Bites from infected arthropods (ticks or flies) and handling contaminated animal tissues are the leading means of human exposure. Consuming or direct contact with contaminated water, food, or soil, or inhaling bioaerosols can also result in human infection. Person-to-person transmission has not been documented.

Human tularemia can present with diverse clinical symptoms depending on the route of exposure, inoculum size, and infecting subspecies. The usual incubation period is 3 to 5 days. Primary disease presentations can include ulceroglandular, glandular, oculoglandular, oropharyngeal, pneumonic, typhoidal or septic forms. Infection can spread to multiple organ systems, including the lungs, liver, spleen, kidney, and lymphatic system.

We describe here the epidemiology of human tularemia in California from 2001 through 2008. Data for 2008 are provisional and may differ from data in future publications. For a complete discussion of the definitions, methods, and limitations associated with this report, please refer to Technical Notes 2. Because of the small numbers of cases, incidence rates were not calculated.

California reporting requirements and surveillance case definition

California Code of Regulations, Title 17, requires health care providers to report suspected cases of human tularemia to their local health department immediately by telephone. Laboratories must immediately communicate by telephone with the CDPH Microbial Diseases Laboratory for instruction whenever a specimen for laboratory diagnosis of suspected human tularemia is received. Laboratories must report to the local health department when laboratory testing yields evidence suggestive of *F. tularensis*; notification must occur within one hour after the health care provider has been notified.

California regulations also require local health officers to report to CDPH cases of human tularemia immediately by telephone. CDPH officially counted cases that satisfied the CDC surveillance case definition. CDC defined a confirmed case as one with clinically compatible illness and isolation of *F. tularensis* in a clinical specimen or fourfold or greater change in serum antibody titer to *F. tularensis* antigen. A probable case was one with clinically compatible illness and (i) elevated serum antibody titer(s) to *F. tularensis* antigen (without documented fourfold or greater change) in a patient with no history of tularemia vaccination or (ii) detection of *F. tularensis* in a clinical specimen by fluorescent assay. Clinically compatible illnesses included ulceroglandular, glandular, oculoglandular, oropharyngeal, intestinal (pain, vomiting, diarrhea), pneumonic, or typhoidal...
(febrile illness without early localizing signs and syndromes) presentations.

**Epidemiology of human tularemia in California**

CDPH received reports of 16 cases of tularemia with estimated onset dates from 2001 through 2008. Case counts rose from 2001 (1) to 2005 (4) and then decreased to 2008 (2) [Figure 1]. No cases were reported to have died with tularemia.

For the surveillance period, the highest number of cases was reported among persons 5 to 14 years of age [Figure 2]. The ratio of male to female cases was 1.3:1.0. Eleven (68.7 percent) cases had estimated onset months from May through August. Cases were reported from 10 counties including the counties of Alameda (4), Contra Costa (2), Los Angeles (2), Marin (1), Mendocino (2), Nevada (1), Sacramento (1), San Diego (1), Sonoma (1), and Ventura (1).

Commonly reported symptoms included fever (12), lymphadenopathy including cervical (5), axillary (2), submandibular (1), or unspecified (1), and wounds or ulcers on the arm/hand (5) or leg (1). *F. tularensis* was detected in 12 cases by culture (7), polymerase chain reaction (2), or direct fluorescent antibody (3). Specimens were blood (3), lymph node (5), or swab of cutaneous lesion (4). Of 7 isolates available for subtyping, 1 was biovar A and 6 were biovar B. Likely sources of infection were arthropod (tick or deer fly) bite (5), contact with rabbit or coyote tissues (3), and ingestion of nonpotable water (1); circumstances of exposure could not be determined for 7 cases. Three cases were likely exposed outside California in Utah (2) or Nevada (1).

**Comment**

During the surveillance period, tularemia remained a rare human infection in California. Human cases occurred more frequently during the spring and summer months. Two of 3 cases clearly associated with tick bites (a 5 year-old male from Alameda County and a 6 year-old female from Marin County) were bitten at the same grounds in San Mateo County, one in 2004 and one in 2006. *F. tularensis* biovar Type B was detected in ticks field-collected from the ground in 2006 and in a tick removed from the case in 2004.

Six cases had cutaneous lesions or ulcers from which *F. tularensis* was recovered, suggesting that the route of exposure was through a break in the skin. For some of these cases, an arthropod bite or direct contact with a mammal carcass were the apparent sources of infection, but others had no identifiable contact with infectious material. For example, 1 case with a wound on his finger reported that during his exposure period he had worked repairing fences on a ranch where cattle, pigs, and rabbits were present but he had no direct contact with them.

Avoiding exposure to bites by ticks and blood-feeding flies (by using insect repellent and by examining clothes and skin for ticks), and avoiding direct contact with wild animal tissues may provide the best opportunities for preventing and controlling human tularemia. Thoroughly washing injuries to the skin and covering new and existing wounds may help to reduce the risk of contamination with bacteria present in the environment.

**References and resources**

3. CDPH tularemia information website http://www.cdph.ca.gov/HealthInfo/discond/Pages/Tularemia.aspx

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