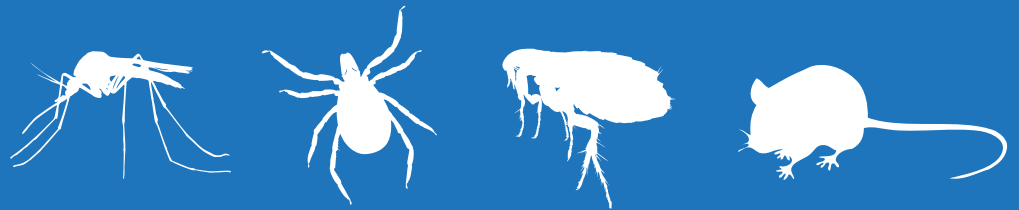


California Department of Public Health Vector-Borne Disease Section Annual Report 2025



2025

ANNUAL REPORT

VECTOR-BORNE DISEASE SECTION

INFECTIOUS DISEASES BRANCH

DIVISION OF COMMUNICABLE DISEASE CONTROL

CENTER FOR INFECTIOUS DISEASES

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH



Gavin Newsom
Governor
State of California



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Preface

We are pleased to present to you the 2025 Annual Report for the Vector-Borne Disease Section (VBDS) of the California Department of Public Health (CDPH). VBDS staff conducted prevention, surveillance, and control of existing and emerging vectors and vector-borne diseases throughout California in 2025.

In 2025, West Nile virus (WNV) activity was widespread, with activity reported from 36 (62%) of 58 counties. Of the 117 human cases reported from 26 counties, 88% were the severe neuroinvasive form of the disease and there were 11 fatalities. The number of human cases was lower than the preceding five-year average and is the lowest number of WNV infections reported since 2010. Although there was a decline in WNV activity in 2025, West Nile continues to pose the greatest vector-borne disease threat in California, with over 8,300 cases (417 fatal) reported since 2003. In addition to WNV activity, St. Louis encephalitis virus activity was detected in three counties, but no human cases were reported.

Local dengue virus transmission was confirmed for the third consecutive year in 2025. Seven locally acquired human cases were reported from Imperial (1) and Los Angeles (6) counties. The increase in local transmission stemmed from elevated dengue virus transmission worldwide. There were 200 travel-associated human cases of dengue reported in California, lower than the peak of 720 reported in 2024. In addition, chikungunya (25) and Zika (4) cases were reported in 2025. *Aedes aegypti* (yellow fever mosquito), the primary vector of dengue, chikungunya, and Zika viruses, is now well established in 28 California counties, whereas *Aedes albopictus* (Asian tiger mosquito) is found in just two counties.

In 2025, 299 human cases of flea-borne typhus, caused by *Rickettsia typhi*, were reported; 251 (84%) required hospitalization and two (0.7%) were fatal. Typhus is considered endemic in parts of southern California. A human case of plague was reported in an El Dorado County resident who survived. Staff of VBDS worked with local agencies to treat a campground where the patient was likely exposed. Since 1980, hantavirus infection has been diagnosed in 99 California residents, with most cases exposed to Sin Nombre virus (SNV) in the interior mountain ranges of the state or eastern Sierra Nevada. There were six human cases with three fatalities reported in 2025. Likely exposure was in El Dorado, Mono (3), and Placer (2) counties. The six cases occurred in February (4) and May (2), which was unusual to have so many cases early in the year. SNV antibody-positive deer mice were found in nine of 13 counties sampled.

Human cases of six tick-borne diseases were reported in California in 2025. Reported cases of Lyme disease (114) increased slightly relative to 2024. Although Lyme disease is the most reported tick-borne disease in California, there were also cases of anaplasmosis (14), soft tick relapsing fever (2), Rocky Mountain spotted fever (10), babesiosis (3), and ehrlichiosis (5). Though human cases of Pacific Coast Tick Fever (PCTF) have not been reported since 2023, the newly named pathogen that causes PCTF, *Rickettsia rickettsii* ssp. *californica*, was detected in Pacific Coast ticks from seven counties.

In 2025, VBDS continued to expand public education through social media, digital and print materials, web-based toolkits and interactive maps. VBDS continued to provide extensive consultation and training to California State Park and National Park Service employees to reduce the risk of vector-borne disease exposure to park staff and visitors.

Many of you are our collaborators and colleagues, and we hope that you find the information contained in this annual report to be of value as we collectively strive to optimize the health and well-being of all Californians.

Submitted by Editors on behalf of Vicki L. Kramer, PhD, Chief (retired December 2025)
Vector-Borne Disease Section

Acknowledgements

The California Department of Public Health, Vector-Borne Disease Section works with numerous local, state, and federal agencies, private and commercial organizations, and members of the medical community in its efforts to monitor, prevent, and control vector-borne diseases in California. Some of the Section's key collaborators in 2025 are listed here.

Mosquito-borne Diseases

California Department of Fish and Wildlife (CDFW); University of California Davis Arbovirus Research and Training (DART) Laboratory; Mosquito and Vector Control Association of California; participating local health departments, physicians, veterinarians, and local mosquito and vector control agencies.

Tick-borne Diseases

Alameda County Vector Control Service District (VCSD); Butte County Mosquito and Vector Control District (MVCD); California State Parks; Lake County Vector Control District (VCD); Los Angeles County West MVCD; Marin County Health and Human Services; Marin-Sonoma MVCD; Mosquito and Vector Management District of Santa Barbara County; National Park Service (NPS); Orange County MVCD; Placer County MVCD; Sacramento-Yolo County MVCD; San Bernardino County Vector Control Program (VCP); San Diego County VCP; San Mateo County MVCD; Santa Clara County VCD; Santa Cruz County MVCD; Shasta MVCD; Ventura County Environmental Health Division.

Flea-borne Diseases

Alameda County VCSD; California State Parks; CDFW; El Dorado County VCP; Los Angeles County DPH; NPS; San Diego County VCP; San Mateo County MVCD; Sierra County Environmental Health Department; United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service, Wildlife Services.

Rodent-borne Diseases

Alameda County VCSD; California State Parks; Museum of Vertebrate Zoology at University of California Berkeley; Northwest MVCD; NPS; Orange County MVCD; Riverside County VCP; San Diego County VCP; San Mateo County MVCD; Santa Clara County VCD; San Bernardino County VCP; West Valley MVCD.

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Coastal Region: Tina Feiszli, MSPH; Ervic Aquino; Erin Belden MS; Erik Blosser, PhD; Marie Cerda, MNR; Margaret Kerrigan; Mario Orantes; Mary-Joyce Pakingan; Hannah Romo, PhD; Andrea Salinas, MS; Megan Saunders, PhD, MSPH.

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Maps

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Suggested Citations

Annual Report

California Department of Public Health. Vector-Borne Disease Section Annual Report, 2025. Kjemtrup, AM and Romo, H. editors. Sacramento, California, 2026. pp 1-28.

<https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/VBDSAnnualReports.aspx>

Chapters

Many staff from the Vector-Borne Disease Section contribute to each chapter of the Annual Report; the lead author(s) for each chapter is listed below.

1 Mosquito-borne Diseases

Romo, H; Danforth, ME and Metzger, M. Chapter 1: Mosquito-borne Diseases. In: Vector-Borne Disease Section Annual Report, 2025. California Department of Public Health, Sacramento, California, 2026. pp 1-8.

2 Tick-borne Diseases

Saunders, M and Kjemtrup, A. Chapter 2: Tick-borne Diseases. In: Vector-Borne Disease Section Annual Report, 2025. California Department of Public Health, Sacramento, California, 2026. pp 9-15.

3 Flea-borne Diseases

Hacker, G; Metzger, M; Novak, M and Kjemtrup, A. Chapter 3: Flea-borne Diseases. In: Vector-Borne Disease Section Annual Report, 2025. California Department of Public Health, Sacramento, California, 2026. pp 16-19.

4 Rodent-borne Diseases

Jackson, B; Lund, A and Kjemtrup, A. Chapter 4: Rodent-borne Diseases. In: Vector-Borne Disease Section Annual Report, 2025. California Department of Public Health, Sacramento, California, 2026. pp 20-23.

5 Vector Control Technician Certification Program

Niemela, M. Chapter 5: Vector Control Technician Certification Program. In: Vector-Borne Disease Section Annual Report, 2025. California Department of Public Health, Sacramento, California, 2026. pp 24-25.

6 Public Information, Scientific Publications

Nicolici, A and Kjemtrup, A. Chapter 6: Public Information, Scientific Publications. In: Vector-Borne Disease Section Annual Report, 2025. California Department of Public Health, Sacramento, California, 2026. pp 26-28.

Program Overview

The mission of the California Department of Public Health, Vector-Borne Disease Section (CDPH-VBDS) is to protect the health and well-being of Californians from arthropod- and vertebrate-transmitted diseases and injurious pests. [Authorizing statutes: Health and Safety Code Sections (HSC) 116100-116108, 116110-116112; 116120; 116130; and 116180]. CDPH-VBDS provides leadership, information, and consultation on vector-borne diseases and vectors to the public and agencies engaged in disease prevention and vector control. CDPH-VBDS staff, located in three regional offices and headquartered in Sacramento, provide the following services:

- Develop and implement statewide vector-borne disease prevention, surveillance, and control programs
- Design and conduct scientific investigations to further knowledge of vector-borne diseases in California
- Coordinate preparedness activities for detection and response to introduced vector-borne diseases and vectors, such as West Nile virus, Zika, chikungunya, dengue, and invasive *Aedes* mosquitoes
- Conduct or coordinate emergency vector control during disease outbreaks
- Provide laboratory testing for vector-borne disease agents in arthropods and vertebrates
- Advise local agencies on public health issues related to vector-borne diseases
- Advise local and other governmental agencies on regulatory issues pertaining to mosquito and other vector control
- Provide information, training, and educational materials to governmental agencies, the medical community, and the public
- Oversee a Cooperative Agreement (HSC 116180) between CDPH and local vector control agencies for pesticide applications
- Oversee the Vector Control Technician Certification and Continuing Education programs (HSC 116110(d)) for government agency employees who apply public health pesticides
- Provide consultation on issues related to the management of ticks, bed bugs, head lice, flies, and other arthropods of public health importance
- Oversee Special Local Need permits for restricted-use public health pesticides

1

Mosquito-borne Diseases

Mosquito-borne diseases under surveillance in California include the endemic arboviral diseases caused by West Nile virus, St. Louis encephalitis virus, and western equine encephalitis virus, as well as predominantly travel-associated diseases caused by *Plasmodium* spp. (malaria), dengue, chikungunya, and Zika viruses. The California Department of Public Health, Vector-Borne Disease Section monitors and consults with local agencies regarding invasive mosquito species including *Aedes aegypti* (yellow fever mosquito) and *Aedes albopictus* (Asian tiger mosquito). Endemic arbovirus surveillance is performed under the California Arbovirus Surveillance program, a cooperative effort of multiple state and local entities.

Human disease surveillance

West Nile virus

Serological diagnosis of human infection with West Nile virus (WNV) and other arboviruses was performed at the California Department of Public Health (CDPH) Viral and Rickettsial Disease Laboratory (VRDL), local public health laboratories, and commercial laboratories. Local and commercial laboratories tested for WNV using an IgM enzyme immunoassay (EIA) and/or an IgM immunofluorescence assay (IFA). Specimens from the first WNV case of the year from each county as well as specimens from all cases from counties with enzootic St. Louis encephalitis virus (SLEV) activity, were forwarded to the CDPH-VRDL for further testing with plaque reduction neutralization tests (PRNT). Additional WNV infections were identified through nucleic acid test screening performed by blood and organ donation centers.

