

# Mosquito-borne Diseases in Alameda County, 2019 – 2023

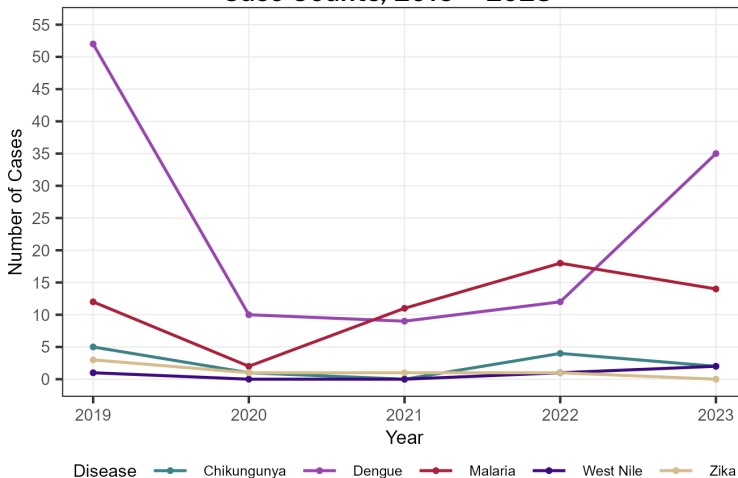
## Background

While most mosquitoes only cause bites that itch, some types of mosquitoes can spread pathogens that cause severe illness. In Alameda County, reported diseases spread by mosquitoes include Dengue, Chikungunya, Zika, Malaria, and West Nile Virus. No cases of Oropouche Virus have been reported to date. Malaria is caused by a parasite spread by the *Anopheles* mosquito. While this mosquito can be found in the United States, local transmission is rare. Dengue, Chikungunya, and Zika are all viruses spread by *Aedes aegypti* and *Aedes albopictus* mosquito species. These mosquitoes are not endemic to Alameda County; although *Ae. aegypti* was found in Alameda County in October 2024, it is not considered established in the jurisdiction. Local transmission of the above mosquito-borne diseases has not been identified, and cases are often associated with international travel. West Nile virus is spread by *Culex* mosquitoes, and is found in local birds and mosquitoes yearly. Recommended prevention measures include using insect repellent when visiting disease-endemic regions, and taking malaria prophylaxis when appropriate. At home, avoid leaving out even a cupful [standing water](#) that can breed mosquitoes.

## Case Counts

[Dengue](#) is the most commonly reported mosquito-borne disease in Alameda County, with a total of 118 confirmed, probable, or suspect cases reported from 2019-2023. Also reported during this time period were a total of 57 Malaria, 12 Chikungunya, 6 Zika, and 4 West Nile virus confirmed, probable, or suspected\* cases. As many of these diseases are associated with international travel, there was a sharp decrease in 2020 due to the COVID-19 pandemic.

**Figure 1. Mosquito-borne Disease Case Counts, 2019 – 2023**



\*Suspect cases are not included in the CSTE case definition for these four diseases, and make up 5% of cases for these diseases.

## Provider Recommendations:

- Take comprehensive patient history including travel in order to assess risk
- Local transmission from viremic individuals is possible due to the finding of *Ae. aegypti* in Alameda County; encourage diagnosed patients to use insect repellent and long-sleeve clothing during viremic or erythrocytic phases
- Ensure use of appropriate diagnostic testing, not just serology; refer to CDC test guidance
- Provide patient education and guidance on prevention of mosquito-borne illness and advise patients to take [appropriate](#) chemoprophylaxis and vaccinations prior to travel
- Report cases of mosquito-borne illnesses to Alameda County Public Health Department
- For training and resources refer to CDC's Dengue [Clinical Management Page](#).

## Case Demographics

The majority of cases occurred in residents ages 18-65 years old. Case rates were highest among African American or Black individuals, although cases were most commonly reported in Asian American and Pacific Islander residents. About half of the cases occurred in females, and half in males.

**Table 1. Demographic Characteristics of Mosquito-Borne Disease Cases in Alameda County, 2019 – 2023**

Characteristic	Cases	Percent	5-Year Case Rate per 100,000
<b>Age Group</b>			
0-5 yrs	3	1.5%	2.7
6-17 yrs	19	9.6%	8.2
18-35 yrs	54	27%	14.4
36-50 yrs	70	36%	21.8
51-65 yrs	42	21%	14.4
>65 yrs	9	4.6%	4.2
<b>Race/Ethnicity</b>			
African American or Black	38	19%	25.1
Asian American or Pacific Islander	57	29%	11.1
Hispanic or Latino/a/x	31	16%	8.7
White	19	9.6%	4.2
Other/Unknown	52	26%	—
<b>Gender</b>			
Female	97	49%	12.3
Male	99	50%	13.1
Other/Unknown	1	0.5%	—

## Clinical Characteristics and Epidemiology

Thirty percent of Dengue cases were hospitalized, and 99% of those interviewed reported international travel. The most commonly reported countries of travel included India (61 cases), Mexico (16), and the Philippines (7).

