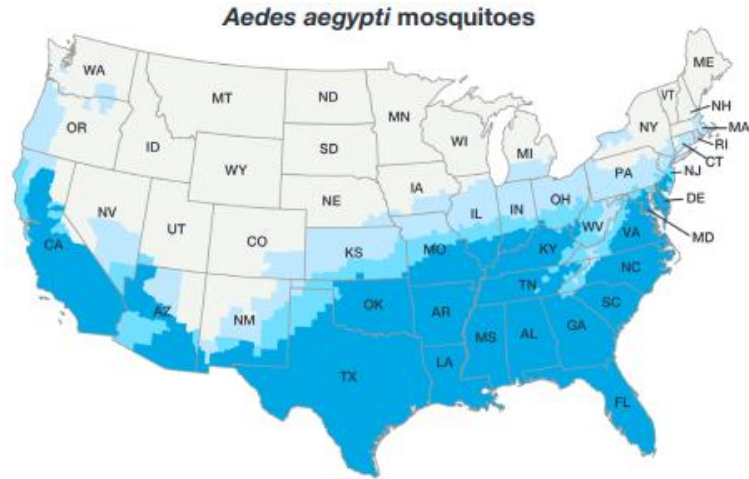


Countries reporting higher-than-usual numbers of dengue cases

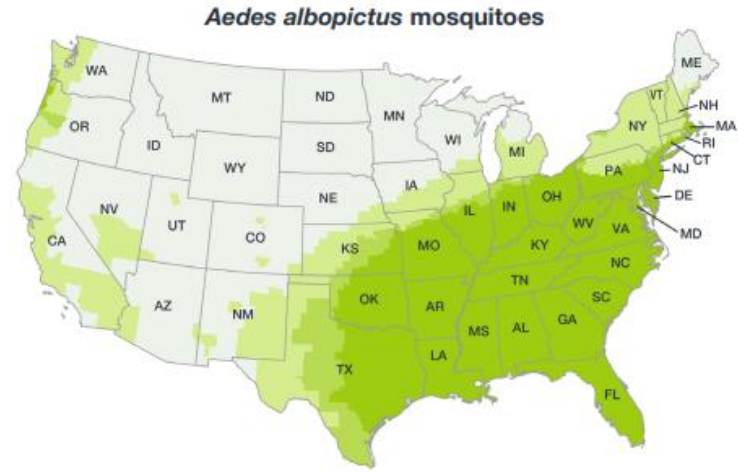
Names and boundary representation are not necessarily authoritative.

Locally Acquired Dengue in U.S. States

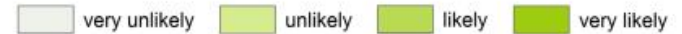
Dengue vectors are present across much of the US.



Mosquitoes' ability to live and reproduce

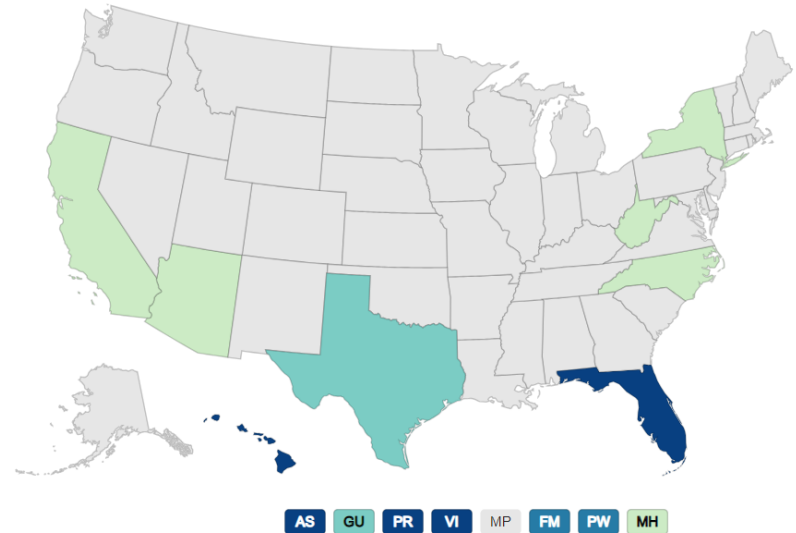


Mosquitoes' ability to live and reproduce



Locally Acquired Dengue in US States, 2010–2023

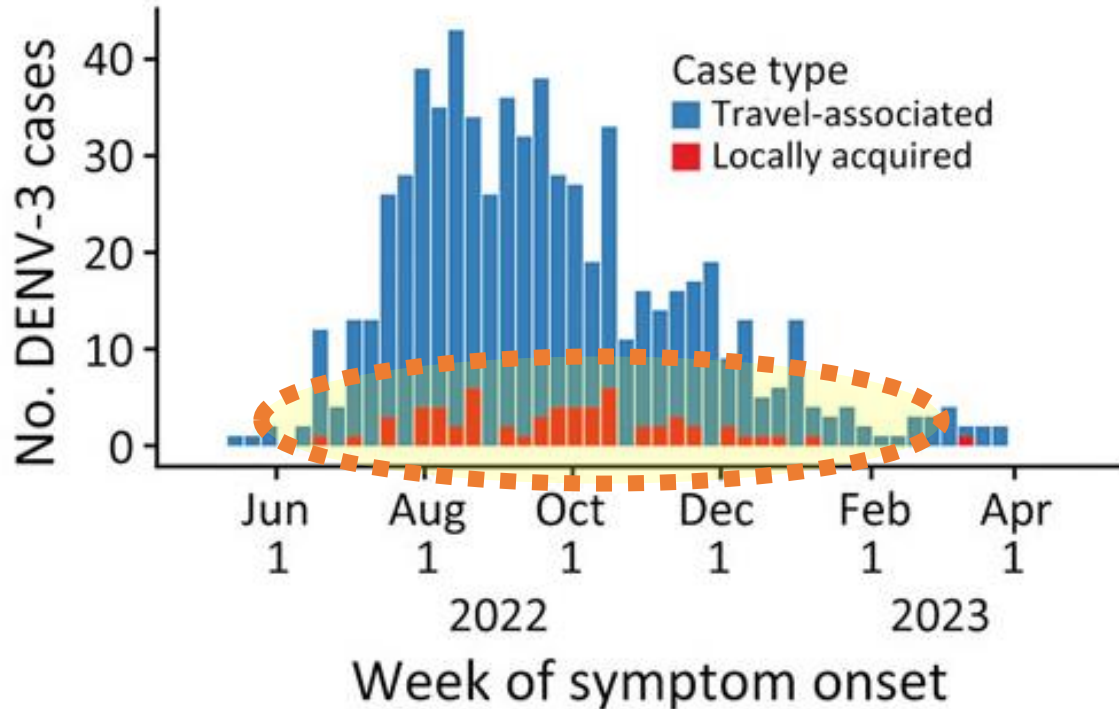
- Sporadic cases historically limited to outbreaks in:
 - Florida, Hawaii, Texas
- Recently, more states are reporting local DENV transmission.
 - Arizona, n=2 (2022)
 - California, n=2 (2023)



Map from: <https://www.cdc.gov/dengue/statistics-maps/current-data.html>

Multiple DENV introductions in Florida from returning travelers resulted in increased local transmission.

Reported dengue cases in Florida, by month — Florida Department of Health, 2022–2023




How can we prepare for
increasing dengue cases?

Emerging Tools to Prevent Dengue

- Novel vector control strategies under evaluation in multiple countries
- Dengue vaccines
 - **Dengvaxia**: recommended in US (children 9-16 years old with previous DENV infection and living in endemic areas)
 - **TAK-003**: licensed in several countries
 - **Butantan-DV**: high efficacy in early phase 3 results
- No dengue vaccines are currently recommended for use in US travelers.



How can we prepare for increasing dengue cases?

- **Recognize** dengue in your clinical practice
 - **Know the warning signs** for progression to severe dengue
 - **Test** appropriately for dengue
- 

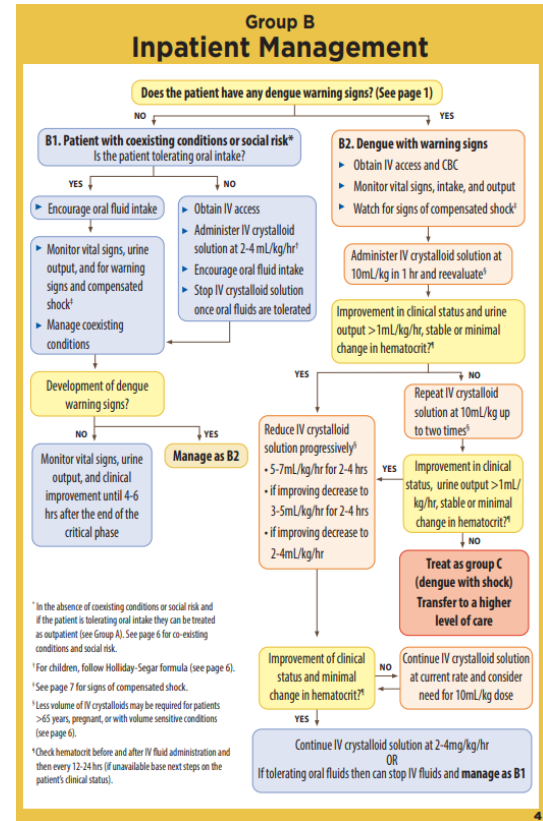
How can we prepare for increasing dengue cases?

- **Recognize** dengue in your clinical practice



Early recognition and appropriate treatment of dengue saves lives.

- No specific antiviral treatment available.
- Standard of care is protocolized IV fluid management, according to WHO guidelines.
- Up to 13% mortality if severe disease is untreated but can be reduced to <0.05% mortality with appropriate management.



