

## LYME DISEASE AND OTHER TICK-BORNE DISEASES IN CALIFORNIA

Consult your healthcare provider if you have been bitten by a tick or were in an area where ticks occur and are concerned about Lyme disease. In addition to Lyme disease, ticks in California carry other agents that can cause disease. These diseases include anaplasmosis, Rocky Mountain spotted fever, Pacific Coast tick fever, babesiosis, Colorado tick fever, tularemia, and relapsing fever. Early diagnosis and treatment of all these diseases are important. Most tick-borne diseases are reportable by physicians to the California Department of Public Health via their county health department.

Additional information can be obtained by contacting the California Department of Public Health.

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# LYME DISEASE IN CALIFORNIA



## WHAT IS LYME DISEASE?

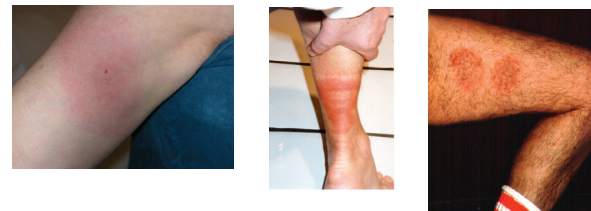
Lyme disease is caused by a spirochete (a corkscrew-shaped bacterium) called *Borrelia burgdorferi* which is transmitted by the bite of an infected blacklegged tick. Lyme disease is named for Old Lyme, Connecticut, where the disease was described in the 1970s. It occurs worldwide where blacklegged ticks are found, including in California.

## WHAT ARE THE SYMPTOMS OF LYME DISEASE?

Early signs and symptoms occur soon after the bite of an infected tick and can include:

- An expanding rash called erythema migrans, or EM. The EM expands over several weeks, and then disappears gradually. More EMs can develop later. The EM:
  - is usually painless
  - varies in shape and appearance
  - looks more like a bruise on dark skin
  - may not occur in all infections or may not be noticed if it is on a part of the body that is difficult to see.
- Flu-like illness such as muscle aches, joint pain, fatigue, headache, stiff neck, chills, fever, and swollen lymph nodes.

Examples of erythema migrans rashes



Early symptoms can disappear without treatment but infection may still be present. If early Lyme disease symptoms are not recognized and treated completely, the disease may progress and be more difficult to treat.

Late signs and symptoms occur weeks to months after an infected tick bite and can include:

- Swelling and pain of one or a few joints, especially the knees. Swelling may move from one joint to another, and come and go.
- Paralyzed muscles of the face.
- Numbness, tingling, or burning feelings in arms and legs.
- Disturbances of heart rhythm.

## HOW IS LYME DISEASE DIAGNOSED AND TREATED?

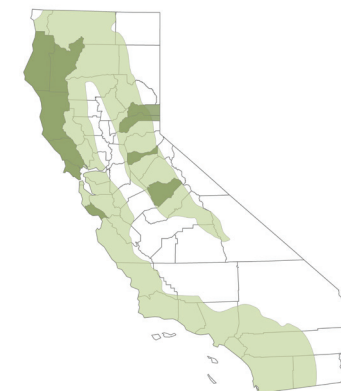
People should see their healthcare provider as early as possible if Lyme disease is suspected. A healthcare provider will want to know if you have been in an area where ticks occur or if you were bitten by a tick. Blood tests may be used to help diagnose Lyme disease.

Prompt treatment with antibiotics can cure the infection and prevent complications of late Lyme disease. If treatment is delayed, recovery may take longer. Reinfection can occur if a person is bitten by another infected tick.

## HOW DO PEOPLE GET LYME DISEASE IN CALIFORNIA?

People get Lyme disease when bitten and fed on by an infected western blacklegged tick (*Ixodes pacificus*).

These ticks are found most commonly in areas shown in green on map. Dark green counties show where reported Lyme disease cases most often had exposure.



## WESTERN BLACKLEGGED TICK AND LYME DISEASE ECOLOGY

Ticks have three life stages as shown from left to right: larva, nymph, and adult (male and female).

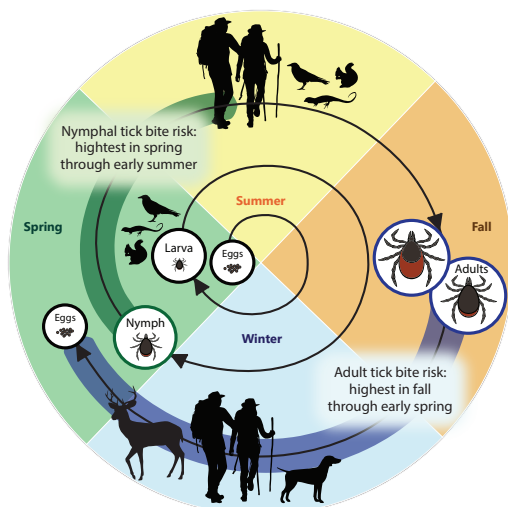


Ticks feed by inserting their mouthparts into the skin and taking a blood meal. Because ticks are small, some people do not notice that they have been bitten.

