

Key Findings and Public Health Messages

- The California Department of Public Health (CDPH) received reports of 93 confirmed and 5 probable cases of brucellosis with estimated illness onset dates from 2009 through 2012. This corresponds to an incidence rate of 0.07 per 100,000 population per year.
- Brucellosis incidence decreased by 33.3 percent from 2009 (24 cases; 0.06 per 100,000 population) to 2011 (15 cases; 0.04 per 100,000 population), but increased by 150.0% from 2011 to 2012 (37 cases; 0.10 per 100,000 population). During the surveillance period, one (1.0 percent) case-patient was reported to have died with brucellosis.
- Brucellosis incidence rates over the four-year surveillance period were highest among persons 75 to 84 years of age (0.25 per 100,000 population per year) and persons 85 years of age and older (0.20 per 100,000 population per year). The ratio of male to female case-patients was 1.1:1.0.
- Hispanic (84.2 percent) ethnicity was reported more frequently for brucellosis case-patients than would be expected based on the overall proportion in California (37.8 percent).
- Avoiding consumption of unpasteurized dairy products (e.g., milk, cheese), wearing protective clothing and washing hands thoroughly when handling livestock reproductive tissues (e.g., aborted fetuses, placentas), and using appropriate respiratory protection when working with livestock or their tissues in a confined space (e.g., slaughterhouse, laboratory) may provide the best

opportunities for prevention of brucellosis among those persons at highest risk.

Background

Brucella spp. are uncommon but important bacterial zoonotic pathogens in the United States (US), causing an estimated 100 to 200 cases of human illness each year. Since 1954, the U.S. Department of Agriculture's National Brucellosis Eradication Program has significantly reduced the prevalence of *Brucella* in domestic livestock through routine testing, culling, and vaccination. Domestic cattle in California have been brucellosis-free since 1997. However, brucellosis remains an important zoonotic disease in other countries where domestic animal health programs are suboptimal. Consuming raw cow or goat milk products illegally imported from other countries is the most common route of exposure in California. Contact through broken skin with infected animal reproductive tissues and fluids, or inhalation of bio-aerosols, can also lead to infection, most notably in occupational settings such as livestock ranches, laboratories, slaughterhouses, meat-packing industry, and veterinary settings. Persons who harvest and dress certain wild animals (e.g., boar) may also be exposed to *Brucella* spp. Person- to-person transmission is extremely rare. *Brucella* spp. are listed among the U.S. Centers for Disease Control and Prevention (CDC) category B bioterrorism agents.

Brucellosis has a variable and sometimes prolonged incubation period (5 days to 6 months) and often presents as a nonspecific febrile syndrome (acute or insidious onset of fever, night sweats, fatigue, headache, and arthralgia). If treatment is delayed, patients may experience recurrent or 'undulant' fevers and possibly focal infections in bones, joints, liver, kidney, spleen, brain, or heart

valves^{1,2}.

We describe here the epidemiology of confirmed and probable human brucellosis cases in California with estimated illness onset from 2009 through 2012 that were reported to CDPH by August 27, 2014. Data for 2012 are provisional and may differ from data in future publications. The epidemiologic description of brucellosis for the 2001-2008 surveillance period was previously published in the Epidemiologic Summary for Brucellosis in California, 2001—2008³. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes⁴.

California reporting requirements and surveillance case definition

California Code of Regulations, Title 17, requires health care providers to immediately report known or suspected cases of brucellosis to their local health jurisdiction. Laboratories must immediately communicate by telephone with the CDPH Microbial Diseases Laboratory for instructions whenever a specimen for laboratory diagnosis of suspected human brucellosis is received. Laboratories must also report to the local health jurisdiction where the health care provider who first submitted the specimen is located, when laboratory testing yields evidence suggestive of *Brucella* sp.

California regulations also require local health officers to immediately report to CDPH cases of brucellosis. CDPH officially counted cases that satisfied the CDC surveillance case definition.

CDC defines a confirmed case as one with an illness clinically characterized by acute or insidious onset of fever, and one or more of the following: night sweats, arthralgia, headache, fatigue, anorexia, myalgia, weight loss, arthritis/spondylitis, meningitis, or focal organ involvement (endocarditis, orchitis/epididymitis, hepatomegaly,

splenomegaly), along with definitive laboratory evidence of *Brucella* infection. Definitive laboratory evidence of *Brucella* infection included either culture and identification of *Brucella* sp. from clinical specimens or evidence of a fourfold or greater rise in *Brucella* antibody titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 weeks apart. A probable case is defined as clinically compatible illness and either an epidemiologic link to a confirmed case or presumptive laboratory evidence (supportive serology using the agglutination method or detection of *Brucella* DNA by PCR)⁵.

