



To: CAHAN San Diego Participants  
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From: Public Health Services, Epidemiology and Immunizations Services Branch

## VECTOR-BORNE ILLNESSES OF PUBLIC HEALTH SIGNIFICANCE

This health notice informs local healthcare providers about vector-borne illnesses of clinical significance in San Diego County, including selected mosquito-borne illnesses of interest to those caring for travelers. Such conditions include illnesses caused by West Nile virus (WNV), chikungunya virus (CHIKV), dengue virus, and Zika virus, as well as Lyme disease, and other tick-borne and vector-borne diseases.

### West Nile Virus

To date in 2018, no humans or dead birds have tested positive for West Nile virus (WNV) in San Diego County. Two mosquito pools have [tested positive](#) this year. The latest information on WNV activity in San Diego County is available at the County of San Diego (COSD) Department of Environmental Health Vector Control Program (DEH VCP) [WNV website](#).

In 2017, two WNV disease cases were reported among San Diego County residents: a 49-year-old female resident of Spring Valley, and a 59-year-old female resident of Rancho Peñasquitos, with symptom onset on July 3 and September 1, respectively; both cases were classified as likely locally-acquired non-neuroinvasive disease. The San Diego County DEH VCP found 43 dead birds that tested positive for the virus in 2017, as well as 9 mosquito batches, and one horse. [Statewide](#), a total of 553 symptomatic and 47 asymptomatic WNV human infections were identified in 2017. Of the 553 clinical cases, 401 (73%) had neuroinvasive disease and 44 (8%) died. [Nationwide](#), WNV remained the leading cause of domestically-acquired arboviral disease in 2017, with 2,002 cases reported from 47 states and the District of Columbia.

Local clinicians are encouraged to consider WNV infection in patients presenting with aseptic meningitis, encephalitis, atypical Guillain-Barré syndrome, or prolonged fever and to recommend to all clients to dump out standing water weekly at their homes so mosquitoes do not breed in it. WNV testing is available, free of charge, through the California Department of Public Health (CDPH) via submittal to the San Diego County Public Health Laboratory (SDCPHL). Clinical guidelines, testing algorithms, and specimen submission forms are available at the COSD [WNV website](#).

Information about clinical presentation, diagnosis and management of WNV may be found at the CDPH [WNV website](#) or the Centers for Disease Control and Prevention (CDC) [WNV website](#).

### Dengue

[Dengue](#) continues to be a public health problem both worldwide and in the Americas. As many as 400 million people are infected yearly by the disease. As of July 31, 2018, 289,473 cases of confirmed or probable dengue have been [reported](#) in the Americas in 2018, including 817 severe cases and 124 deaths. In Mexico, 19,510 confirmed or probable dengue cases have been [reported](#) in 2018. Dengue case reports in Mexico peak in the late summer and early fall and usually top 100,000 cases annually. Local transmission of dengue in Baja California has only been detected in the past several years. In 2017, 11 confirmed and 161 probable cases were reported in Baja California, including four confirmed cases in Tijuana. To date in 2018, 45 probable cases have been reported in Baja California.

There have been no confirmed or suspect locally-acquired cases of dengue in California, though the mosquito vectors (*Aedes aegypti* and *Aedes albopictus*) have been found in San Diego and other California counties. To date in 2018, 23 travel-associated dengue cases have been reported in California, including two San Diego residents.

Symptoms of dengue include fever, joint pain, headache, retro-orbital pain, rash, myalgia, arthralgia, general weakness, and extreme fatigue. Sometimes hemorrhagic symptoms manifest including blood in vomit, urine, and stool or from the gums. Severe cases may result in shock, fluid accumulation, and respiratory distress.

Dengue, Zika virus infection, and chikungunya should be considered in the differential diagnosis for each other. Dengue is typically [diagnosed using serology](#), but to avoid false negative or indeterminate results, serum specimens should also be collected during the convalescent phase (at least six days after onset of symptoms). Ideally, both acute (first five days post symptom onset) and convalescent phase (six or more days post symptom onset) specimens are needed to make a diagnosis of dengue infection. If a patient with suspected dengue infection submits a late, acute phase specimen that is negative (e.g., by RT-PCR or MAC-ELISA), and a convalescent specimen is not submitted, then the case is classified as laboratory-indeterminate.

For more information on dengue, and for clinical and laboratory guidance, go to the [CDC dengue website](#) or the [CDPH Aedes website](#). CDC maintains a continuing medical education (CME) accredited [online course on dengue](#) and the World Health Organization published a comprehensive [dengue resource](#) in 2009.

