



# MONDAYS WITH D R MARK & D R MICHAEL

Monday, April 15, 2024 | 1:00 – 1:45PM

TOPIC #21  
Travel Medicine



# Guest speaker:



## Bradley A. Connor, MD

- Clinical Professor of Medicine, *Weill Cornell Medical College*
- Medical Director, *The New York Center for Travel and Tropical Medicine*



# Global Warming and the Risk to the Traveler of Mosquito Transmitted Disease

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**Presentation to NEBGH**

**April 15, 2024**

# Dengue Fever: Risk in Puerto Rico

## ■ Significant Dengue Increase: Mainly in San Juan

Updated Mar 28, 2024 (Posted Mar 26, 2024)

- According to Puerto Rico's Department of Health, more than 40 confirmed cases of dengue fever per week are being reported. More than 549 confirmed cases (mainly serotypes 2 and 3), a significant increase over average incidence, have been reported since January 2024 throughout the country, mainly in San Juan. The outbreak has yet to peak. Travelers should observe insect precautions; mosquitoes that transmit dengue can bite throughout the day but have peak activity in the early morning, late afternoon, and evening.

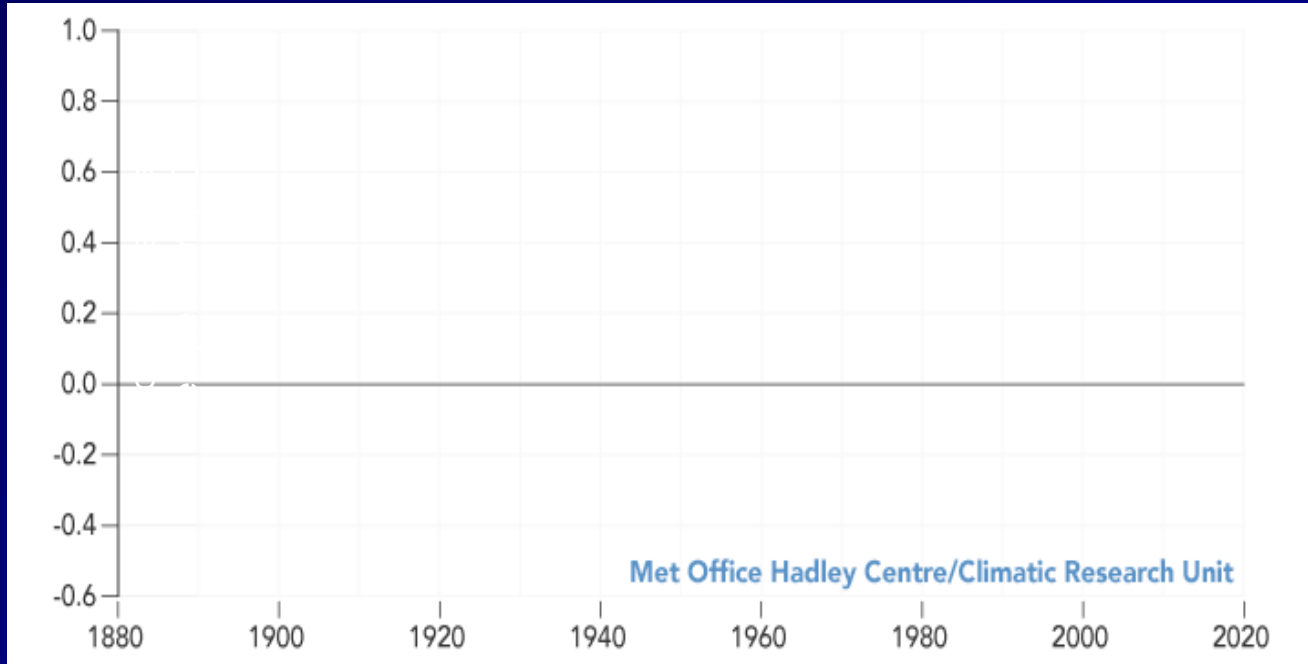
# Dengue Cases Surging In The Americas, PAHO Says