Epidemiology of brucellosis in California

CDPH received reports of 93 confirmed and 5 probable cases of brucellosis with estimated illness onset dates from 2009 through 2012. This corresponds to an incidence rate of 0.07 per 100,000 Californians per year.

Brucellosis incidence decreased by 33.3 percent from 2009 (24 cases; 0.06 per 100,000 population) to 2011 (15 cases; 0.04 per 100,000 population), but increased by 150.0% from 2011 to 2012 (37 cases; 0.10 per 100,000 population), almost reaching the peak observed in 2001 (39 cases; 0.11 per 100,000 population) [Figure 1]. During the surveillance period, one (1.0 percent) case-patient was reported to have died with brucellosis.

Brucellosis incidence rates over the four-year surveillance period were highest among persons 75 to 84 years of age (0.25 per 100,000 population per year) and those 85 years of age and older (0.20 per 100,000 population per year) [Figure 2]. Among brucellosis case-patients with complete information on race/ethnicity (96.9 percent), Hispanic ethnicity (84.2 percent) was reported more frequently than would be expected based on the overall proportion in California (37.8 percent) [Figure 3]. The ratio of male to female cases was 1.1:1.0.

Brucellosis incidence rates for brucellosis during the four-year surveillance period were similar in Northern California (0.07 per 100,000 population per year) and Southern California (0.06 per 100,000 population per year). However, incidence

rates for the Central Coast (0.19 per 100,000 population per year), San Diego (0.12 per 100,000 population per year), and Sacramento (0.12 per 100,000 population per year) regions were higher than other regions in the state [Figure 4].