All clinicians should be asking:

**Could this patient
have dengue?**

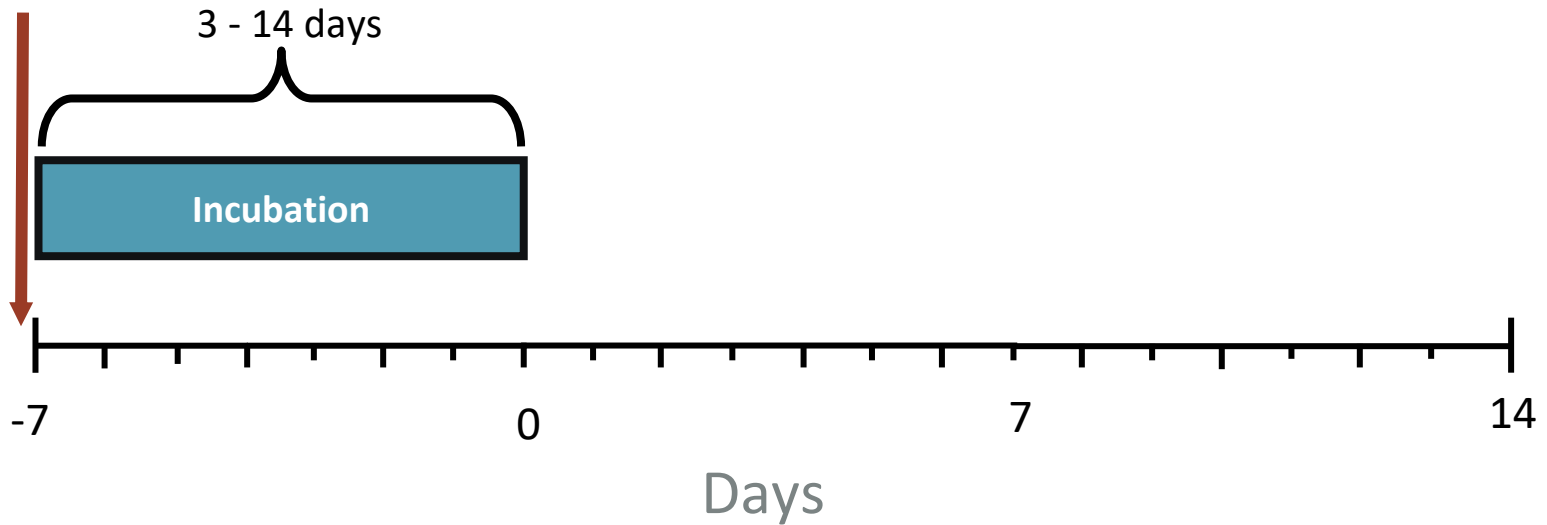
How can we prepare for increasing dengue cases?

- Recognize dengue in your emergency rooms
- **Know the warning signs** for progression to severe dengue



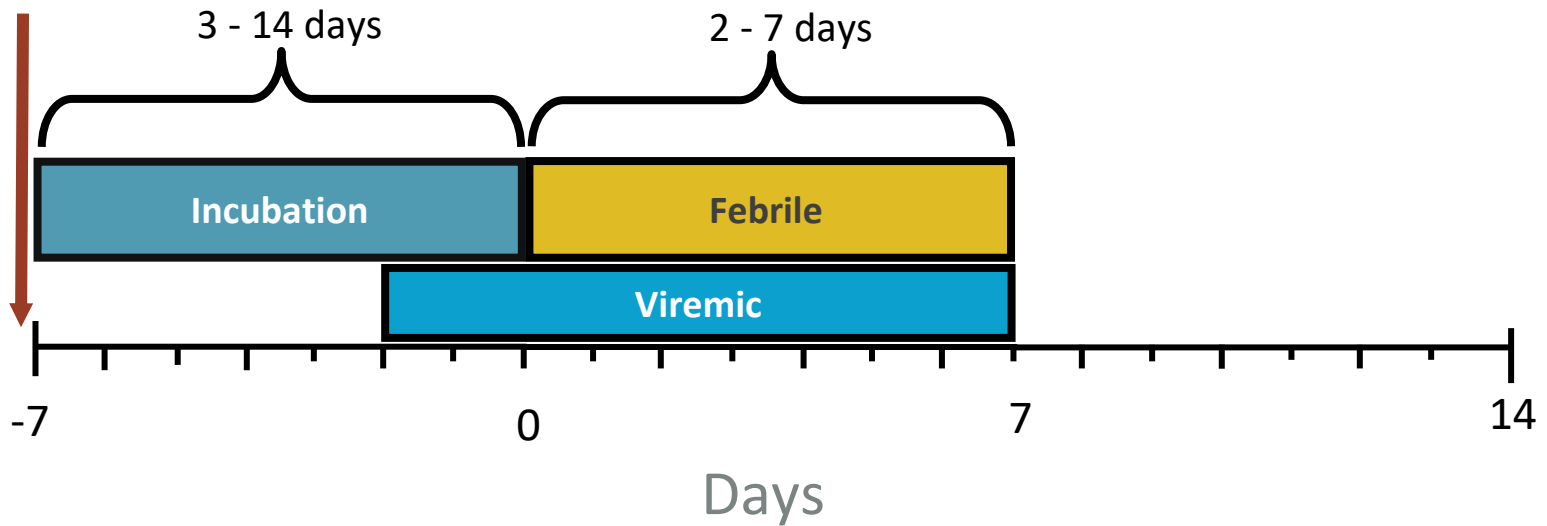
Dengue Clinical Course

Mosquito
bite



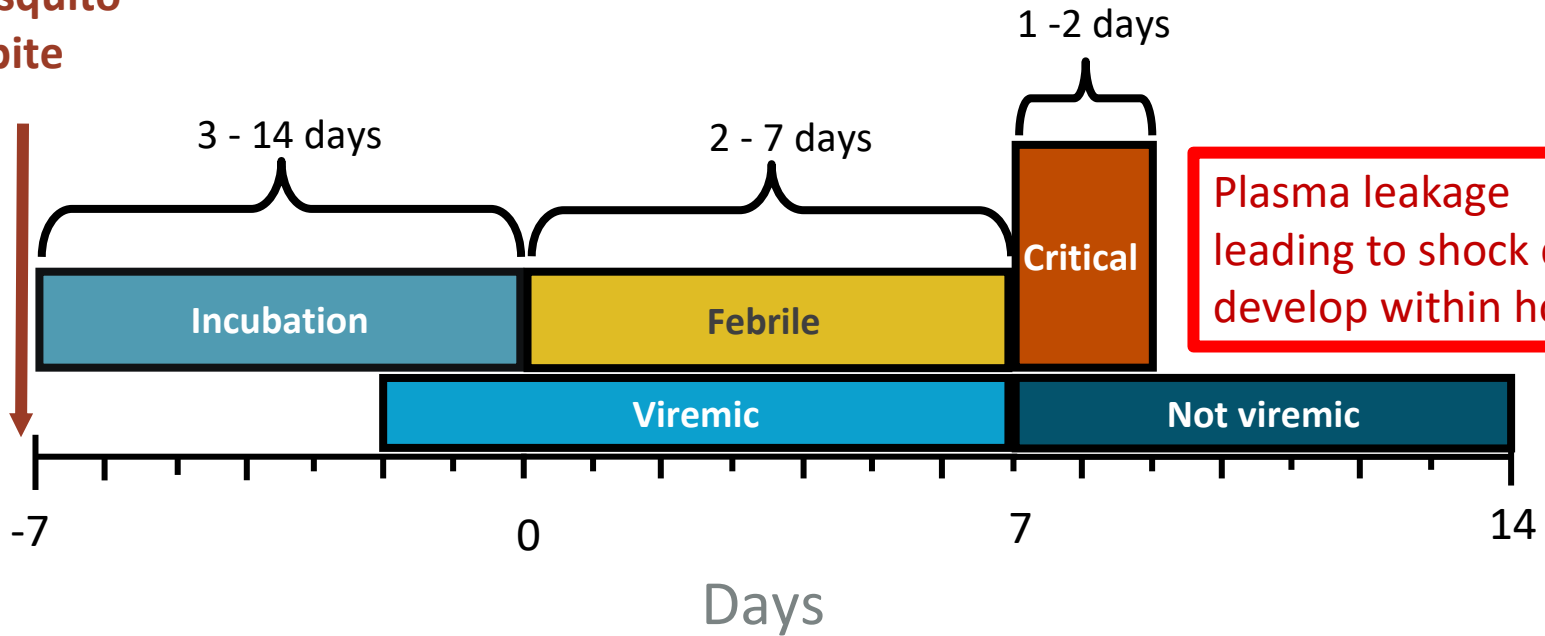
Febrile Phase

Mosquito
bite



Critical Phase

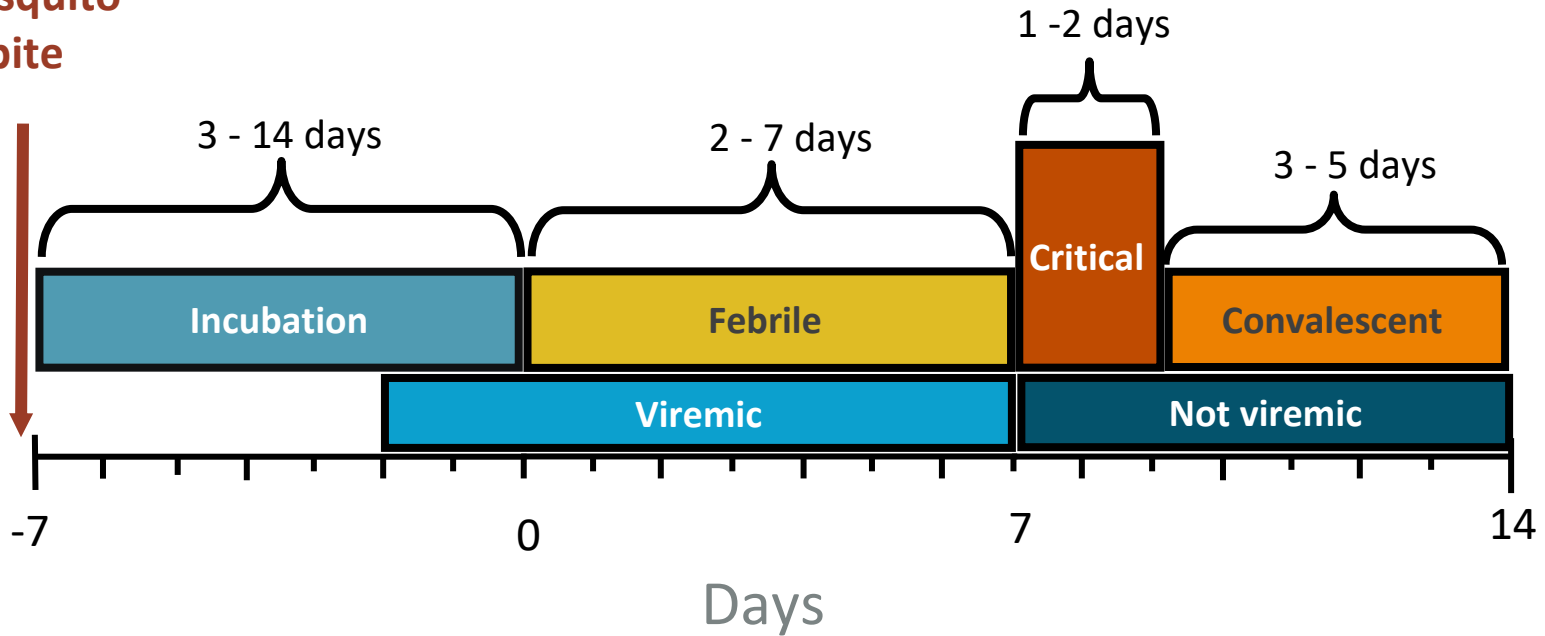
Mosquito
bite



Plasma leakage
leading to shock can
develop within hours!

