

## Epidemiologic Summary of Listeriosis in California, 2013-2019

### Key Findings

Listeriosis is an infection caused by *Listeria*, a type of bacteria that is common in the environment and can make some people very sick. People usually get listeriosis by eating food that is contaminated with *Listeria* bacteria, especially raw (uncooked) food, unpasteurized milk or milk products, and deli meats and soft cheeses that may have been contaminated during or after processing. Listeriosis mainly affects older adults, people with weakened immune systems, and pregnant women and their newborns. It is rare for healthy people in other groups to get sick with listeriosis. Listeriosis is uncommon, but it can cause severe disease and death. It is usually a mild illness for pregnant women but can cause severe disease in the newborn or in the fetus, resulting in stillbirth.

### Listeriosis in California from 2013 through 2019

**Total Cases:** There were a total of 812 new listeriosis cases from 2013 through 2019. This is an average of 116 cases each year.

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

- **By County:** Of the 11 California counties that had at least one case each year, the average rate was highest in San Mateo County and San Francisco County (both with about 1 case per 100,000 people).
- **By Sex:** More cases were female (about 58%) than male (about 42%), but the average rates for both females and males were less than 1 case per 100,000 people.
- **By Age Group:** The average rates were highest in adults aged 65 years or older and children less than 1 year of age, but both groups had about 1 case per 100,000 people.
- **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 40%).
- **By Month:** There were more listeriosis cases in June through September (about 93 cases each month) than in all other months (about 55 cases each month).

To help prevent listeriosis, pregnant women, older adults, and people with weakened immune systems should avoid foods that are more likely to be contaminated with *Listeria*, or make sure that these foods are thoroughly cooked before eating. These foods include raw (unpasteurized) milk and milk products, soft cheeses, hot dogs, lunch/deli meats, refrigerated smoked fish, and raw sprouts.

For more information about listeriosis in California, please visit the [CDPH Listeriosis webpage](#). For details about key infectious diseases in California, please visit the [CDPH Surveillance and Statistics Section webpage](#).

## Background

In the United States, listeriosis is an uncommon but serious foodborne illness associated with an estimated 1,600 infections and 260 deaths annually.<sup>1, 2</sup> Listeriosis is caused by the bacterium *Listeria monocytogenes*, which is ubiquitous in the environment in soil, vegetation, and untreated water, and can also infect various animals. The national *Healthy People 2020* target objective for listeriosis is for an incidence rate lower than 0.2 new cases per 100,000 population.<sup>3</sup>

Consuming foods contaminated with *Listeria* is the leading source of infection. *Listeria* has been found in raw foods, including unpasteurized milk and milk products, smoked/cured meat or fish, and produce, and has also been found in foods that became contaminated during or after processing, such as ready-to-eat deli meats and soft cheeses.<sup>4</sup> Cooking and pasteurizing kills *Listeria*, but unlike other foodborne pathogens, *Listeria* can survive and multiply in refrigerated temperatures.<sup>5, 6</sup> Transmission between mother and fetus or newborn can occur during pregnancy or delivery.

Most *Listeria* infections occur in immunocompromised persons, adults aged 65 years and older, and pregnant women, their fetuses, and newborns.<sup>7</sup> Onset of symptoms after consumption can range from as little as one day to more than two months.<sup>8</sup> Invasive listeriosis may present clinically as septicemia or meningoenzephalitis, with a high mortality rate. Symptoms vary depending on primary site of infection but may include gastroenteritis, fever, head and muscle aches, stiff neck, and convulsions. Most patients with listeriosis require hospitalization; immunocompromised persons and adults 65 years and older are at greatest risk. In pregnant women, listeriosis may present with mild or no symptoms, but may result in premature delivery, miscarriage, stillbirth, or serious infection in the newborn.<sup>7</sup>

This report describes the epidemiology of confirmed listeriosis cases in California from 2013 through 2019, plus probable cases in 2019 (due to a 2019 revision of the case definition). A description of listeriosis outbreaks involving California case-patients that occurred during 2013-2019 is also included. 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*.<sup>9</sup> The epidemiologic description of listeriosis for earlier surveillance periods can be found in the *Epidemiologic Summary of Listeriosis in California, 2001-2008 and 2009-2012*.<sup>10, 11</sup>

## 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 listeriosis to their local health department within one working day of identification or immediately by telephone if an outbreak is suspected.<sup>12</sup> Per CCR, Title 17, Section 2505, laboratories are required to report laboratory testing results suggestive of *Listeria* 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.<sup>13</sup>