Figure 1. California brucellosis case counts and incidence rates

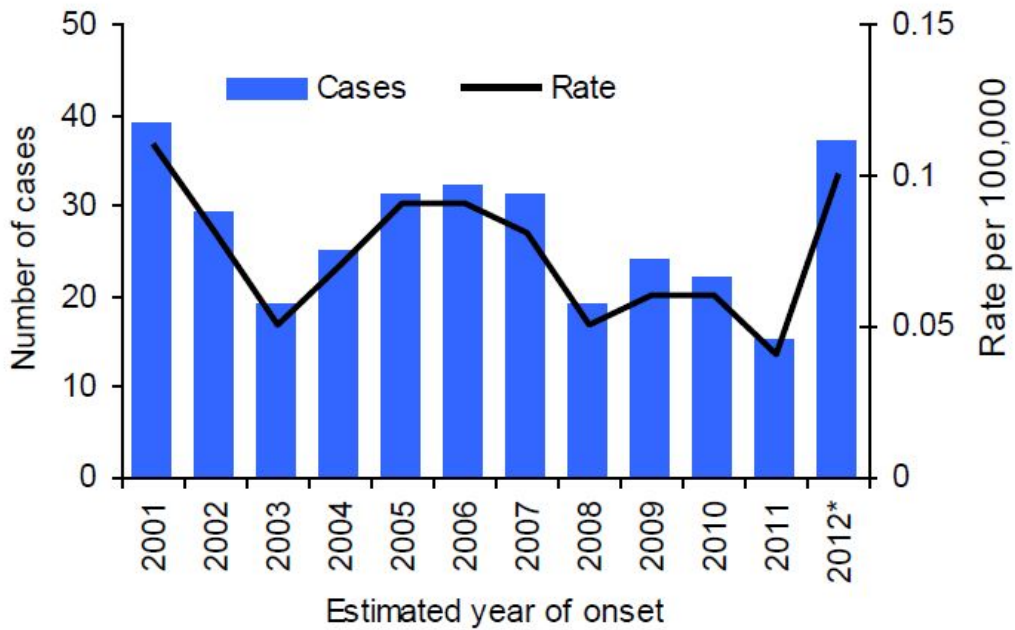


Figure 2. California brucellosis incidence rates by age 2009-2012*

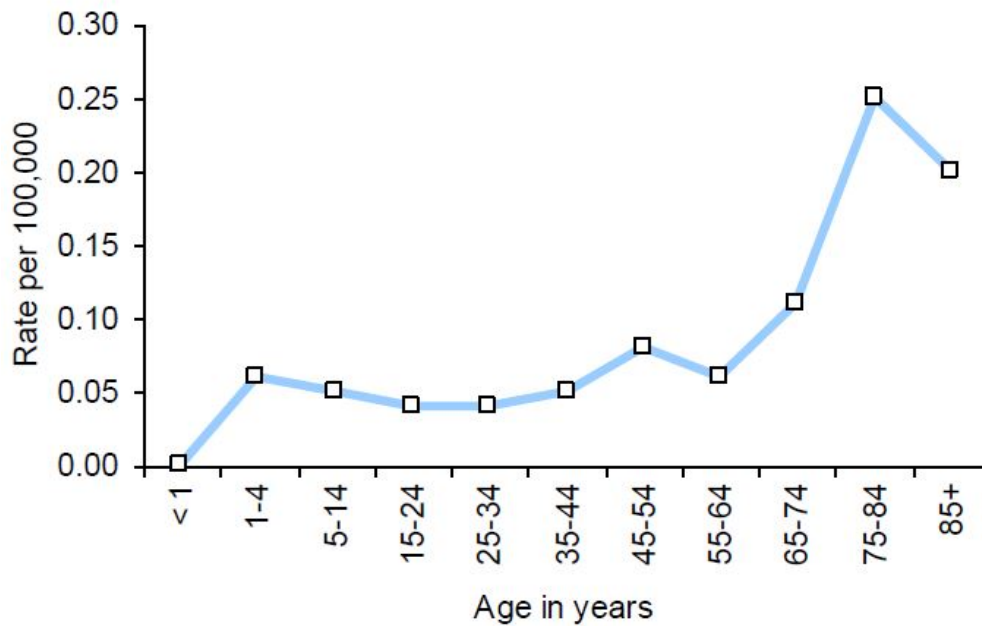
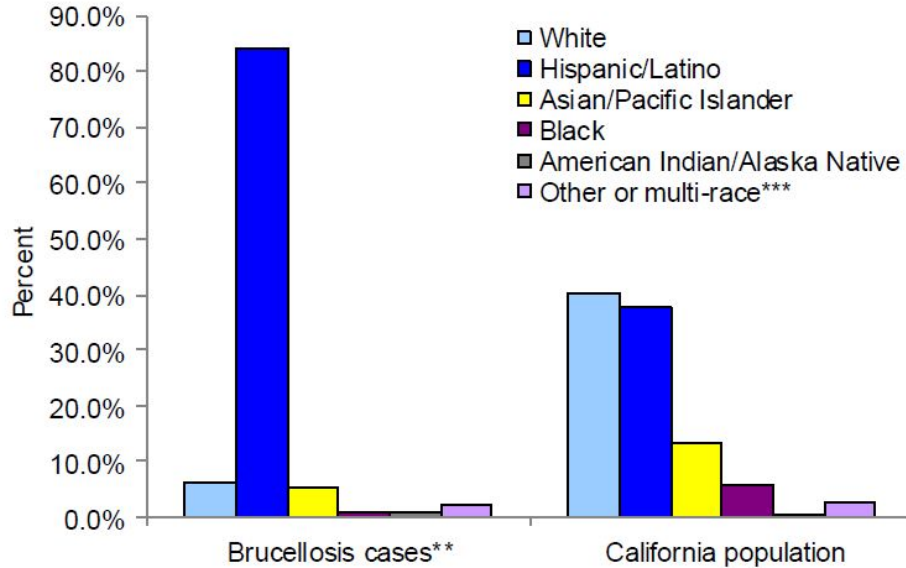


Figure 3. California brucellosis cases and population by race/ethnicity 2009-2012*