In 2025, a total of 117 symptomatic and 12 asymptomatic infections with WNV were identified, which was a 16% decrease compared to the number of total infections (154) reported in 2024 (Table 1.1). Of the 117 symptomatic cases, 103 (88%) were classified as West Nile neuroinvasive disease (e.g., encephalitis, meningitis, acute flaccid paralysis, or other neurologic dysfunction) and 14 (12%) were classified as West Nile non-neuroinvasive disease. There were 11 fatal cases for a case-fatality of 9%. Patients were residents of 26 counties and incidence was highest (5.84 cases per 100,000 persons) in Kings County (Table 1.1, Figure 1.1). Eighty-nine of symptomatic patients (76%) were

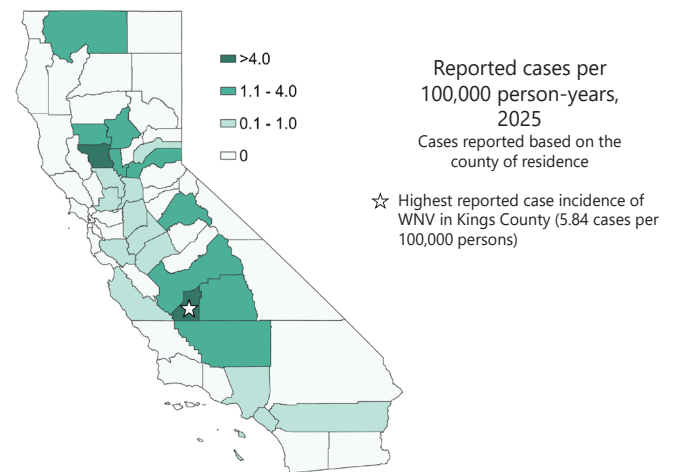


Figure 1.1. Incidence of reported human cases of West Nile virus, by county, California, 2025

male. The median age for neuroinvasive cases was 65 years (range, 32 to 88 years), and among non-neuroinvasive cases, the median age was 59 years (range, 37 to 69 years). The median age of the 11 WNV-associated fatalities was 73 years (range, 34 to 88 years). Dates of symptom onset for all reported cases ranged from May 28, 2025 to November 23, 2025.

St. Louis encephalitis virus

No cases of SLEV infection were reported in 2025.

Table 1.1. Reported West Nile virus human cases by county of residence, California, 2016-2025

County	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2025 incidence per 100,000 person-years	10-year incidence per 100,000 person- years
Alameda	0	1	0	1	0	0	1	1	0	0	0.00	0.20
Alpine	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Amador	1	0	1	1	0	0	0	0	0	0	0.00	0.76
Butte	21	4	12	5	4	13	3	18	11	4	1.93	4.58
Calaveras	0	0	0	0	0	0	0	1	1	0	0.00	0.45
Colusa	2	0	0	1	0	0	1	1	1	1	4.54	3.18
Contra Costa	4	4	4	1	4	2	1	10	4	1	0.09	0.30
Del Norte	0	0	0	0	0	0	0	0	0	0	0.00	0.00
El Dorado	1	0	0	0	1	1	0	3	0	0	0.00	0.31
Fresno	14	13	14	51	10	14	30	23	17	15	1.45	1.94
Glenn	6	0	2	0	1	2	1	4	1	1	3.40	6.13
Humboldt	0	0	1	0	0	0	0	0	0	0	0.00	0.07
Imperial	0	3	0	3	1	0	0	0	0	0	0.00	0.38
Inyo	0	4	0	0	0	0	0	0	0	0	0.00	2.13
Kern	17	30	13	28	8	8	22	16	12	19	2.06	1.87
Kings	8	5	0	3	2	8	7	9	6	9	5.84	3.70
Lake	1	0	1	0	2	0	0	6	0	0	0.00	1.49
Lassen	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Los Angeles	151	277	43	31	90	16	61	62	23	20	0.20	0.78
Madera	6	2	4	3	6	3	3	9	0	1	0.62	2.28
Marin	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mariposa	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mendocino	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Merced	0	10	2	10	12	6	7	8	3	2	0.68	2.05
Modoc	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Mono	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Monterey	1	0	1	0	0	0	0	2	0	1	0.23	0.11
Napa	0	0	1	0	0	0	0	0	0	0	0.00	0.07
Nevada	0	0	1	0	0	0	0	1	0	1	1.00	0.30
Orange	32	33	9	5	17	3	9	6	1	2	0.06	0.37
Placer	7	0	9	1	2	2	2	6	0	6	1.42	0.83
Plumas	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Riverside	11	32	15	12	10	3	0	20	6	1	0.04	0.44
Sacramento	25	6	15	4	7	6	5	53	7	3	0.19	0.82
San Benito	0	0	0	0	0	0	0	0	0	0	0.00	0.00
San Bernardino	8	57	9	7	3	1	4	28	5	0	0.00	0.55
San Diego	20	2	2	3	1	3	3	0	2	0	0.00	0.11
San Francisco	0	1	0	0	0	1	0	0	0	0	0.00	0.02
San Joaquin	13	14	14	7	2	7	4	15	2	7	0.87	1.05
San Luis Obispo	0	0	0	2	0	2	0	2	0	0	0.00	0.21
San Mateo	0	0	0	0	0	1	1	3	0	0	0.00	0.07
Santa Barbara	0	0	0	0	0	2	0	0	0	0	0.00	0.04
Santa Clara	1	0	1	1	0	3	1	3	4	2	0.10	0.08
Santa Cruz	0	0	0	0	0	1	0	0	0	0	0.00	0.04
Shasta	1	1	1	0	2	3	1	6	1	0	0.00	0.28
Sierra	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Siskiyou	0	0	0	0	0	0	0	0	0	1	2.31	0.23
Solano	4	1	0	1	1	2	2	6	0	1	0.22	0.40
Sonoma	0	0	0	0	0	0	0	1	0	0	0.00	0.02
Stanislaus	26	28	15	16	35	5	15	33	5	2	0.36	3.24
Sutter	12	3	1	1	1	0	1	7	1	2	1.99	2.89
Tehama	5	2	2	0	2	0	3	0	1	0	0.00	2.31
Trinity	0	0	0	0	0	0	0	0	0	0	0.00	0.00
Tulare	10	12	8	24	7	8	15	25	4	12	2.46	2.57
Tuolumne	0	0	1	0	0	0	0	0	0	2	3.68	0.55
Ventura	7	1	2	2	0	0	0	1	0	0	0.00	0.16
Yolo	16	6	11	1	4	3	3	39	9	1	0.44	4.13
Yuba	11	1	2	0	0	0	1	5	4	0	0.00	2.87
Total WNV disease	442	553	217	225	235	129	207	433	131	117	0.30	0.68
Asymptomatic Infections ^a	41	47	26	18	28	19	14	40	20	12		
Total WNV infections	483	600	243	243	263	148	221	473	151	129		

^a WNV infections detected through blood bank screening; no associated illness reported

Local dengue virus transmission was confirmed for the third consecutive year in 2025. Six human cases were reported from Los Angeles County.

Dengue

In 2025, 207 cases of dengue were reported to CDPH; patients were residents of 34 California counties (Table 1.2). The median age was 45.5 years (range, 3 to 86 years); 93 (45%) were male. Seven locally acquired cases were reported among symptomatic residents of two counties: Imperial (1) and Los Angeles (6) counties. For the travel-associated cases, travel history included Latin America and the Caribbean (112), South Asia (25), East Asia and the Pacific (58), and Sub-Saharan Africa (3). The place of exposure was unknown for two patients.

Malaria

In 2025, 121 cases of malaria were reported to CDPH. Patients were residents of 28 California counties and 84 (69%) were male. The median age was 42 years (range, 5 to 77 years). Of the 111 cases for which the *Plasmodium* species was determined, 73 (67%) were *P. falciparum*, 29 (26%) *P. vivax*, 7 (6%) *P. ovale*, and 2 (2%) *P. malariae*. Patients reported compatible travel history to malaria-endemic areas in Sub-Saharan Africa (83), South Asia (19), Latin America & Caribbean (20), East Asia & Pacific (5), and Middle East & North Africa (1). Exposure information for two patients was not available.

Chikungunya

Twenty-five cases of chikungunya were reported to CDPH in 2025 (Table 4.2). Patients were residents of 12 California counties, 14 (56%) were male, and the median age was 57 years (range, 20 to 84 years). No locally acquired cases were reported. Twenty-three patients reported travel to chikungunya endemic or outbreak areas including South Asia (11), Latin America and the Caribbean (10), and East Asia and the Pacific (2). Exposure information for two patients was not available.

State of California

California Department of Public Health

Table 1.2. Reported confirmed and probable Aedes- transmitted diseases in humans by county, California, 2025

County	Chikungunya	Dengue	Zika	TOTAL
Alameda	4	18	0	22
Alpine	0	0	0	0
Amador	0	0	0	0
Butte	0	0	0	0
Calaveras	0	0	0	0
Colusa	0	1	0	1
Contra Costa	2	6	0	8
Del Norte	0	0	0	0
El Dorado	0	0	0	0
Fresno	0	2	0	2
Glenn	0	0	0	0
Humboldt	0	0	0	0
Imperial	0	1	0	1
Inyo	0	0	0	0
Kern	0	1	0	1
Kings	0	0	0	0
Lake	0	1	0	1
Lassen	0	0	0	0
Los Angeles	4	65	2	7
Madera	0	1	0	1
Marin	0	4	0	4
Mariposa	0	0	0	0
Mendocino	0	1	0	1
Merced	0	2	0	2
Modoc	0	0	0	0
Mono	0	0	0	0
Monterey	0	2	0	2
Napa	0	1	0	1
Nevada	0	0	0	0
Orange	4	15	0	19
Placer	0	1	0	1
Plumas	0	0	0	0
Riverside	0	7	1	8
Sacramento	1	7	0	8
San Benito	0	0	0	0
San Bernardino	0	6	0	6
San Diego	1	17	1	19
San Francisco	1	11	0	12
San Joaquin	0	4	0	4
San Luis Obispo	0	1	0	1
San Mateo	0	10	0	10
Santa Barbara	2	2	0	4
Santa Clara	3	6	0	9
Santa Cruz	1	4	0	5
Shasta	0	1	0	1
Sierra	0	0	0	0
Siskiyou	0	0	0	0
Solano	0	1	0	1
Sonoma	1	1	0	2
Stanislaus	0	1	0	1
Sutter	0	0	0	0
Tehama	0	0	0	0
Trinity	0	0	0	0
Tulare	0	1	0	1
Tuolumne	0	0	0	0
Ventura	1	3	0	4
Yolo	0	2	0	2
Yuba	0	0	0	0
TOTAL	25	207	4	217

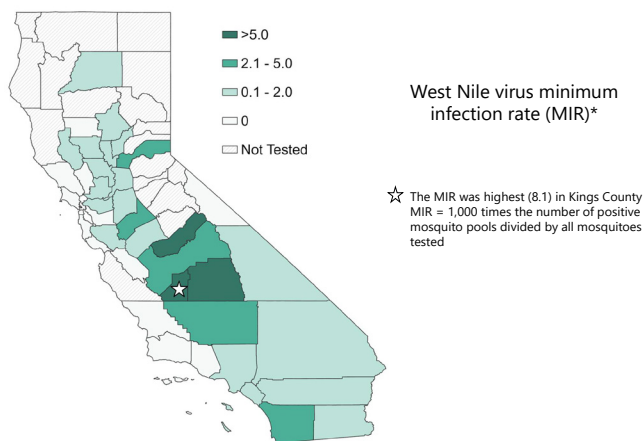


Figure 1.2. West Nile virus minimum infection rate of mosquitoes, by county, California, 2025

Zika

In 2025, four cases of Zika virus were reported to CDPH (Table 1.2). Patients were residents of two counties and all had travel history compatible with exposure to Zika-endemic regions.

Mosquito surveillance

In 2025, a total of 1,466,666 mosquitoes (53,780 pools) collected in 40 counties were tested at the University of California, Davis Arbovirus Research and Training (DART) laboratory or at one of 15 local agencies by a real-time (TaqMan) reverse transcriptase-polymerase chain reaction (RT-qPCR) for SLEV, western equine encephalitis virus (WEEV), and/or WNV viral RNA (Table 1.3). WNV was detected in 2,759 mosquito pools from 27 counties, and SLEV was detected in 105 mosquito pools from three counties (Tables 1.3, 1.5, 1.8). Statewide, the minimum infection rate (MIR)—defined as the number of infected mosquito pools divided by the total number of mosquitoes tested multiplied by 1,000—of WNV in all mosquitoes tested was 1.9; the MIR was highest (8.1) in Kings County (Table 1.3, Figure 1.2). Since 2003, the MIR of WNV in California has ranged from a low of 0.08 (2003) to a high of 3.9 (2014). Statewide, the SLEV MIR in all mosquitoes tested was 0.07; the MIR was highest (0.3) in Kings County. WNV was identified from one *Aedes* species (*Ae. aegypti*) and five *Culex* species (*Cx. erythrothorax*, *Cx. pipiens*, *Cx. quinquefasciatus*, *Cx. stigmatosoma*, and *Cx. tarsalis*) (Table 1.4), and SLEV was identified from two *Culex* species (*Cx. quinquefasciatus* and *Cx. tarsalis*).