## Zika Virus

In 2018, no local mosquito-borne Zika virus transmission has been reported in the continental United States. The vectors, *Aedes aegypti* and *Aedes albopictus*, have been found in San Diego County at 103 trapping events by the [Vector Control Program](#) as of July 25. None of the mosquitos tested positive for Zika. However, Zika infection continues to be a risk to San Diego County residents who travel to any of the 94 [areas with Zika risk](#) reported by CDC. Since January 1, 2015, there have been 105 confirmed or probable travel associated [Zika cases in San Diego County](#), including two cases of sexual transmission from travelers. Four cases of congenital Zika have also been reported in San Diego County.

As Zika can cause [serious birth defects](#), clinicians are encouraged to continue to [screen pregnant women](#) for exposure to Zika and advise them to avoid non-essential travel to areas with risk of Zika. Partners of pregnant women and [couples considering pregnancy](#) should be [educated on the risks to pregnancy and take prevention steps](#). All travelers should strictly follow [steps to prevent mosquito bites](#) and [prevent sexual transmission](#) during and after the trip.

Many people infected with Zika virus are asymptomatic. Characteristic clinical findings are acute onset of fever with maculopapular rash, arthralgia, or conjunctivitis. Other commonly reported symptoms include myalgia and headache. [CDPH](#) and [CDC](#) recommend Zika testing for all symptomatic persons with travel to an area with risk of Zika or sexual contact with a person who traveled to or lives in an area with risk of Zika, newborns of women with Zika exposure during pregnancy, pregnant women whose fetus has [Zika-associated birth defects](#), and asymptomatic pregnant women with ongoing (weekly, monthly) sexual or travel exposure to Zika. More information for healthcare providers, including testing guidance and provider resources can be found on this [COSD website](#).

## Chikungunya Virus

Like dengue and Zika, [chikungunya](#) (CHIKV) is transmitted to humans through the bites of infected *Aedes aegypti* and *Aedes albopictus* mosquitoes. CHIKV was introduced into the Americas in late 2013, became epidemic in 2016, and resulted in 504,373 confirmed and suspected cases [reported](#) through 2017.

In 2018, three probable imported CHIKV cases have been reported among San Diego residents to date, and four cases have been reported in other California counties. Clinicians should consider the illness in travelers with fever and polyarthralgia and when working patients up for Zika and dengue. Serologic testing (IgG and IgM by IFA) for exposure to

CHIKV is available through commercial laboratories (e.g., Focus/Quest), as well as from the CDPH Viral and Rickettsial Disease Laboratory ([VRDL](#)) through the San Diego Public Health Laboratory ([SDPHL](#)).

More information about the clinical presentation, diagnosis, and management of CHIKV infection may be found at the [CDC chikungunya website](#).

## Lyme Disease

Lyme disease is the most common tick-borne disease in the United States and is caused by the spirochete *Borrelia burgdorferi*. Symptoms include dermatologic, rheumatologic, neuralgic, and cardiac abnormalities. The most common clinical marker for the disease is *erythema migrans* (EM), the initial skin lesion that occurs in 60-80% of patients, which usually appears 3 to 32 days after tick exposure (mean 7 to 10 days). For the purpose of surveillance, the definition of a qualified laboratory assay is two-tier testing: 1) EIA or IFA and 2) Western Blot IgG and IgM along with clinical symptoms consistent with acute and/or chronic forms of the disease.

San Diego County tick surveillance by DEH VCP has occasionally found ticks that harbor *Borrelia burgdorferi*. Locally acquired Lyme disease is rare, so a travel history is important when evaluating patients with compatible symptoms. Information on the prevention, signs, symptoms, diagnosis and treatment of Lyme disease can be found at the [CDC Lyme Disease website](#).

## Tularemia and other tick-borne diseases

*Francisella tularensis*, the cause of [tularemia](#), is also occasionally found in local ticks. Numerous batches of ticks have tested positive for tularemia in 2018, the most recent in July in the [Lopez Canyon Trail](#) in Sorrento Valley. Even with the recent positive findings in the local area; the last human case of tularemia in San Diego was reported in 2004. A local animal case of tularemia was [reported](#) in 2014. The signs and symptoms of tularemia vary depending on how the bacteria enter the body, although all forms have fever. The major forms of tularemia are ulceroglandular, glandular, oculoglandular, oropharyngeal, pneumonic, and typhoidal.