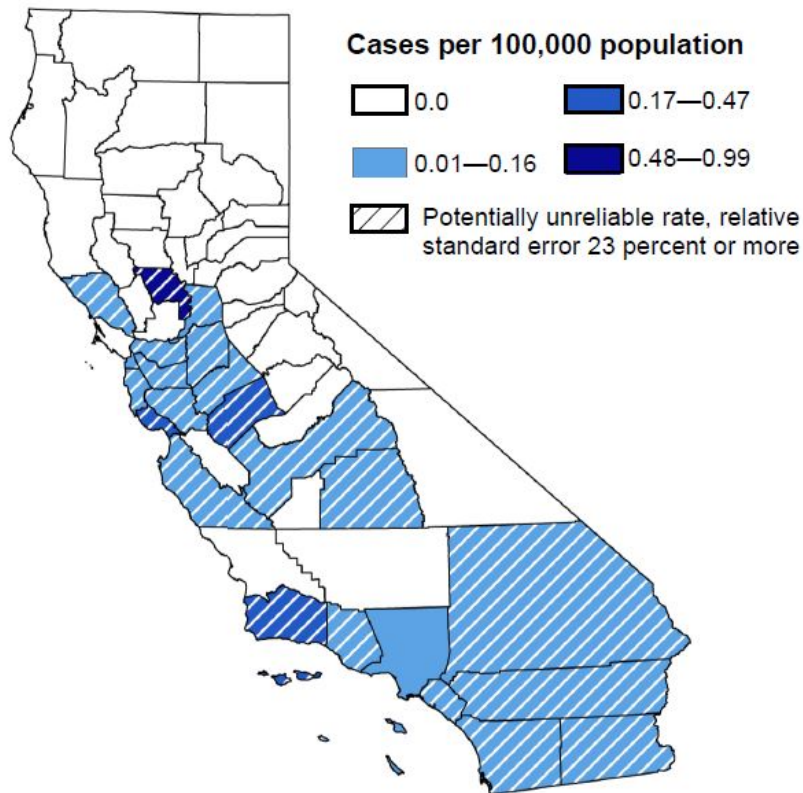
Notes for Figures 1-4

*2012 data are provisional

** Unknowns were excluded

*** Includes cases who identified "other" as their race and Californians ("population") who identified more than one race

Figure 4. California county-specific brucellosis incidence rates
2009 - 2012*



Notes for Figures 1-4

*2012 data are provisional

** Unknowns were excluded

*** Includes cases who identified "other" as their race and Californians ('population') who identified more than one race

Comment

Brucellosis incidence in 2012 was 2.5 times that observed in 2011 nearing the peak observed in 2001. Brucellosis in California occurred disproportionately more frequently among persons of Hispanic ethnicity during surveillance period 2009 through 2012. This finding is consistent with the previously described report for surveillance period 2001 through 2008³. The highest rates of cases with estimated illness onset dates from 2009 through 2012 were among persons 75 to 84 years and those 85 years

of age and older. Whereas, the highest rate of cases with estimated onset dates during 2001– 2008 was among persons 75 and 84 years of age³. The further shift of the disease toward older population and the higher frequency of the disease among persons of Hispanic ethnicity underscore the importance of prevention and control of brucellosis in California’s aging and Hispanic population.

Animal brucellosis control programs (vaccination and/or test-and-slaughter of infected animals) are central to preventing

human cases. Avoiding consumption of unpasteurized dairy products (e.g., milk, cheese), wearing protective clothing and washing hands thoroughly when handling livestock reproductive tissues (e.g., aborted fetuses, placentas), and using appropriate respiratory protection when working with livestock or their tissues in a confined space (e.g., slaughterhouse, laboratory) may provide the best opportunities for prevention of brucellosis among those persons at highest risk^{1,2}.

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References and resources

1 [CDC brucellosis information website](http://www.cdc.gov/brucellosis/exposure/expecting-mothers.html)
<http://www.cdc.gov/brucellosis/exposure/expecting-mothers.html>

2 [CDPH brucellosis information website](http://www.cdph.ca.gov/HealthInfo/discord/Pages/Brucellosis.aspx)
<http://www.cdph.ca.gov/HealthInfo/discord/Pages/Brucellosis.aspx>

3 [Epidemiological Summaries of Selected General Communicable Diseases in California, 2001—2008: Brucellosis](http://www.cdph.ca.gov/programs/sss/Documents/Epi-Summaries-CA-2001-2008-083111.pdf#page=9)
<http://www.cdph.ca.gov/programs/sss/Documents/Epi-Summaries-CA-2001-2008-083111.pdf#page=9>

4 [Epidemiologic Summaries of Selected General Communicable Diseases in California, 2001 - 2008 and 2009 - 2012: Technical Notes](http://www.cdph.ca.gov/programs/sss/Documents/TechnicalNotes01-08and09-12.pdf)
<http://www.cdph.ca.gov/programs/sss/Documents/TechnicalNotes01-08and09-12.pdf>

5 [Brucellosis \(*Brucella* spp.\) 2010 Case Definition](http://wwwn.cdc.gov/nndss/script/casedef.aspx?CondYrID=625&DatePub=1/1/2010%2012:00:00%20AM)
<http://wwwn.cdc.gov/nndss/script/casedef.aspx?CondYrID=625&DatePub=1/1/2010%2012:00:00%20AM>

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