California regulations require cases of listeriosis 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 (CDC)/Council of State and Territorial Epidemiologists surveillance

case definition of a confirmed (2013-2018) or confirmed and probable (2019) case.<sup>14</sup> From 2013-2018, a confirmed case of listeriosis was defined as an infection in which *L. monocytogenes* is isolated from a normally sterile site, or, in the setting of a miscarriage or stillbirth, *L. monocytogenes* is isolated from placental or fetal tissue. In 2019, the surveillance definition for a confirmed case of listeriosis was expanded to include several additional sterile sites (pleural, peritoneal, pericardial, vitreous fluid, etc.). In addition, in the setting of pregnancy, products of conception (chorionic villi, placenta, fetal tissue amniotic fluid, etc.) were included for maternal case-patients, and tracheal aspirate and meconium were specified for neonatal case-patients.

In 2019, the surveillance case definition added a probable case classification for listeriosis, which was defined as meeting presumptive laboratory criteria or having an epidemiologic linkage for pregnancy-associated listeriosis. *Listeria* detected from culture-independent diagnostic testing meets presumptive laboratory evidence. In the setting of pregnancy, a mother (who does not meet confirmed case classification) who gave birth to a confirmed/probable neonate (< 28 days old), meets the probable surveillance case definition. A neonate (who does not meet confirmed case classification) with a mother who meets confirmed/probable case classification from products of conception OR a clinically compatible neonate (who does not meet confirmed case classification) with a mother who meets confirmed/probable case definition from a sterile site, also meets the probable surveillance case definition.<sup>15</sup>

## Epidemiology of Listeriosis in California, 2013-2019

CDPH received reports of 812 cases of listeriosis with estimated symptom onset dates from 2013 through 2019. This is an average annual incidence rate of 0.3 cases per 100,000 population. Incidence rates during the 2013-2019 surveillance period were relatively stable, with a minor decrease in 2018 [Figure 1]. During the surveillance period, 148 (18.2%) case-patients were reported to have died with listeriosis.

Statewide from 2013 through 2019, only 11 California counties reported at least one case for each year of the surveillance period: Alameda, Los Angeles, Orange, Riverside, Sacramento, San Bernardino, San Diego, San Francisco, San Mateo, Santa Clara, and Sonoma. Among these 11 counties, the average incidence rate was highest in San Mateo County (0.7 per 100,000; 37 cases), San Francisco County (0.6 per 100,000; 34 cases), and San Diego County (0.4 per 100,000; 97 cases). Of the 58 California counties, 30 (51.7%) had an average annual incidence rate that was above the national *Healthy People 2020* target rate for listeriosis of 0.2 per 100,000 population.<sup>3</sup>

Of all listeriosis cases from 2013 through 2019, 57.9% were female and 42.1% were male. The average annual incidence rate was slightly higher among females (0.3 per 100,000; 469 cases) than among males (0.2 per 100,000; 341 cases).

Average annual listeriosis incidence rates during the 2013-2019 surveillance period were highest among adults aged 65 years or older (1.2 per 100,000; 450 cases, not shown) and children aged less than 1 year (1.0 per 100,000; 34 cases) [Figure 2].

