

Key Findings

Flea-borne typhus is an infectious disease caused by a group of bacteria called *Rickettsia* that are spread by fleas. Fleas can become infected when they feed on small animals like rats, opossums, and cats that can carry *Rickettsia*. If a person comes in contact with infected fleas, they can get flea-borne typhus and have symptoms such as fever, headache, chills, and may need hospital care. In California, flea-borne typhus has been reported mainly in areas of Los Angeles and Orange counties.

Flea-borne Typhus in California from 2013 through 2019

Total Cases: There were a total of 744 new flea-borne typhus cases from 2013 through 2019.

Rate: The average annual rate of new flea-borne typhus cases during 2013-2019 was less than 1 case per 100,000 people in California.

- **By County:** The average rate was highest in Los Angeles and Orange counties (both with about 1 case per 100,000 people). Almost all (about 97%) flea-borne typhus cases during 2013-2019 were in these two counties.
- **By Sex:** Average rates were higher in males than in females, but rates were less than 1 case per 100,000 people for both groups.
- **By Age Group:** The average rate was highest in adults aged 35 to 64 years, but rates were less than 1 case per 100,000 people in this age group.
- **By Race/Ethnicity:** For cases where race and ethnicity information was available, the highest percentage of cases was in people who reported non-Hispanic White race/ethnicity (about 47%).
- **By Month:** There were more flea-borne typhus cases in June, July, and August (about 100 cases each month) than in all other months (about 49 cases each month).

To help prevent flea-borne typhus, people should avoid contact with fleas. Keep fleas off pet cats and dogs by using flea control products and keeping cats indoors. Keep fleas away from your home by preventing stray cats, rats, and other rodents (like opossums) from living around your home. Keep garbage containers covered and do not leave pet food or trash outside that may attract animals.

For more information about flea-borne typhus in California, please visit the [CDPH Flea-borne Typhus webpage](#). For details about key infectious diseases in California, please visit the [CDPH Surveillance and Statistics Section webpage](#).

Background

Typhus fever is the collective name for a group of rickettsial diseases caused by bacteria that are spread to humans by fleas, lice, and chiggers. In California, typhus is typically caused by *Rickettsia typhi* and is referred to as flea-borne, murine, or endemic typhus. Flea-borne typhus occurs in tropical and subtropical climates throughout the world.^{1, 2}

Flea-borne typhus has been rare in the U.S. since the 1950s due largely to improved sanitation and pest management. Consequently, flea-borne typhus was removed from the U.S. Centers for Disease Control and Prevention (CDC) list of nationally notifiable diseases in 1987.³ However, it is still endemic to certain areas of Hawaii, Texas, and California; in California, it has been reported mainly in areas of Los Angeles and Orange counties.^{1, 2, 4}

Flea-borne typhus is caused by exposure to the feces of infected fleas. Fleas become infected after feeding on small mammals that carry the bacteria, including rats, opossums, and cats. The bacteria are most commonly transferred to a person when the infectious flea feces enter an open flea bite wound, a cut, or a scratch, but can also be inhaled or rubbed into a person's eyes. The bacteria are not spread person to person.^{2, 5} Human infections are more common in areas where humans and host animals (particularly rodents) come into regular contact, including in areas with poor sanitation.⁶

Many persons with flea-borne typhus are asymptomatic; however, those who do develop symptoms can have illness ranging from mild to severe. Within 6-14 days after contact with infected fleas, a person may experience symptoms such as fever, head and body aches, chills, cough, nausea, or a maculopapular rash that starts on the trunk and spreads peripherally. Hospitalization occurs for a majority of symptomatic cases in California.⁷ Although rare, severe illness can result if an infection is left untreated and can cause damage to one or more organs, including the liver, kidneys, heart, lungs, and brain. Typhus is treated with antibiotics.^{5, 6} Due to the non-specific presentation of flea-borne typhus and the unreliability of early diagnostic tests, treatment decisions should be made based on clinical presentation and epidemiologic settings.⁷