- [Reuters](#) (3/28, Giraldo) reports, “Dengue cases in the Americas rose in the first three months of this year by three times the number of infections reported in the same period last year, the head of the Pan American Health Organization said on Thursday.” Argentina, Brazil, “and Paraguay are the countries hardest hit by dengue in what PAHO officials described as potentially the worst outbreak in the Americas to date for the deadly mosquito-borne viral illness.” PAHO Director Dr. Jarbas Barbosa da Silva said, “Probably this will be the worst dengue season that we will have.”
- [NBC News](#) (3/28, Acevedo) reports, “The risk of getting sick with dengue fever is ever present in Puerto Rico and other places with hot, humid climates – but this year ‘cases have exceeded historical figures,’ according to Puerto Rico Health Secretary Carlos Mellado.” The health secretary “declared a public health emergency this week in an effort to curb the rise in dengue fever cases, saying the decree helps guarantee Puerto Rico has access to the resources needed to combat the outbreak.”
- [CNN](#) (3/28, Rivera, Musa) reports “Mellado said the health department has registered 549 cases of dengue so far this year, far exceeding historical numbers.”

# Trends in global temperature



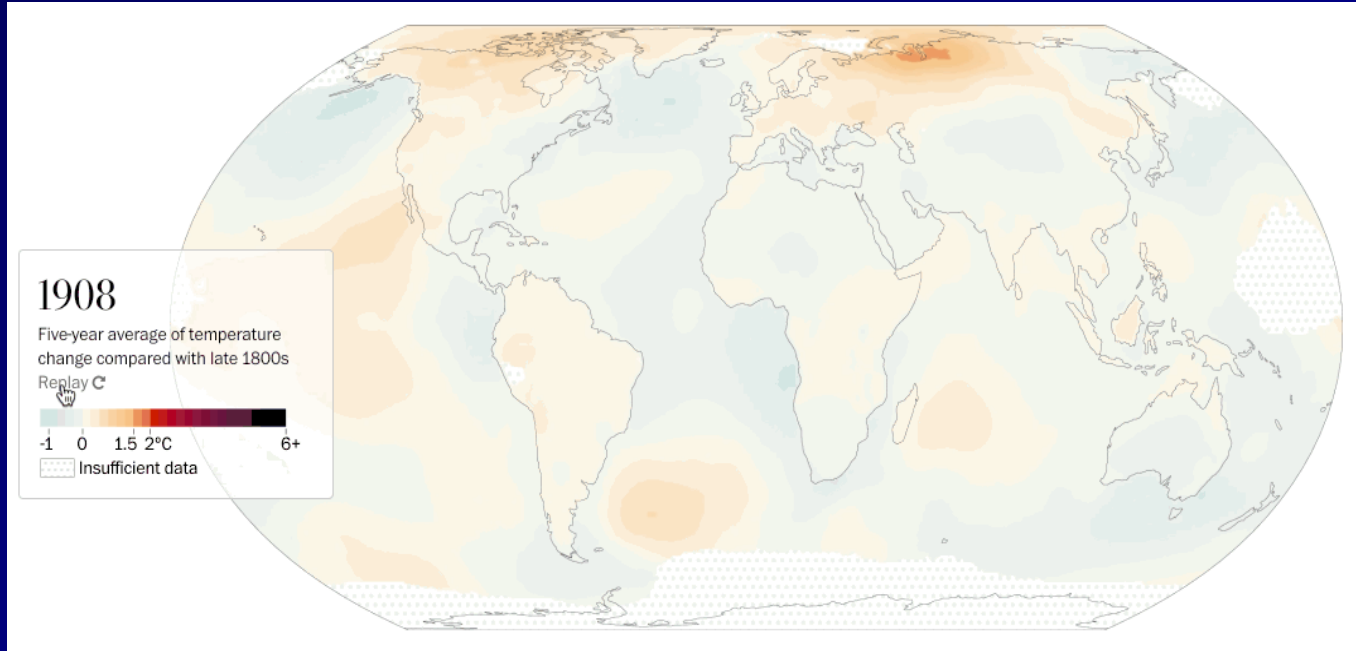
Global surface air temperature over time  
(relative to 1951–1980, °C)



NASA Earth Observatory, World of Change: Global Temperatures. Available at:  
[earthobservatory.nasa.gov/world-of-change/global-temperatures](https://earthobservatory.nasa.gov/world-of-change/global-temperatures)