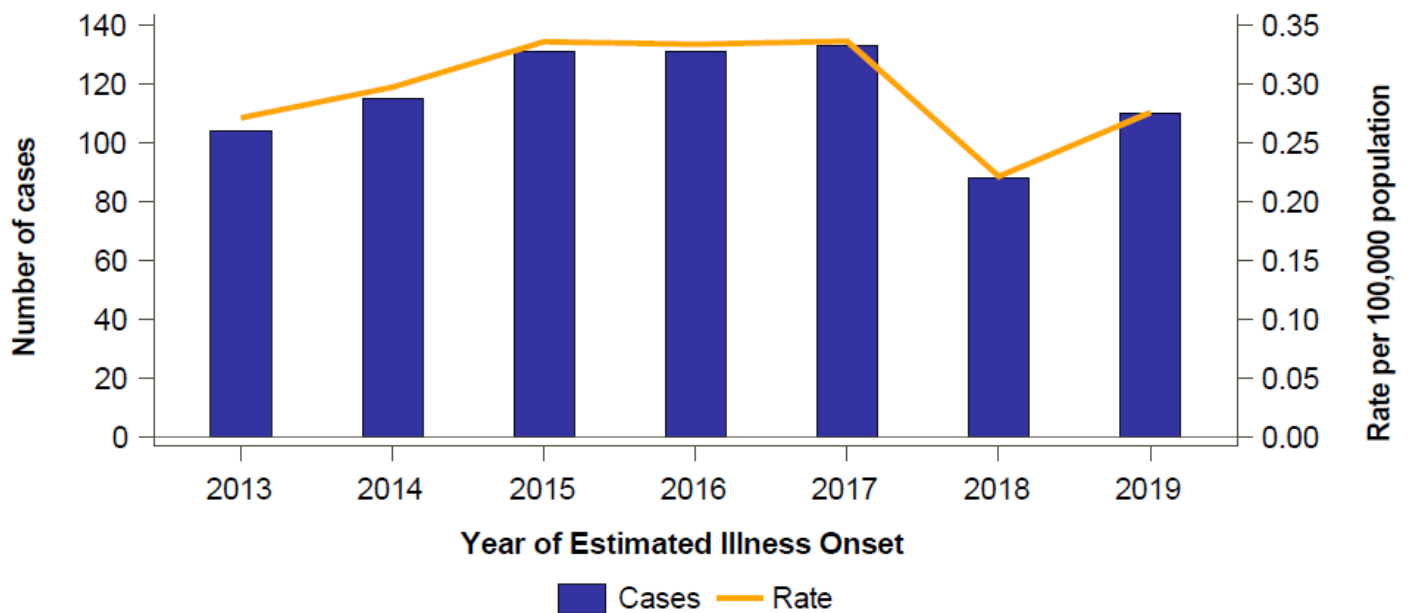
For listeriosis cases with complete race/ethnicity information (see *Technical Notes*), the highest percentage of cases was among case-patients who reported non-Hispanic White race/ethnicity (39.6%). However, case-patients reported non-Hispanic Asian/Pacific Islander

race/ethnicity (22.3%) more frequently and Hispanic/Latino race/ethnicity (32.2%) less frequently than would be expected compared to the percentage of these groups in California (14.8% and 38.5%, respectively) [Figure 3].

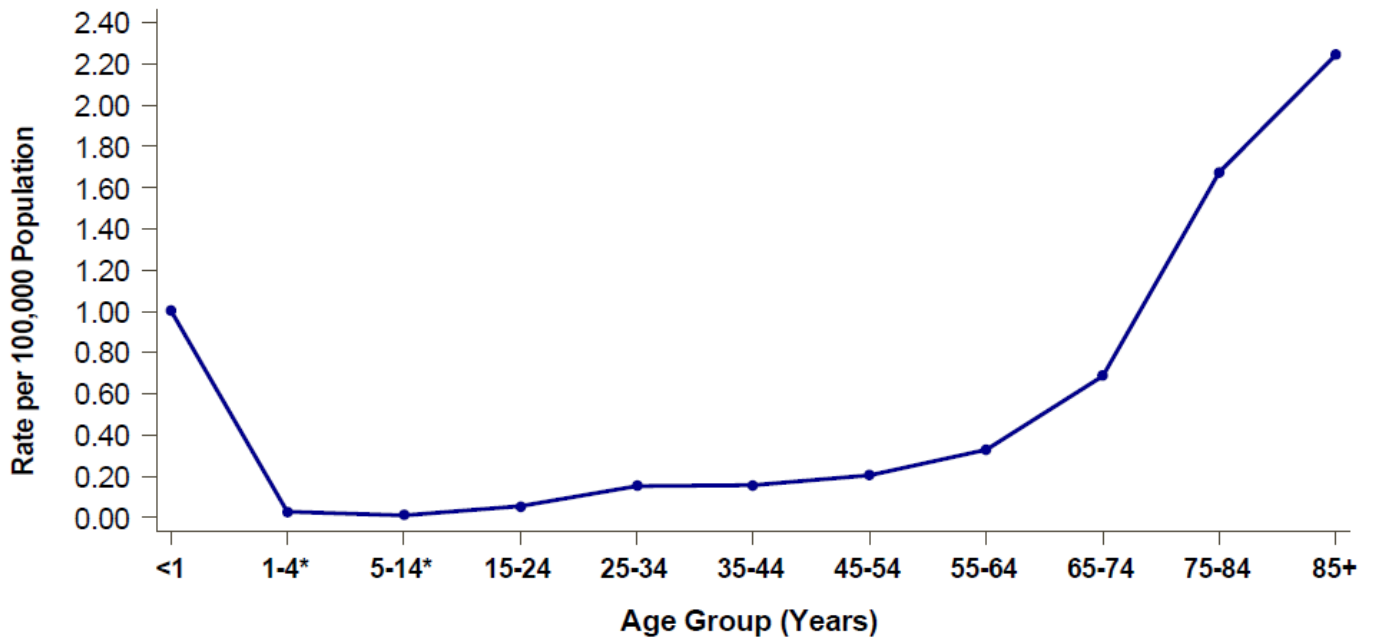
Listeriosis occurs seasonally, with the highest number of cases occurring during warm-weather months. During 2013-2019, 45.8% (372) of all listeriosis cases had estimated symptom onsets during June, July, August, and September, an average of 93 cases each month. In comparison, an average of 55 cases occurred each month during October through May [Figure 4].