This report describes the epidemiology of confirmed and probable flea-borne typhus cases in California from 2013 through 2019. Incidence rates presented in this report are based on surveillance data and should be considered estimates of true disease incidence. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to the *Technical Notes*.⁸

California Reporting Requirements and Surveillance Case Definitions

California Code of Regulations (CCR), Title 17, Section 2500 requires health care providers to report suspected cases of typhus to their local health department within seven calendar days of identification.⁹ Per CCR, Title 17, Section 2502, laboratories are required to report laboratory testing results suggestive of *Rickettsia* 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.¹⁰ The organism isolated from the suspected typhus patient should be submitted to the California Department of Public Health (CDPH) Viral and Rickettsial Disease Laboratory or another public health laboratory for definitive identification.⁷

California regulations require cases of typhus to be reported to CDPH. CDPH counted cases that satisfied the CDPH-designated surveillance case definition¹¹ of a confirmed or probable case. During the 2013-2019 surveillance period, a confirmed case of flea-borne typhus was defined as a clinically compatible illness with laboratory-confirmed infection with *R. typhi* or other *Rickettsia* species, or a clinically compatible illness with laboratory results supportive of infection plus an established epidemiologic link to a confirmed case. A probable case was defined as a clinically compatible illness with laboratory results supportive of *Rickettsia* infection.⁷

Epidemiology of Flea-Borne Typhus in California, 2013-2019

CDPH received reports of 744 total cases of flea-borne typhus with estimated symptom onset dates from 2013 through 2019. This corresponds to an average annual incidence rate of 0.3 cases per 100,000 population in California [Figure 1]. Notably, of all flea-borne typhus cases, 80.4% (598 cases) were reportedly hospitalized.

Statewide during 2013-2019, 720 (96.8%) of flea-borne typhus cases occurred among residents of Los Angeles County (0.8 per 100,000; 593 cases) and Orange County (0.6 per 100,000; 127 cases) [Figure 2]. The remaining 22 cases (3.2%) occurred among residents of thirteen other counties, each reporting an average annual incidence rate of less than 0.1 per 100,000 population.

During the surveillance period, the average annual incidence rate was 0.3 per 100,000 among males (436 cases) and 0.2 per 100,000 among females (316 cases). Overall, 58.5% of case-patients were male and 41.5% were female.

From 2013 through 2019, the average annual flea-borne typhus incidence rate was highest at 0.4 per 100,000 among adults aged 35 to 44 years (127 cases), 45 to 54 years (146 cases), and 55 to 64 years (125 cases) [Figure 3].

Of 646 flea-borne typhus cases with complete race/ethnicity information, the highest percentage of cases was among case-patients who reported non-Hispanic White race/ethnicity. Case-patients reported non-Hispanic White race/ethnicity (47.1%) more frequently and non-Hispanic Asian/Pacific Islander race/ethnicity (7.7%) less frequently than compared to the percentage of these groups in California during the same time period (38.0% and 14.8%, respectively) [Figure 4].

Flea-borne typhus occurs seasonally, with the highest number of cases occurring during warm-weather months. During 2013-2019, 40.3% (300 cases) of all typhus cases had estimated symptom onsets during June, July, and August, an average of 100 cases each month. In comparison, an average of 49 cases occurred each month during September through May [Figure 5].