Nymphs are most active in spring and early summer, and adult ticks are most active from fall through early spring.

Larvae and nymphs feed on small rodents, lizards, or birds; adults prefer larger animals such as deer. Each life stage feeds for several days before maturing to the next stage. When larvae or nymphs feed on a wild rodent carrying the Lyme disease bacteria, the ticks may become infected and transmit the infection when they feed as nymphs and adults.

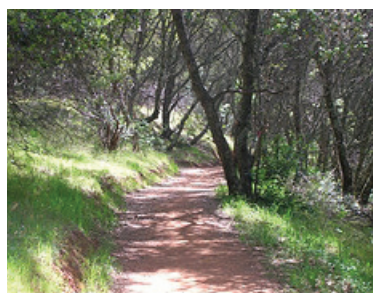
### Life cycle of the western blacklegged tick



Only nymphs and adult females of the western blacklegged tick can transmit the Lyme bacteria to humans. Nymphs can pose a greater risk of transmitting Lyme disease bacteria to humans compared to adult ticks because they are tiny and difficult to see (< 1/20 inch, about the size of a poppy seed), and so may not be removed promptly.

In addition, in some areas of California, studies show that a higher percentage of nymphs (average 5-15%, range= 0-41%) carry the Lyme disease bacteria compared to adult ticks (average 1-2%, range=0-10%).

Nymphs are found in leaf litter and on rocks, logs, tree trunks, or fallen branches under trees in oak woodlands or other shaded natural areas. Adults are found on the tips of grasses and shrubs, often along trails. Ticks do not jump or fly. Ticks climb on to people when people brush against them such as along a trail edge.



### HOW CAN LYME DISEASE BE PREVENTED?

#### Before going into areas where ticks live:

- Treat clothing, socks, and shoes/boots with permethrin according to label directions. Permethrin kills ticks.
- Pack a pair of tweezers to remove any attached ticks.

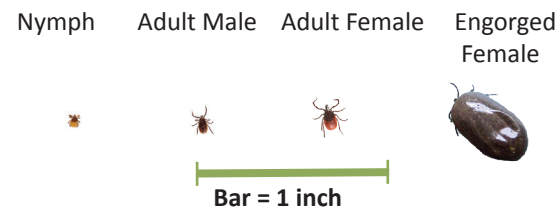
#### While in areas where ticks live:

- Apply a tick repellent with at least 20% DEET on exposed skin and clothing.
- Stay on trails and avoid contact with bushes or grasses alongside trails where adult ticks are common.
- Avoid contact or sitting directly on wooden picnic benches, logs, tree trunks, leaves under trees, and rocks in shaded areas.
- Check yourself often. If you find a tick crawling on you, remove it as soon as possible.

#### After leaving areas where ticks live:

- Shower as soon as you can.
- Put clothing you were wearing on high heat in a dryer for 10 minutes to kill any ticks on your clothes. If clothing must be washed first, use a hot wash and hot dry for 60 minutes. Washing only will not kill ticks.
- Check your entire body for ticks for 4 days. Look closely at the hairline, behind the ears, under the arms and breasts, at the belt line, groin, and behind the knees. Parents should carefully examine their children.
- Check your pets for ticks too, and use a tick control product as recommended by your veterinarian.

Check closely because the western blacklegged tick is small. Actual size:



Removing a tick shortly after it attaches (less than 24 hours) can prevent transmission of Lyme disease and other tick-borne diseases.

#### TO SAFELY REMOVE AN ATTACHED TICK:

- Use tweezers to grab the tick as close to your skin as possible.
- Pull the tick straight out, using a firm, steady motion; do not jerk the tick.
- Do not twist, smother, or burn an attached tick; these are not effective methods for tick removal.

#### Tweezers are used to remove attached ticks

(photo enlarged to show detail)



- Wash your hands and the bite site with soap and water after the tick is removed.
- Apply an antiseptic to the bite site.
- Painful redness that occurs less than 24 hours after a tick bite that does not expand is likely a local allergic reaction to the tick's saliva.
- An infection can occur where the tick was attached. If redness or pain develops at the tick bite site, consult your healthcare provider.



Tick bite reaction