From 2013 through 2019, there were 14 foodborne outbreaks of listeriosis involving 68 California case-patients. Thirteen (92.9%) outbreaks involved patients in multiple states<sup>16</sup> and were primarily due to commercially distributed food products. Some notable multi-state listeriosis outbreaks involving California residents that led to food recalls included those associated with the consumption of caramel apples, frozen vegetables, prepackaged leafy greens, and enoki mushrooms.

**Figure 1. Listeriosis Cases and Incidence Rates by Year of Estimated Illness Onset, California, 2013-2019**

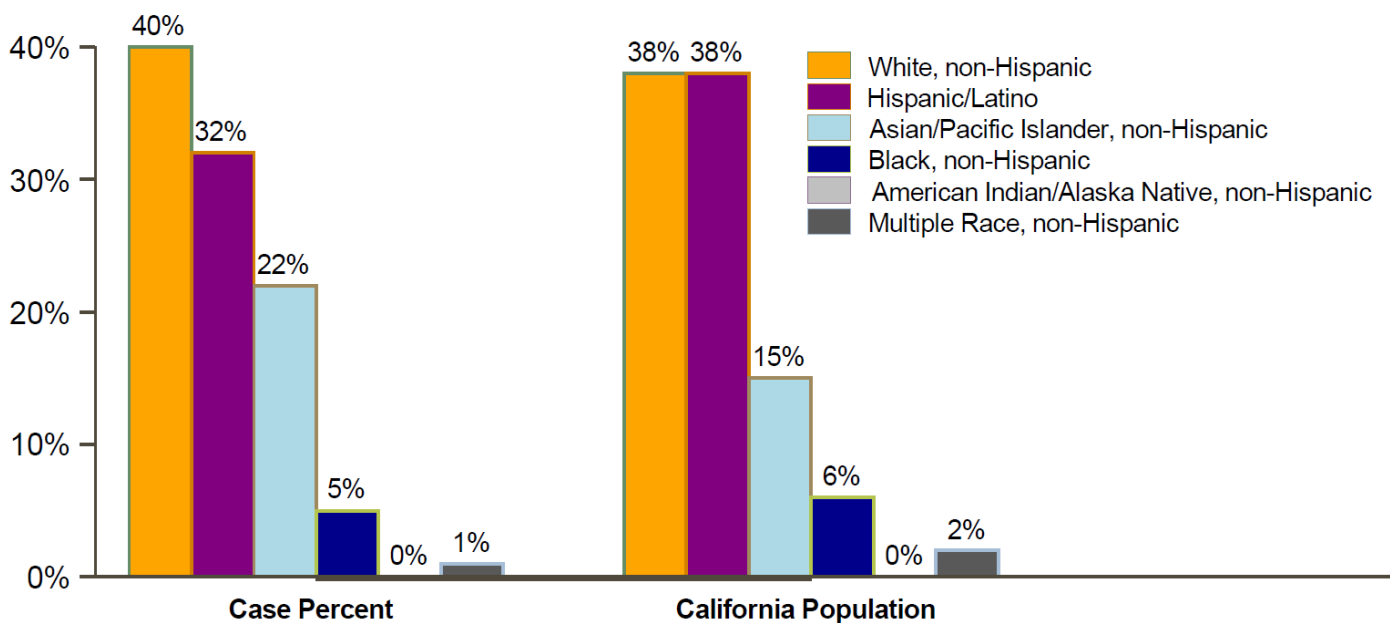


**Figure 2. Listeriosis Average Annual Incidence Rates by Age Group, California, 2013-2019**



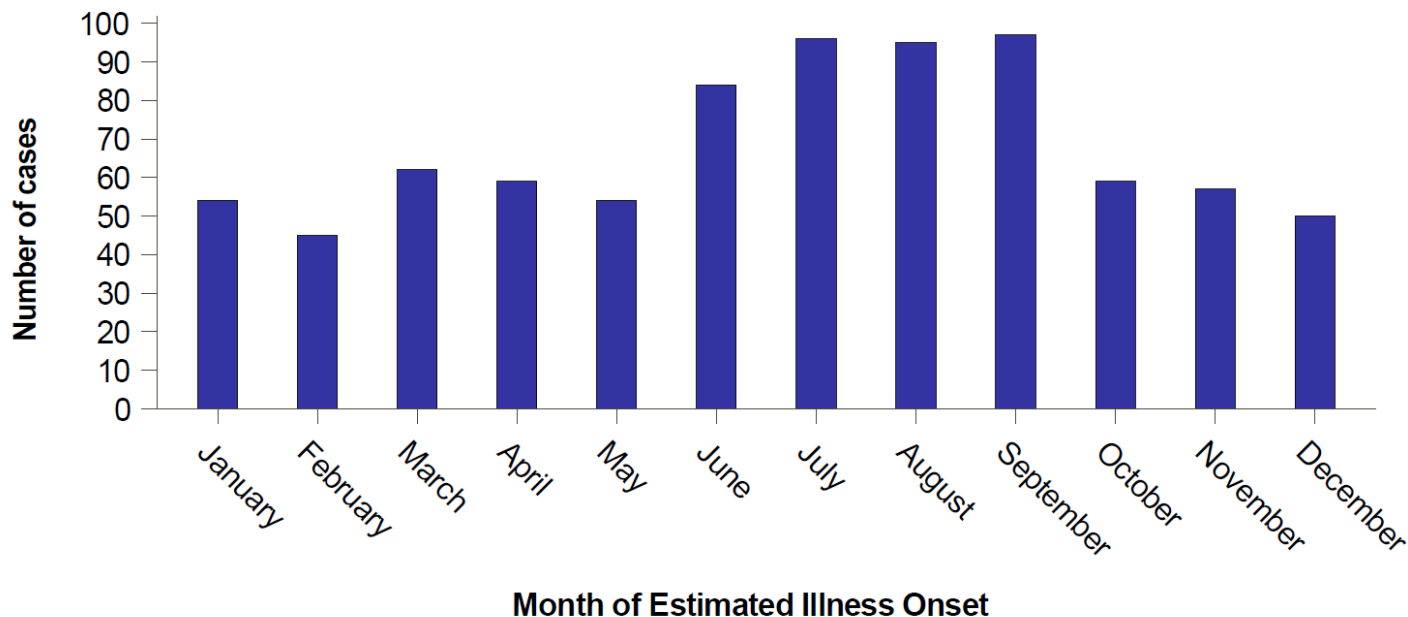
\*Potentially unreliable rate: relative standard error 23 percent or more.

**Figure 3. Listeriosis Cases and Population by Race/Ethnicity, California, 2013-2019**



8.5% (n=69) of reported incidents of Listeriosis did not identify race/ethnicity and 3.2% (n=26) 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 4. Listeriosis Cases by Month of Estimated Illness Onset, California, 2013-2019**



## Comments

Incidence rates per 100,000 population of listeriosis in California were relatively stable from 2013 through 2019; average annual incidence rates ranged from 0.2 per 100,000 population (in 2018) to 0.3 per 100,000 population (in 2017). Each year during the surveillance period, the statewide average annual incidence rate of listeriosis was greater than the national *Healthy People 2020* target objective of an incidence rate lower than 0.2 new cases per 100,000 population.<sup>3</sup>