# Global Temperature Change Compared With Late 1800s

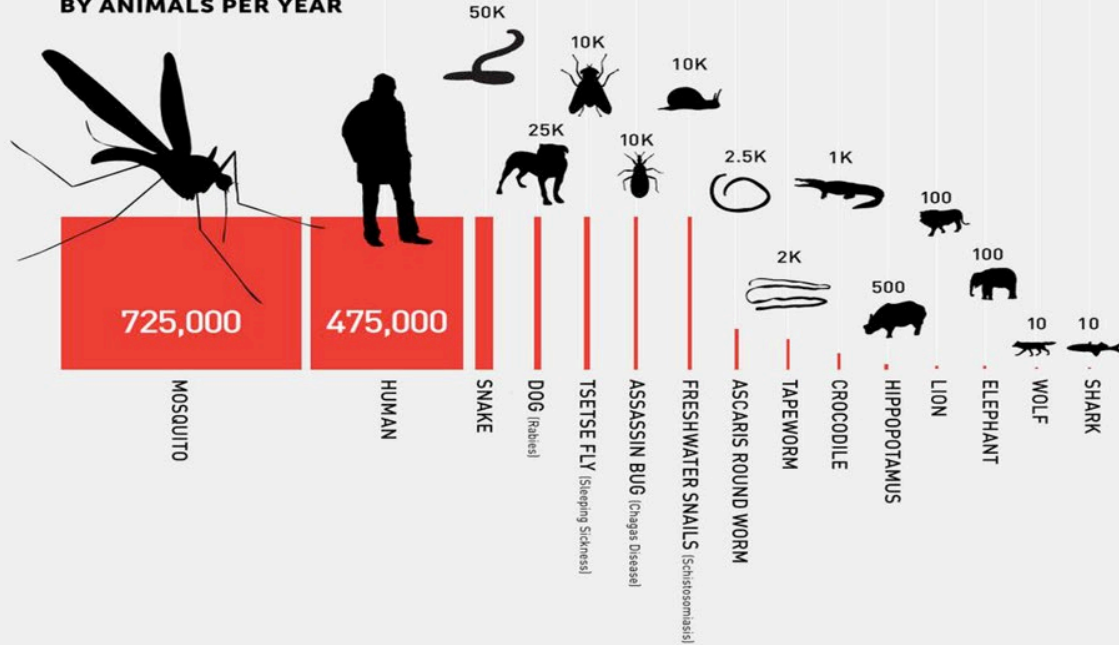


- The Washington Post. Dangerous New Hot Zones Spreading Around the World: <https://www.washingtonpost.com/graphics/2019/national/climate-environment/climate-change-world/>; The Washington Post. How We Know Global Warming is Real. <https://www.washingtonpost.com/graphics/2019/national/climate-environment/thermometers-climate-change/> Accessed 29 September 2023.

# WORLD'S DEADLIEST ANIMALS

NUMBER OF PEOPLE KILLED BY ANIMALS PER YEAR

**MOSQUITO WEEK**  
on gatesnotes.com



SOURCES: WHO; crocodile-attack.info; Kasturiratne et al. [doi.org/10.1371/journal.pmed.0050218]; FAO [webcitation.org /6Dgp585VO]; Linnell et al. [webcitation.org/ 6ORL7DBUO]; Packer et al. [doi.org/10.1038%2F436927a]; Alessandro De Maddalena. All calculations have wide error margins.



# Aedes mosquito



# What is Dengue Fever?

- Dengue fever is a viral infection acquired through the bite of **day-biting mosquitoes**
- Risk is increased for travelers going to **populated urban areas** of affected countries
- **Symptoms** include high fever, rash, severe headache, muscle joint and back pain

# Dengue: Key Points

- Usually self-limited with illness lasting 3 to 5 days but:
- Chronic fatigue is common, lasting weeks to months
- Small percentage can get very sick with bleeding, shock and death

# Dengue: Prevention

- Be aware that the **mosquitoes** that transmit dengue **may be found indoors** in close contact with humans
- Most often found in poorly screened areas, places with nearby **stagnant water**, such as discarded tires, flowerpots, blocked rain gutters which may host mosquito larvae

# Dengue: Prevention

- Wear long sleeves and long pants
- Observe day-time personal protective measures against mosquito bites (insect repellent with DEET and permethrin sprayed on clothing)
- Remain in well-screened or air-conditioned buildings during the day
- Schedule evening events for after sundown

# Dengue: Prevention

- Be aware that the mosquitoes that transmit dengue are **daytime feeders** with 2 peak times of biting activity: **2 to 3 hours after dawn** and **mid to late afternoon**.
- This pattern changes to all day activity on overcast days.

