

Lyme Disease and You

The latest on prevention, symptoms, and treatment

That poppy seed you flicked off your pants a minute ago—what if it didn't just fall off your breakfast bagel? What if it had snagged your pantleg as you brushed against a stalk of trailside grass? And what if it wasn't a poppy seed at all, but a bloodsucking arachnid with eight legs, tiny curved teeth, and a spiral pathogen burning in its gut? What if it could give you Lyme disease?

It's time you got to know America's most common tick-borne illness. Lyme disease is an infection caused by *Borrelia burgdorferi*, a corkscrew-shaped bacterium that spreads to humans exclusively through the bite of an infected tick (never from person to person). But don't panic: Most tick bites don't lead to the disease. Even in high-risk hot spots such as Connecticut and New York, only about one in four of these tiny

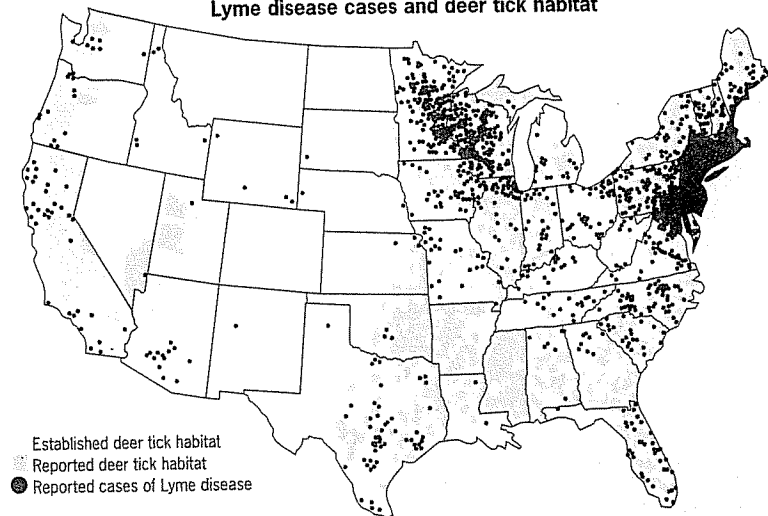
arachnids carries the disease. And when an infected tick bites, transmission is not spontaneous, says Richard Falco, Ph.D., a medical entomologist at Fordham University. Studies show it takes 36 to 48 hours for *Borrelia burgdorferi* to move from tick to human, in part because the bacteria must migrate from the creature's midgut to its salivary glands before passing to a human host. If you remove a tick within the first 36 hours, your odds of contracting Lyme disease are slim—less than 4 percent—says Gary Wormser, M.D., chief of infectious diseases at New York Medical College. If you're approaching (or past) that time limit, a single 200-milligram dose of the antibiotic doxycycline can cut your risk to almost nil.

While the risk is low, the disease can be devastating if it's left untreated. The first

symptom to appear is a rash that expands outward from the tick bite, often in a bull's-eye pattern. A variety of other flu-like symptoms may accompany the rash, but at this stage, the illness quickly capitulates to antibiotics. Still, studies indicate that about 20 percent of people who contract Lyme never develop or notice the telltale rash, and without prompt treatment, more serious symptoms such as temporary facial paralysis, heart palpitations, swelling and pain in the joints, debilitating fatigue, meningitis, nerve pain, and cardiac arrhythmia can develop. Though antibiotics still can cure the infection once these more severe problems set in, it may take months for symptoms to subside in the worst cases.