Figure 1. Flea-borne Typhus Cases and Incidence Rates by Year of Estimated Illness Onset, California, 2013-2019

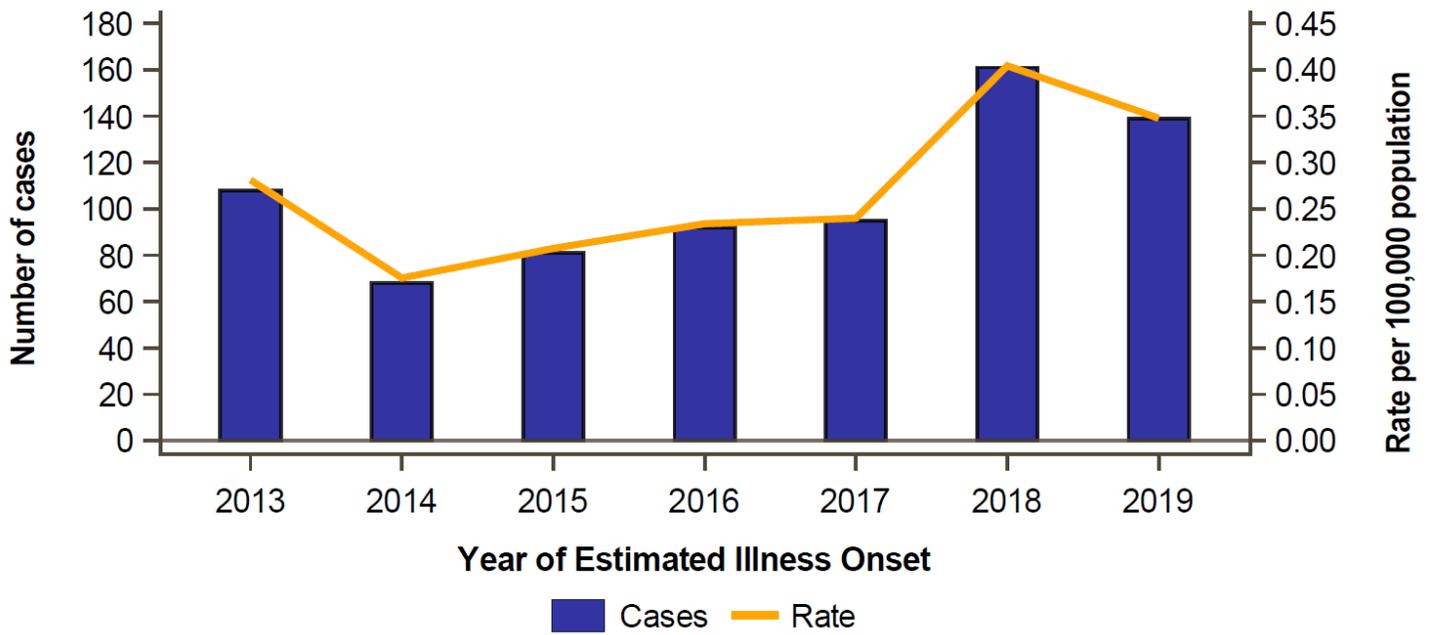
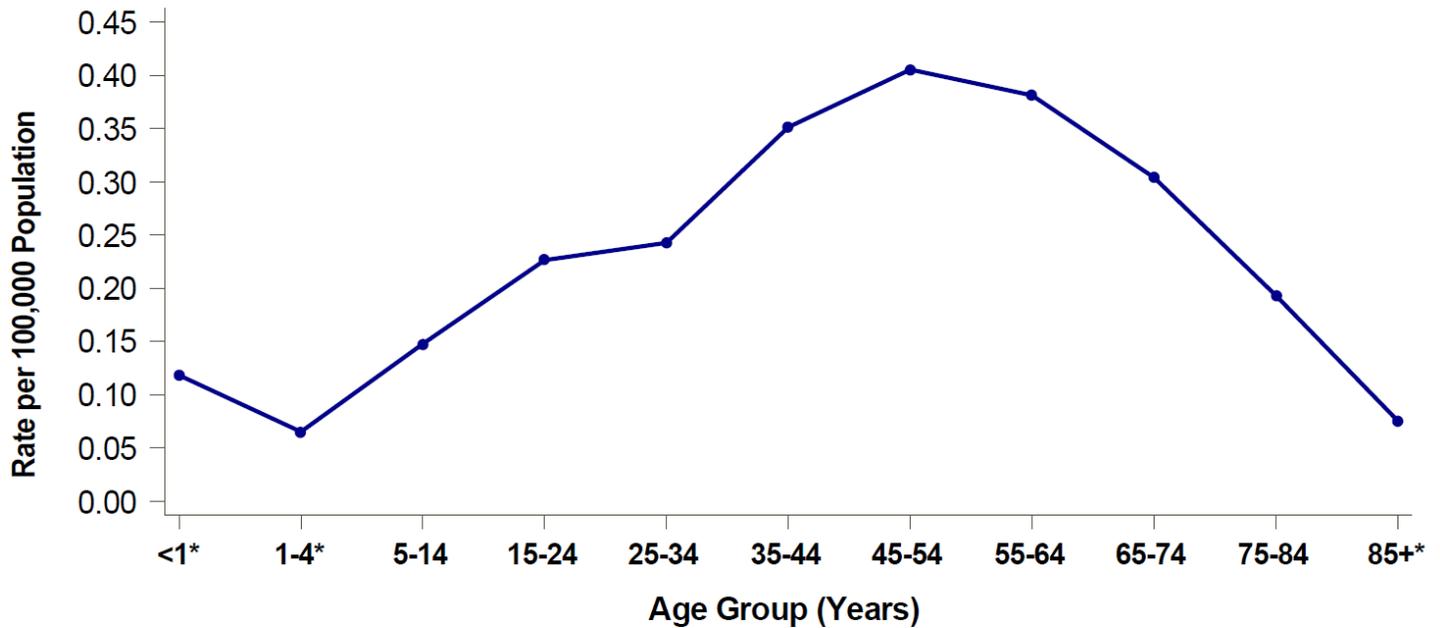
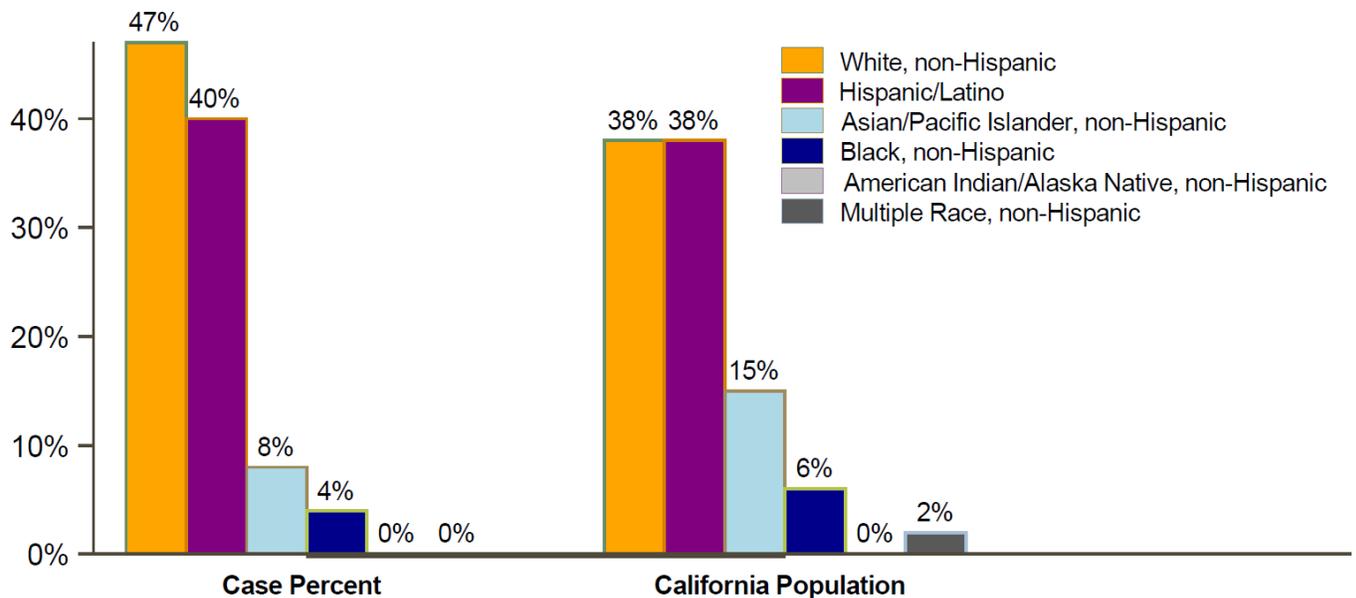