# Dengue: Prevention

## Vaccine

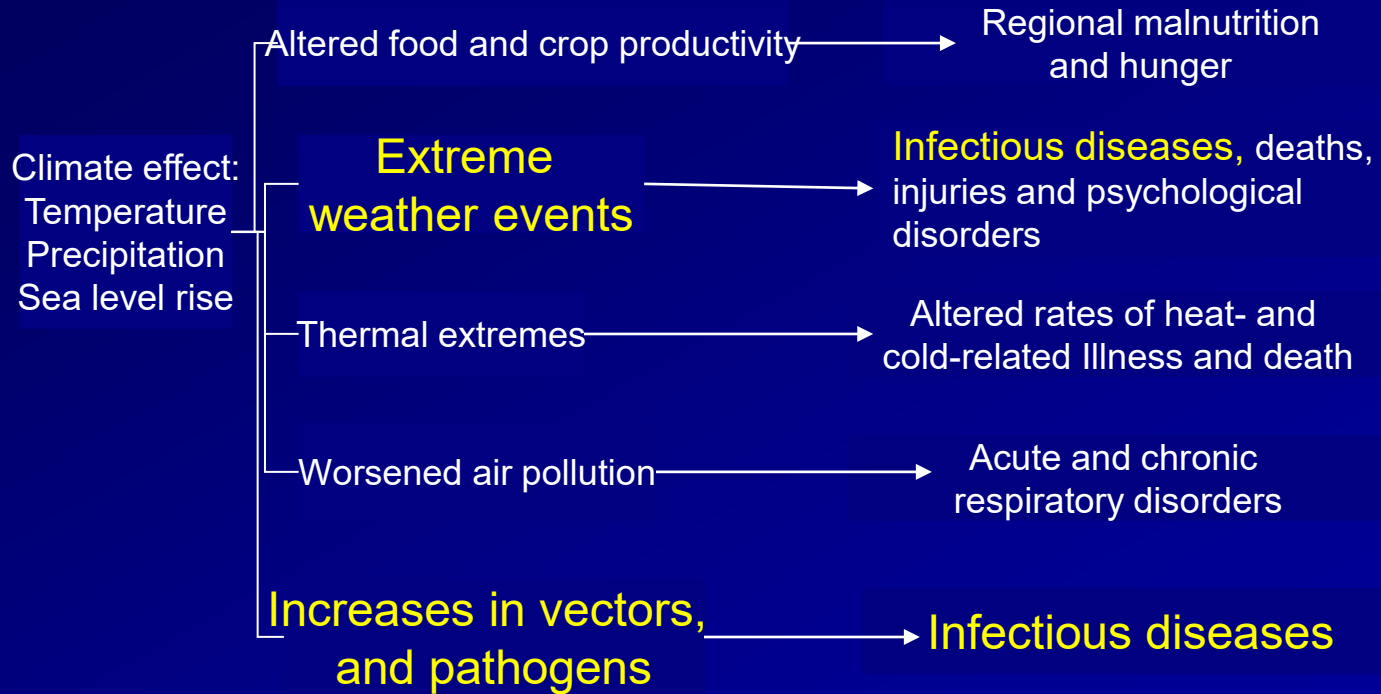
### ■ Dengvaxia

- 3 doses at 0,6,12 months
- Approved in Europe and recommended by WHO for persons aged 9 to 45 with previous dengue infection who live in endemic areas
- CDC recommends the vaccine for children aged 9 to 16 with previous dengue infection who live in endemic U.S. territories such as Puerto Rico. This vaccine is **not approved for travelers to these regions and not commercially available in the U.S.**

### ■ Qdenga

- 2 doses 3 months apart
- Approved in several countries including Indonesia for persons 6 to 45 years of age, European Union for persons 4 years of age and older, Brazil ages 4 to 60 and Thailand for persons 4 to 60 years of age
- **Not available in the U.S.**