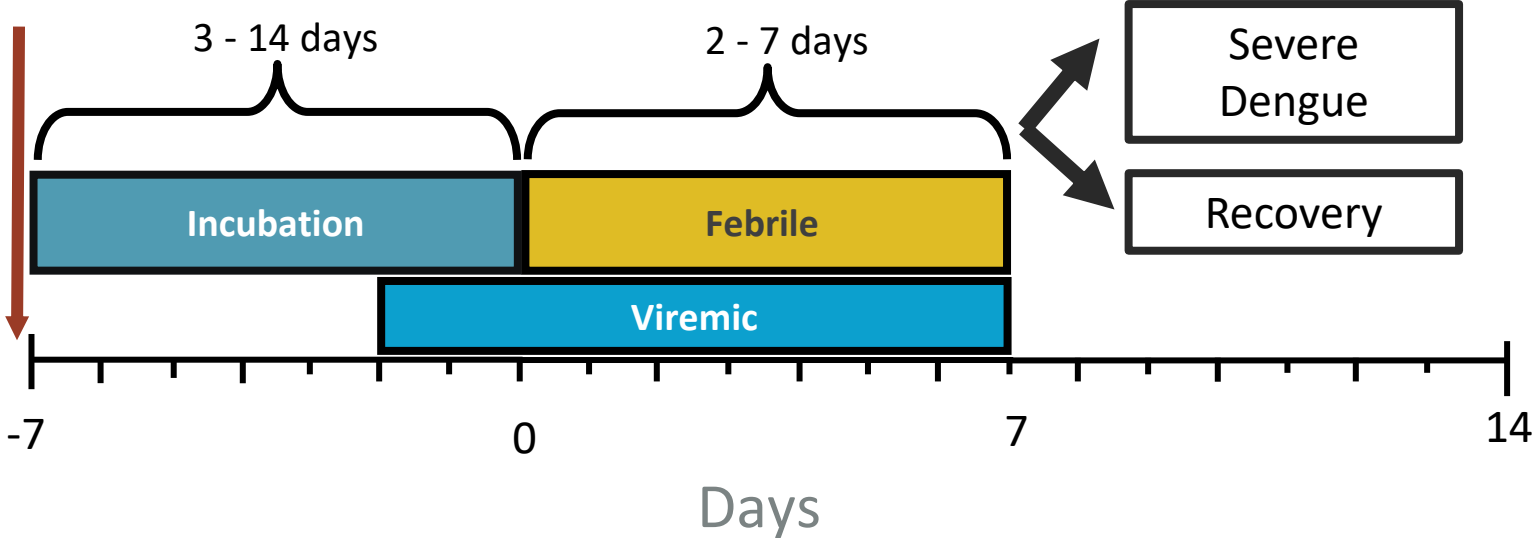
Convalescent Phase

Mosquito
bite



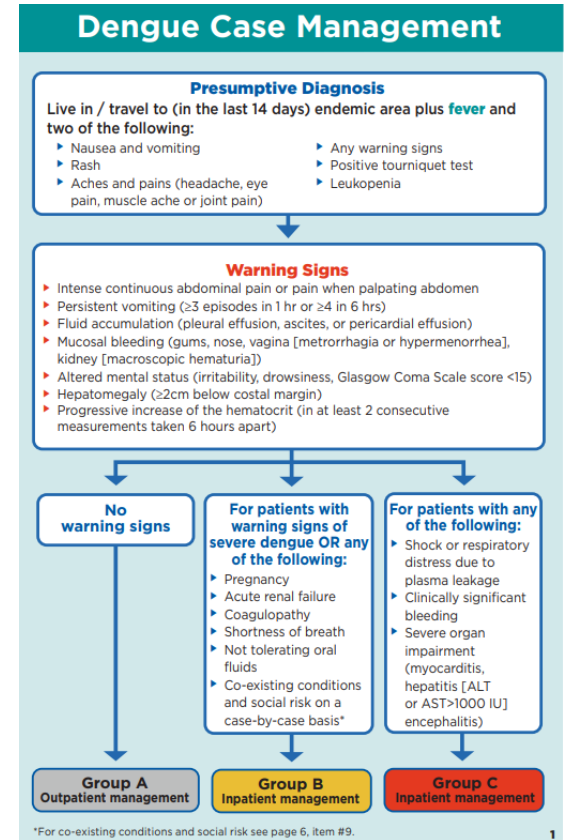
How do I know if my patient will progress to severe dengue?

Mosquito bite



! Dengue Warning Signs !

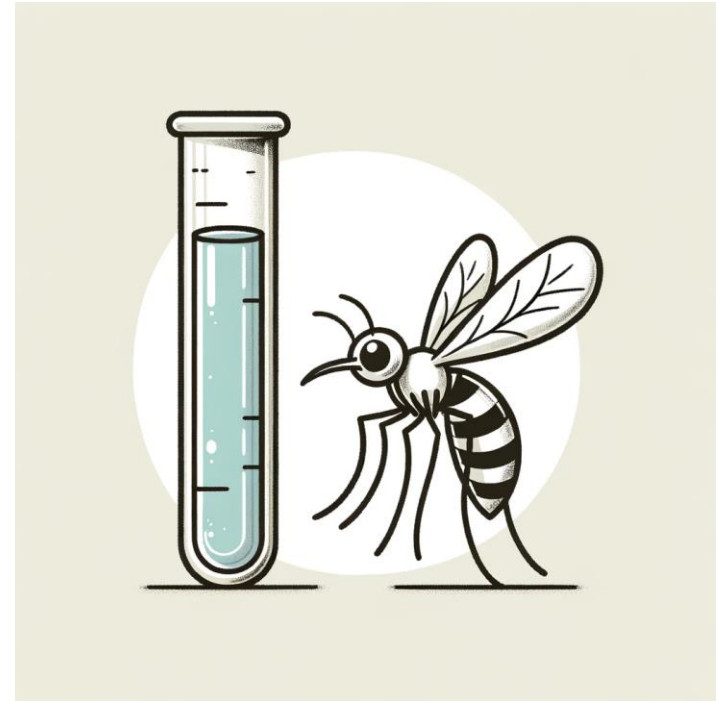
- Intense continuous **abdominal pain** or tenderness
- **Persistent vomiting**
 - ≥ 3 episodes in 1 hr or ≥ 4 in 6 hrs
- **Fluid accumulation**
 - pleural effusion, ascites, or pericardial effusion
- **Mucosal bleeding**
 - gums, nose, vagina (metrorrhagia or hypermenorrhea), kidney (macroscopic hematuria)
- **Altered mental status**
 - irritability, drowsiness, Glasgow Coma Scale score < 15
- **Hepatomegaly**
 - ≥ 2 cm below costal margin
- **Progressive increase of hematocrit**
 - in at least 2 consecutive measurements taken 6 hours apart



For further dengue training resources, visit:
<https://www.cdc.gov/dengue/hcp/clinical-care/index.html>

How can we prepare for increasing dengue cases?

- Recognize dengue in your emergency rooms
- Know the warning signs for progression to severe dengue
- **Test** appropriately for dengue



Laboratory testing is most sensitive when performed within the first 7 days of illness.

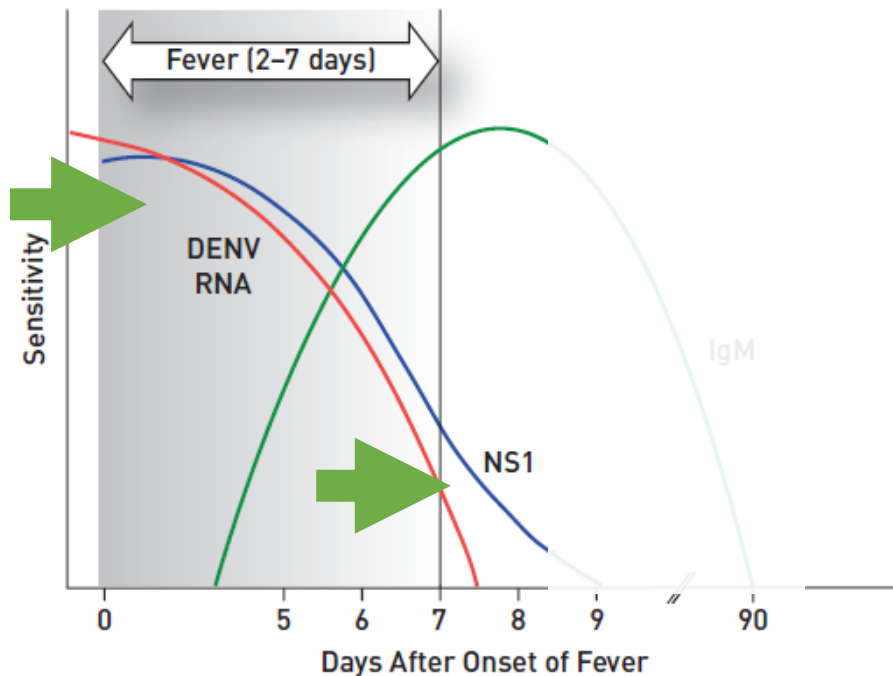
- **Within 7 days** of symptom onset, test with:

RT-PCR + IgM ELISA

or

NS1 antigen ELISA + IgM ELISA

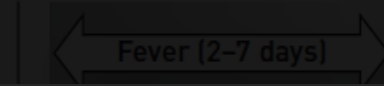
Using this test combination provides a laboratory diagnosis in >90% of dengue cases.*



For more information on testing, visit: www.cdc.gov/dengue/healthcare-providers/testing/

Laboratory testing is most sensitive when performed within the first 7 days of illness.

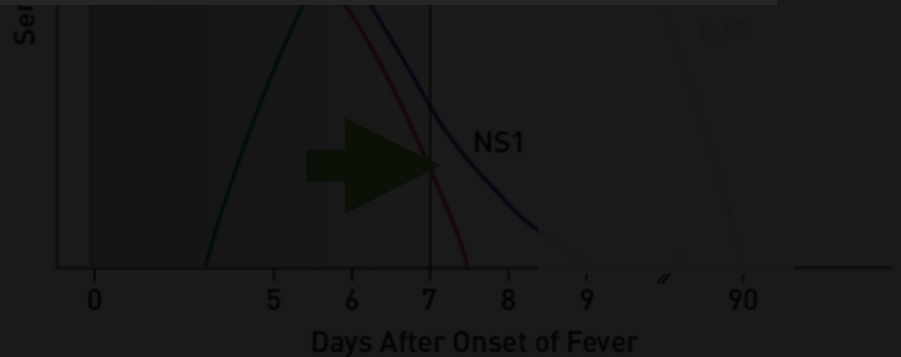
- Within 7 days of symptom onset, test with:



Most patients present for clinical care and testing during the first 7 days of illness.

