Key Findings

Chikungunya is an infectious disease caused by a virus that spreads from the bite of an infected mosquito. The mosquitoes that can spread the chikungunya virus, *Aedes aegypti* and *Aedes albopictus*, have invaded many areas of California. At this time, *Aedes* mosquitoes in California are not known to be infected with chikungunya, and locally acquired cases of chikungunya have not been reported. So far in California, cases of chikungunya have been reported only in people who were infected while traveling outside of California. Chikungunya occurs in many tropical and subtropical areas of the world, including Africa, Asia, and Central and South America.

Chikungunya in California from 2017 through 2019

Total Cases: A total of 98 chikungunya cases were reported from 2017 through 2019. Required reporting for this disease began in mid-2016.

Rate: The average annual rate of new chikungunya cases during 2017-2019 was less than 1 case per 100,000 people in California.

- **By County**: There were 7 California counties that reported at least 1 case of chikungunya each year during 2017-2019, with an average rate of less than 1 case per 100,000 people.
- **By Sex**: The average rates for males and females were each less than 1 case per 100,000 people.
- **By Age Group**: The average rates were highest in adults aged 45 to 64 years, but rates were less than 1 case per 100,000 people.
- **By Race/Ethnicity**: For cases where race and ethnicity information was available, the highest percentage of cases (62%) was in people who reported non-Hispanic Asian/Pacific Islander race/ethnicity.

To help prevent chikungunya, people who travel to areas where chikungunya occurs should take steps to prevent mosquito bites by using mosquito repellent on clothes and exposed skin, sleeping under a mosquito bed net, and keeping mosquitoes out of living spaces by using window and door screens. After returning from an area where chikungunya occurs, people should continue to use mosquito repellent for three weeks to prevent spreading chikungunya to mosquitoes around their home.

For more information about chikungunya in California, please visit the CDPH Chikungunya webpage. For details about key infectious diseases in California, please visit the CDPH Surveillance and Statistics Section webpage.

Background

Chikungunya is a viral infection that is primarily transmitted through bites from infected mosquitoes, specifically *Aedes aegypti* and *Aedes albopictus*. Mosquitoes become infected when they feed on a person who is already infected with the virus.[1] Chikungunya can also spread via blood-borne transmission. The highest risk of virus transmission to a mosquito or through blood to another individual occurs when a patient is viremic during their first week of illness. In utero transmission is rare but has been documented.[2]

The incubation period for chikungunya is usually 3-7 days, and the most commonly reported symptoms include acute onset of fever and severe pain in multiple joints. Other symptoms may include headache, muscle pain, joint swelling, fatigue, nausea, vomiting, diarrhea, or rash. Acute symptoms will usually resolve within 7-10 days. People at risk for severe disease include newborns exposed at birth, adults 65 years and older, and persons with underlying medical conditions.[3] There is no vaccine or antiviral therapy for chikungunya, and treatment typically includes rest, fluids, and the use of non-steroidal anti-inflammatory drugs to relieve symptoms.[4] Mortality from chikungunya is rare and occurs mostly in older individuals.[3] Chikungunya virus infection is similar to dengue virus infection in that both viruses are transmitted by the same mosquitoes and the infections have similar clinical features. As co-infection is possible in the same patient, it is important to rule out dengue virus infection because proper clinical management of dengue can improve outcome.[2]

Globally, chikungunya cases and infections have been identified in tropical and subtropical regions of Africa, Asia, Europe, and the Indian and Pacific Oceans. Since 2013, local transmission of chikungunya has been reported in the Americas, including in Caribbean countries and territories, as well as in the United States and U.S. territories, including Florida, Texas, and Puerto Rico.[5] In California, chikungunya infections have been reported only in people who were infected while traveling outside of California.[6]

This report describes the epidemiology of confirmed and probable chikungunya cases in California from 2017 (the first year case data were available for the full year) through 2019. Due to multiple factors that can contribute to underreporting, data in this report are likely underestimates of actual disease incidence. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to the *Technical Notes*.[7]