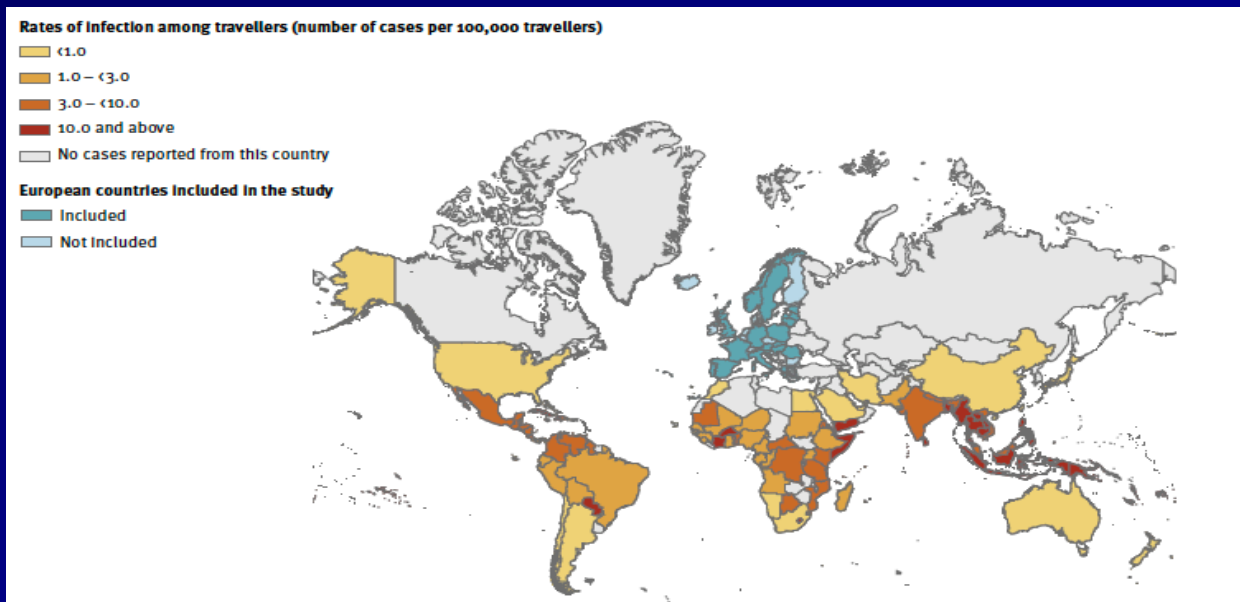
# Climate Change Impact on Human Health





# Dengue among European Travelers (2015-2019)

- 11,478 travel-related dengue cases reported to the ECDC European Surveillance System (71% acquired in Asia, 18% Latin America & Caribbean)
- **9 local outbreaks in Europe (6 France, 3 Spain)**

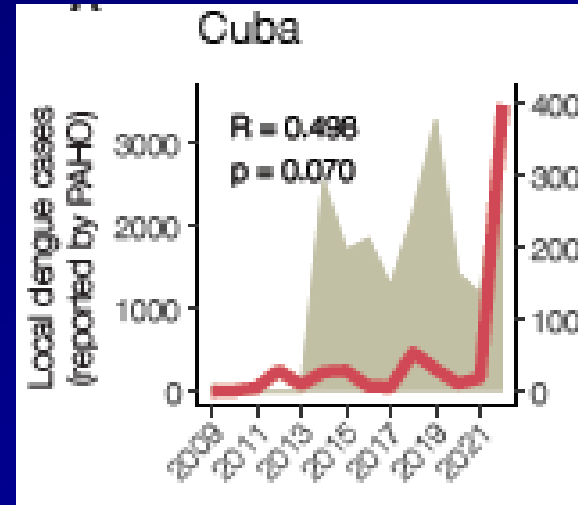
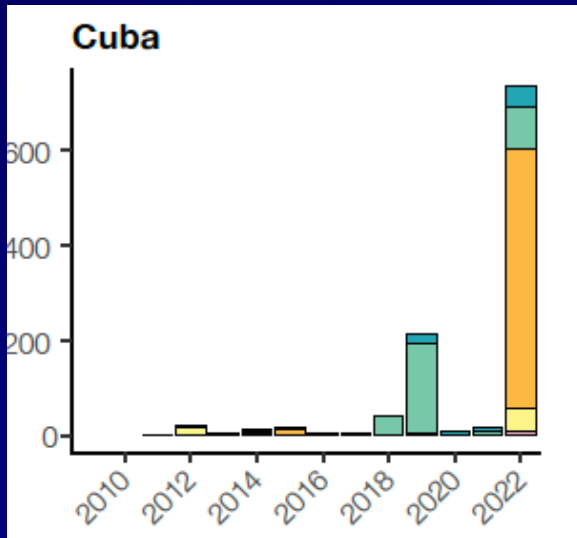