NS1 antigen ELISA + IgM ELISA

Using these test combinations provides a laboratory diagnosis in >90% of dengue cases.*



For more information on testing, visit: www.cdc.gov/dengue/healthcare-providers/testing/

*Hunsperger, E. A., et al. (2016). "Performance of Dengue Diagnostic Tests in a Single-Specimen Diagnostic Algorithm." J Infect Dis 214(6): 836-844

Testing >7 days After Illness Onset

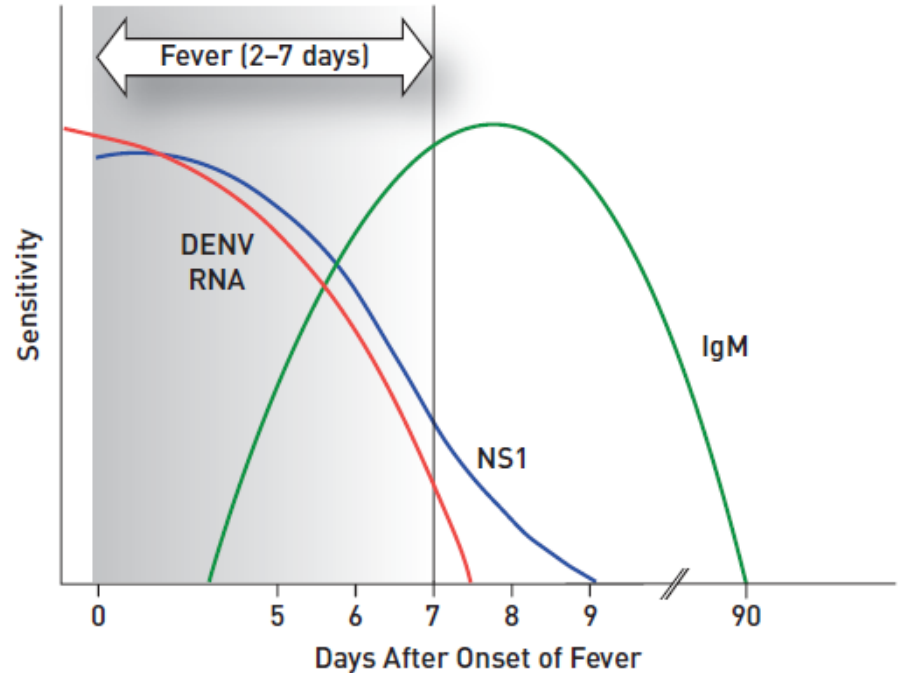
- Test with:

IgM serology

and consider*

NS1 antigen ELISA or RT-PCR

(lower sensitivity compared to days 0–7)



*Testing guidance may vary by jurisdiction, especially in endemic areas.

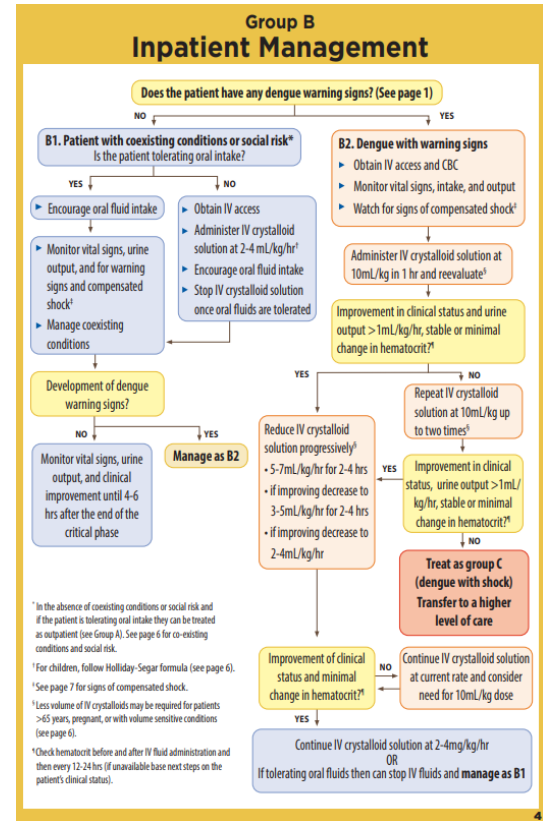
For more information on testing, visit: www.cdc.gov/dengue/healthcare-providers/testing/

In Summary

- Dengue cases globally are increasing.
- Dengue cases in the US are increasing.
 - Outbreak declared in PR
 - CDC has stood up an emergency response.
- Steps to prepare for increased dengue cases:
 - Recognize dengue in your clinical practice
 - Know the **▲ warning signs▲** for progression to severe dengue
 - Test appropriately for dengue

The new dengue clinical management pocket guide available.

- Early recognition and appropriate treatment of dengue saves lives.
- The pocket guide describes dengue case management, including recommendations by patient group (outpatient, inpatient, and inpatient with compensated or hypotensive shock).
- To download the pocket guide or request printed copies, visit:
 - <https://www.cdc.gov/dengue/hcp/pocketguide/index.html>



- **Don't forget:**
 - **Recognize** dengue in your clinical practice
 - **Know the warning signs** for progression to severe dengue
 - **Test** appropriately for dengue

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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nof9@cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.





DENGUE IN PUERTO RICO: A FEDERALLY QUALIFIED HEALTH CENTER
EXPERIENCE

HEALTHPROMED, SAN JUAN, P.R.

BACKGROUND

Dengue is endemic in PR – clinicians are used to managing Dengue cases throughout the year.

PR declared a public health emergency due to dengue on March 25/2024.

On June 21, it was extended up to December 31/2024.

Evidence based written protocols were reviewed and discussed with clinicians during faculty meetings.

BACKGROUND

Education was provided to patients and the community regarding dengue prevention and warning signs.

According to a recent administrative order, all clinicians are required to take a Dengue Management webinar, created by the Panamerican Health Organization (PAHO).

HealthproMed has an in-house laboratory to process diagnostic tests rapidly and efficiently.





FACTS ABOUT DENGUE

CLINICAL PRESENTATION

75% ASYMPTOMATIC

25% SYMPTOMATIC

AMONG SYMPTOMATIC PERSONS

- ~5% SEVERE DENGUE
- ~95% MILD TO MODERATE



Four Serotypes – second infection is associated to highest probability of severe dengue.

2009 WHO Case definition

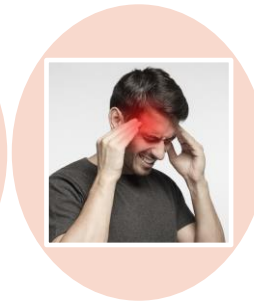
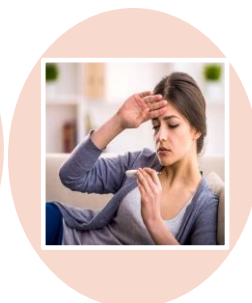
-Hemorrhagic dengue – discontinued.

-Severe dengue – accepted.

Shock, not hemorrhage, is the main cause of death in Dengue.

Instead, increased capillary permeability → plasma leakage → dehydration → hemoconcentration → hypovolemic shock → metabolic acidosis → multiple organ failure → death.





Fever
Headache
Joint pain
Myalgia
Retroorbital pain

Nausea
Vomiting
Skin rash
Tiredness
Anorexia

FREQUENT SYMPTOMS: NOT ALL OF THEM NEED TO BE PRESENT

- Fever is of acute and sudden onset.
- Retroorbital pain is a red flag for diagnosis of dengue.
- Lack of URI Symptoms helps to differentiate from influenza.

A hand wearing a light blue nitrile glove holds a white dengue test strip. The strip has a pink top section and a red bottom section. The word "Dengue" is printed vertically on the strip. The background is a blurred laboratory setting with various colored containers.

LABORATORY WORK UP

- Diagnostic tests for dengue – according to onset of symptoms.
- CBC, CMP, Serum Protein and Albumin, Liver Enzymes, Coagulation Panel.
- Dengue should be considered in any patient who presents a high fever of acute onset and has a history of recent travel (< 2 weeks) to a country where dengue is endemic.
- If dengue is suspected, there is no need to wait for diagnostic test results to treat the patient accordingly.



LABORATORY WORK UP CONT.

- **CBC** – should be repeated daily during the febrile and critical phases.
- Patients usually present with leukopenia and thrombocytopenia, but its absence does not rule out dengue.
- WBC count decreases gradually during the febrile phase and then increases after defervescence.



LABORATORY WORK UP CONT.

- Platelet count decreases gradually and usually increases after the WBC increase.
- Hemorrhage, if it occurs, is not related to a determined platelet count level.
- Decreasing platelet count, which is secondary to transient platelet destruction is indicative of active viral disease.

AMBULATORY MANAGEMENT OF PATIENTS

Once diagnosed or suspected, patients should be reevaluated daily in clinic or ER.

Vital signs, hydration state and CBC results should be monitored daily.

Watch closely for warning signs and educate patients regarding the importance of early identification.

Referral to ER for further evaluation and management if warning signs are present or for any concerning symptom.

AMBULATORY MANAGEMENT OF PATIENTS

Watch for resolution of fever and provide close follow-up during next 48 hours.

Instructions to patients:

- Acetaminophen PRN for fever or pain.
- Aspirin, NSAID's and steroids are contraindicated.
- Bed rest
- Take plenty of fluids.
- Use insect repellent and mosquito nets at home.
- Watch closely for warning signs.



PATIENT OUTCOMES

- Most of our patients with dengue received ambulatory treatment in our clinic, showing gradual complete recovery and their lab tests returned to normal values.
- Most common warning signs of those who required ER evaluation and hospitalization:
 - Abdominal pain
 - Persistent vomiting
 - Hemoconcentration

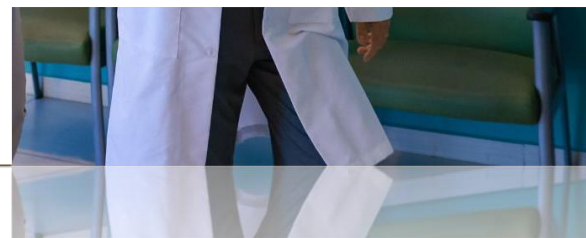


THANK YOU

Héctor Villanueva Rodríguez

Clinical Advisor

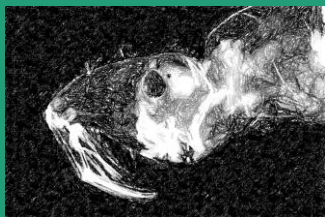
HealthproMed



West Nile Virus and Oropouche Update

Erin Staples, MD. PhD

U.S. Centers for Disease Control & Prevention

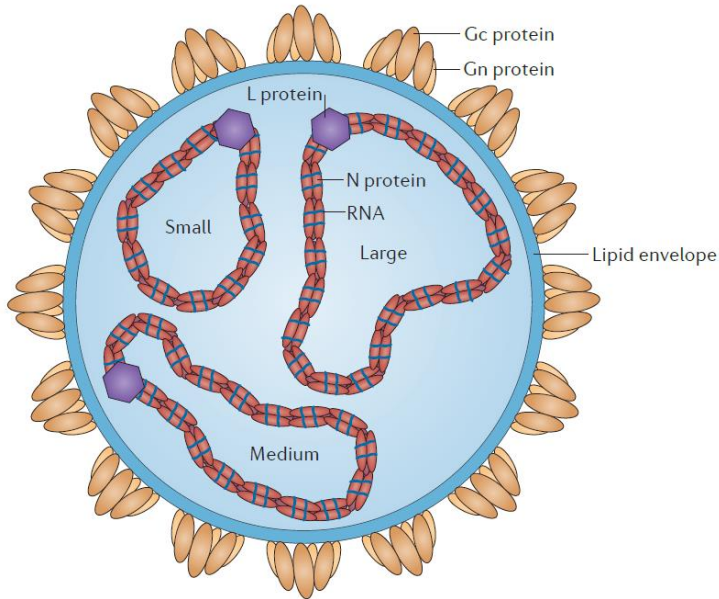


Oropouche virus

J. Erin Staples, MD, PhD
Surveillance, Epidemiology, and Clinical Care Task Force
2024 Dengue Oropouche Response
CDC/IDSA Clinician Call
August 26, 2024