Table 1.3. West Nile virus positive mosquito pools and minimum infection rate, by county, California, 2025

County	No. mosquitoes tested ^a	No. mosquito pools tested	WNV positive pools ^a	WNV Minimum Infection Rate ^b
Alameda	33,766	1,230	0	0.0
Alpine				
Amador				
Butte	21,904	475	28	1.3
Calaveras				
Colusa	500	10	1	2.0
Contra Costa	9,690	313	3	0.3
Del Norte				
El Dorado				
Fresno	37,034	1,076	132	3.6
Glenn	305	7	0	0.0
Humboldt				
Imperial	4,202	281	1	0.2
Inyo	1,258	27	1	0.8
Kern	28,751	858	129	4.5
Kings	15,852	381	129	8.1
Lake	16,183	556	5	0.3
Lassen				
Los Angeles	185,110	4,544	200	1.1
Madera	34,755	934	264	7.6
Marin	2,365	120	0	0.0
Mariposa				
Mendocino				
Merced	26,673	823	42	1.6
Modoc				
Mono	28	1	0	0.0
Monterey				
Napa	3,789	183	0	0.0
Nevada				
Orange	113,972	5,338	186	1.6
Placer	39,169	2,519	145	3.7
Plumas				
Riverside	259,893	7,857	15	0.1
Sacramento	39,608	3,627	67	1.7
San Benito	207	99	0	0.0
San Bernardino	48,817	1,854	6	0.1
San Diego	75,038	2,740	181	2.4
San Francisco	72	2	0	0.0
San Joaquin	85,199	2,559	139	1.6
San Luis Obispo	1,339	34	0	0.0
San Mateo	5,120	244	0	0.0
Santa Barbara	2,362	152	0	0.0
Santa Clara	10,702	2163	3	0.3
Santa Cruz	1,397	117	0	0.0
Shasta	14,998	518	2	0.1
Sierra				
Siskiyou				
Solano	47,694	1,297	28	0.6
Sonoma	15,070	622	0	0.0
Stanislaus	59,052	1,658	196	3.3
Sutter	12,318	335	12	1.0
Tehama				
Trinity				
Tulare	148,960	5,689	759	5.1
Tuolumne				
Ventura	1,580	39	0	0.0
Yolo	53,422	2,232	77	1.4
Yuba	8,512	266	8	0.9
Total	1,466,666	53,780	2,759	1.9

^a Tested by University of California Davis Arbovirus Research and Training Laboratory or local mosquito/vector control agency.

^b Minimum Infection Rate = (No. pools positive/No. mosquitoes tested) X 1,000

Table 1.4. West Nile virus positive mosquito pools and minimum infection rate, by mosquito species, California, 2025

Mosquito Species	No. pools tested	No. mosquitoes	WNV positive pools	WNV minimum infection rate ^a
Culex species				
<i>Cx. erythrothorax</i>	2,483	146,806	2	0.0
<i>Cx. pipiens</i>	8,849	145,303	285	2.0
<i>Cx. quinquefasciatus</i>	21,076	581,979	1,369	2.4
<i>Cx. restuans</i>	7	7	0	0.0
<i>Cx. stigmatosoma</i>	1,318	16,893	65	3.8
<i>Cx. tarsalis</i>	18,192	563,785	1,036	1.8
<i>Cx. territans</i>	2	7	0	0.0
<i>Cx. thriambus</i>	115	273	0	0.0
<i>Culex species</i>	2	65	0	0.0
All Culex	52,044	1,455,118	2,757	1.9
Aedes species				
<i>Ae. aegypti</i>	1,441	4,833	2	0.4
<i>Ae. melanion</i>	98	4,006	0	0.0
<i>Ae. notoscriptus</i>	12	65	0	0.0
<i>Ae. squamiger</i>	1	50	0	0.0
All Aedes	1,552	8,954	2	0.2
Other species				
<i>Anopheles hermsi</i>	1	1	0	0.0
<i>Culicidae</i>	2	13	0	0.0
<i>Culiseta incidens</i>	161	2,339	0	0.0
<i>Culiseta inornata</i>	7	40	0	0.0
<i>Culiseta particeps</i>	7	195	0	0.0
Unknown	6	6	0	0.0
All other	184	2,594	0	0.0

^a Minimum Infection Rate = (No. pools positive/No. mosquitoes tested) X 1,000

In 2025, the first detection of WNV in mosquitoes was from a *Cx. quinquefasciatus* pool collected in Tulare County on April 25, and the last detection was from a *Cx. quinquefasciatus* pool collected in San Diego County on December 24. The first detection of SLEV in mosquitoes was from a *Cx. tarsalis* pool collected in Riverside County on June 17, and the last detection was collected on October 7 from a *Cx. tarsalis* pool collected in Riverside County.

Animal surveillance

Chicken serosurveillance

In 2025, 17 local mosquito and vector control agencies in 15 counties maintained 57 sentinel chicken flocks (Table 1.6). Blood samples were collected from chickens every other week and tested for antibodies to WNV, SLEV, and WEEV by an EIA at the CDPH Vector-Borne Disease Section (CDPH-VBDS). Positive samples were confirmed at CDPH-VBDS by IFA or western blot. Of 4,202 chicken blood samples tested, 65 seroconversions to WNV were detected among 23 flocks in 8 counties (Tables 1.6, 1.8). Statewide, 18% of sentinel chickens seroconverted to WNV. Since 2003, the percentage of WNV seroconversions in chickens has ranged from a low of 3.2% (2003) to

Table 1.5. Infections with St. Louis encephalitis virus in humans, mosquito pools, and sentinel chickens, by county, California, 2025

County	Humans	Mosquito pools ^a	Sentinel chickens
Fresno	0	1	NT
Imperial	0	8	NT
Riverside	0	96	NT
State Totals	0	105	0

NT= no samples tested

^aPositive mosquito pools included *Culex quinquefasciatus* (13) and *Culex tarsalis* (92).

In 2025, a decrease in West Nile virus (WNV) and St. Louis encephalitis virus (SLEV) activity was reported, with 129 WNV human infections and no SLEV human infections. This is lowest number of WNV infections since 2010.

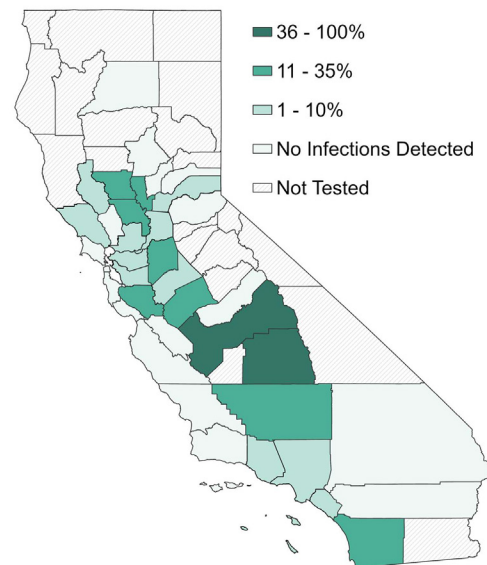


Figure 1.3. Prevalence of West Nile virus infection in dead birds, California, 2025

a high of 40% (2023). In 2025, the first and last WNV seroconversions were detected in Butte County on July 22 and in Los Angeles County on November 11, respectively. No SLEV seroconversions were detected in 2025 (Table 1.5).

Dead bird surveillance for West Nile virus

In 2025, the California WNV and Dead Bird Call Center and website received 7,737 dead bird reports from the public in 54 counties (Table 1.7). Oral swabs or other samples (e.g., brain, kidney, ocular) from dead bird carcasses were tested by RT-qPCR at the DART laboratory or at one of 15 local agencies. Of the 1,908 carcasses deemed suitable for testing, WNV was detected in 154 (8%) carcasses from 21 counties (Tables 1.7, 1.8, Figure 1.3). Since 2003, the prevalence of WNV-positive dead birds has ranged from a low of 5% (2003) to a high of 60% (2014). In 2025, the first WNV-positive dead bird was an American Crow reported from Alameda County on March 19, and the last were an American Crow and a Cooper's Hawk, both reported from San Diego County on November 12.

Horses

Serum or brain tissue specimens from horses displaying neurological symptoms were tested for WNV at the California Animal Health and Food Safety Laboratory. In 2025, WNV infection was detected in five horses from five counties (Table 1.8); one was euthanized or died because of their infection.

Many birds are susceptible to WNV, and some species will die from the infection. Dead birds are an important component of WNV surveillance, serving as early indicators of virus activity in the environment. In 2025, WNV was detected in 8% of dead birds tested across 38 counties.

Table 1.6. Results of testing sentinel chickens for West Nile virus, by county, California, 2025

County	No. flocks	No. chickens ^a	No. WNV positive flocks	WNV positive chickens
Alameda	1	12	0	0
Alpine				
Amador				
Butte	7	43	6	14
Calaveras				
Colusa	1	10	1	1
Contra Costa	4	20	0	0
Del Norte				
El Dorado				
Fresno				
Glenn				
Humboldt				
Imperial				
Inyo				
Kern				
Kings				
Lake	2	12	2	6
Lassen				
Los Angeles	17	88	8	18
Madera				
Marin				
Mariposa				
Mendocino				
Merced				
Modoc				
Mono				
Monterey				
Napa				
Nevada	4	16	0	0
Orange				
Placer				
Plumas				
Riverside				
Sacramento				
San Benito	1	15	0	0
San Bernardino				
San Diego				
San Francisco				
San Joaquin				
San Luis Obispo				
San Mateo				
Santa Barbara				
Santa Clara				
Santa Cruz				
Shasta	3	20	0	0
Sierra				
Siskiyou				
Solano	3	15	1	2
Sonoma				
Stanislaus				
Sutter	5	33	3	11
Tehama	3	29	0	0
Trinity				
Tulare	1	10	1	9
Tuolumne				
Ventura	3	26	0	0
Yolo				
Yuba	2	14	1	4
Total	57	363	23	65

^a Reflects planned standard number of chickens per flock. Actual number may vary due to mortality or replacement of seroconverted chickens.

Table 1.7. Dead birds reported, tested, and positive for West Nile virus, by county, California, 2025

County	Reported	Tested ^a	Positive	Percent
Alameda	563	225	6	3
Alpine	0	0	0	0
Amador	2	0	0	0
Butte	62	13	0	0
Calaveras	8	0	0	0
Colusa	13	4	1	25
Contra Costa	515	53	3	6
Del Norte	0	0	0	0
El Dorado	73	17	0	0
Fresno	160	17	11	65
Glenn	7	0	0	0
Humboldt	17	0	0	0
Imperial	3	0	0	0
Inyo	1	0	0	0
Kern	45	4	1	25
Kings	17	0	0	0
Lake	20	10	1	10
Lassen	1	0	0	0
Los Angeles	781	98	5	5
Madera	16	3	0	0
Marin	88	4	0	0
Mariposa	1	0	0	0
Mendocino	15	0	0	0
Merced	48	4	1	25
Modoc	0	0	0	0
Mono	1	0	0	0
Monterey	38	5	0	0
Napa	30	6	0	0
Nevada	32	4	0	0
Orange	443	157	4	3
Placer	228	83	8	10
Plumas	3	0	0	0
Riverside	177	48	0	0
Sacramento	804	298	27	9
San Benito	4	1	0	0
San Bernardino	138	31	0	0
San Diego	467	175	33	19
San Francisco	105	13	0	0
San Joaquin	215	49	7	14
San Luis Obispo	63	11	0	0
San Mateo	578	180	0	0
Santa Barbara	51	18	0	0
Santa Clara	805	172	26	15
Santa Cruz	108	33	0	0
Shasta	17	6	0	0
Sierra	1	0	0	0
Siskiyou	3	0	0	0
Solano	150	33	3	9
Sonoma	157	16	1	6
Stanislaus	161	13	1	8
Sutter	27	8	1	13
Tehama	14	0	0	0
Trinity	0	0	0	0
Tulare	73	20	8	40
Tuolumne	5	0	0	0
Ventura	132	22	1	5
Yolo	222	47	5	11
Yuba	29	7	0	0
Totals	7,737	1,908	154	8

^a Tested by the University of California Davis Arboviral Research and Training laboratory or local mosquito/vector control agency

Table 1.8. Infections with West Nile virus in humans, horses, dead birds, mosquito pools, and sentinel chickens, by county, California, 2025