# Locally acquired Dengue in Europe - 2023

- Between August and October 2023, 68 patients with no recent travel diagnosed with dengue in Italy
  - 36 in Lombardo and 32 in Lazio
  - Plus 2 in Rome in late August
- 36 locally acquired cases in France
  - Notably 3 in Paris Region!
- 3 in Spain

# Dengue Outbreak in Cuba

- Large outbreak of DENV3 in Cuba identified through sentinel travelers
- Many were returning to Florida



Serotype DENV-1 DENV-2 DENV-3 DENV-4 Multiple

Travel cases (location of infection) Cuba

# Dengue in Florida and Travel from the Caribbean

## 4 more cases of locally acquired dengue reported in Florida as virus continues to spread: Officials

Cases have been detected in Broward and Miami-Dade counties.

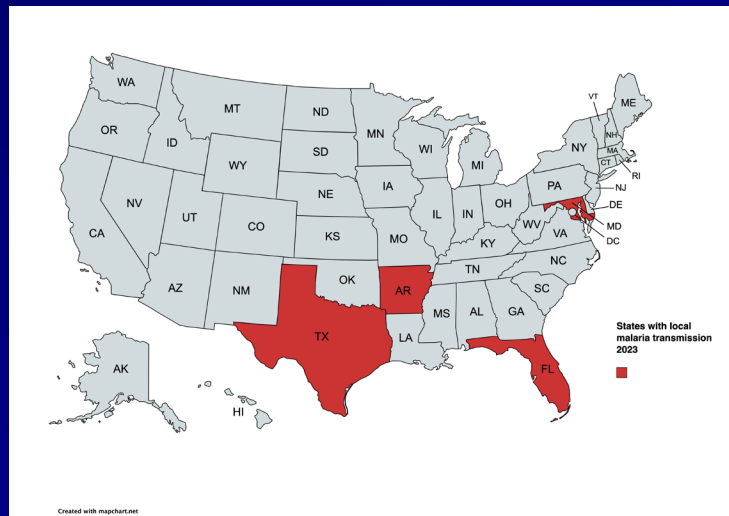
By [Mary Kekatos](#)

August 16, 2023, 3:18 PM



# Local US Malaria Transmission - 2023

- Sarasota County, FL -7 cases (Pv)
- Cameron County, TX – 1 Pv
- Saline County, AR – 1 Pv
- North Capitol Region, MD – 1 Pf



- Blackburn D et al. MMWR 2023
- Duwell M et al. MMWR 2023

# Updates from 2021 World Malaria Report

## ■ Malaria cases:

- 2015: 230 million
- 2020: 245 million
- 2021: 247 million
- Case incidence (cases/1000/yr)
  - 2000: 82      2015: 59
  - 2019: 57      2021: 59

## ■ Malaria deaths:

- 2000: 897,000      2015: 577,000
- 2019: 568,000      2021: 619,000  
(68% ↑ 2020 due to COVID-19)
- % children < 5 yrs
  - 2000: 87%
  - 2015-present: 76%
- Mortality rate (deaths/100,000)
  - 2000: 30      2015: 15
  - 2019: 14      2021: 15