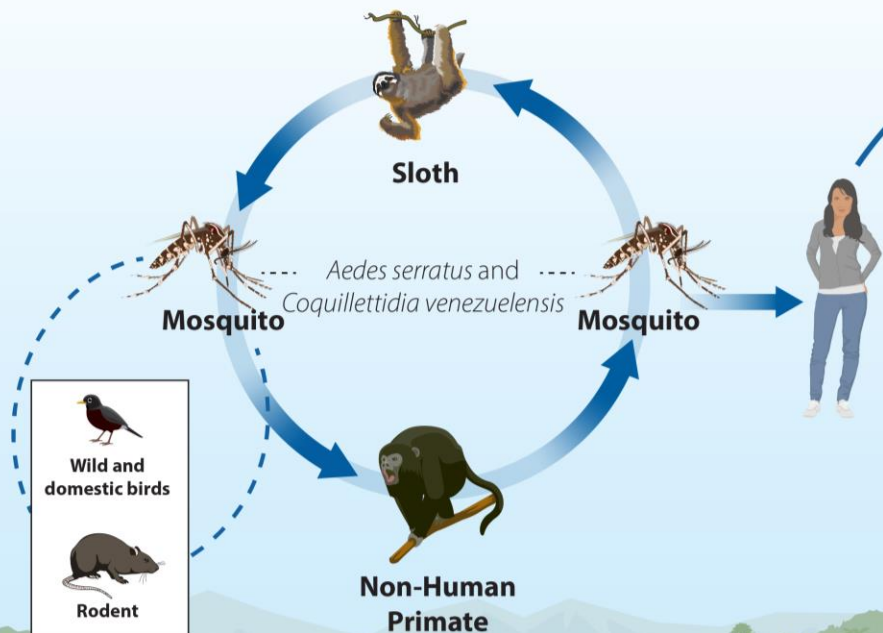
Oropouche virus

(oro-POU-che, oro-POOCH, oro-POOSH)



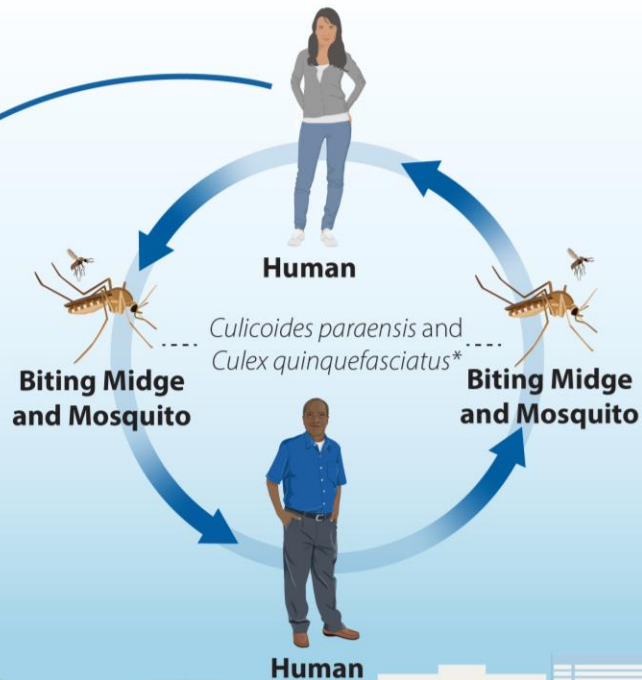
- Simbu serogroup, *Orthobunyavirus* genus, *Peribunyaviridae* family
- Tripartite genome – susceptible to reassortment
- Current strain some evidence of successive reassortment and mutations
- Influence on vector competence, disease severity, immune protective status, and virus transmissibility is **unknown**

Jungle (Sylvatic)



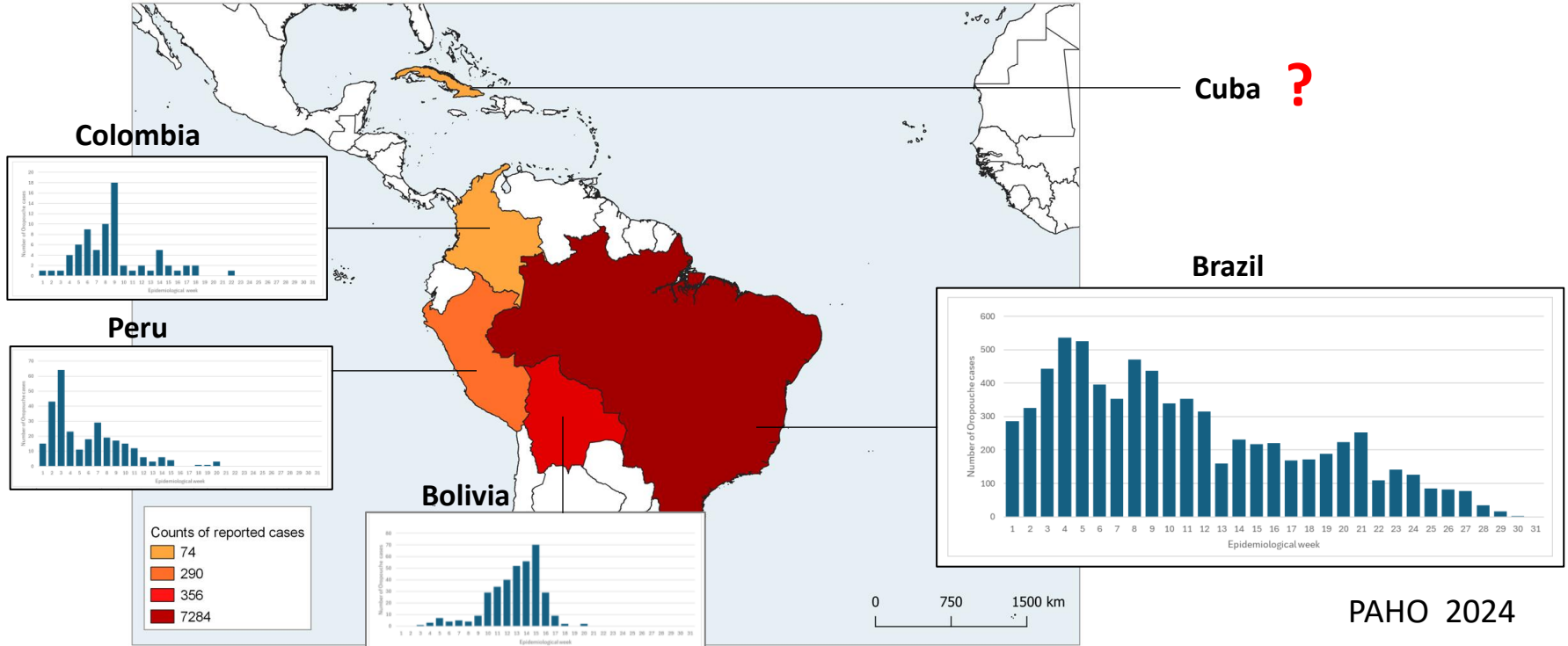
Hosts with unknown status

Urban



*There is evidence of these mosquitoes being infected, but their role in transmission is uncertain.

Current Oropouche Outbreak



Clinical Overview

- Initial presentation similar to infections caused by dengue, Zika, and chikungunya viruses
- Incubation period: 3-10 days
- Symptomatic attack rate: ~60%



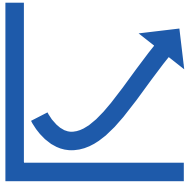
A close-up photograph of a woman's face. She has her eyes closed and is covering them with her right hand, with her fingers spread across her forehead and eyes. This action is a common response to photophobia (sensitivity to light). The background is dark and out of focus.

Initial Clinical Illness

- Acute onset of fever
- Severe headache
- Chills
- Myalgia
- Arthralgia
- Fatigue
- Photophobia
- Dizziness
- Conjunctival injection
- Maculopapular rash

Clinical Laboratory Findings

- Initial leukopenia, lymphopenia, and slightly elevated liver enzymes
- Can have leukocytosis later in course



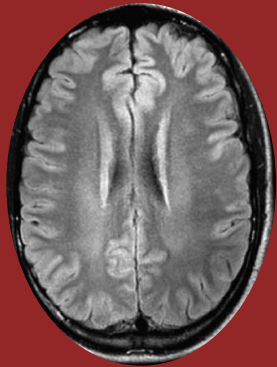
Clinical Course

- Relapse of symptoms in up to 70% of cases
 - Days to weeks after first occurrence
- Disease is typically mild, deaths are rare



Clinical Presentation – Severe Disease

Neuroinvasive disease

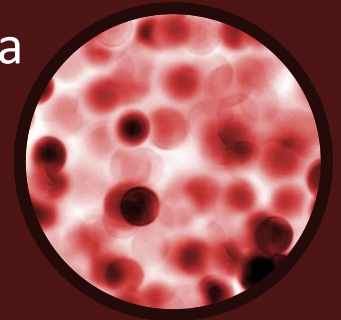


Vernal et al, 2019

- Occipital pain
- Dizziness
- Confusion
- Lethargy
- Photophobia
- Nausea
- Vomiting
- Nuchal rigidity
- Nystagmus

Hemorrhagic manifestations

- Epistaxis
- Gingival bleeding
- Melena
- Menorrhagia
- Petechiae



Clinical Management

- No specific antiviral treatment
- Treat symptoms: rest, fluids, and use of analgesics and antipyretics
 - Acetaminophen preferred treatment for fever and pain
 - Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) should not be used to reduce risk of hemorrhage
- Patients with more severe symptoms might need hospitalization for observation and supportive treatment



Deaths Associated with Oropouche



- Two recent deaths in otherwise healthy young women
 - 21 and 24 years of age
 - Non-pregnant
- Similar presentation to severe dengue
- Clinical features
 - Signs of hemorrhage, rapid evolution
 - Died within ~4 days of symptom onset
 - High level viremia (based on low RT-PCR CT values)

Oropouche and Pregnancy

- **Based on limited data from Brazil, vertical transmission of Oropouche virus is possible**
 - Several pregnant people with evidence of vertical transmission to their fetus associated with fetal death or congenital abnormalities, including microcephaly
 - Pregnant persons had symptoms during pregnancy; most had positive test results
 - Tissues from still births and one infant born with microcephaly tested positive by RT-PCR
- **Frequency of vertical transmission is unknown**
- **Effect of timing of disease during pregnancy on risk of adverse outcome is unknown**



<https://www.news-medical.net/health/What-is-Vertical-Transmission.aspx>

What is the risk to the US?

