Epidemiologic Summary of Cyclosporiasis in California, 2013 - 2019

Key Findings

Cyclosporiasis is an infection caused by a parasite called *Cyclospora cayetanensis*. This parasite can be found in food and water that has been contaminated by the feces (stool or poop) of infected people. People can get cyclosporiasis by eating or drinking something that is contaminated with *Cyclospora.* Cyclosporiasis can cause watery diarrhea, stomach cramps, and loss of appetite. Cyclosporiasis is most common in tropical and subtropical areas of the world. In the United States, foodborne outbreaks of cyclosporiasis have been linked to various types of fresh produce, mostly imported from other countries.

Cyclosporiasis in California from 2013 through 2019

Total Cases: There were a total of 367 new cyclosporiasis cases from 2013 through 2019.

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

- **By County**: The average rate was highest in San Francisco County (less than 1 case per 100,000 people).
- **By Sex**: The average rate was similar in males and females, each group with less than 1 case per 100,000 people.
- **By Age Group**: The average rates were highest in adults aged 35 to 44 years and 65 to 74 years, but rates were less than 1 case per 100,000 people in each age group.
- **By Race/Ethnicity**: For cases where race and ethnicity information was available (about 67%), the highest percentage of cases was in people who reported non-Hispanic White race/ethnicity (about 57%).
- **By Month**: Most cyclosporiasis cases (about 89%) occurred from May through August.

To help prevent cyclosporiasis, it is important to follow food safety guidelines and wash hands with soap and water before and after handling fruits and vegetables. Before eating, cutting, or cooking fruits and vegetables, wash preparation utensils and surfaces, and wash fresh produce thoroughly under clean, running water. People traveling in tropical or subtropical areas of the world should be careful with what they eat or drink and remember to "boil it, cook it, peel it, or forget it". Travelers should drink only bottled water and drinks, or boil water for one minute before drinking, and eat only foods that have been thoroughly cooked. Fruit that can be peeled is safest to eat when it is peeled by the person who is eating it.

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

Background

Cyclosporiasis is transmitted by ingesting *Cyclospora cayetanensis* oocysts, usually within contaminated food or water.[1] *Cyclospora* is shed in the feces from an infected person; after being passed in feces, *Cyclospora* take days to weeks in the environment to become infectious to another person. Therefore, it is unlikely that the infection is passed directly from person to person.[2] Cyclosporiasis occurs in many countries throughout the world and is most common in tropical and subtropical regions. In the United States, foodborne outbreaks of cyclosporiasis have been linked to various types of fresh produce, including raspberries, cilantro, basil, snow peas, and mixed salad imported from Latin America.[2]

Symptoms of cyclosporiasis usually begin one to two weeks after ingestion of infective *Cyclospora* oocysts. Symptoms may include: watery diarrhea, loss of appetite, weight loss, bloating, stomach cramps, increased gas, nausea, and fatigue. Vomiting and low-grade fever may also occur. If not treated, symptoms may persist for several days to several weeks. Some symptoms, such as diarrhea, may seem to go away and then return (relapse). Some people who are infected with *Cyclospora* do not have any symptoms.[3] Cyclosporiasis is usually not life threatening, and most people with healthy immune systems will recover without treatment. Immunocompromised persons or those with preexisting medical conditions may be at higher risk for severe or prolonged illness; antibiotics or medication to alleviate symptoms may be used to treat cyclosporiasis.[4]

This report describes the epidemiology of confirmed and probable cyclosporiasis cases in California from 2013 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*.[5]

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 cyclosporiasis to their local health department within seven calendar days of identification or immediately by telephone if an outbreak is suspected.[6] Per CCR, Title 17, Section 2505, laboratories are also required to report laboratory testing results suggestive of cyclosporiasis (*Cyclospora cayetanensis*) to either the California Reportable Diseases Information Exchange (CalREDIE) via electronic laboratory reporting or the local health department; notification should occur within one day after the health care provider has been notified of the laboratory testing result.[7]