California Reporting Requirements and Surveillance Case Definition

California Code of Regulations (CCR), Title 17, Section 2500 requires health care providers to report suspected cases of chikungunya to their local health department within one working day of identification by electronic transmission, fax, or telephone if an outbreak is suspected.[8] Per CCR, Title 17, Section 2505 laboratories are required to report laboratory testing results suggestive of chikungunya virus infection to either the California Reportable Disease Information Exchange (CalREDIE) via electronic laboratory reporting or the local health department; reporting must occur within one working day after the health care provider has been notified.[9]

California regulations require cases of chikungunya to be reported to the California Department of Public Health (CDPH). CDPH counted cases that satisfied the U.S. Centers for Disease Control and Prevention/Council of State and Territorial Epidemiologists surveillance case definition of a confirmed or probable case for neuroinvasive and non-neuroinvasive arboviral diseases, which

includes chikungunya.

During the surveillance period (2017-2019), a confirmed case of chikungunya was defined as a clinically compatible case with confirmatory laboratory results. Clinically compatible illness included one or more of the following for neuroinvasive disease: meningitis, encephalitis, acute flaccid paralysis, or other acute signs of central or peripheral neurologic dysfunction, and absence of a more likely clinical explanation. For non-neuroinvasive disease, clinically compatible illness included fever or chills, and both the absence of neuroinvasive disease and the absence of a more likely clinical explanation. Other clinically compatible symptoms for both neuroinvasive and non-neuroinvasive disease can include headache, myalgia, rash, arthralgia, vertigo, vomiting, paresis and/or nuchal rigidity. Confirmatory laboratory criteria included: (i) isolation of chikungunya virus from, or demonstration of specific arboviral or genomic sequences in, tissue, blood, cerebrospinal fluid (CSF), or other body fluid by polymerase chain reaction (PCR) test, immunofluorescence, or immunohistochemistry, or (ii) demonstration of a > 4-fold rise in quantitative antibody titers to chikungunya virus antigens in paired acute and convalescent serum samples, or (iii) Immunoglobulin M (IgM) antibodies in serum with confirmatory demonstration of a > 4-fold rise in PRNT (plaque reduction neutralization test) end point titer between chikungunya virus and other arboviruses tested in a convalescent serum sample, or (iv, for neuroinvasive disease) virus-specific IgM antibodies in CSF and a negative result for other IgM antibodies in CSF for arboviruses endemic to the region where exposure occurred. A probable case of chikungunya was defined as a clinically compatible case with virus-specific IgM antibodies in serum or CSF, in the absence of other testing and a more likely explanation. Probable laboratory criteria included a positive chikungunya-specific enzyme-linked immunosorbent assay (ELISA) or immunofluorescence assay (IFA) for IgM on a single acute or convalescent phase serum specimen.[10]

Epidemiology of Chikungunya in California, 2017-2019

CDPH received reports of 98 total cases of chikungunya with estimated symptom onset dates from 2017 through 2019. The overall average annual incidence of chikungunya was 0.1 per 100,000 population [Figure 1].

To date, no locally acquired cases of chikungunya have been reported in California. Of the 82 case-patients with a reported travel destination during the surveillance period, 56 (68.3%) reported travel to Asia, 9 (11.0%) reported travel to parts of North America (Mexico and U.S.), 5 (6.1%) reported travel to Central America, 5 (6.1%) reported travel to South America, and 7 (8.5%) reported travel to other parts of the world.

Statewide from 2017 through 2019, only seven counties reported at least one case for each year of the surveillance period: Alameda, Contra Costa, Los Angeles, Sacramento, San Diego, San Mateo, and Santa Clara counties. Cases from these 7 counties made up 81.6% of the total chikungunya cases reported. Among these 7 counties, the average annual incidence rate of the 3 years was highest in Santa Clara County (0.4 per 100,000; 24 cases), Alameda County (0.2 per 100,000; 12 cases), and Contra Costa County (0.2 per 100,000; 6 cases) [Figure 2].