60,900 routes

EUROPE

NORTH AMERICA

AFRICA

LATIN AMERICA

Possible Vectors in the United States



Culicoides paraensis

Competent vector in lab studies
Implicated in field studies

Culex quinquefasciatus

Less competent vector in lab studies
Implicated in field studies



Culicoides sonorensis

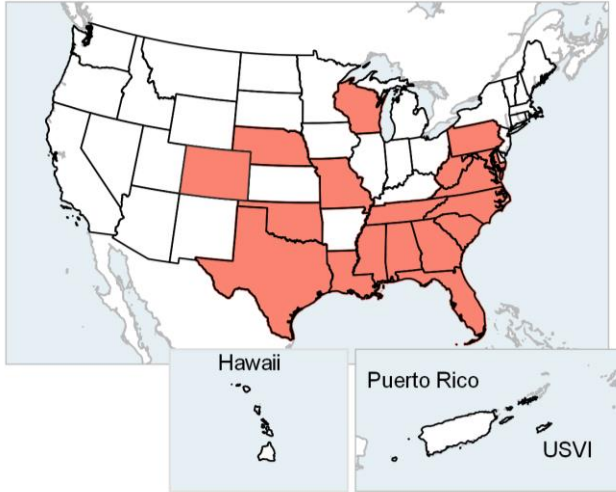
Competent vector in lab studies

"NACER355-12 Lateral" - BOLD:ABX5601 (cf. *Culicoides paraensis*) (licensed under <http://creativecommons.org/licenses/by/4.0/>)

CDC Public Health Image Library

Known Distribution of Vectors in the United States

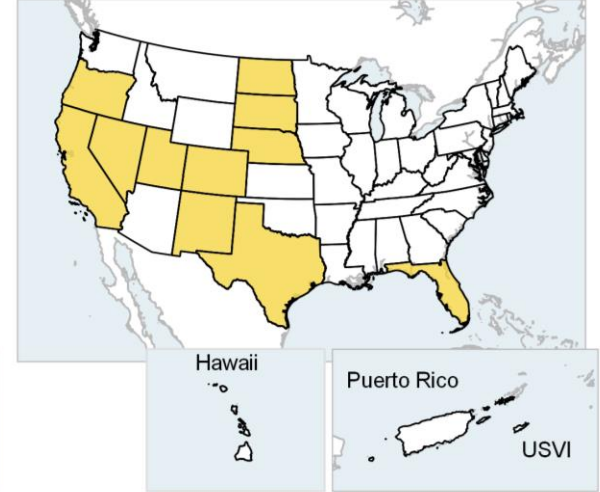
Culicoides paraensis



Culex quinquefasciatus



Culicoides sonorensis



Risk of Local Transmission in the US

- Risk for sustained local transmission in continental U.S. is likely low...

...but non-zero

- Risk is not uniformly distributed over space and time
 - Travel patterns
 - Vector distribution



<https://mountainhouse.com/blogs/emergency-prep-survival/tips-winds-storm-emergency-safety/>

CDC Response Activities

Updated Travel Health Notices

Pregnant people should reconsider non-essential travel to Cuba and take precautions to prevent bites in other areas where OROV may be circulating

Oropouche in Cuba

Level 4 - Avoid All Travel
Level 3 - Reconsider Nonessential Travel
Level 2 - Practice Enhanced Precautions
Level 1 - Practice Usual Precautions

Key points

- There is an outbreak of Oropouche in Cuba (see map).
 - A Level 1 Travel Health Notice has been issued for [Oropouche in South America](#).
- Multiple cases of Oropouche have recently been reported in [U.S.](#) and [European](#) travelers returning from travel to Cuba indicating there is ongoing risk.
- Oropouche is spread by the bite of infected midges (small flies) and mosquitoes.
- All travelers to Cuba should take steps to [prevent bug bites](#) during travel to protect themselves from infection.
- **Pregnant people should reconsider non-essential travel to Cuba.** If travel is unavoidable, these travelers should **strictly** follow Oropouche [prevention](#) recommendations.
- Illness can occur in people of any age and is often mistaken for [dengue](#).

Current Situation

- On August 1, 2024, the Pan American Health Organization (PAHO) issued an [epidemiological alert](#) about Oropouche cases, including deaths, in the Americas. There were also concerns about an



Map: Areas in Cuba with reported cases of Oropouche ([see larger map](#))

What is Oropouche?

[Oropouche](#) is a disease caused by Oropouche virus. It is spread through the bites of infected midges (small flies) and mosquitoes.

[Symptoms](#) of Oropouche include headache, fever, muscle aches, stiff joints, nausea, vomiting, chills, or sensitivity to light. Severe

Oropouche in South America

Level 4 - Avoid All Travel
Level 3 - Reconsider Nonessential Travel
Level 2 - Practice Enhanced Precautions
Level 1 - Practice Usual Precautions

Key points

- Parts of Bolivia, Brazil, Colombia, and Peru (see map) are reporting cases of Oropouche, although the case numbers are declining.
 - A Level 2 Travel Health Notice has been issued for [Oropouche in Cuba](#).
- Oropouche is spread by the bite of infected midges (small flies) and mosquitoes.
- Travelers to affected areas should take steps to [prevent bug bites](#).
- Illness can occur in people of any age and is often mistaken for [dengue](#).



Map: Areas in South America with reported cases of Oropouche ([see larger map](#))

Current Situation

What Travelers Can Do to Protect Themselves and Others

- Travelers to affected areas should take steps to [prevent bug bites](#) during travel to protect themselves from infection. They should also prevent bug bites for 3 weeks after travel to avoid possibly spreading the virus to others in the U.S.
 - If travelers are pregnant, they should discuss travel plans, reasons for travel, steps to prevent bug bites, and potential risks with their healthcare provider.

Health Alert Network (HAN) Health Advisory

Notifying clinicians and public health authorities of increase in Oropouche virus disease in the Americas

Increased Oropouche Virus Activity and Associated Risk to Travelers

[Print](#)



Distributed via the CDC Health Alert Network
August 16, 2024, 4:00 PM ET
CDCHAN-00515

- Advises on evaluating and testing travelers returning from impacted areas with signs and symptoms consistent with Oropouche virus infection
- Raises awareness of possible risk of vertical transmission and associated adverse effects on pregnancy
- Highlights prevention measures to mitigate additional spread of virus and potential importation into unaffected areas

CDC's Oropouche pages related to pregnant persons and their infants

Considerations for Clinicians

 Oropouche

EXPLORE TOPICS ▾ Q SEARCH

AUGUST 16, 2024

Interim Clinical Considerations for Pregnant People with Confirmed or Probable Oropouche Virus Disease

AT A GLANCE


CDC is working to learn more about the potential risks of Oropouche virus disease during pregnancy, in close collaboration with the American College of Obstetricians and Gynecologists, Society for Maternal-Fetal Medicine, and the American Academy of Pediatrics. Interim clinical considerations are based on recent reports from Brazil describing Oropouche virus vertical transmission associated with fetal deaths or congenital abnormalities and based on other congenital viral infections with similar clinical manifestations. This page describes considerations for clinical management of confirmed or probable Oropouche virus disease in pregnancy.



ON THIS PAGE

Manifestations and clinical manage...

Manifestations and clinical management of pregnant people

 Oropouche


EXPLORE TOPICS ▾ Q SEARCH

AUGUST 27, 2024

Interim Guidance for Evaluating and Managing Infants Born to Pregnant People with Confirmed or Probable Oropouche Virus Disease

AT A GLANCE

- Data on congenital Oropouche virus disease (Oropouche) is currently limited.
- Findings among people in Brazil with Oropouche during pregnancy have included stillbirth and severe microcephaly.
- Infants born to people with confirmed or probable Oropouche during pregnancy should receive a comprehensive evaluation by a healthcare provider at birth and at each well-child visit.
- Infants and children with congenital anomalies might benefit from multidisciplinary care.



<https://www.cdc.gov/oropouche/hcp/clinical-care-pregnancy>

<https://www.cdc.gov/oropouche/hcp/clinical-care/infants>



Oropouche Virus Disease Among U.S. Travelers — United States, 2024

Early Release / August 27, 2024 / 73

- As of August 16, 2024, 21 Oropouche virus disease cases were identified among U.S. travelers from Cuba.
- Most patients presented with fever, myalgia, and headache, often with other symptoms such as arthralgia, diarrhea, retroorbital pain, abdominal pain, and nausea/vomiting.
- At least three patients had recurrent symptoms after the initial illness

Morrison et al, 2024

Acknowledgements

Surveillance, Epidemiology, and Clinical Care Task Force

Carolyn Gould

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Van Tong

Romeo Galang

Rachel Alade

Haben Debessai

Jennita Reefhuis

Nicki Roth

Christina Sancken



For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.



What's new for West Nile virus and eastern equine encephalitis virus

J. Erin Staples, MD, PhD

Surveillance and Epidemiology Team

Arboviral Diseases Branch

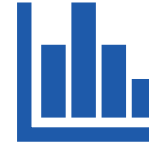
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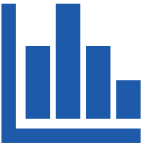


Overview

- West Nile virus (WNV) **epidemiology**
- Risk factor for severe disease
- Knowledge of **diagnostic testing**
- Eastern equine encephalitis (EEEV) **epidemiology**

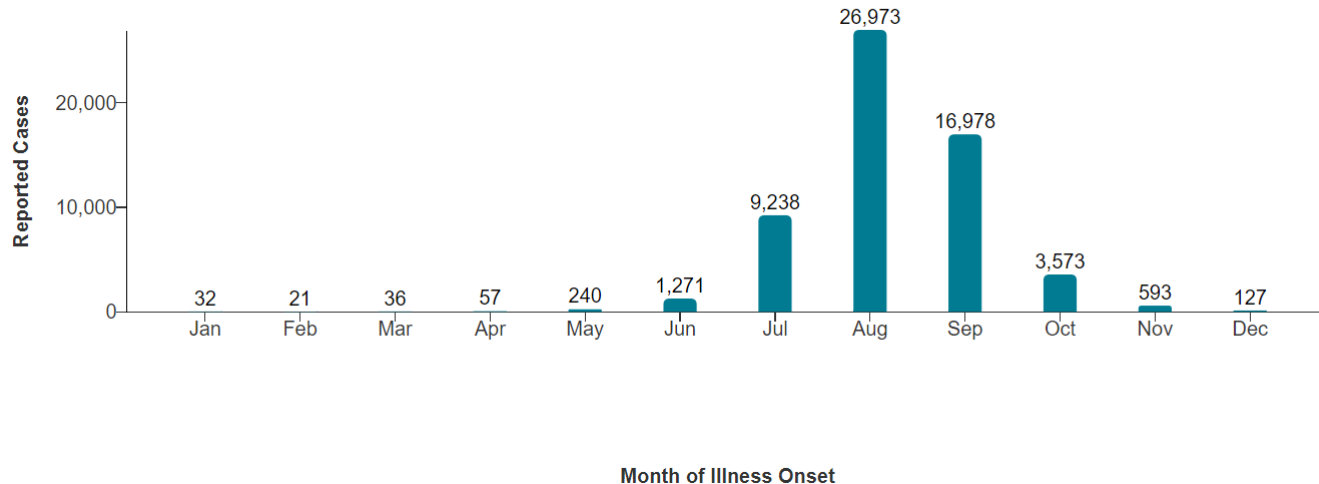


WNV leading cause of mosquito-borne disease in continental U.S. – 1999-2023

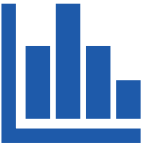


Human Disease Cases	Hospitalizations	Deaths
59,141 <i>Cases from year(s) and type of case selected above</i>	27,617 <i>Hospitalizations from year(s) and type of case selected above</i>	2,958 <i>Deaths from year(s) and type of case selected above</i>