**Important impact of COVID-19 on malaria control (63,000 excess deaths)**

## A Zebra Among the Horses: Clinical Implications of Malaria in the United States

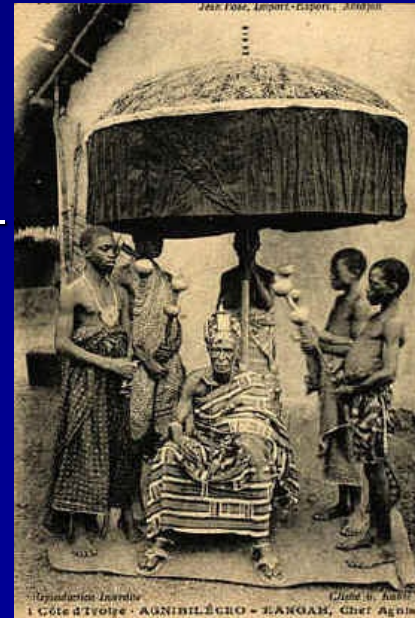
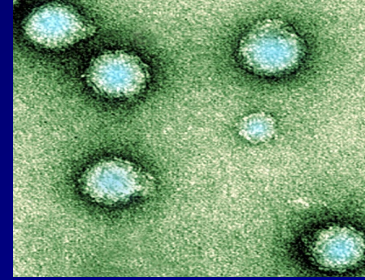
Ralph Huits, MD, PhD; Erika Wallender, MD, MPH; Kristina M. Angelo, DO, MPH&TM; Michael Libman, MD; and Davidson H. Hamer, MD

### Key points

- Climate change increases risk for introduction and local malaria transmission
- Even in absence of a suggestive travel-related exposure, consider malaria (and dengue)
- Rapid diagnostic confirmation crucial (RDTs, blood smears)

# Chikungunya Virus

- Identified in the 1950s in Africa (Southern Province, Tanganyika)
- Disease given a Kimakonde name: chikungunya
  - Term derived from kungunyala—meaning to become contorted





# Mosquito Vectors – Chikugunya



***Aedes aegypti***

**Multiple blood meals  
Humans preferred host**



***Aedes albopictus***

**Single blood meal  
Feeds on humans and  
other mammals**

# Chikungunya in the Americas

More than 1.7  
million  
estimated  
cases  
reported to  
PAHO



Pan American  
Health  
Organization



World Health  
Organization  
REGIONAL OFFICE FOR THE AMERICAS

Countries/territories with autochthonous transmission  
or imported cases of Chikungunya  
in the Americas, EW 49, 2013 - EW 5, 2016



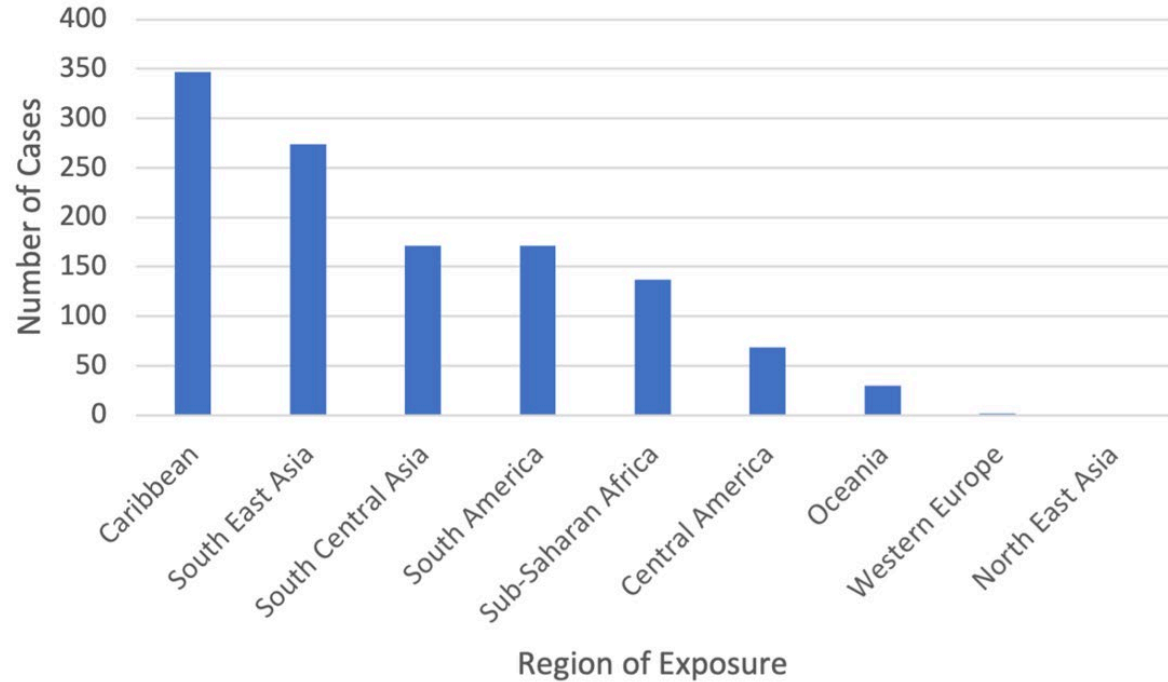
Data source:  
PAHO/WHO. Number of reported cases of Chikungunya Fever in the Americas  
<http://www.paho.org/chikungunya>  
Map production:  
PAHO-WHO AD CHA IR ARO

\* Note: Entire countries have been shaded on the map though there is no evidence of country-wide virus presence.  
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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.