Figure 3. Flea-borne Typhus Average Annual Incidence Rates by Age Group, California, 2013-2019



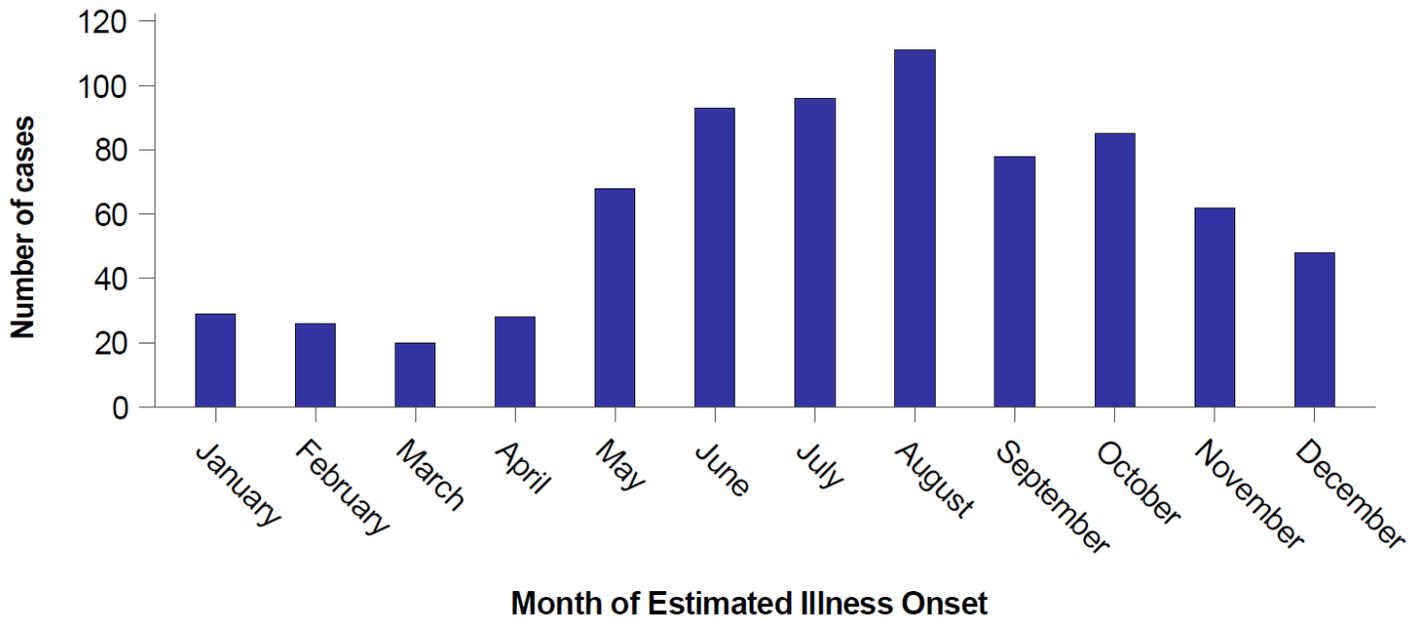
*Potentially unreliable rate: relative standard error 23 percent or more.

Figure 4. Flea-borne Typhus Cases and Population by Race/Ethnicity, California, 2013-2019



10.5% (n=78) of reported incidents of Typhus Fever did not identify race/ethnicity and 2.7% (n=20) 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.