County	Humans ^a	Horses	Dead birds	Mosquito pools	Sentinel chickens
Alameda	0	0	6	0	0
Alpine	0	0	NT	NT	NT
Amador	0	0	NT	NT	NT
Butte	4	0	0	28	14
Calaveras	0	0	NT	NT	NT
Colusa	1	0	1	1	1
Contra Costa	1	1	3	3	0
Del Norte	0	0	NT	NT	NT
El Dorado	0	0	0	NT	NT
Fresno	17	0	11	132	NT
Glenn	1	0	NT	0	NT
Humboldt	0	0	NT	NT	NT
Imperial	0	0	NT	1	NT
Inyo	0	0	NT	1	NT
Kern	20	0	1	129	NT
Kings	9	0	NT	129	NT
Lake	0	0	1	5	6
Lassen	0	0	NT	NT	NT
Los Angeles	24	0	5	200	18
Madera	2	0	0	264	NT
Marin	0	0	0	0	NT
Mariposa	0	0	NT	NT	NT
Mendocino	0	0	NT	NT	NT
Merced	3	0	1	42	NT
Modoc	0	0	NT	NT	NT
Mono	0	0	NT	0	NT
Monterey	1	0	0	NT	NT
Napa	0	0	0	0	NT
Nevada	1	0	0	NT	0
Orange	2	0	4	186	NT
Placer	6	0	8	145	NT
Plumas	0	0	NT	NT	NT
Riverside	1	0	0	15	NT
Sacramento	3	1	27	67	NT
San Benito	0	0	0	0	0
San Bernardino	0	0	0	6	NT
San Diego	0	0	33	181	NT
San Francisco	0	0	0	0	NT
San Joaquin	7	0	7	139	NT
San Luis Obispo	0	0	0	0	NT
San Mateo	0	0	0	0	NT
Santa Barbara	0	1	0	0	NT
Santa Clara	2	0	26	3	NT
Santa Cruz	0	0	0	0	NT
Shasta	0	0	0	2	0
Sierra	0	0	NT	NT	NT
Siskiyou	1	0	NT	NT	NT
Solano	1	0	3	28	2
Sonoma	0	0	1	0	NT
Stanislaus	2	1	1	196	NT
Sutter	2	0	1	12	11
Tehama	0	0	NT	NT	0
Trinity	0	0	NT	NT	NT
Tulare	15	0	8	759	9
Tuolumne	2	0	NT	NT	NT
Ventura	0	0	1	0	0
Yolo	1	1	5	77	NT
Yuba	0	0	0	8	4
State Totals	129	5	154	2,759	65

^aIncludes asymptomatic infections detected through blood bank screening

NT= no samples tested

Invasive mosquito surveillance

Three species of invasive *Aedes* mosquitoes became established in California between 2011 and 2014: the Asian tiger mosquito, *Ae. albopictus* (2011), the yellow fever mosquito, *Ae. aegypti* (2013), and the Australian backyard mosquito, *Ae. notoscriptus* (2014). All three species have similar biology and behavior, live in close association with human-made environments, and are container breeders. *Aedes aegypti* is the primary worldwide vector of dengue, chikungunya, Zika, and yellow fever, viruses, and *Ae. albopictus* can also serve as a vector of these arboviruses. In Australia, *Ae. notoscriptus* is an important urban vector of dog heartworm and has been found infected with Ross River and Barmah Forest viruses. None of these viruses are endemic to California.

Since 2011, local vector control agencies have detected one or more species of invasive *Aedes* mosquitoes in over 400 cities or census-designated places (CDP) in 30 counties; however, populations are only established within urbanized areas of 28 (*Ae. aegypti*) and 2 (*Ae. albopictus*) counties (Figure 1.4). In 2025, *Ae. aegypti* were discovered for the first time in two new cities. In contrast, the range of

Ae. albopictus has been declining since 2017, leaving only areas of Los Angeles and Shasta counties with detectable populations. *Aedes notoscriptus*, not currently considered a public health threat, is established in parts of Los Angeles, Orange, and San Diego counties.

In 2025, a total of 32,307 *Ae. aegypti* mosquitoes, representing 2,868 pools, were tested for dengue, chikungunya, and Zika viruses: one *Ae. aegypti* pool tested positive for dengue virus and was collected in response to a locally acquired dengue case. In addition, 4,833 *Ae. aegypti*, representing 1,441 pools, were tested for WNV, SLEV, and WEEV: two *Ae. aegypti* pools tested positive for WNV (Table 1.4).

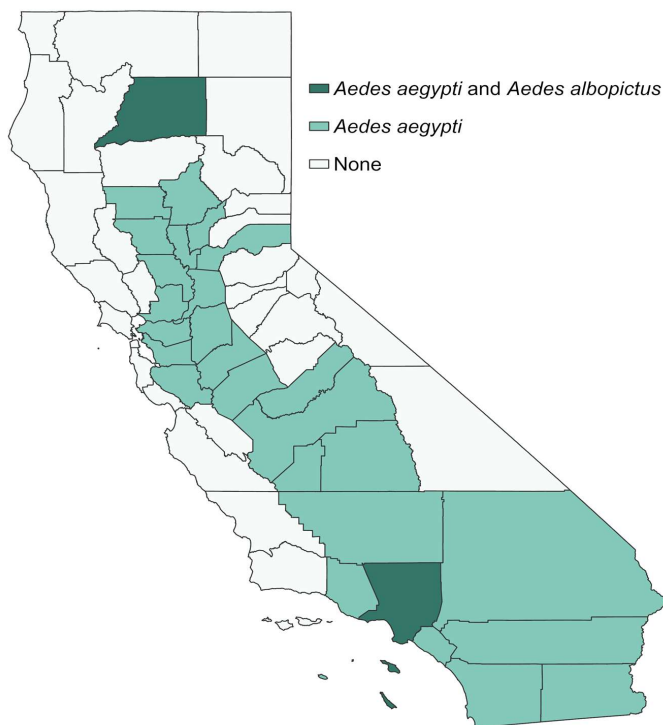


Figure 1.4. Invasive *Aedes* mosquito detections, by county, California, 2025

2

Tick-borne Diseases

Californians are exposed to tick-borne diseases when they recreate or live where ticks are found in California and when traveling out of state. Nine tick-borne endemic diseases have been documented in California. A goal of the California Department of Public Health, Vector-Borne Disease Section is to reduce human morbidity from tick-borne diseases through ongoing surveillance of disease-causing agents and ticks, investigation of human cases, management of tick populations when appropriate, collation of state-wide tick data from participating agencies, and timely dissemination of findings and prevention messages to the public, medical and public health communities, and vector control agencies.

Human disease surveillance

Anaplasmosis

In 2025, 14 cases of anaplasmosis caused by *Anaplasma phagocytophilum* were reported to the California Department of Public Health (CDPH): 11 (79%) met national surveillance criteria for a confirmed case and three (21%) met the criteria for a probable case. The median age was 75 years (range, 34 to 90 years), 10 (71%) were male and four (29%) were female. For self-reported race and ethnicity, 11 (79%) were White, three (21%) were Unknown or Other. None identified as Hispanic or Latino. Case-patients were residents of Alameda (2), Los Angeles (3), Marin (5), San Francisco, and Sonoma (3) counties. Four (33%) patients reported exposure within California, including Marin (3) and Sonoma counties; 10 (71%) reported exposure in the northeast or upper Midwest of the United States (Figure 2.1).

Babesiosis

In 2025, three cases of babesiosis were reported to CDPH; one (33%) met national surveillance criteria for a confirmed case and two (66%) were a probable case for infection with *Babesia microti*. The median age was 38 years (range, 36 to 74 years). Two (66%) were male; one (33%) was female. Self-reported race and ethnicity were White (2) or Unknown (1); none reported Hispanic or Latino ethnicity. Case-patients were residents of Lake, Los Angeles, and San Diego counties. All exposure was due to travel to eastern United States where *B. microti* is endemic.

Ehrlichiosis

Five cases of ehrlichiosis were reported to CDPH

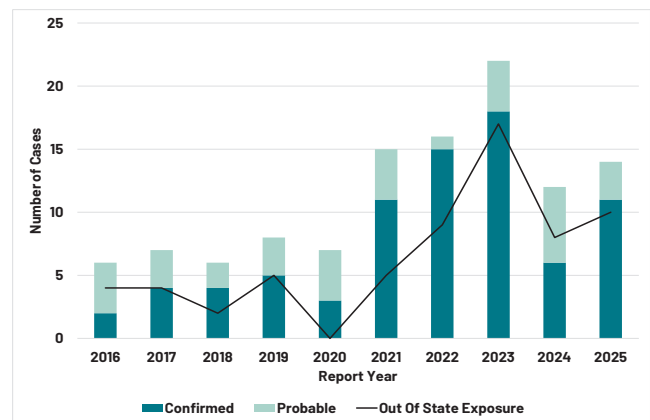


Figure 2.1. Confirmed and probable anaplasmosis cases, including cases reporting travel within incubation period, by report year 2016 - 2025

in 2025; one met national surveillance criteria for a confirmed case for infection with *Ehrlichia chaffeensis* and four were probable cases. Two cases had travel history to midwestern states where the Lone Star tick (*Amblyomma americanum*), the tick vector for *E. chaffeensis* is endemic, and travel history was unknown for three.

Lyme disease

A total of 114 cases of Lyme disease caused by *Borrelia burgdorferi* were reported in 2025; 84 (74%) of these met the surveillance case definition criteria for a confirmed case, 22 (19%) were probable, and 8 (7%) were suspect cases with erythema migrans (EM) rash only with exposure in California (Figure 2.2). Of the 84 confirmed cases, case-patients were residents of 23 counties, with Los Angeles County reporting the greatest number of cases (15) (Table 2.1). The median age of confirmed Lyme disease case-patients was 44 years (range, 2 to 85 years); 31 (37%) were female

and 53 (63%) were male. Of the 63 confirmed case-patients for whom race and ethnicity were reported, 50 (79%) self-identified as White, 1 (2%) as Native Hawaiian or Other Pacific Islander, 1 (2%) as Asian, and 11 (17%) as Other. Seven (11%) self-identified as Hispanic or Latino. Erythema migrans (EM) was identified in 34 (40%) confirmed patients, with onset noted mostly in summer months of June through August (29 or 85%). Between 2016 and 2025, the highest incidence of Lyme disease was in the north and central coastal counties and some northern counties with western-facing Sierra slopes (Figure 2.2). Of the 58 (55%) confirmed and probable case-patients reporting travel history outside of California one month prior to onset,

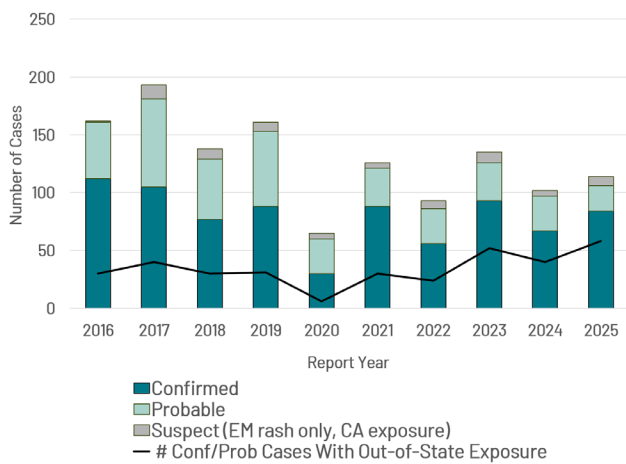


Figure 2.2. Confirmed, probable and suspect Lyme disease cases, including cases reporting travel within incubation period, by report year 2016 – 2025

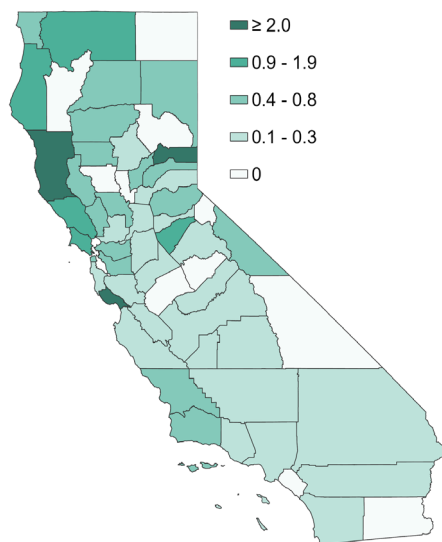
the most common areas of exposure were the northeast or upper Midwest of the United States (48 or 83%) followed by Europe (9 or 16%), and Canada (1 or 2%).

Spotted fever group rickettsiosis

Ten cases of Rocky Mountain spotted fever (RMSF) caused by *Rickettsia rickettsii*, were reported to CDPH in 2025. One (10%) met the surveillance criteria for a confirmed case and nine (90%) were probable. The median age was 39 years (range, 4 to 66 years); six (60%) were female and four (40%) were male. Of the 10 case-patients self-reporting race and ethnicity, four (40%) were White, and six (60%) were Other or Unknown race. Two (20%) were Hispanic or Latino ethnicity and eight (80%) were non-Hispanic/non-Latino or Unknown. Case-patients were residents of Los Angeles (3), Orange (2), Riverside, San Bernardino, San Diego, San Francisco, or Santa Cruz counties. Exposure locations included California (4), Southeast United States (3) or Mexico (3). Two cases of probable spotted fever group rickettsiosis were reported from Los Angeles County. Average age was 64 years; one was male and one was female. Both cases had exposure in Oklahoma.