California regulations require cases of cyclosporiasis 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. During the surveillance period (2013-2019), a confirmed case of cyclosporiasis was defined as a case with clinically compatible illness and at least one of the following criteria for laboratory confirmation: detection of *Cyclospora* organisms or DNA in stool, intestinal fluid/aspirate, or intestinal biopsy specimens. Clinically compatible illness includes one or more of the following: watery diarrhea, loss of appetite, weight loss, abdominal cramps/bloating, nausea, body aches, and fatigue, vomiting and lowgrade fever. A probable case was defined as a case that meets the clinical description and

is epidemiologically linked to a confirmed case.[8]

Epidemiology of Cyclosporiasis in California, 2013-2019

CDPH received reports of 367 total cases (334 confirmed and 33 probable) of cyclosporiasis with estimated symptom onset dates from 2013 through 2019. This corresponds to an average annual incidence rate of 0.1 cases per 100,000 people. Annual cyclosporiasis incidence increased from 2 cases (0.01 per 100,000 people in 2013) to 89 cases (0.2 per 100,000 people in 2019) during the surveillance period. The highest annual incidence rate occurred in 2018 (0.4 per 100,000; 172 cases) [Figure 1]. Of 189 case-patients with reported travel history, 81 (42.9%) reported international travel.

County-specific average annual incidence rates per 100,000 population from 2013 through 2019 ranged from 0 to 0.7, with the highest average rate in San Francisco County (0.7 per 100,000, 43 cases), followed by San Mateo County (0.7 per 100,000, 37 cases) and Ventura County (0.5 per 100,000 people, 28 cases) [Figure 2]. By region (see *Technical Notes*) average annual incidence rates were highest in the Bay Area (0.3 per 100,000; 145 cases), the Central Coast (0.2 per 100,000; 19 cases) and the South Coast (0.1 per 100,000; 133 cases).

From 2013 through 2019, average annual incidence was similar among males (0.1 per 100,000; 189 cases) and females (0.1 per 100,000; 177 cases).

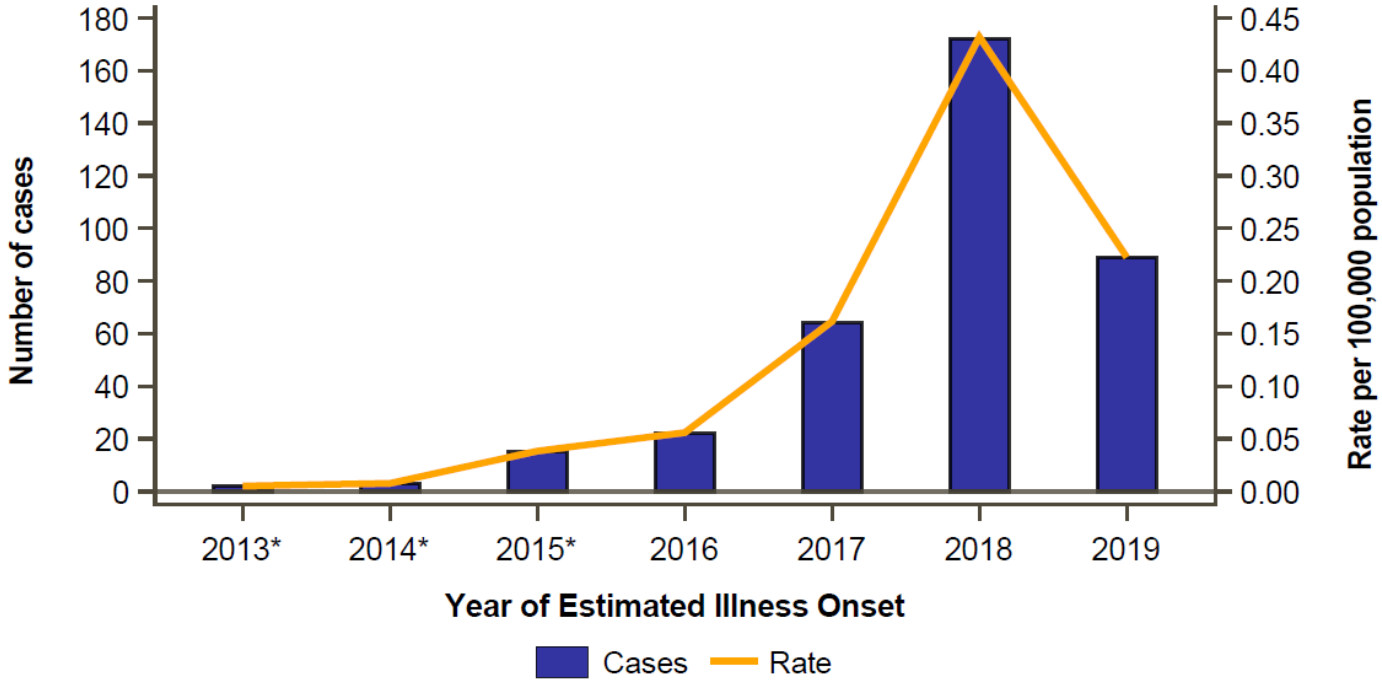
By age group, average annual incidence rates were highest among adults aged 35-44 years (0.2 cases per 100,000; 78 cases), followed by those aged 65-74 years (0.2 per 100,000; 45 cases) and 75-84 years (0.2 per 100,000; 22 cases).