That's why early detection is so important. In the United States, Lyme disease is spread by two ticks—the deer tick (*Ixodes scapularis*) on the East Coast and Midwest, and its close cousin, the Western black-legged tick (*Ixodes pacificus*) in California and Oregon. (Anyone bitten by a tick should save it for future reference and testing.) Most Lyme cases arise from bites delivered by a tick in the nymph stage. At this point in their lives, ticks appear to be about the size of a poppy seed, so they're easy to overlook. "If you aren't scanning for something that small, you'll miss it," says medical entomologist Joseph Piesman, D.Sc., chief of the Lyme Disease Vector Section at the Centers for Disease Control

Lyme disease cases and deer tick habitat

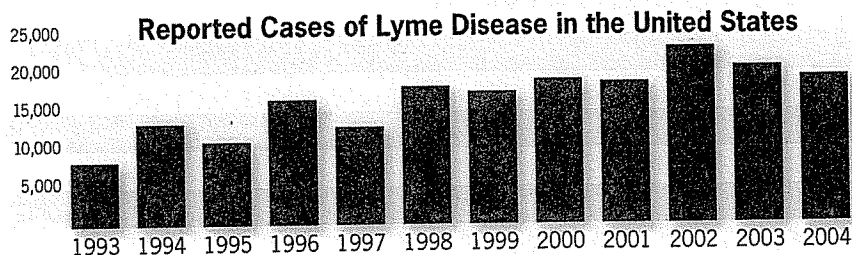


Lyme by the numbers

Any way you slice it, Lyme disease is an expanding problem. As the graph (bottom left) indicates, the number of confirmed cases has roughly doubled in the past decade. The map shows the distribution of reported 2004 cases of Lyme disease (in red) as well as the presence of the ticks that can cause it (in yellow and blue). Both the map and the table below confirm that most cases are still clustered in the Northeast and Midwest.

Highest-risk states

State	INCIDENCE PER 100,000	TOTAL CASES
Rhode Island	68.39	706
Pennsylvania	46.34	5,730
Connecticut	40.28	1,403
New Jersey	33.42	2,887
New York	28.13	5,399
Delaware	25.93	212
Massachusetts	23.81	1,532
New Hampshire	14.76	190
Wisconsin	13.52	740
Maine	13.40	175
Maryland	12.54	691



All charts and map based on CDC data. Deer-tick habitat range as of 2002; remaining information comes from a 2003 survey unless otherwise noted.

TICK ILLUSTRATIONS BY BRYON THOMPSON

and Prevention (CDC). Most cases of Lyme disease occur in June and July, a spike that coincides with the nymph stage in the tick's life cycle (see right).

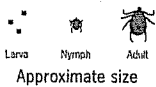
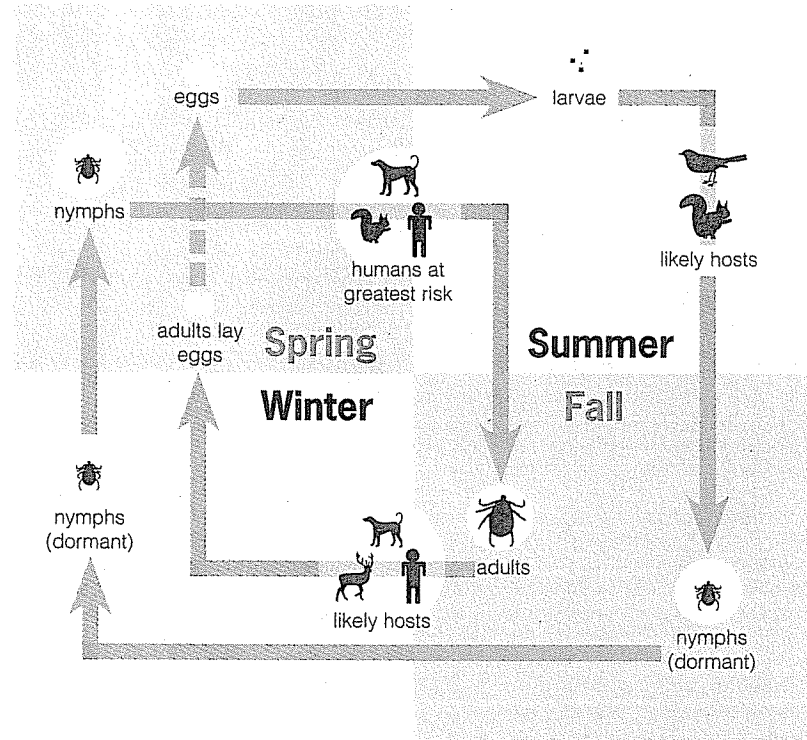
Unfortunately, ticks lurk in many of the same environments that hikers favor. Hardwood forests with lots of leaf litter provide ideal habitat, says Piesman. Swampy regions and areas with woody shrubs also commonly harbor ticks.