Soft tick relapsing fever

Two cases of soft tick relapsing fever, caused by *Borrelia hermsii*, were reported to CDPH in 2025 and both were confirmed. Average age was 68 years;



Mendocino	3.4
Santa Cruz	3.2
Sierra	3.1
Humboldt	1.7
Siskiyou	1.1
Sonoma	1.1
Marin	1.1
Calaveras	0.9
Mono	0.8
San Francisco	0.8
Del Norte	0.7

* Reported by county of residence. Though Lyme disease cases have been reported in nearly every county, cases are reported based on the county of residence, which does not necessarily reflect the county of infection.

Figure 2.3. Ten-year incidence of reported confirmed Lyme disease, by county, California 2016 – 2025

Table 2.1. Reported confirmed Lyme disease cases by county of residence, California, 2016–2025*

County	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	TOTAL	10-year Incidence per 100,000 person-years
Alameda	8	11	3	9	5	4	4	5	5	8	62	0.37
Alpine	0	0	0	0	0	0	0	0	0	0	0	0.00
Amador	0	0	0	0	0	0	0	0	1	0	1	0.25
Butte	2	0	0	1	0	1	0	1	0	0	5	0.23
Calaveras	0	1	0	1	0	0	0	1	1	0	4	0.89
Colusa	0	0	0	0	0	0	0	0	0	0	0	0.00
Contra Costa	8	11	10	1	2	5	2	1	4	4	48	0.42
Del Norte	0	0	0	0	0	0	1	0	0	1	2	0.74
El Dorado	2	1	0	0	0	1	4	0	2	0	10	0.53
Fresno	1	0	1	1	0	1	1	0	0	1	6	0.06
Glenn	0	0	1	0	0	0	0	0	0	0	1	0.35
Humboldt	4	2	2	5	1	0	4	5	0	0	23	1.69
Imperial	0	0	0	0	0	0	0	0	0	0	0	0.00
Inyo	0	0	0	0	0	0	0	0	0	0	0	0.00
Kern	1	0	0	1	0	0	0	1	0	0	3	0.03
Kings	1	0	0	0	0	0	0	0	1	0	2	0.13
Lake	1	0	1	2	1	0	0	0	0	0	5	0.74
Lassen	1	0	0	0	0	0	0	0	0	0	1	0.32
Los Angeles	1	3	2	2	0	6	5	14	8	16	57	0.06
Madera	0	0	0	0	1	0	1	0	0	1	3	0.19
Marin	2	0	1	8	0	5	3	0	4	5	28	1.08
Mariposa	0	0	0	0	0	0	0	0	0	0	0	0.00
Mendocino	1	1	1	8	1	6	3	3	4	3	31	3.41
Merced	0	0	0	0	0	0	0	0	0	0	0	0.00
Modoc	0	0	0	0	0	0	0	0	0	0	0	0.00
Mono	0	0	0	0	0	0	0	0	0	1	1	0.76
Monterey	1	0	0	1	0	2	1	0	0	0	5	0.11
Napa	1	1	0	0	1	1	2	0	0	0	6	0.44
Nevada	2	0	2	1	0	0	0	1	0	0	6	0.59
Orange	1	0	0	0	0	0	0	0	0	0	1	0.00
Placer	2	3	0	0	0	0	1	1	0	0	7	0.17
Plumas	0	0	0	0	0	0	0	0	0	0	0	0.00
Riverside	3	1	2	1	2	2	0	3	0	1	15	0.06
Sacramento	1	1	3	2	0	0	2	4	2	1	16	0.10
San Benito	0	0	0	0	0	0	0	1	0	0	1	0.16
San Bernardino	0	0	0	2	0	3	0	0	1	0	6	0.03
San Diego	9	4	4	0	2	6	2	10	2	8	47	0.14
San Francisco	2	10	14	8	3	12	2	3	6	5	65	0.76
San Joaquin	1	0	1	3	0	0	0	1	0	1	7	0.09
San Luis Obispo	1	0	1	2	1	2	2	0	2	1	12	0.43
San Mateo	5	3	0	2	1	0	0	0	3	2	16	0.21
Santa Barbara	7	3	3	2	1	2	1	2	1	3	25	0.56
Santa Clara	11	9	3	2	3	5	4	11	8	6	62	0.32
Santa Cruz	7	17	7	12	2	13	4	12	6	5	85	3.16
Shasta	0	0	0	0	1	1	0	1	2	1	6	0.33
Sierra	0	0	1	0	0	0	0	0	0	0	1	3.11
Siskiyou	1	1	1	0	0	1	0	1	0	0	5	1.14
Solano	3	2	2	0	1	1	0	1	0	3	13	0.29
Sonoma	12	10	6	5	0	3	4	8	2	5	55	1.12
Stanislaus	1	3	2	0	0	0	0	0	0	0	6	0.11
Sutter	0	0	0	0	0	0	0	0	0	0	0	0.00
Tehama	3	1	0	0	0	0	0	0	0	0	4	0.62
Trinity	0	0	0	0	0	0	0	0	0	0	0	0.00
Tulare	1	0	1	3	0	0	0	1	0	0	6	0.13
Tuolumne	0	0	0	1	0	0	0	0	0	0	1	0.18
Ventura	3	3	2	2	0	3	1	1	1	1	17	0.20
Yolo	1	3	0	0	0	1	1	0	1	1	8	0.37
Yuba	0	0	0	0	1	1	1	0	0	0	3	0.37
TOTAL	112	105	77	88	30	88	56	93	67	84	800	0.20

* Confirmed cases only are reported in this table. A total of 89 confirmed, probable, and suspect cases were reported in 2025.

Numbers of probable and locally acquired suspect cases are reported in the text.

one was male and the other female. Patients were residents of Contra Costa and Sacramento counties and patients were likely exposed in Tuolumne County at two different locations.

Tularemia

No tick-exposure related tularemia cases were reported in 2025.

Tick surveillance

Anaplasma phagocytophilum

In 2025, a total of 10,854 adult and 1,768 nymphal western blacklegged ticks (*Ixodes pacificus*) were collected and tested for the presence of *Anaplasma phagocytophilum*, the causative agent of anaplasmosis (Tables 2.2 and 2.2). Of these ticks, the CDPH Vector-Borne Disease Section (CDPH-VBDS) individually tested 2,118 adult and 421 nymphs from 29 counties. Additionally, Placer Mosquito and Vector Control District (MVCD) individually tested 303 nymphal *Ixodes pacificus* (Table 2.2). Eight (0.4%) adult and 2 (0.3%) nymphal western blacklegged ticks tested positive by real-time polymerase chain reaction (RT-PCR) at the CDPH-VBDS laboratory. None of the individually tested nymphs from Placer MVCD were positive for *A. phagocytophilum*. Alameda County Department of Environmental Health, Butte MVCD, Placer MVCD, San Mateo MVCD, and Shasta MVCD share *A. phagocytophilum* pooled tick testing data with CDPH-VBDS (Table 2.3). In 2025, these agencies collected and tested 8,736 adult western blacklegged ticks in 1,909 pools, and 1,044 nymphal ticks in 535 pools from sites in their counties. Fifty-eight (0.7%) adult tick pools and 10 (1.0%) nymphal pools tested positive for *A. phagocytophilum* (Table 2.3).

Francisella tularensis

In 2025, CDPH-VBDS tested by RT-PCR a total of 181 adult western American dog ticks (*Dermacentor similis*) from Contra Costa, Lake, Los Angeles, Marin, Monterey, Napa, Orange, San Francisco, San Joaquin, and San Mateo counties for *Francisella tularensis*, the causative agent of tularemia. All ticks tested negative. In addition, the San Diego County Environmental Health Vector Control Program tested 3,311 *D. occidentalis*, 285 *D. similis*, and 2 *D. hunteri* ticks for *F. tularensis* by RT-PCR. All ticks tested negative.

Molecular and ecological studies refine our understanding of ticks and tick-borne diseases. *Rickettsia lanei*, formerly *R. species CA6269*, has been identified as another agent of Rocky Mountain spotted fever, while an associated vector tick, the rabbit tick, has been renamed to *Haemophysalis vespertina* (formerly *H. leporispalustris*).

Spotted fever group rickettsiosis

The spotted fever group *Rickettsia* (SFGR) species include several human pathogenic *Rickettsia* spp., including *Rickettsia rickettsii*, and newly recognized *Rickettsia lanei* (formerly *Rickettsia* species CA6269), both causative agents of Rocky Mountain spotted fever (RMSF), and *Rickettsia rickettsii* subspecies *californica*, the causative agent of Pacific Coast tick fever. In 2025, CDPH-VBDS tested 2,375 adult and 50 nymphal *D. occidentalis* ticks for SFGR species from Alameda, Amador, Calaveras, Colusa, Contra Costa, Fresno, Lake, Los Angeles, Marin, Mariposa, Monterey, Napa, Orange, Sacramento, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Solano, Sonoma, Stanislaus, Sutter, Tehama, Trinity, Tuolumne, Ventura, and Yolo counties. Additionally, 36 nymphal and 6 adult rabbit ticks (*H. vespertina* - formerly *H. leporispalustris*) from Contra Costa, Marin, and San Mateo counties were tested for SFGR species. DNA from all ticks was extracted by CDPH-VBDS and tested by RT-PCR at the CDPH Viral and Rickettsial Disease Laboratory. A total of 117 adult Pacific Coast ticks tested positive for *Rickettsia rickettsii* ssp. *californica*; positive ticks were detected from Los Angeles (108 of 1,147 or 9.4%), Monterey (8 of 115 or 7.0%), San Diego (2 of 39 or 5.1%), San Luis Obispo (2 of 81 or 2.5%), Santa Barbara (1 of 45 or 2.2%), Stanislaus (1 of 19 or 5.3%), and Ventura (2 of 40 or 5.0%) counties. All ticks tested negative for *R. rickettsii* and *R. lanei*.

Table 2.2. Infection prevalence of *Anaplasma phagocytophilum* in *Ixodes pacificus* ticks, California, 2025^a

County	No. Ticks Tested		Positive <i>A. phagocytophilum</i>	
	Adults	Nymphs	Adults (IP ^a)	Nymphs (IP ^a)
Alameda	9			
Amador	6			
Calaveras	17			
Contra Costa	152	109		
El Dorado	210	22	1 (0.5)	
Fresno	18			
Los Angeles	207		1 (0.5)	
Marin	106	14	1 (0.9)	
Mariposa	39	1		
Mendocino	16	40		
Monterey	5	1		
Napa	78	6		
Nevada	153	5	1 (0.7)	1 (20.0)
Orange	11			
Placer	225	307	1 (0.4)	
Sacramento		4		
San Diego	13			
San Luis Obispo	300			
San Mateo	76	122		1 (0.8)
Santa Barbara	152			
Sierra	27	2		
Solano	131	47		
Sonoma	42	39	3 (7.1)	
Stanislaus	1			
Sutter	13			
Tehama	30			
Trinity	40	4		
Tuolumne	24	1		
Ventura	17			
Non-pooled totals	2,118	724	8 (0.4)	2 (0.3)

Abbreviations: IP, Infection prevalence=the number of positive individually tested ticks divided by the number of ticks tested multiplied by 100.

^a All ticks collected and tested by California Department of Public Health, Vector-Borne Disease Section except Placer County tick data also contributed and tested by Placer County Mosquito Vector Control District

Table 2.3. Minimum infection prevalence of *Anaplasma phagocytophilum* in *Ixodes pacificus* ticks, California, 2025^a

County	No. Ticks Tested		Positive <i>A. phagocytophilum</i>	
	Adults (pools)	Nymphs (pools)	Adults (MIP)	Nymphs (MIP)
Alameda	1,123 (226)	252 (132)	11 (1.0)	1 (0.4)
Butte	278 (66)	4 (2)	1 (0.4)	
Placer	2,088 (499)		21 (1.0)	
San Mateo	4,025 (850)	788 (401)	25 (0.6)	9 (1.1)
Shasta	1,222 (268)			
Pooled totals	8,736 (1,909)	1,044 (535)	58 (0.7)	10 (1.0)

Abbreviations: MIP, Minimum infection prevalence= the number of positive pools divided by the number of ticks tested multiplied by 100

^a Ticks collected and tested by respective county vector agency: Alameda Department of Environmental Health, Butte County Mosquito Vector Control District (MVCD), Placer MVCD, San Mateo MVCD and Shasta MVCD

Reported to CDPH-VBDS, the Alameda County Vector Control Program tested 1,281 adult *D. occidentalis* in 258 pools and 86 adult *D. similis* in 42 pools for SFGR. Six pools of *D. occidentalis* were positive for *Rickettsia rickettsii* ssp. *californica* for a county MIP of 0.5%. Orange County MVCD tested 1,540 adult *D. occidentalis* in 322 pools and 28 *D. similis* in 15 pools for SFGR; all were negative. The San Diego County Environmental Health Vector Control Program tested 3,311 *D. occidentalis* in 489 pools, 285 *D. similis* in 55 pools, and 2 *D. hunteri* for SFGR. Eighty-nine pools of *D. occidentalis* were positive for *Rickettsia rickettsii* ssp. *californica* for a county MIP of 2.7%. Santa Clara County MVCD tested 181 adult *D. occidentalis* in 44 pools and 28 *D. similis* in 15 pools for SFGR. One pool of *D. occidentalis* was positive for *Rickettsia rickettsii* ssp. *californica* for a county MIP of 0.6%.