The average annual incidence rate by sex was 0.1 per 100,000 population for both males and females during the surveillance period. Of the 98 total cases, 57 (58.2%) were among females and 41 (41.8%) were among males.

By age group, the average annual incidence rates were highest among adults aged 45-54 years (0.1 per 100,000; 26 cases) and 55-64 years (0.1 per 100,000; 18 cases). The average annual incidence rate was lowest among children aged 5-14 years (0.01 per 100,000; 2 cases).

For the 71 (72.4%) cases with complete race/ethnicity data, the highest percentage of cases was among those who reported non-Hispanic Asian/Pacific Islander race/ethnicity (62.0%). The percentage of cases among those who reported non-Hispanic Asian/Pacific Islander race/ethnicity was disproportionally higher than the percentage of the non-Hispanic Asian/Pacific Islander racial/ethnic population in California during the same time period (62.0% vs. 15.3%, respectively) [Figure 3].

Figure 1. Chikungunya Cases and Incidence Rates by Year of Estimated Illness Onset, California, 2017-2019

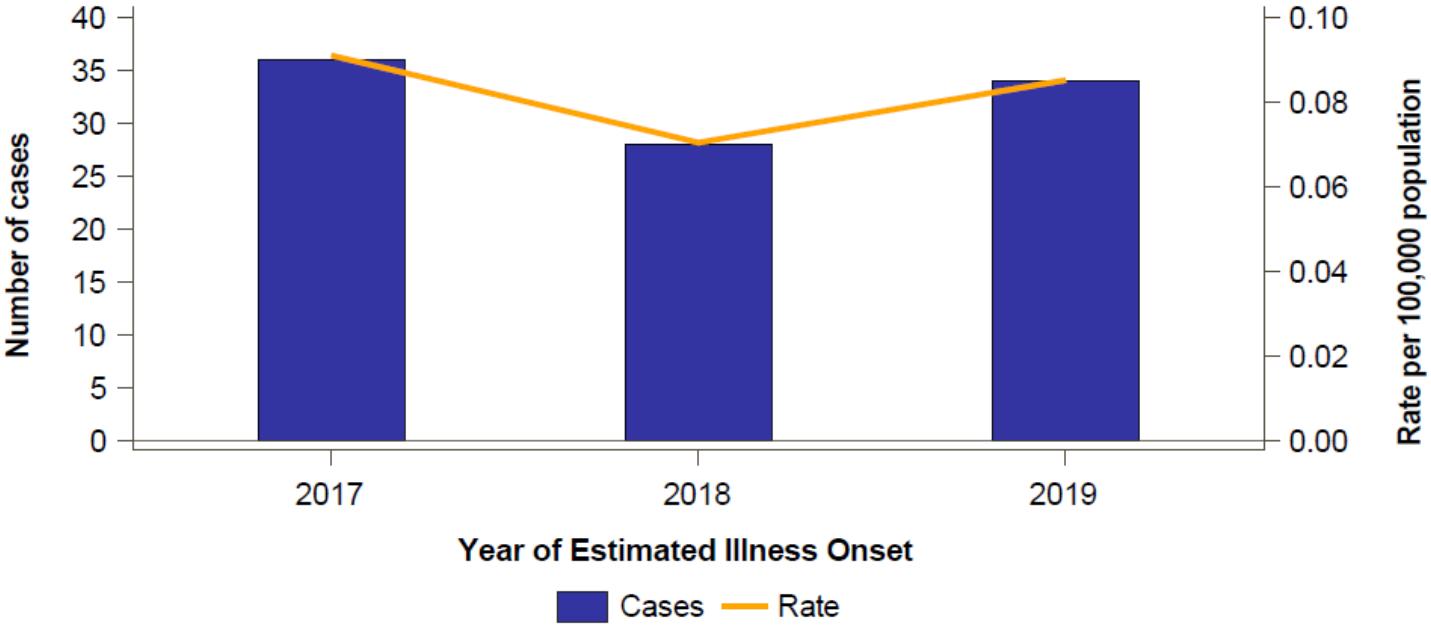


Figure 2. Chikungunya Average Annual Incidence Rates by County, California, 2017-2019