Figure 5. Flea-borne Typhus Cases by Month of Estimated Illness Onset, California, 2013-2019



Comments

From 2013 through 2019, incidence rates of flea-borne typhus in California remained low with a statewide average annual incidence rate of 0.3 per 100,000 population. Almost all flea-borne typhus cases occurred among Los Angeles and Orange County residents.

To prevent flea-borne typhus, persons should avoid contact with fleas. Pet owners can keep fleas off pet cats and dogs by using flea control products; cats should be kept indoors to minimize contact with fleas outside. Persons should also discourage feral cats, rats, and other rodents, including opossums, from living around homes by covering garbage containers and removing pet food and trash outside that may attract animals.

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References

¹ [Typhus Fevers. U.S. Centers for Disease Control and Prevention website.](https://www.cdc.gov/typhus/index.html) Updated November 13, 2020. Accessed November 23, 2020. <https://www.cdc.gov/typhus/index.html>

² [Flea-borne Typhus Fact Sheet. California Department of Public Health website.](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/FleaBorneTyphusFactSheet.pdf) Updated February 2019. Accessed November 19, 2020. <https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/FleaBorneTyphusFactSheet.pdf>.

³ [Typhus Fevers, Historical Trends. U.S. Centers for Disease Control and Prevention website.](https://www.cdc.gov/typhus/murine/history.html) Updated July 11, 2019. Accessed November 23, 2020.
<https://www.cdc.gov/typhus/murine/history.html>

⁴ [Flea-borne Typhus Statistics. Texas Department of State Health Services website.](https://www.dshs.texas.gov/IDCU/disease/murine_typhus/Statistics.aspx) Updated March 2, 2021. Accessed March 17, 2021.
https://www.dshs.texas.gov/IDCU/disease/murine_typhus/Statistics.aspx

⁵ [Typhus Fevers, Flea-Borne \(Murine\) Typhus. U.S. Centers for Disease Control and Prevention website.](https://www.cdc.gov/typhus/murine/index.html) Updated November 13, 2020. Accessed November 23, 2020.
<https://www.cdc.gov/typhus/murine/index.html>

⁶ Typhus Fevers, [Information for Healthcare Providers – Murine Typhus. U.S. Centers for Disease Control and Prevention website.](https://www.cdc.gov/typhus/healthcare-providers/index.html#murine) Updated March 29, 2021. Accessed May 6, 2021.
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⁷ [State of California, Department of Public Health. Guidance for Flea-Borne Typhus Surveillance and Reporting.](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/FleaBorneTyphusGuidance.pdf) Sacramento, CA; 2019. Accessed November 23, 2020.
<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/FleaBorneTyphusGuidance.pdf>

⁸ State of California, Department of Public Health. [Technical notes. In: Epidemiologic Summaries of Selected Communicable Diseases in California, 2013-2019.](https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/EpiSummariesTechnicalNotes2013-2019.pdf) Sacramento, California; 2021. Accessed December 30, 2021.
<https://www.cdph.ca.gov/Programs/CID/DCDC/CDPH%20Document%20Library/EpiSummariesTechnicalNotes2013-2019.pdf>

⁹ [Reportable Diseases and Conditions: Reporting to the Local Health Authority, 17 CCR § 2500 \(2021\).](https://govt.westlaw.com/calregs/Document/I5849DB60A9CD11E0AE80D7A8DD0B623B)
<https://govt.westlaw.com/calregs/Document/I5849DB60A9CD11E0AE80D7A8DD0B623B>

¹⁰ [Reportable Diseases and Conditions: Notification by Laboratories, 17 CCR § 2505 \(2021\).](https://govt.westlaw.com/calregs/Document/I1947D280662411E384928538D6692020)
<https://govt.westlaw.com/calregs/Document/I1947D280662411E384928538D6692020>

¹¹ Because flea-borne typhus is not nationally notifiable, the U.S. Centers for Disease Control and Prevention/Council of State and Territorial Epidemiologists did not develop a national case definition for typhus.