For cyclosporiasis cases with complete race/ethnicity information (67.3%), the highest percentage of cases was among those who reported non-Hispanic White race/ethnicity (56.9%); cases reported non-Hispanic White race/ethnicity more frequently than would be expected based on the percentage of the non-Hispanic White racial/ethnic population in California during the same time period (56.9% vs. 38.0%, respectively) [Figure 4].

By month during the surveillance period, the highest number of cases occurred during warmer-weather months; during 2013-2019, 88.5% (325) of all cyclosporiasis cases had estimated illness onsets in May, June, July, and August [Figure 5].

During this surveillance period, three outbreaks of cyclosporiasis involving 86 California case-patients were identified. All three outbreaks occurred in spring (May and June) of 2018 and involved multiple jurisdictions. One involved case-patients from other states. One outbreak implicated a confirmed food source (fresh basil); sources of the other two outbreaks were not able to be determined.

Figure 1. Cyclosporiasis Cases by Year of Estimated Illness Onset, California, 2013-2019



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

Figure 2. Cyclosporiasis Average Annual Incidence by County, California, 2013-2019

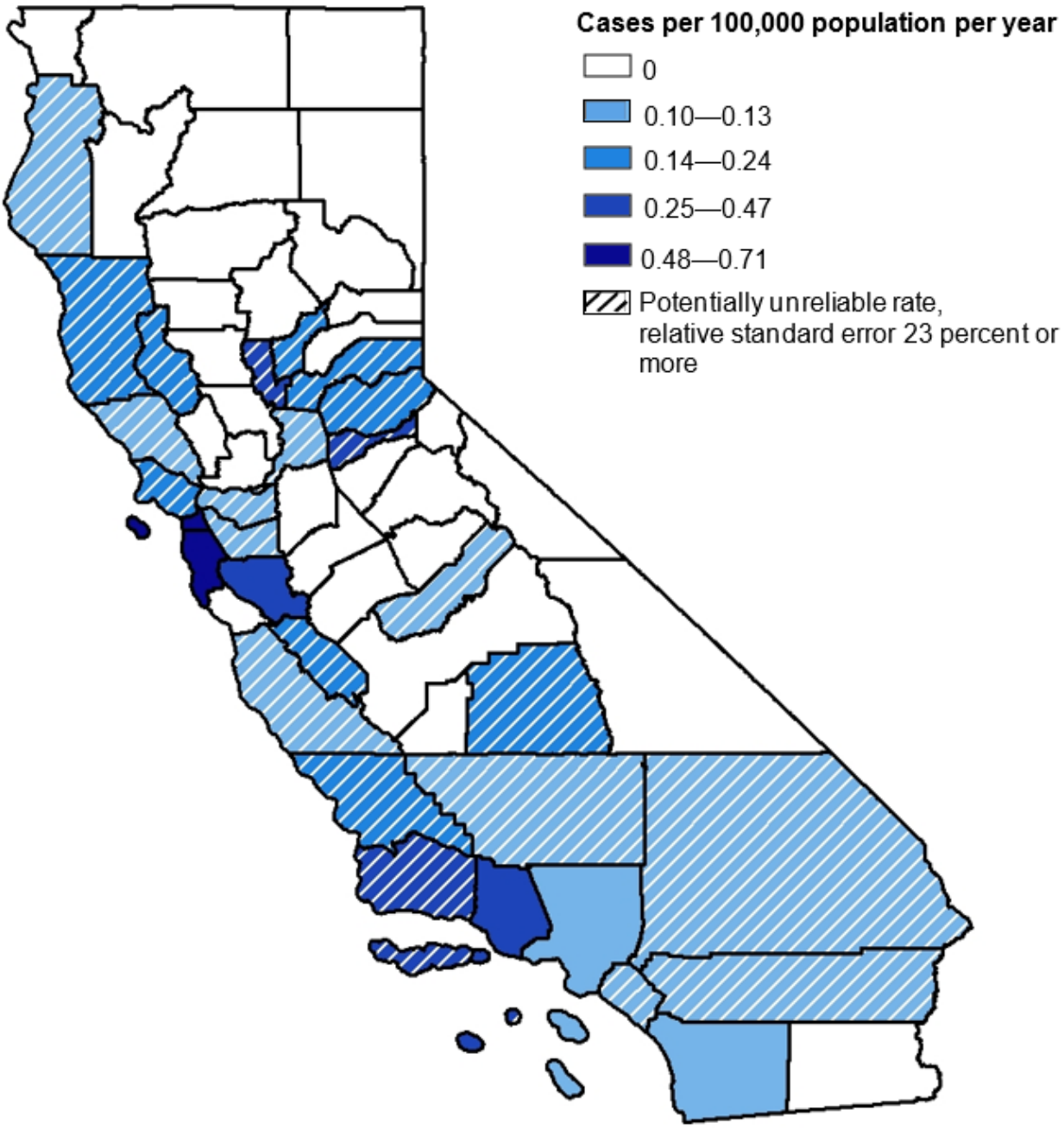
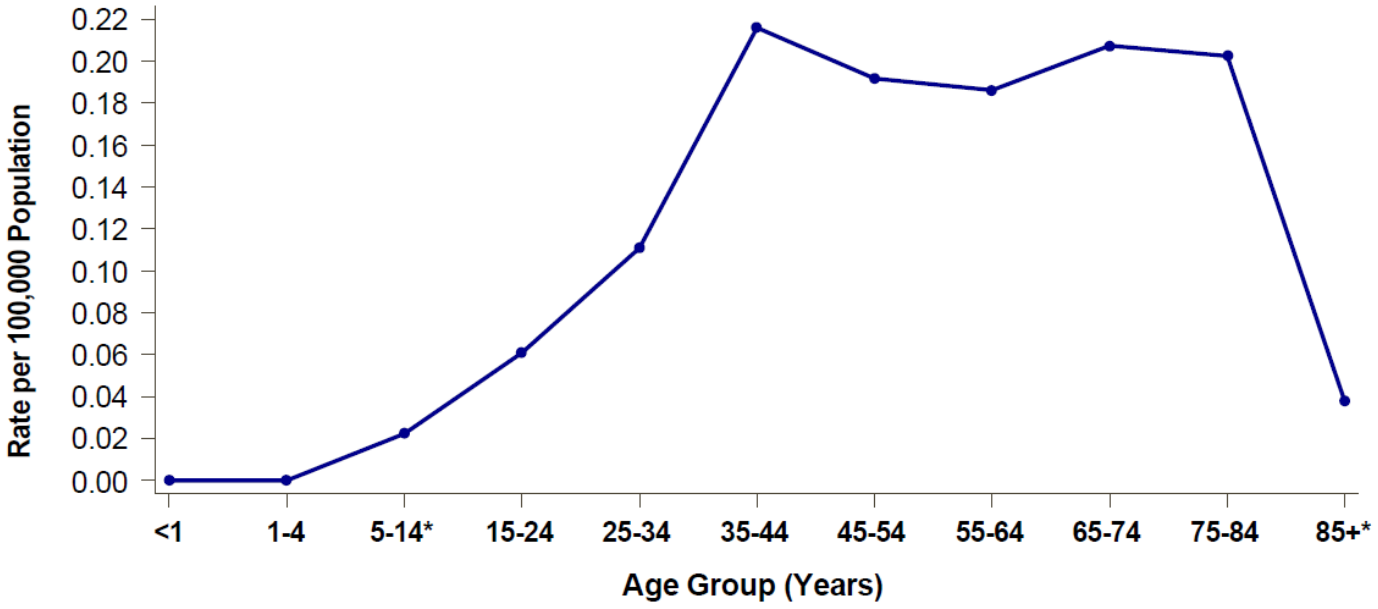
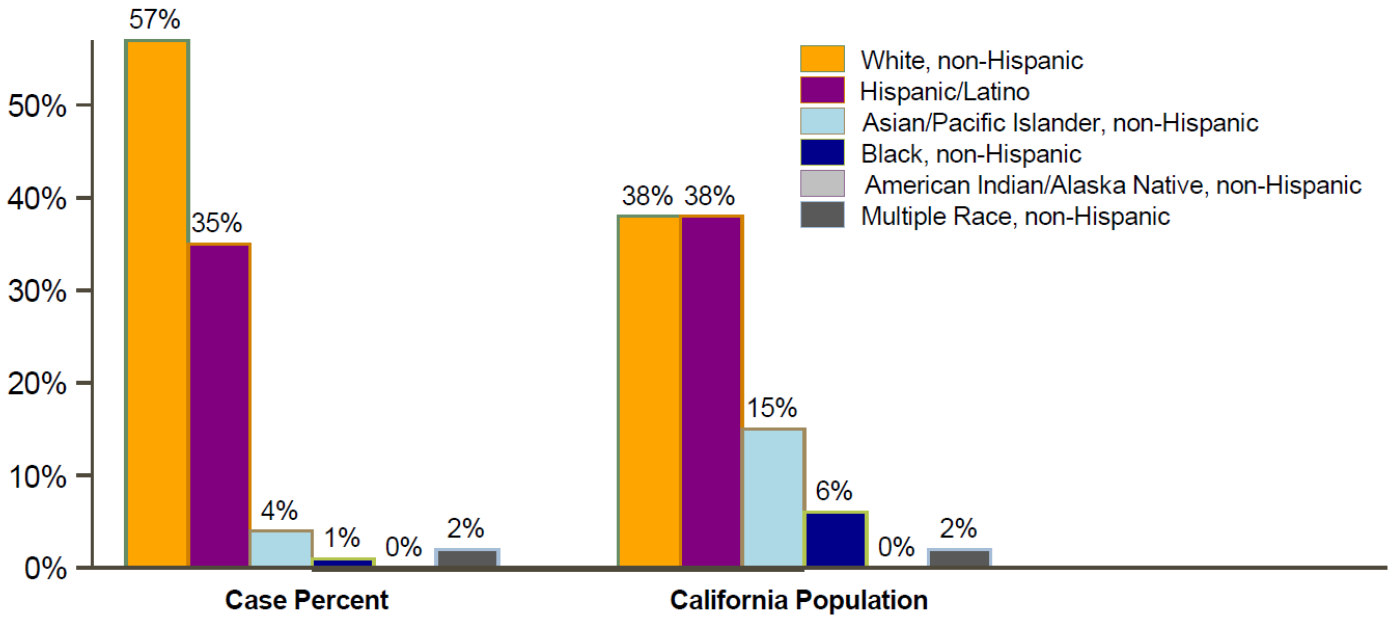