West Nile virus human disease cases reported by month of illness onset, 1999-2023, All disease cases

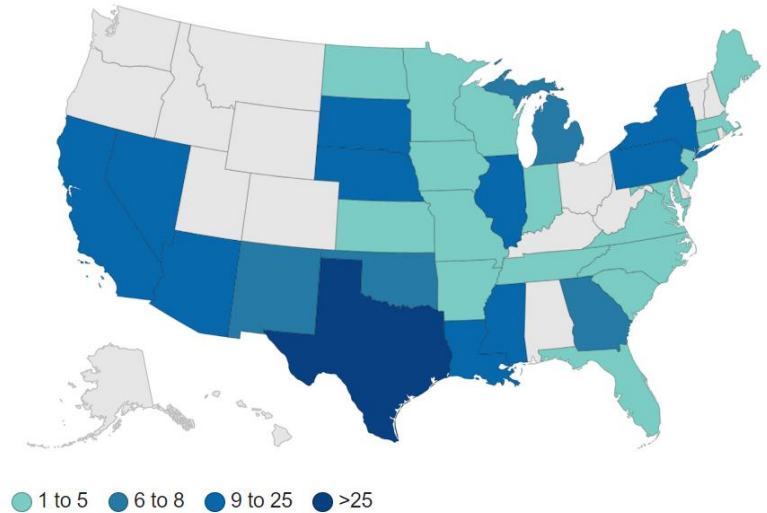


Current case counts for 2024* similar to prior years with several focal areas of concern



- **Case counts tracking with 10-year median**
 - Deaths increased
 - Human infections (blood donors screening positive) increased
- **Increased activity**
 - Texas (Houston and Dallas-Fort Worth areas),
 - Nevada (Las Vegas),
 - NYC area
- **Remind patients to use insect repellent, alert high-risk patients, and order correct testing to diagnose disease**

West Nile virus human disease cases reported by state of residence, 2024




*Preliminary data shared by state health department

Risk factor for severe disease: Rituximab and other B-cell depleting therapies



- **Most clinical experience for Rituximab**
 - First approved for treating non-Hodgkin's lymphoma in 1997
 - Approvals expanded to other conditions
 - Widely used off-label for autoimmune and inflammatory conditions
- **90% circulating B cells killed within 3 days of first infusion**
- **Near complete B cell depletion persists for 6–12 months**
 - Prolonged depletion for >3 years reported
 - Quantification of CD19+ cells using flow cytometry preferred method of monitoring depletion

Fatal Cache Valley virus meningoencephalitis associated with rituximab maintenance therapy

Yuanquan Yang¹  | Jingxin Qiu² | Abigail Snyder-Keller³ | Yongping Wu³ | Shufeng Sun³ | Haixin Sui³ | Amy B. Dean³ | Laura Kramer³ | Francisco Hernandez-Ilizaliturri¹

JAMA Neurology | **Brief Report**

Fatal Powassan Encephalitis (Deer Tick Virus, Lineage II) in a Patient With Fever and Orchitis Receiving Rituximab

Isaac H. Solomon, MD, PhD; Kristyn M. Spera, MD; Sophia L. Ryan, MD; Jeffrey Helgager, MD, PhD; Juliana Andric, MBBS, PhD; Sherif R. Zaki, MD, PhD; Henrikas Vaitkevicius, MD; Kristoffer E. Leon, BS; Michael R. Wilson, MD; Joseph L. DeRisi, PhD; Sophia Koo, MD; Stellos M. Smirnakis, MD, PhD; Umberto De Girolami, MD

EMERGING INFECTIOUS DISEASES®

DISPATCHES

Fatal Case of Chronic Jamestown Canyon Virus Encephalitis Diagnosed by Metagenomic Sequencing in Patient Receiving Rituximab

Isaac H. Solomon,¹ Vijay S. Ganesh,¹ Guixia Yu, Xian Ding Deng, Michael R. Wilson, Steve Miller, Tracey A. Milligan, Shibani S. Mukerji, Abigail Mathewson, Justin Linxweiler, Darlene Morse, Jana M. Ritter, J. Erin Staples, Holly Hughes, Carolyn V. Gould, Pardis C. Sabeti,² Charles Y. Chiu,² Anne Plantadosi^{2,3}

Open Forum Infectious Diseases

ID CASE



Fatal Eastern Equine Encephalitis in a Patient on Maintenance Rituximab: A Case Report

Isaac H. Solomon,¹ Pedro D. S. C. Ciarlini,¹ Sandro Santagata,¹ Asim A. Ahmed,³ Umberto De Girolami,¹ Sashank Prasad,⁴ and Shibani S. Mukerji^{2,4}

Two Cases of Severe Tick-Borne Encephalitis in Rituximab-Treated Patients in Germany: Implications for Diagnosis and Prevention

Philipp A. Steininger,¹ Tobias Bobinger,² Wenke Dietrich,³ De-Hyung Lee,² Michael Knott,⁴ Christian Bogdan,⁵ Klaus Korn,¹ and Roland Lang⁵

THE AMERICAN
JOURNAL of
MEDICINE®

Seronegative West Nile Virus Infection in a Patient Treated with Rituximab for Rheumatoid Arthritis





Severe Arboviral Neuroinvasive Disease in Patients on Rituximab Therapy: A Review

Ronak K. Kapadia,^{1,2} J. Erin Staples,³ Christine M. Gill,⁴ Marc Fischer,³ Ezra Khan,³ Janeen J. Laven,³ Amanda Panella,³ Jason O. Velez,³ Holly R. Hughes,³ Aaron Brault,³ Daniel M. Pastula,^{1,3,6} and Carolyn V. Gould³

- Identified 21 cases of arboviral disease in patients taking rituximab
 - WNV, tick-borne encephalitis virus, eastern equine encephalitis virus, Powassan virus, Cache Valley virus, and Jamestown Canyon virus
 - Often indolent clinical course; presenting off-season
- 18/19 (95%) patients had negative serologic results
 - Collected 3 days–10 months after illness onset
 - 2 patients seroconverted at 6-month follow-up
- 15 (71%) died and at least 4 (19%) with long-term sequelae

Arboviral disease in patients on B cell-depleting monoclonal antibodies can be severe → counsel on mosquito and tick prevention



- Severe clinical presentations with high mortality
- Seasonal onset may not apply as disease can be protracted
- Lack of serologic response
- Patients who are being prescribed rituximab should be counseled about mosquito and tick prevention!
- Molecular testing is preferred
- CDC has resources on website for patients and providers



CDC's Risk Factors for
Vector-Borne Diseases



Assessment of Healthcare Provider (HCP) Knowledge of WNV Diagnostic Testing*

- Nation web-based survey distribute August-September 2022 to 2,167 HCP been in practice ≥ 3 years selected by specialty
- Two multi-select questions on diagnostic testing for patients with suspected WNV neuroinvasive disease:
 - Patient A: 70 yo male immunocompetent patient
 - Patient B: 49 yo female immunocompromised patient on anti-B-cell monoclonal antibody therapy
- **Answer selections included:**

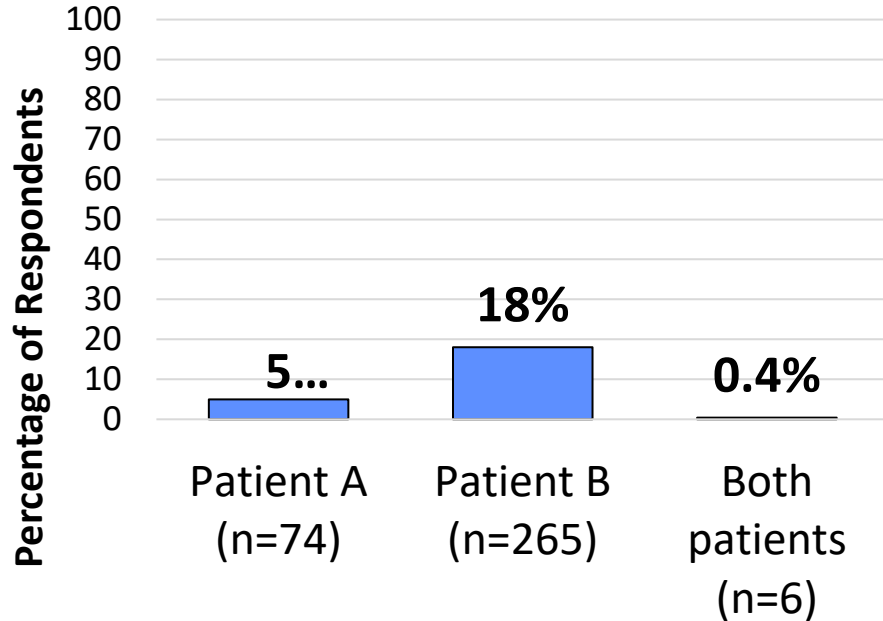
<input type="checkbox"/> RT-PCR on serum or CSF	<input type="checkbox"/> IgM antibody test on serum
<input type="checkbox"/> IgM antibody test on CSF	<input type="checkbox"/> IgG antibody test on serum
<input type="checkbox"/> IgG antibody test on CSF	<input type="checkbox"/> Not sure



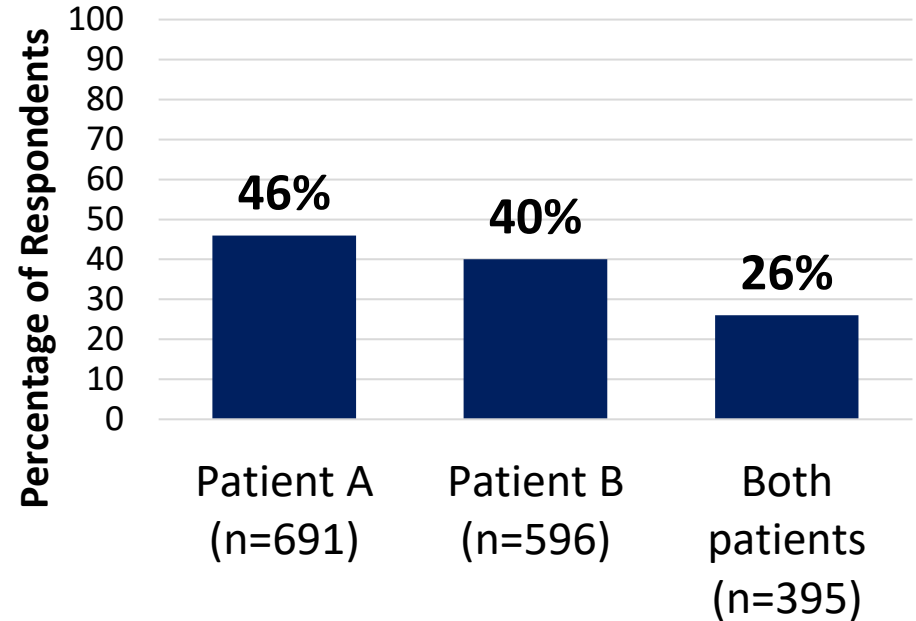
Fewer than half of surveyed HCPs were able to correctly diagnosis WNV disease (N=1,502)