[Spotted fever group Rickettsia](#) have been detected in local ticks, with approximately 5% of Pacific Coast ticks harboring *Rickettsia philipii*, which can cause an [eschar-associated febrile illness](#). Clinicians should be aware of [continued reports](#) of [Rocky Mountain spotted fever](#) (RMSF) transmitted by the brown dog tick (*Rhipicephalus sanguineus*) in Mexico, especially in Mexicali and northern Baja California. The last San Diego resident with confirmed RMSF acquired the illness outside the county in 2015; however, a probable case with an unknown travel history was reported in December 2017.

Clinicians should **never delay treatment** for suspected rickettsiosis while awaiting laboratory confirmation. Doxycycline is the antibiotic of choice for all patients. The adult dose is 100 mg bid for 14 days or until three days after fever subsides. The pediatric dose is 2.2 mg/kg (up to 100 mg) bid.

For more information on the symptoms, diagnosis, treatment, and prevention of tick-borne diseases, please visit the [CDC Ticks website](#) where the updated 2018 reference manual for healthcare providers entitled "[Tickborne Diseases of the United States](#)" is available to download. CDC recently posted a [toolkit](#) for providers on RMSF and other tick-borne diseases with an accredited CME course and other educational resources.

## Murine Typhus

[Murine typhus](#) is endemic in southern California. The most recent serologically confirmed cases of this flea-borne disease were a San Diego resident hospitalized in July 2017 who had contact with feral kittens in her home and a North Park woman hospitalized in May 2018 who had an indoor/outdoor cat and recalled recent flea bites. The California Department of Public Health (CDPH) [reports](#) that there are about 200 cases of murine typhus each year in the United States. Most cases occur in Texas, California and Hawaii.

Murine typhus is under recognized and should be considered in the differential diagnosis when a patient has persistent fever of 3 to 5 days duration without explanation and has either local exposure to opossums, cats, or fleas or if a history of travel to tropical or semitropical environments where large rat populations are likely to exist. There is no vaccine to prevent murine typhus, but it can be [treated](#) successfully with antibiotics (doxycycline). The risk of contracting murine typhus can be [reduced](#) by using veterinarian-approved flea control products for cats and dogs, especially for animals that go outdoors. More information about murine typhus can be found at the [CDC murine typhus website](#).

## Hantavirus

Hantavirus has been found in rodents in various locations throughout the county this year, the [most recent](#) being in Warner Springs in a California mouse in June and San Diego in a Western harvest mouse in May. Infection with hantavirus can progress to hantavirus pulmonary syndrome (HPS), a febrile illness characterized by bilateral interstitial pulmonary infiltrates and respiratory compromise usually requiring supplemental oxygen and clinically resembling Acute Respiratory Disease Syndrome (ARDS).

The typical HPS prodrome consists of fever, chills, myalgia, headache, and gastrointestinal symptoms. Typical clinical laboratory findings include hemoconcentration, left shift in the white blood cell count, neutrophilic leukocytosis, thrombocytopenia, and circulating immunoblasts. The case-fatality rate is high (36%), but mortality may be reduced with early recognition and supportive care. Testing for hantavirus is available at the CDPH VDRL through SDCPHL.

A total of 75 HPS cases have been reported in California since 1980. The last locally-acquired HPS case in San Diego County was reported in 2004. More information about HPS can be found at the [CDC hantavirus website](#) and the [CDPH HPS website](#). Guidance on preventing mice infestation and cleaning up after rodents may be found at the [CDC Rodents website](#).

## Plague

Plague is endemic in limited areas of San Diego County and evidence of infection was [detected](#) in a squirrel at Palomar Mountain in September 2017. Plague symptoms depend on how the patient was exposed to the plague bacteria. Plague can take different clinical forms, but the most common are bubonic, pneumonic, and septicemic.

No human case of plague has been reported in the county in decades, although two human cases were reported in [California in 2015](#). More information about plague can be found at the [CDC plague website](#) and [CDPH plague website](#).

***Report suspected cases of any of the vector-borne diseases noted in this health advisory to the Epidemiology Program*** by calling 619-692-8499 during normal business hours, or 858-565-5255 after hours, weekends or County-observed holidays. The urgency of reports vary by [disease](#), but note that suspected plague, tularemia, and the *Aedes*-borne diseases (dengue, Zika, and CHIKV) should be reported immediately by telephone.

For more information on preventive measures for the public and about vector-borne disease surveillance in San Diego County, visit [www.SDVector.com](http://www.SDVector.com) or call the Vector Control Program at 858-694-2888.

Thank you for your continued participation.

### CAHAN San Diego

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