Though Lyme disease has turned up throughout the country (only three states report no cases, in part because travelers may not realize they've contracted it until they return home), it occurs most often in three regions (see "Lyme by the numbers," below left)—the Northeast, upper Midwest, and, to a lesser extent, northern California and Oregon. If you're diagnosed with Lyme disease and you live in a state south of Virginia, "You need a second opinion," says Wormser, since there's a high probability you have something else.

Reported cases of Lyme disease have more than doubled since the early 1990s, and the CDC itself acknowledges that these figures are probably underestimations of the actual numbers (due to undiagnosed cases, limitations of nationwide reporting, and the stringent diagnostic criteria for national data collection purposes). Some researchers predict that the numbers could rise further if climate change allows Lyme-carrying ticks to extend their range.

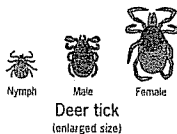
Seasons of Change

The 2-year life cycle of the deer tick



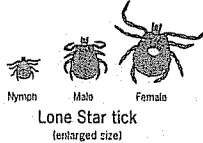
Identification 101

Get to know the ticks that cause Lyme—and those that don't.



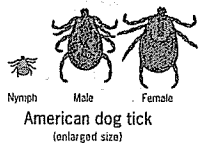
Deer tick (*Ixodes scapularis*)

Transmits agents of Lyme disease and a malarialike parasitic disease called babesiosis. It is typically found from Maine to northern Virginia and west to Wisconsin and Minnesota. The closely related *Ixodes pacificus* is found on the West Coast.



Lone Star tick (*Amblyomma americanum*)

Transmits agents of ehrlichiosis and a Lyme-like condition known by the acronym STARI. It gets its name from a conspicuous spot on the female and is found in the Southeast and some coastal locations in the Northeast.



American dog tick (*Dermacentor variabilis*)

Transmits agents of Rocky Mountain spotted fever and tularemia (but not Lyme). Found from Nova Scotia to the Gulf Coast and as far west as Texas and the Dakotas. The closely related *Dermacentor andersoni* is found in the Northwest. Only adults are known to feed on people and their pets; they are larger than the other tick species described here.

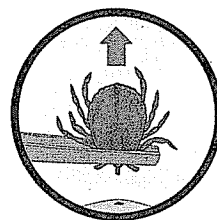
Avoid the enemy

To protect yourself from ticks—and reduce your risk of contracting Lyme disease—follow these steps.

- › Steer clear of marshy areas, and minimize your contact with high grass, brush, and woody shrubs.
- › Wear long pants and tuck them into your socks to prevent ticks from crawling up your legs. Tick researchers wind duct tape around the sock-pant junction to keep ticks out.
- › Wear long sleeves and tuck your shirt into your pants to keep ticks off of your torso.
- › Wear light-colored clothing so you can spot ticks more easily.
- › Spread deet on your skin, or spray the insecticide permethrin on your clothing.
- › At least once a day, do a tick check. Think little—nymphs, which spread Lyme disease far more than adults, are usually smaller than a tiny freckle.

How to remove a tick

Carry a set of fine-tipped tweezers when hiking in high-risk areas. If you find an embedded tick, use the tweezers to grasp it tightly near your skin and pull it out in one steady movement. Take care not to crush it, and don't worry if its mouthparts remain in your skin. Once the tick's body is gone, it can no longer transmit disease. If you inadvertently crush the tick, wash your skin with soapy water or alcohol.



Blood tests for Lyme?

Though it's tough to diagnose the disease without an evident bull's-eye rash, several tests can detect antibodies to the Lyme bacteria. The CDC recommends several tests—including ELISA, IFA, and the Western blot—that can help support a diagnosis. The agency recently warned patients to stay away from other tests, which have not been clinically validated.