Respondents exclusively selecting most appropriate test

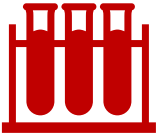


Respondents able to diagnose WNV

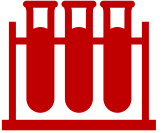


Ensure correct testing ordered for WNV to make diagnosis

- **Response influenced by patient characteristics, specialty type, location of practice, and work setting**
 - More challenges with ordering correct tests for immunocompromised patient
 - Internists often able to make diagnosis compared to FPs, NPs, PAs, and Peds
 - HCPs practicing in inpatients settings able to make diagnosis compared to outpatient
 - HCPs in areas with more WNV able to make diagnosis compared to lower incidence areas
- **1,025 excess (incorrect) tests ordered by HCPs**



Access to provider education on appropriate WNV diagnostic testing and clinical care



- Decrease delays in diagnosis and unnecessary testing or treatment
- Improve reporting and target prevention measures

Medscape training:
“Diagnosis and Management of West Nile
Virus Infection: A Case-Based Approach”



CDC’s WNV diagnostic
testing algorithm
webpage



CDC’s WNV Disease
Therapeutics: Review
of the Literature

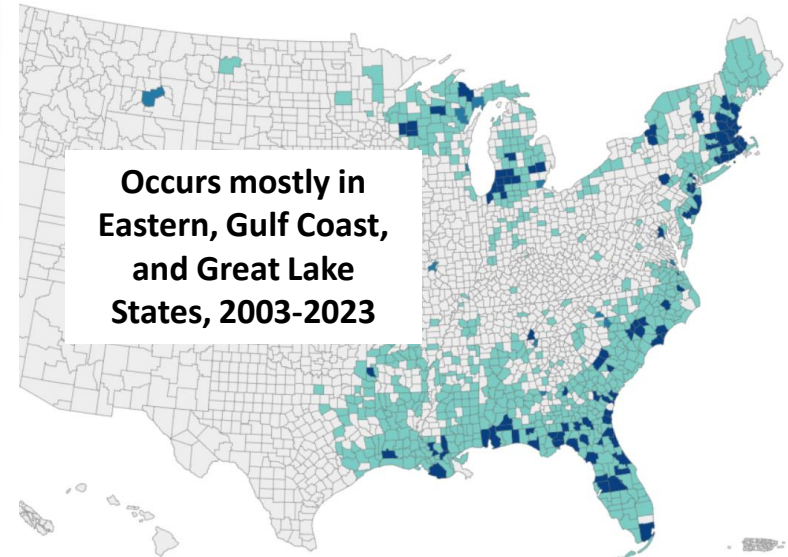


EEE most severe arbovirus with ~30% case fatality rate and 50% of survivors with long-term disabilities

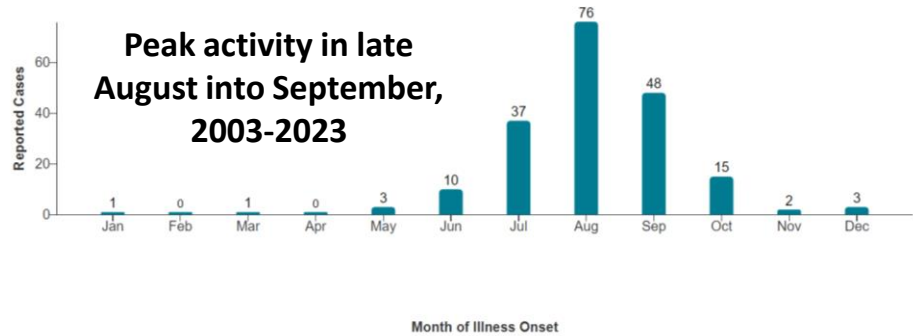


- To date, four cases reported to CDC in 2024 but in peak transmission season

Human Disease Cases	Hospitalizations	Deaths
196 <i>Cases from year(s) and type of case selected above</i>	176 <i>Hospitalizations from year(s) and type of case selected above</i>	79 <i>Deaths from year(s) and type of case selected above</i>



Eastern equine encephalitis virus human disease cases reported by month of illness onset, 2003-2023, All disease cases



● Non-human activity ● Human disease cases ● Human disease cases and non-human activity

Clinical and testing inquiries

State and local health department vector-borne disease coordinator

CDC

Oropouche virus clinical inquires: eocevent495@cdc.gov

Other arboviral disease clinical inquires: ADBClinicalTeam@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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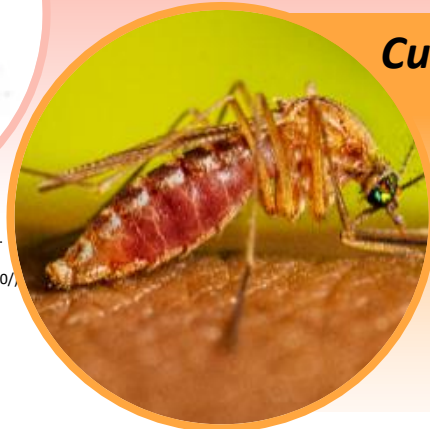
Risk Associated with Possible Vectors



Culicoides paraensis

Low abundance in the US
Different ecology in North America
Not detected in Puerto Rico

"NACER355-12 Lateral" - BOLD:ABX5601 (cf. *Culicoides paraensis*) (licensed under <http://creativecommons.org/licenses/by/4.0/>)



Culex quinquefasciatus

Unknown contribution to transmission
Target of vector control programs
Insecticide resistance is an issue

CDC Public Health Image Library



Culicoides sonorensis

Low abundance in the US
Found in rural areas
Not detected in Puerto Rico
Unknown contribution to transmission

Q&A/ Discussion

Selected Resources

Program Links:

- This webinar is being recorded and can be found with the slides online at <https://www.idsociety.org/cliniciancalls>
- COVID-19 Real-Time Learning Network: <https://www.idsociety.org/covid-19-real-time-learning-network/>

Joshua Wong, MD

- <https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON518>
- <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON498>
- https://www.cdc.gov/dengue/data-research/facts-stats/?CDC_AAref_Val=https://www.cdc.gov/dengue/statistics-maps/data-and-maps.html
- <https://www.salud.pr.gov/CMS/DOWNLOAD/8937>
- <https://www.salud.pr.gov/CMS/DOWNLOAD/9209>
- <https://wwwnc.cdc.gov/travel/notices/level1/dengue-global>
- <https://www.cdc.gov/dengue/statistics-maps/data-and-maps.html>
- https://www.cdc.gov/dengue/data-research/facts-stats/current-data.html?CDC_AAref_Val=https://www.cdc.gov/dengue/statistics-maps/current-data.html
- <https://www.cdc.gov/mosquitoes/pdfs/Aedes-mosquito-maps.pdf>
- <https://www.cdc.gov/dengue/statistics-maps/current-data.html>
- <https://www.cdc.gov/dengue/hcp/clinical-care/index.html>
- <https://www.cdc.gov/dengue/healthcare-providers/testing/>
- <https://www.cdc.gov/dengue/healthcare-providers/testing/testing-guidance.html>
- <https://www.cdc.gov/dengue/hcp/pocketguide/index.html>

Selected Resources

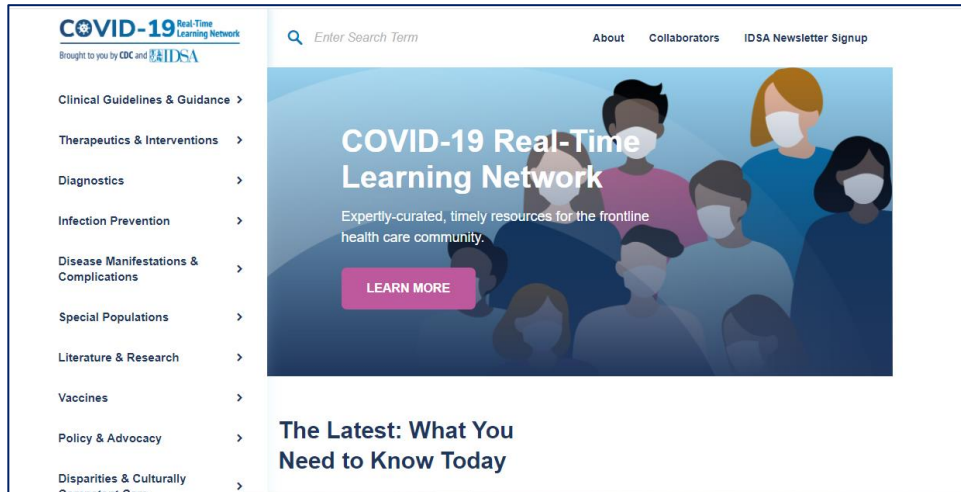
Erin Staples, MD, PhD

- <https://preprints.scielo.org/index.php/scielo/preprint/view/9342>
- https://www.cdc.gov/oropouche/hcp/clinical-care/pregnancy.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Foropouche%2Fhcp%2Fclinical-care-pregnancy%2Findex.html
- https://www.cdc.gov/mmwr/volumes/73/wr/mm7335e1.htm?s_cid=mm7335e1_e&ACSTrackingID=USCDC_921-DM135007&ACSTrackingLabel=Early%20Release%20%E2%80%93%20Vol.%2073%2C%20August%2027%2C%202024&deliveryName=USCDC_921-DM135007
- Oropouche virus clinical inquires: eocevent495@cdc.gov
Other arboviral disease clinical inquires: ADBClinicalTeam@cdc.gov

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Brought to you by CDC and IDSA

An online community bringing together information and opportunities for discussion on latest research, guidelines, tools and resources from a variety of medical subspecialties around the world.



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American Academy of Pediatrics
American College of Emergency Physicians
American College of Obstetricians and Gynecologists
American College of Physicians
American Geriatrics Society
American Thoracic Society
Pediatric Infectious Diseases Society
Society for Critical Care Medicine
Society for Healthcare Epidemiology of America
Society of Hospital Medicine
Society of Infectious Diseases Pharmacists

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THANK YOU

We want to hear from you!

Please complete the post-call survey.

A recording of this call, slides and the answered Q&A will be posted at

www.idsociety.org/cliniciancalls

-- library of all past calls available --

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Deirdre Lewis (dlewis@idsociety.org)