Borrelia spirochetes

Borrelia burgdorferi sensu lato

In 2025, local, state, and federal agencies, in collaboration with CDPH-VBDS, collected 15,613 adult and 1,188 nymphal western blacklegged ticks from 35 counties to test for *Borrelia burgdorferi*, the causative agent of Lyme disease (Tables 2.4 and 2.5). Collection and testing data for western blacklegged ticks was collated by CDPH-VBDS. From the counties where ticks were tested individually by RT-PCR, 35 of 3,705 (0.9%) adult and 39 of 844 (4.6%) nymphal ticks tested positive for *B. burgdorferi sensu lato* (Table 2.4). Ticks tested by local vector control agencies in pools were tested by RT-PCR or IFA. In the counties where ticks were tested in pools, 143 (1.2% MIP) adult tick pools out of 11,908 ticks collected, and 48 nymphal pools out of 1,044 ticks collected (4.6% MIP) tested positive for *Borrelia burgdorferi* sl (Table 2.5).

Borrelia miyamotoi

In 2025, of the western blacklegged ticks collected, 12,724 adult ticks and 1,888 nymphal ticks were tested for *Borrelia miyamotoi*, the causative agent of hard tick relapsing fever. Of the 3,699 individually tested adults and 844 individually tested nymphs, 25 (0.7%) and 13 (1.5%), respectively, tested positive for *B. miyamotoi* (Table 2.4). Of the 9,019 adult ticks tested in 1,966 pools and 1,044 nymphs tested in 535 pools, 81 (0.9% MIP) and 19 (1.8% MIP), respectively, tested positive (Table 2.5).

***Borrelia* spp. coinfection**

In 2025, two adult *I. pacificus* from Marin (1) and Sonoma (1) counties tested positive for both *B. burgdorferi* sl and *A. phagocytophilum* by CDPH-VBDS for a statewide adult co-infection prevalence of 0.1% (2 positive out of 2,118 individually tested adults).

Reported to CDPH-VBDS by Placer County MVCD, eight adult *I. pacificus* pools were positive for both *B. burgdorferi* sl and *A. phagocytophilum*, two adult *I. pacificus* pools were positive for both *B. burgdorferi* sl and *B. miyamotoi*, and one adult *I. pacificus* pool was positive for *B. burgdorferi* sl, *B. miyamotoi*, and *A. phagocytophilum*, for county MIPs of 0.4% (8 positive pools out of 2,088 ticks), 0.1% (2 positive pools out of 2,088 ticks), and 0.05% (1 positive pool out of 2,088 ticks), respectively. A coinfection in a pooled sample does not necessarily mean a coinfection in a single tick.

Mammal surveillance

Francisella tularensis

CDPH-VBDS collaborates with the CDPH Microbial Disease Laboratory to test mammals for *Francisella tularensis*, the causative agent of tularemia, by serology, DFA, PCR, and culture. Mammals may be tested for tularemia in response to reported human cases or for environmental risk assessment including specific carcass testing requests. In 2025, four small mammal carcasses tested negative for *F. tularensis* from El Dorado (3) and Sierra (1) counties.

Table 2.4. Infection prevalence of *Borrelia burgdorferi* sensu lato and *Borrelia miyamotoi* spirochetes in *Ixodes pacificus* ticks, California, 2025

County	No. Ticks Tested		Positive <i>B. burgdorferi</i>		Positive <i>B. miyamotoi</i> ^a	
	Adults	Nymphs	Adults (IP) ^b	Nymphs (IP) ^b	Adults (IP) ^b	Nymphs (IP) ^b
Alameda	9					
Amador	6					
Calaveras	17					
Contra Costa	152	109	2 (1.3)	3 (2.8)	4 (2.6)	1 (0.9)
El Dorado	210	22	2 (1.0)	7 (31.8)	6 (2.9)	
Fresno	18					
Los Angeles	207		5 (2.4)			
Marin ^c	110	115	2 (1.8)	4 (3.5)		5 (4.3)
Mariposa	39	1				
Mendocino	16	40	1 (6.3)	3 (7.5)		1 (2.5)
Monterey	5	1				
Napa	78	6				
Nevada	153	5			1 (0.7)	
Orange	11					
Placer ^c	225	307	8 (3.6)	11 (3.6)	1 (0.4)	4 (1.3)
Sacramento		4				
San Diego	13					
San Joaquin ^c	6					
San Luis Obispo	300		1 (0.3)			
San Mateo	76	122	2 (2.6)	5 (4.1)		1 (0.8)
Santa Barbara	152					
Santa Clara	711	17	7 (1.0)		6 (0.8)	
Santa Cruz ^c	864		3 (0.3)		5 (0.6)	
Sierra	27	2				
Solano	131	47		5 (10.6)		
Sonoma ^c	44	41	2 (4.5)	1 (2.4)	2 (4.5)	1 (2.4)
Stanislaus	1					
Sutter	13					
Tehama	30					
Trinity	40	4				
Tuolumne	24	1				
Ventura	17					
Total	3,705	844	35 (0.9)	39 (4.6)	25 (0.7)	13 (1.5)

All *Ixodes pacificus* ticks tested at CDPH-VBDS are tested by multiplex real-time polymerase chain reaction (RT-PCR) for *Borrelia burgdorferi* sensu lato and *Borrelia miyamotoi*.

^cTicks also collected and tested by respective county vector agencies: Marin-Sonoma MVCD, Placer County MVCD, San Joaquin MVCD, Santa Cruz County MVCD.

Abbreviations:

CDPH-VBDS, California Department of Public Health, Vector-Borne Disease Section; MVCD, Mosquito and Vector Control District; VCD, Vector Control District; VCP, Vector Control Program

^a 3,699 adults tested for *Borrelia miyamotoi*. San Joaquin MVCD does not test for *B. miyamotoi*.

^b IP: Measure of prevalence. IP (infection prevalence) is equal to the number of positive ticks divided by the number of ticks tested multiplied by 100.

Table 2.5. Minimum infection prevalence of *Borrelia burgdorferi* sensu lato and *Borrelia miyamotoi* in *Ixodes pacificus* ticks, California, 2025

County	No. Ticks Tested		Positive Pools, <i>B. burgdorferi</i>		Positive Pools, <i>B. miyamotoi</i> ^a		Collected by	Laboratory
	Adults (pools)	Nymphs (pools)	Adults (MIP) ^b	Nymphs (MIP) ^b	Adults (MIP) ^b	Nymphs (MIP) ^b		
Alameda	1,123 (226)	252 (132)	11 (1.0)	8 (3.2)	13 (1.2)	2 (0.8)	Alameda County DEH	Alameda County DEH
Butte	278 (66)	4 (2)	6 (2.2)		3 (1.1)		Butte County MVCD	Placer MVCD
Los Angeles ^a	82 (26)						Los Angeles County West VCD	Santa Clara County PHL
Marin	14 (4)						Marin-Sonoma MVCD	Marin-Sonoma MVCD
Orange	171 (44)						Orange County MVCD	Orange County MVCD
Placer	2,088 (499)		60 (2.9)		3 (1.1)		Placer MVCD	Placer MVCD
Sacramento	1,149 (295)		21 (1.8)				Sacramento-Yolo MVCD	Sacramento-Yolo MVCD
San Diego	1,328 (182)						County of San Diego VCP	County of San Diego VCP
San Mateo	4,052 (850)	788 (401)	29 (0.7)	40 (5.1)	55 (1.4)	17 (2.2)	San Mateo MVCD	San Mateo MVCD
Santa Clara	192 (41)		2 (1.0)		1 (0.5)		Santa Clara County MVCD	Santa Clara County MVCD
Shasta	1,222 (268)		13 (1.1)		6 (0.5)		Shasta MVCD	Shasta MVCD
Sonoma	50 (12)		1 (2.0)				Marin-Sonoma MVCD	Marin-Sonoma MVCD
Yolo	159 (46)						Sacramento-Yolo MVCD	Sacramento-Yolo MVCD
Total	11,908 (2,559)	1,044 (535)	143 (1.2)	48 (4.6)	81 (0.9)	19 (1.8)		

Abbreviations:

DEH, Department of Environmental Health; MVCD, Mosquito and Vector Control District; VCD, Vector Control District; VCP, Vector Control Program; PHL, Public Health Laboratory.

^a Tested by immunofluorescent antibody (IFA) test.

^b MIP: Measure of prevalence. MIP (minimum infection prevalence) is equal to the number of positive pools divided by the number of ticks tested multiplied by 100.

^c 9,019 (1,966) adult ticks and 1,044 (535) nymphs tested for *Borrelia miyamotoi*, Orange County MVCD, Sacramento-Yolo MVCD, San Diego VCP, and Los Angeles County West VCD do not test for *B. miyamotoi*.

3

Flea-borne Diseases

Flea-borne typhus and plague are the principal flea-borne diseases under surveillance in California. The California Department of Public Health collaborates with local, state, and federal agencies to conduct a statewide plague surveillance program. The California Department of Public Health, Vector-Borne Disease Section collects, collates, and analyzes information on suspect and confirmed plague activity among humans, domestic pets, and wild animals throughout California to evaluate the potential risk of plague to the public and, where necessary, implements preventive and control actions.

Human disease surveillance

Flea-borne typhus

Human testing for *Rickettsia typhi*, the causative agent of flea-borne typhus, is principally performed at commercial laboratories and at the Los Angeles County Department of Public Health. The California Department of Public Health (CDPH) Viral and Rickettsial Disease Laboratory (VRDL) performs serology or PCR for samples requiring additional confirmation. Of 299 patients reported to CDPH in 2025, 99 (33%) of these were confirmed according to the CDPH working surveillance definition, and 200 (67%) were probable. The median age was 44 years (range 1 to 89 years); 169 (57%) were male, and 130 (43%) were female. Of these patients, 251 (84%) required hospitalization and two (0.7%) were fatal. Patients were residents of Kern (1; 0.3%); Los Angeles (242; 81%), Orange (38; 13%), San Bernardino (16; 5%), and Riverside (2; 0.7%) counties. Typhus is considered endemic in Southern California; reported patients from outside Southern California had travel history to endemic areas prior to exposure.

Plague

Human cases of plague are reportable to CDPH by local health jurisdictions. Presumptive positive test results for reported cases are typically confirmed by either the CDPH Microbial Diseases Laboratory (CDPH-MDL) or the U.S. Centers for Disease Control and Prevention. Environmental investigation in response to a human case of plague typically includes an evaluation and risk assessment of all potential exposure sites.

One human case of plague was reported to CDPH in August 2025. The patient was a resident of El Dorado County who survived after being hospitalized. The CDPH Vector-Borne Disease Section (CDPH-VBDS) and El Dorado County Vector Control District performed rodent and flea surveillance in local areas where the patient reported likely exposure. Based on findings, exposure was suggested to be at a public camping area. Insect-treated bait tubes were deployed to control fleas on rodents. Follow-up surveillance indicated that flea control within the treatment areas was successful with flea abundance reduced to less than one per rodent sampled.

Animal disease surveillance (plague)

Rodent surveillance is conducted to test for antibodies to *Yersinia pestis* in rodent blood samples and for the presence of *Y. pestis* in their fleas, which can provide evidence of local plague transmission. Reported rodent carcasses are submitted to CDPH and tested for *Y. pestis* when plague infection is suspected. Recreational area closures and flea control applications may be initiated depending on surveillance findings and determinations of elevated plague transmission risk. Domestic pet plague cases and elevated *Y. pestis* antibody prevalence in carnivore blood samples may indicate increased local or regional plague activity and typically prompt additional rodent and flea surveillance.

Domestic pets

No cases of *Y. pestis* infection in domestic pets were reported in 2025.