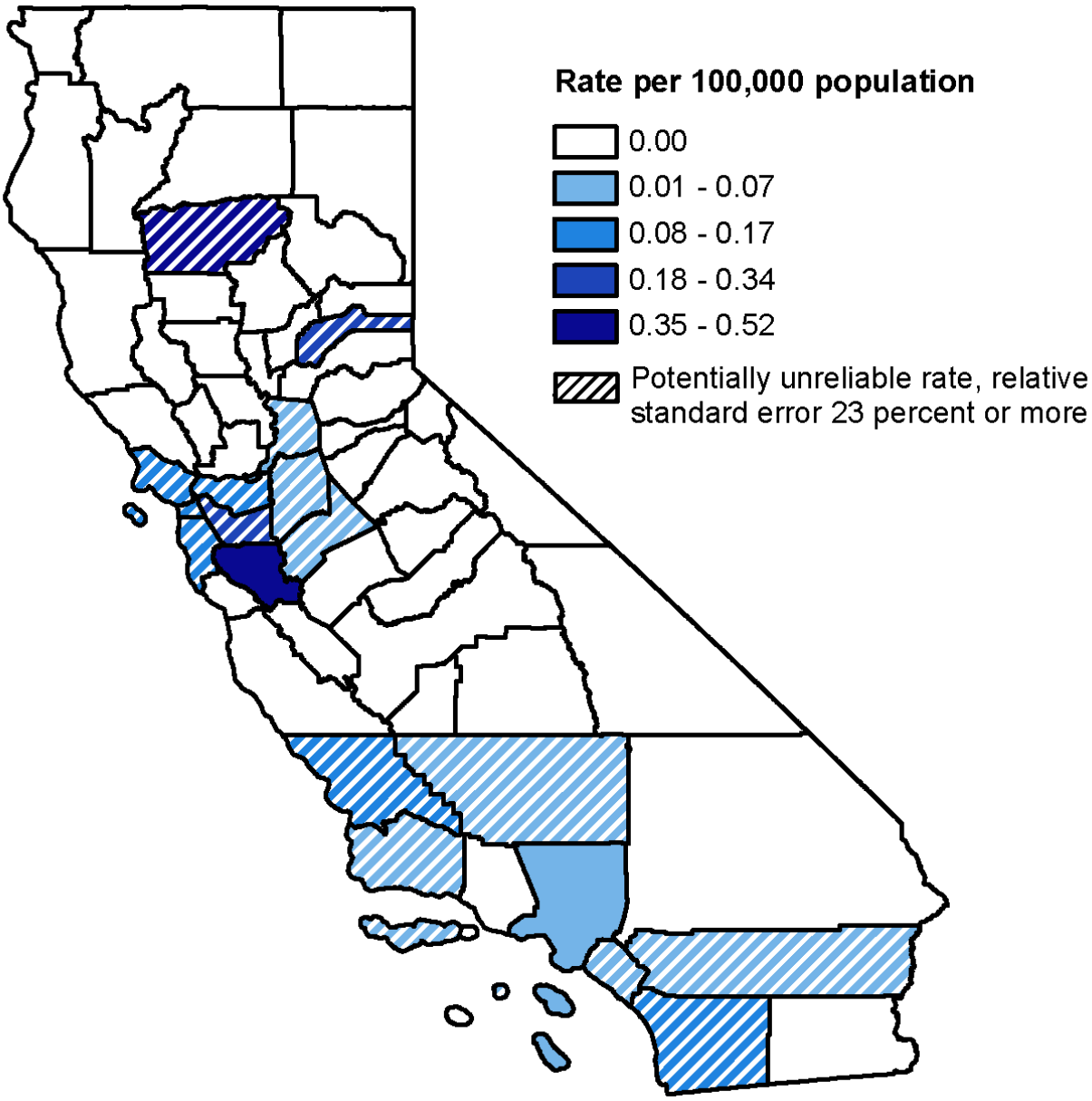
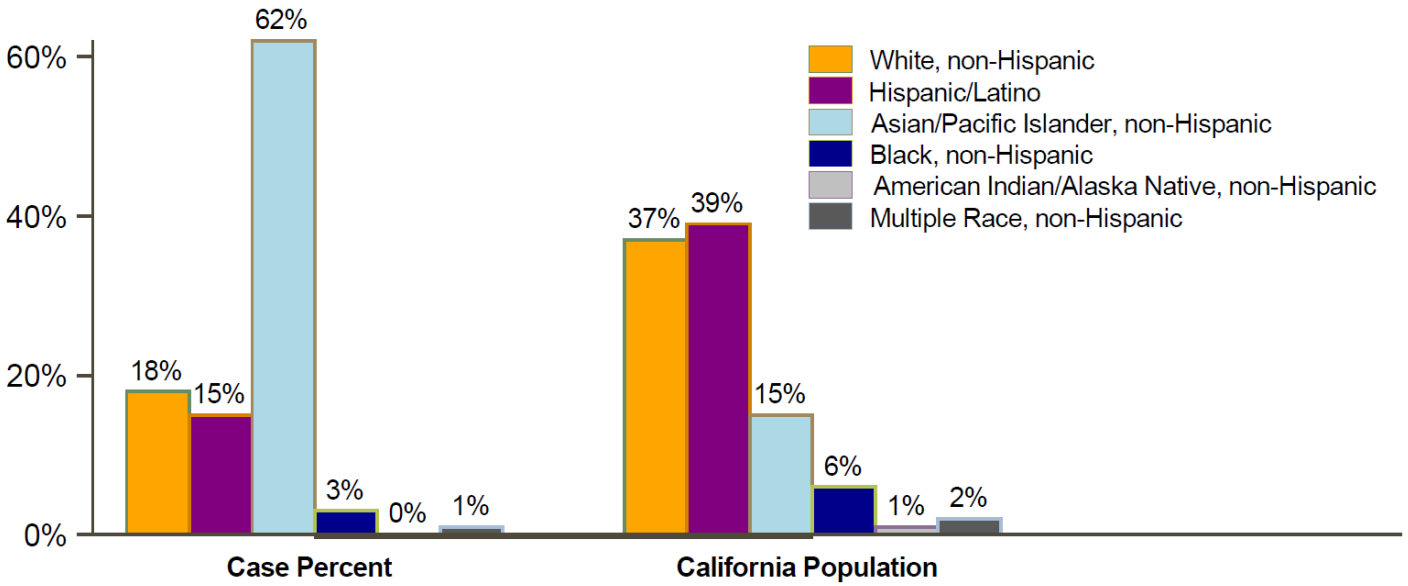


Figure 3. Chikungunya Cases and Population by Race/Ethnicity, California, 2017-2019



26.5% (n=26) of reported incidents of Chikungunya Virus Infection did not identify race/ethnicity and 1% (n=1) of incidents identified as 'Other' race/ethnicity and are not included in the Case Percent calculation. Information presented with a large percentage of missing data should be interpreted with caution.

Comments

Required reporting of chikungunya virus infection began on June 1, 2016. Therefore, this epidemiologic summary only covers the period of 2017 through 2019 for which case data were available for the full year. Descriptions of chikungunya cases in California in 2016 can be found in the CDPH *Vector-Borne Disease Section Annual Report, 2016.*[11]

To prevent chikungunya, persons who travel to areas where chikungunya occurs should take precautions to prevent mosquito bites by using mosquito repellent on clothes and exposed skin, sleeping under a mosquito bed net, and keeping mosquitoes out of living spaces by using window and door screens. After returning from an area where chikungunya occurs, persons should continue to use mosquito repellent for three weeks to prevent spreading chikungunya to mosquitoes around their home.

Prepared by Inderbir Sohi, Yanyi Djamba, Charsey Porse, Vicki Kramer, Allyx Nicolici, and Duc Vugia — Infectious Diseases Branch, March 2022

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