Overall, incidence rates during the 2013-2019 surveillance period were similar to rates during the 2009-2012 surveillance period: the average rate was 0.3 per 100,000 population during both surveillance periods. The age group, sex, and racial/ethnic epidemiologic profiles of incident cases were similar to those reported in epidemiologic summaries from earlier years, except adults 85 years of age or older had a higher incidence during the 2013-2019 surveillance period.<sup>10, 11</sup>

National listeriosis incidence rates during the surveillance period were comparable to California's rates. The age distribution of incident cases in California and in the U.S. were similar; children aged less than 1 year and adults aged 65 years and older experienced the highest rates of listeriosis.<sup>17, 18, 19, 20</sup>

Continuing to screen and recall commonly contaminated foods, such as queso fresco and other soft cheeses, deli meats, and raw produce, and educational outreach to high-risk populations, such as pregnant women, the immunocompromised, and adults aged 65 years and older, may provide the best opportunities for reducing the incidence of listeriosis. Additionally, continued surveillance of human infections, especially in combination with enhanced molecular characterization of infecting strain types, may help detect dispersed, previously unrecognized disease clusters.

To prevent listeriosis, pregnant women, older adults, and immunocompromised persons should avoid foods that are more likely to be contaminated with *Listeria* or ensure that these foods are thoroughly cooked before eating. Foods more likely to be contaminated include unpasteurized milk and milk products, soft cheeses, hot dogs, lunch/deli meats, refrigerated smoked fish, and raw sprouts.

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