Table 3.1. CDPH-VBDS *Yersinia pestis* test results for wild rodents and carnivores sampled in 2025

Location	Rodent blood tested by serology	Rodent carcasses tested by culture	Carnivore/pig blood tested by serology	Positive specimens	
				Species	Collection Month
El Dorado	412	2	3		
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	July
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	July
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	July
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	July
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	August
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	August
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	August
LTBMU: Taylor Creek Visitor Center				<i>Tamias amoenus</i>	August
D. L. Bliss SP				<i>Glaucomys oregonensis</i>	August
D. L. Bliss SP				<i>Tamias quadrimaculatus</i>	August
D. L. Bliss SP				<i>Tamias senex</i>	August
South Lake Tahoe				<i>Tamias amoenus</i>	August
Ed Z'berg Sugar Pine Point State Park: General Creek CG				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: General Creek CG				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: General Creek CG				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: General Creek CG				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: General Creek CG				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Tamias senex</i>	September
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	October
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Otospermophilus beecheyi</i>	October
Ed Z'berg Sugar Pine Point State Park: Day Use Area				<i>Tamias quadrimaculatus</i>	October
Humboldt	48		0		
Kern	4		28		
Kings	0		2		
Lassen	28		0		
Marin	0		1		
Mariposa	89		23		
Yosemite NP				<i>Pekania pennanti</i>	January
Yosemite NP				<i>Pekania pennanti</i>	February
Yosemite NP				<i>Pekania pennanti</i>	February
Yosemite NP				<i>Pekania pennanti</i>	February
Yosemite NP				<i>Pekania pennanti</i>	February
Yosemite NP				<i>Ursus americanus</i>	August
Yosemite NP				<i>Pekania pennanti</i>	November
Yosemite NP				<i>Pekania pennanti</i>	November
Sierra NF				<i>Pekania pennanti</i>	December
Sierra NF				<i>Pekania pennanti</i>	December
Sierra NF				<i>Pekania pennanti</i>	December
Sierra NF				<i>Pekania pennanti</i>	December
Sierra NF				<i>Pekania pennanti</i>	December
Sierra NF				<i>Pekania pennanti</i>	December
Mono	93		1		
Napa	0		1		
Nevada	12		0		
Placer	0		3		
Truckee				<i>Ursus americanus</i>	March
Truckee				<i>Ursus americanus</i>	June
Plumas	44		0		
San Bernardino	0		38		
San Diego	131		3		
San Luis Obispo	0		2		
Santa Barbara	0		1		
Shasta	13		1		
Sierra	0	2	0		
Sonoma	0		4		
Stanislaus	0	0	5		
Tulare	0		1		
Tuolumne	74		3		
Yosemite NP				<i>Otospermophilus beecheyi</i>	July
Yosemite NP				<i>Mustela frenata</i>	August
Yosemite NP				<i>Ursus americanus</i>	October
Total	948	4	120		

*No samples were tested by CDPH-VBDS. Refer to text for details on testing conducted by the county of San Diego

CG: Campground

LTBMU: Lake Tahoe Basin Management Unit (United States Forest Service)

NF: National Forest

NP: National Park

SP: State Park

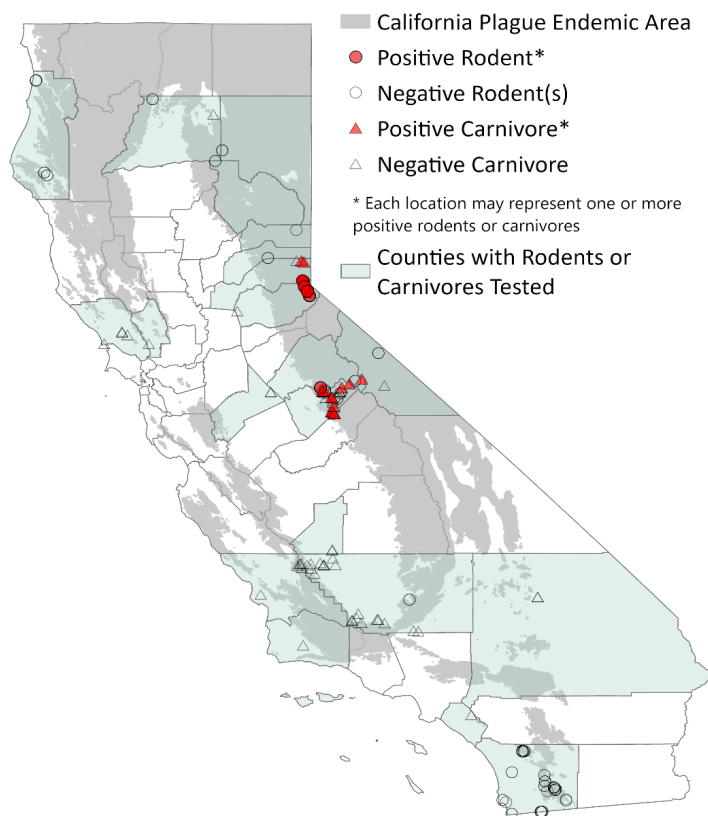


Figure 3.1. Approximate locations of carnivores or rodents collected in 2025 that were tested by serology or culture for *Yersinia pestis*

Wild animals

In 2025, CDPH- VBDS tested 948 wild rodent and 120 carnivore samples obtained from 21 California counties (Figure 3.1 and Table 3.1). Serum antibodies to *Y. pestis* were observed in 36 rodent blood samples from two counties for an overall seroprevalence of 3.8% (Figure 3.1, Table 3.1). The 948 rodents tested for plague antibodies included: 423 deer mice (*Peromyscus maniculatus*), 266 chipmunks (*Neotamias* spp.), 177 California ground squirrels (*Otospermophilus beecheyi*), 21 golden-mantled ground squirrels (*Callospermophilus lateralis*), 17 woodrats (*Neotoma* spp.), 15 Douglas squirrels (*Tamiasciurus douglasii*), 10 other *Peromyscus* spp., 6 montane voles (*Microtus montanus*), 5 *Rattus* spp., 3 white-tailed antelope squirrels (*Ammospermophilus leucurus*), 2 Humboldt's flying squirrels (*Glaucomys oregonensis*), 1 Belding's ground squirrel (*Uroditellus beldingi*), 1 house mouse (*Mus musculus*), and 1 unknown species. Antibodies to *Y. pestis* were detected in 15 (8.5%) California ground squirrels from El Dorado and Tuolumne counties, and 9 (15.5%) Allen's Chipmunks (*Neotamias senex*), 9 (8.6%) yellow-pine chipmunks (*Neotamias amoenus*), 2 (5.9%) long-eared chipmunks (*Neotamias quadrimaculatus*), and 1 (50%) Humboldt's flying squirrel from El Dorado County (Table 3.1). Four rodent carcasses from El Dorado and Sierra counties tested negative for *Y. pestis* by the CDPH-MDL reference bacteriology unit (Table 3.1). The 115 wild carnivore samples included: 71 coyotes (*Canis latrans*), 16 fishers (*Pekania pennanti*), 15 black bears (*Ursus americanus*), 4 gray foxes (*Urocyon cinereoargenteus*), 3 mountain lions (*Puma concolor*), 2 striped skunks (*Mephitis mephitis*), 2 long-tailed weasels (*Mustela frenata*), 1 red fox (*Vulpes vulpes*), and 1 gray wolf (*Canis lupus*). Serum antibodies to *Y. pestis* were detected in nine wild carnivores from three counties for an overall seroprevalence of 7.8%. Positive samples included five fishers, three black bears, and one long-tailed weasel (Table 3.1). Additional carnivore samples from 2025 will likely be tested at a later date.

Rodent flea testing

A total of 1,359 fleas collected from wild rodents in six counties were identified to 15 different species (Tables 3.2, 3.3). They were combined into 485 pools and tested for the presence of *Y. pestis* bacteria. One flea pool of 10 *Oropsylla montana* from a California ground squirrel tested PCR-positive for *Y. pestis* in 2025 (Tables 3.2, 3.3).

Table 3.2. CDPH-VBDS *Yersinia pestis* test results in fleas from rodents by California county, 2025

County		
Location	Flea Pools (Total # Fleas) Tested by PCR	Number Positive Pools
El Dorado	350 (1,043)	1
Lassen	20 (44)	0
Mariposa	55 (78)	0
Nevada	10 (75)	0
Orange	1 (6)	0
Tuolumne	49 (113)	0
Total	485 (1,359)	1

PCR: Polymerase Chain Reaction

Table 3.3. CDPH-VBDS *Yersinia pestis* test results in fleas from rodents by flea sp

County	
Location	Flea Pools (Total # Fleas) Tested by PCR
<i>Amonopsyllus ciliatus</i>	110 (193)
<i>Oropsylla montana</i>	105 (671)
<i>Atheca wagneri</i>	79 (122)
<i>Eumolpianus eumolpi</i>	75 (189)
<i>Malareus telchinus</i>	39 (50)
<i>Eumolpianus eutamiadis</i>	38 (55)
<i>Peromyscopsylla hesperomys adelpha</i>	13 (19)
<i>Orchopeas nepos</i>	8 (30)
<i>Oropsylla idahoensis</i>	6 (6)
<i>Catallagia sp.</i>	3 (3)
<i>Opisodasys keeni</i>	2 (2)
<i>Orchopeas agilis</i>	2 (2)
<i>Orchopeas cascadenis</i>	1 (1)
<i>Catallagia rutherfordi</i>	1 (1)
<i>Megabothris abantis</i>	1 (2)
Unknown	2 (13)
Total	485 (1,359)

PCR: Polymerase Chain Reaction

4

Rodent-borne Diseases

Rodent-borne diseases in California include hantavirus and Chagas disease. Hantavirus infection is the most important rodent-borne disease in California and is most commonly caused by Sin Nombre virus. Since the disease was first identified in 1993, the California Department of Public Health, Vector-Borne Disease Section (CDPH-VBDS) has collaborated with county, state, and federal public health agencies to identify and investigate human cases of disease, to survey and study Sin Nombre virus infection in wild rodents, and to prepare and promote preventive information for the public. Chagas disease, caused by the parasite *Trypanosoma cruzi* and transmitted by droppings from kissing bugs (*Triatoma* spp.), is found predominantly in woodrats in California. People are rarely infected through contact with droppings from infected kissing bugs. CDPH-VBDS performs environmental follow up on human Chagas disease cases if they are acquired in California.

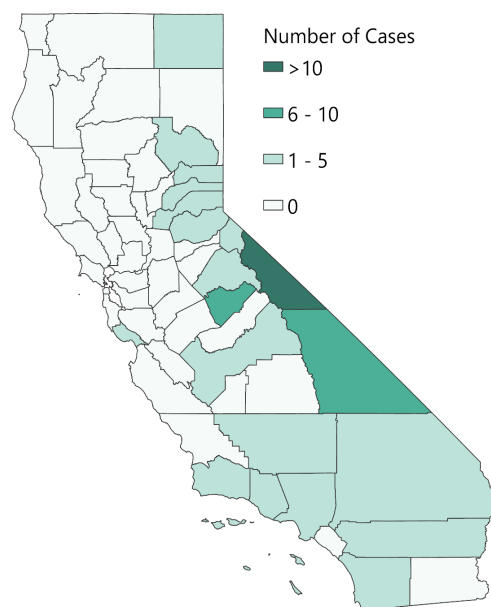
Human disease surveillance

Hantavirus

Human cases of hantavirus infection, which include both hantavirus pulmonary syndrome and non-pulmonary syndrome, are reported to the California Department of Public Health (CDPH) and are usually confirmed serologically and molecularly by the CDPH Viral and Rickettsial Disease Laboratory (CDPH-VRDL). When necessary, the CDPH Vector-Borne Disease Section (CDPH-VBDS) follows human cases with environmental investigations to evaluate unusual exposure circumstances or potential for additional exposures. Investigations may include trapping rodents and collaborating with CDPH-VRDL to test rodent samples for Sin Nombre virus (SNV). In 2025, six cases of hantavirus pulmonary syndrome were reported from El Dorado (1), Mono (3), and Placer (2) counties. Three (50%) were fatal. Months of illness onset were February (4) and May (2). Environmental investigations and laboratory tests confirmed exposure likely occurred at the case-patients' place of occupation and/or residence. SNV antibodies from deer mice collected at potential exposure locations were detected in two (29%) of seven from El Dorado County, four (27%) of 15 from Mono County, and five (29%) of 17 from Placer County. Since 1980, hantavirus infection has been diagnosed in 99 California residents, with the majority exposed to SNV in the interior mountain ranges of the state or eastern Sierra Nevada (Figure 4.1).