During this 5-year period, results for 257 patients tested for Dengue were reported. Of those, 225/257 (87%) of Dengue reports were tested by IgM/IgG serology only. [CDC](#) recommends testing for acute Dengue using a RT-PCR (i.e., a nucleic acid amplification test [NAAT]) or an NS1 antigen test, as well as with an IgM enzyme-linked immunosorbent assay (ELISA) antibody test, regardless of symptom onset date, although the sensitivity of RT-PCR and NS1 antigen tests decrease after the first 7 days of symptoms.

There are four serotypes of Dengue, DENV1-4, that an individual may be exposed to over their lifetime; exposure to one serotype does not provide immunity from other serotypes. Repeated exposure and infection with different serotypes of DENV increases the risk for developing severe outcomes, including Dengue Hemorrhagic Fever.

Twenty-five percent of Chikungunya cases were hospitalized, and all travelled internationally. The most commonly reported destination was India, with 5 cases.

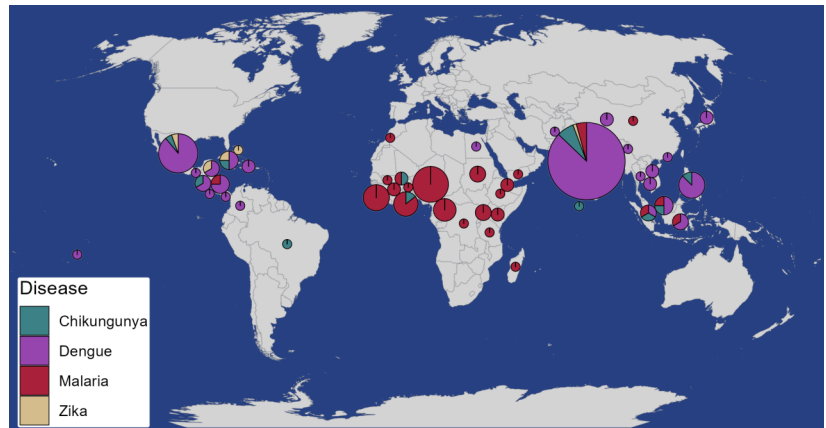
Over half of the malaria cases were hospitalized. All had reported international travel. The most common destinations were Nigeria (18) and Sierra Leone (8). Only 7 (12%) reported taking chemoprophylaxis, and of those, only 1/3 took the full course. Of the 57 Malaria cases, 44 (77%) were caused by *Plasmodium falciparum*, 8 (14%) were caused by *P. vivax* or *P. ovale*, two (4%) were caused by *P. malariae*, and three were unspiciated. The median time from symptom onset to test date was 5 days, and the average time was 14 days.

None of the Zika cases were hospitalized, and 60% were pregnant. All interviewed cases travelled internationally, to different countries in the Caribbean and Central America, and India.

Three of the four West Nile patients interviewed had travelled domestically in the United States; 75% of the reported cases were hospitalized.

No reported mosquito-borne cases died during this period, and no Oropouche Virus cases were reported.

**Figure 2. Map of International Travel Locations and Disease Reported for Returning Travelers with Mosquito-borne Diseases, 2019-2023\***



\*Sizes of circles correspond to number of cases. Cases that visited multiple countries are represented in each country visited.

**Table 2. Epidemiologic and Clinical Characteristics for Mosquito-borne Disease Cases\***

	Chikungunya N = 12	Dengue N = 118	Malaria N = 57	West Nile N = 4	Zika N = 6
<i>Clinical Characteristics</i>					
Pregnant	0 / 3 (0%)	1 / 13 (7.7%)	1 / 7 (14%)	0 / 2 (0%)	3 / 5 (60%)
Hospitalized	3 / 12 (25%)	31 / 102 (30%)	29 / 55 (53%)	3 / 4 (75%)	0 / 4 (0%)
Death	0/12 (0%)	0/118 (0%)	0/57 (0%)	0/4 (0%)	0/6 (0%)
<i>Epidemiologic factors</i>					
International Travel	12 / 12 (100%)	111 / 112 (99%)	57 / 57 (100%)	0 / 4 (0%)	4 / 4 (100%)
Domestic Travel**	2 / 12 (17%)	0 / 104 (0%)	0 / 57 (0%)	3 / 4 (75%)	2 / 4 (50%)
<i>Recalled Mosquito Bite</i>					
Yes	8 / 12 (67%)	63 / 111 (57%)	—	2 / 4 (50%)	0 / 4 (0%)
No	2 / 12 (17%)	25 / 111 (23%)	—	1 / 4 (25%)	3 / 4 (75%)
Not Sure	2 / 12 (17%)	23 / 111 (21%)	—	1 / 4 (25%)	1 / 4 (25%)

\*Percents are calculated based on the number of patients interviewed for each question.

\*\*Cases reporting solely domestic travel were West Nile cases. All other cases reporting domestic travel also travelled internationally.

## Summary

From 2019-2023, there were 197 confirmed, probable, or suspect mosquito-borne illnesses reported for Alameda County residents. Most cases were associated with international or domestic travel, with India (70), Mexico (18), and Nigeria (15) being the most visited countries. There were no deaths, but many patients were hospitalized, especially for malaria. Measures to prevent mosquito bites and chemoprophylaxis are recommended for individuals traveling to areas with endemic disease.