Figure 3. Cyclosporiasis Average Annual Incidence Rates by Age Group, California, 2013-2019



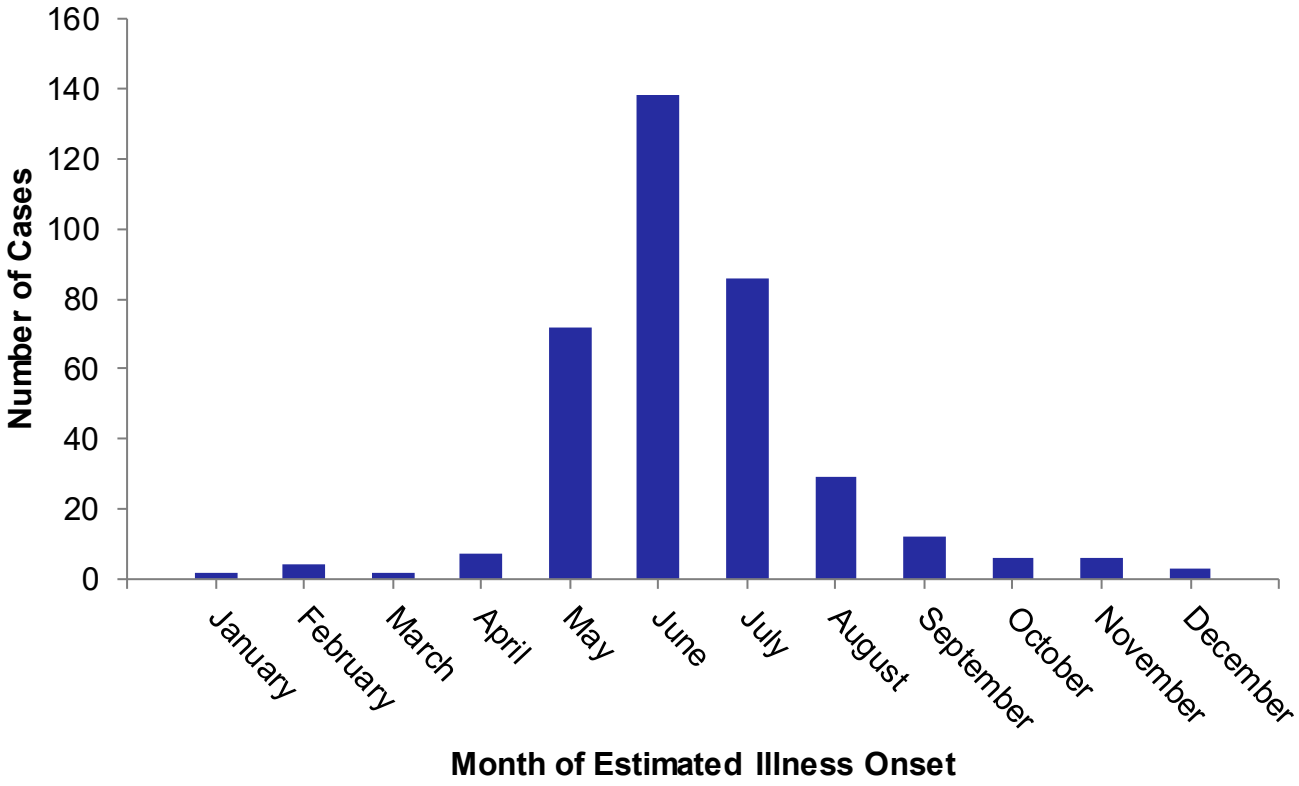
*Potentially unreliable rate: relative standard error 23 percent or more.

Figure 4. Cyclosporiasis Cases and Population by Race/Ethnicity, California, 2013-2019



32.7% (n=120) of reported incidents of Cyclosporiasis did not identify race/ethnicity and 4.1% (n=15) 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. Cyclosporiasis Cases by Month of Estimated Illness Onset, California, 2013-2019



Comments

Incidence rates per 100,000 population of cyclosporiasis in California increased from 2013 (0.01 per 100,000; 2 cases) through 2019 (0.2 per 100,000 people; 89 cases) but remained low overall. The sharp increase in cases in 2018 was driven by the three outbreaks that occurred in that year.

To prevent *Cyclospora* infection, persons should follow recommendations for safe handling of fruits and vegetables, and practice proper hand hygiene before preparing or eating food. This includes washing cutting boards, utensils, dishes, and surfaces with soap and water prior to preparing food. All fruits and vegetables should also be thoroughly washed under clean, running water before preparing or eating. Travelers to cyclosporiasis-endemic areas (including tropical and subtropical regions) should adhere to strict food safety precautions; while traveling, persons should drink only bottled, canned, or properly treated/filtered water and drinks, and eat only foods that have been thoroughly cooked. Raw fruits that can be peeled are safest when peeled by the person who eats them.[9]

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