Chagas disease

Human testing for *Trypanosoma cruzi*, the causative agent of Chagas disease, is conducted primarily by blood banks and commercial laboratories, with confirmatory testing available through the U.S. Centers for Disease Control and Prevention. Chagas disease is not a reportable condition in California (California Code of Regulations, Title 17, Section 2500), though a national case definition was established in 2024. Some local health jurisdictions may choose to report cases for surveillance purposes. Los Angeles and San Diego counties have designated the condition as locally reportable and



*This map shows only cases of hantavirus infection where county of exposure was determined based on patient history, epidemiologic and environmental evaluation, and molecular virus testing (80 cases total.) The exposure location could not be determined for all reported cases and others were exposed outside California. Deer mice (*Peromyscus maniculatus*), the main source of infection that can spread hantavirus, can be found throughout California.

Figure 4.1. Likely county of exposure for reported hantavirus infections, California (1980 – 2025)*

Table 4.1. Serologic evidence of hantavirus infection in California rodents, 2016 - 2025

Species	Common name	2025			2016-2025		
		No. tested	No. reactive	Percent	No. tested	No. reactive	Percent
<i>Peromyscus boylii</i>	brush mouse	99	0		776	5	0.6
<i>Peromyscus californicus</i>	California mouse	198	0		1,628	13	0.8
<i>Peromyscus crinitus</i>	canyon mouse	0	0		40	2	5.0
<i>Peromyscus eremicus</i>	cactus mouse	181	0		1,926	10	0.5
<i>Peromyscus maniculatus</i>	deer mouse	596	135	22.7	4,690	655	14.0
<i>Peromyscus truei</i>	piñon mouse	23	1		416	3	0.7
<i>Peromyscus</i> spp.	unspeciated <i>Peromyscus</i>	0	0		29	0	
<i>Peromyscus</i> spp. subtotal		1,097	136	12.4	9,505	688	7.2
<i>Reithrodontomys megalotis</i>	western harvest mouse	36	4	11.1	660	90	13.6
<i>Neotoma</i> spp.	woodrats	5	0		231	0	
<i>Microtus</i> spp.	voles	5	1	20.0	104	13	12.5

their data are not included in this summary. In 2025, 81 cases of Chagas disease were reported to CDPH. Of these, 17 (21%) cases met the 2025 national surveillance case definition for confirmed, 2 (2%) were classified as probable, and 62 (77%) were classified as suspect. The median patient age was 56 years (range, 24 to 80 years); 45 (55%) were male and 36 (44%) were female. All cases were classified as chronic infections. Sixteen (20%) patients reported clinically-compatible symptoms, while 43 (53%) asymptomatic patients received a positive screening, either following blood donation (9; 1%) or prior to receiving or donating an organ (34 ; 42%). Clinical presentation was unknown for 22 (27%) patients with positive laboratory results. Patients were residents of 17 counties: Alameda, Contra Costa, Kern, Marin, Monterey, Orange, Los Angeles, Riverside, San Bernardino, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Solano, Sonoma, Stanislaus, and Ventura. Of the 35 (43%) patients for whom travel history data were available, 26 (74%) reported travel to Latin America (Mexico, El Salvador, Guatemala, Peru), 3 (9%) reported travel to multiple possible exposure locations, and 6 (17%) reported no travel. Travel history was unknown for 46 (57%) patients. No patients reported encounters with kissing bugs which are the vector of Chagas disease. Patients with no travel reported were classified as suspect cases with limited follow up investigation; no local acquisition was evident for these or other reported cases. One out-of-state resident was diagnosed with Chagas disease following exposure in Lake County.

Rodent surveillance

In 2025, 1,143 rodents (Genera: *Microtus*, *Neotoma*, *Peromyscus*, and *Reithrodontomys*) were tested for antibodies to SNV (Table 4.1). Of 1,097 *Peromyscus* spp. sampled, 136 (12.4%) were positive for SNV antibodies. Seroprevalence in deer mice (*Peromyscus maniculatus*), the primary reservoir for SNV, was 22.7% (Table 4.2). At least one deer mouse was SNV antibody-positive in nine (69%) of 13 counties sampled in 2025 (Table 4.2). SNV antibodies have been detected in deer mice from 28 of 41 counties sampled in the last 10 years; prevalence ranged from 0.9% to 45.5% (average 14%) over that period (Table 4.2).

Additionally, four (11.1%) of 36 western harvest mice (*Reithrodontomys megalotis*) and one (20%) of five voles (*Microtus* spp.) demonstrated reactivity to SNV (Table 4.1). None of five woodrats (*Neotoma* spp.) demonstrated reactivity to SNV (Table 4.1). Seropositivity in these rodents may represent spillover of SNV from deer mice or infection with other hantaviruses, which cross-react to the Sin Nombre virus assay. In California, no hantaviruses other than SNV have been shown to be pathogenic to humans.

Table 4.2. Serologic evidence of hantavirus (Sin Nombre) infection in *Peromyscus maniculatus* in California, 2016-2025

County	2025			2016-2025		
	No. tested	No. reactive	Percent	No. tested	No. reactive	Percent
Alameda	3	0	0.0	115	1	0.9
Alpine				27	4	14.8
Amador				4	0	0.0
Butte				6	0	0.0
Calaveras				4	1	25.0
Del Norte				1	0	0.0
El Dorado	20	2	10.0	292	58	19.9
Fresno				8	0	0.0
Glenn				5	1	20.0
Humboldt	41	0	0.0	110	0	0.0
Inyo				11	5	45.5
Kern				66	1	1.5
Lassen	1	1	100.0	27	9	33.3
Los Angeles				33	1	3.0
Marin				43	0	0.0
Mariposa	151	47	31.1	516	76	14.7
Modoc				38	3	7.9
Mono	84	42	50.0	458	180	39.3
Monterey				10	0	0.0
Napa				5	1	20.0
Nevada	9	2	22.2	114	17	14.9
Orange				5	2	40.0
Placer	17	5	29.4	36	5	13.9
Plumas	24	7	29.2	151	32	21.2
Riverside				103	15	14.6
San Bernardino				31	0	0.0
San Diego	156	12	7.7	1417	74	5.2
San Joaquin				4	0	0.0
San Mateo				136	24	17.6
Santa Barbara				12	0	0.0
Santa Clara				1	0	0.0
Santa Cruz	21	0	0.0	39	5	12.8
Shasta	12	0	0.0	95	6	6.3
Sierra				123	29	23.6
Siskiyou				133	26	19.5
Sonoma				46	0	0.0
Sutter				9	0	0.0
Tehama				32	8	25.0
Tulare				28	2	7.1
Tuolumne	57	17	29.8	361	68	18.8
Ventura				35	1	2.9
Total	596	135	22.7	4,690	655	14.0

National Park hantavirus prevention

In May 2013, Yosemite National Park (YOSE) of the National Park Service (NPS) and Heluna Health (HH, formerly Public Health Foundation Enterprises) began a cooperative agreement to decrease the risk of contracting vector-borne diseases on National Park lands through increased health education, vector surveillance, and public health research. CDPH-VBDS and HH worked with YOSE staff in 2025 on hantavirus prevention activities including rodent surveillance to estimate deer mouse abundance and Sin Nombre virus (SNV) prevalence, facility evaluations, and improving employee training and public education. Deer mouse surveillance was conducted in developed areas of Yosemite Valley, Tuolumne Meadows, Crane Flat, and along Glacier Point Road. The deer mouse trap success rate (31%) at Yosemite Valley locations in 2025 was higher than the overall Valley trap success of 11% for surveillance conducted from 2012 through 2024. Thirty (24%) of 127 deer mice collected from Yosemite Valley locations tested positive for SNV antibodies in 2025, compared to 34 (8%) of 441 of deer mice sampled from 2012 through 2024. The 39% trap success for deer mice at locations outside of Yosemite Valley was higher than the overall trap success of 22% for surveillance events in these areas from 2012 through 2024. The SNV seroprevalence of 30 (38%) of 79 was higher than the overall SNV seroprevalence 89 (17%) of 522 for deer mice sampled outside of Yosemite Valley from 2012 through 2024. In addition to rodent surveillance and SNV testing, over 60 structures were evaluated for rodent-borne disease risks. CDPH-VBDS and HH staff provided a hantavirus safety talk for concessions staff and hantavirus prevention recommendations to YOSE and its partners based on the rodent surveillance results and facility evaluations.

Lassen Volcanic National Park (LAVO) renewed a cooperative agreement with HH and CDPH-VBDS in 2025 for services that included facility evaluations and deer mouse surveillance to estimate rodent abundance and SNV prevalence. Deer mouse surveillance was conducted in two developed areas of LAVO, and 7 (27%) of 26 deer mice tested seropositive for SNV antibodies. For comparison, 58 (19%) of 299 of deer mice in LAVO tested positive for SNV antibodies from 2014 through 2024. In addition, over 20 buildings in LAVO were evaluated for hantavirus or other vector-borne disease risks. HH staff provided hantavirus prevention recommendations to LAVO based on the surveillance results and facility evaluations.

5

Vector Control Technician Certification Program

The California Health and Safety Code, § 106925, requires every government agency employee who handles, applies, or supervises the use of any pesticide for public health purposes to be certified by the California Department of Public Health. The Vector-Borne Disease Section administers the Public Health Vector Control Technician certification examination twice each year (May and November) to certify the competence of government agency personnel to control vectors for the health and safety of the public.

To become certified in a control category, applicants must pass the Core section and at least one Specialty section of the examination. Each applicant to the examination pays a fee for each section requested on the application. The Core section consists of questions about the safe and effective use of pesticides. Specialty sections of the examination include the Biology and Control of Mosquitoes in California, Arthropods of Public Health Significance in California, and Vertebrates of Public Health Importance in California (Table 5.1). Successful examinees are issued a gold certification card that is valid for up to two years in the qualified categories specified on the card. To maintain full certification status in subsequent two-year cycles, Certified Technician employees must pay annual renewal fees and fulfill minimum continuing education requirements. The California Department of Public Health (CDPH) Vector-Borne Disease Section approved 134 continuing education events in 2025. Successful examinees that elect not to participate in continuing education are issued parchment certificates in the categories in which they qualified. These Certified Technicians (Limited) employees may use pesticides only under the direct supervision of a Certified Technician.

Through 2025, 1,233 Vector Control Technicians employed at 102 local public health agencies and CDPH held 3,006 certificates (Table 5.2). The agencies include special districts, departments of county government, departments of city government, and CDPH. Of these agencies, 73 are signatory to a cooperative agreement with CDPH.

In 2025, 951 individuals employed at 73 agencies held full certification status. In addition, 282 employees from 51 agencies held limited status. Many agencies employ technicians with both full and limited status.

Vector Control Technicians can view their certification records and the approved Vector Control continuing education courses at: <http://ce.calsurv.org>. All training manuals, as well as practice questions and the Continuing Education Guide, are posted on the website dedicated to the Vector Control Technician Program: <https://bit.ly/VCTCertification>

Table 5.1. Results of certification examinations administered in 2025

Exam section	No. Exams Given	No. Passed (%)
Core	152	107 (70)
Mosquito Control	157	90 (57)
Terrestrial Invertebrate Control	114	69 (61)
Vertebrate Vector Control	106	78 (74)
Totals	529	344 (65)

Table 5.2. Vector Control Technician certificates in effect as of December 2025

Certification Category	No. Certificates		
	Full Status	Limited Status	Total
Mosquito Control	942	204	1,146
Terrestrial Invertebrate Vector Control	756	153	909
Vertebrate Vector Control	762	189	951
Totals	2,460	546	3,006

6

Public Information, Scientific Publications

A goal of the California Department of Public Health, Vector-Borne Disease Section is to provide clear and effective information on disease prevention and injurious pests to a wide audience. This goal is pursued through presentations, development and distribution of print and digital materials, and maintenance of web pages with up-to-date information. Research projects in which staff from the California Department of Public Health, Vector-Borne Disease Section were principal or collaborating investigators are published in peer-reviewed scientific literature.

New resources in 2025

- Dead Rodent? Report It (flyer)
- Lyme Disease Resources (toolkit webpage)

Expanded resources in 2025

- Guide to Common Ticks in California and Diseases They Transmit
- Kissing Bugs and Chagas Disease (webpage)
- Lyme Disease (webpage)
- Plague (webpage)
- Soft Tick Relapsing Fever (webpage)
- West Nile Virus (webpage)

Collaborative Newsletters

- CDPH Occupational Health Watch
 - » Winter 2025 – *Preventing Hantavirus Infection in the Workplace*
- University of California Integrated Pest Management Home & Garden Pest Newsletter
 - » Summer 2025 – *Just a Kiss? Kissing Bugs in Summer*



Publications*

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*Bolded names are members of VBDS staff at time research was conducted



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