# Recent Chikungunya Outbreaks

- Djibouti 2020 - >41,000 cases
- Thailand, Myanmar, Maldives 2018-2020
- Paraguay 2023 - >120,000 cases and 46 deaths
- India -- annually with more cases in 2023
  - Javelle E et al. Eurosurveillance 2019
  - Dudouet P et al. Travel Med Infect Dis 2020
  - Díaz-Menendez M et al. Eurosurveillance 2020
  - Javelle E et al. EID 2023

# Regions of Chikungunya Exposure Among Travelers Reported to GeoSentinel, 2005 –2020 (N=1,202)



# SÍNTOMAS

## FIEBRE CHIKUNGUNYA

El virus de Chikungunya se transmite por la picadura de mosquitos hembra infectados. La OMS señala que los insectos implicados en la transmisión son el *Aedes aegypti* y *Aedes albopictus*, especies que también transmiten el dengue.



**Fiebre alta**  
Inicia súbitamente, puede superar los 39 grados

**Dolor de cabeza**

**Dolores musculares**

**Conjuntivitis**

**Vómito y náuseas**

**Dolor difuso de espalda**

**Dolor de articulaciones severo**

**Rash**  
(alteración de la piel)



# Arthralgias and Arthritis

- Relapsing, incapacitating joint pains = hallmark of chikungunya
- Often have high fever, arthritis in multiple joints followed by disabling peripheral rheumatism lasting for months
  - Arthralgias or arthritis can persist for months to years
- May cause decreased ability to work and carry out activities of daily life
- Substantial cost of acute and chronic illness to travelers

# Prevention: Anti-vector Personal Protective Measures

- Insect repellents
  - Repellents containing DEET (30%), picaridin, IR3535, and oil of lemon eucalyptus and para-menthane-diol products provide long lasting protection
  - If you use both sunscreen and insect repellent, apply sunscreen first and then repellent
  - Treat clothing with permethrin
- Keep in mind: dark colors, strong smells, carbon monoxide attract mosquitoes

# Chikungunya Vaccine

IXCHIQ (chikungunya vaccine, live attenuated; Valneva),

- approved by US FDA in November 2023
- world's first-ever chikungunya vaccine
- recommended as a single intramuscular dose
  
- *Recommended for:* persons aged  $\geq 18$  years traveling to a country or territory where a chikungunya outbreak exists.
- Sero-response rates for the vaccine were 98% at 28 days and 99% at 12 months post vaccination
- Vaccine side effects include with headache, fatigue, and myalgias



# Conclusions

- Chikungunya responsible for large outbreaks in the Americas and sporadic outbreaks in many tropical locations
- Dengue cases increasing in popular Caribbean destinations
- Clinical overlap among dengue and chikungunya
- Substantial potential for chikungunya and dengue introduction and spread in the US due to climate change

# Resources for Travel Medicine

- Centers for Disease Control and Prevention (CDC)

[www.cdc.gov/travel](http://www.cdc.gov/travel)

- International Society of Travel Medicine (ISTM)

[www.istm.org](http://www.istm.org)

- The New York Center for Travel and Tropical Medicine

[www.travelhealth.net](http://www.travelhealth.net)

[www.connorgroupmed.com](http://www.connorgroupmed.com)

# Any Questions?



# Questions

## Upcoming NEBGH events

- **April 29** – Mondays w/ Dr. Mark & Dr. Michael
- **May 2** - Developing and Implementing a Global Mental Wellbeing Strategy
- **May 9** – Creating a Menopause-Supportive Work Environment
- **May 13** – Mondays w/ Dr. Mark & Dr. Michael
- **May 16** - Your Leave Administration “Plan B”: What to do if the Leave Manager Leaves?
- **June 20** – Reshaping Care and Culture: Health and Benefits Innovation