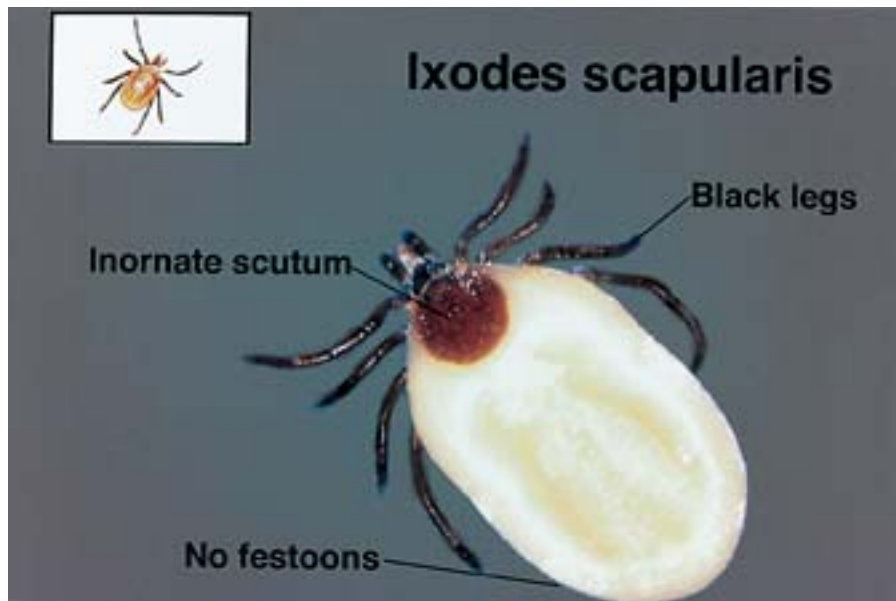


# What's Eating You? *Ixodes* Ticks

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*Ixodes* ticks have teardrop-shaped bodies and inornate scuta.

*Ixodes* ticks are characterized by an inornate scutum (hard dorsal “shell”) and an upside down U-shaped ventral groove, with its apex anterior to the anus.<sup>1</sup> The groove extends caudal to the anus. In other hard ticks, the anal groove is posterior to the anus and often is inconspicuous. *Ixodes scapularis*, the eastern black-legged tick, is the best known of the *Ixodes* ticks. Like other *Ixodes* ticks, it has a characteristic tear-drop shape. Adult females typically are found attached to the host in late fall and spring. They are characterized by a small, inornate, brown scutum overshadowed by a large, soft, cream-colored, engorged abdomen (Figure).

Tick-borne illness is common in the United States. *Ixodes* ticks are vectors for Lyme disease (LD), babesiosis, and human granulocytic ehrlichiosis (HGE). In western states, *Ixodes Pacificus* (the western black-legged tick) is the major vector of Lyme disease. In the mid-Atlantic, the Great Lakes region and the northeastern United States, *I. scapularis* is the major vector. Because the larval and nymph stages of the tick like to attach to birds in the spring and summer, migrating birds may be responsible for the broad geographic distribution of the tick. American robins are competent as reservoir hosts for the Lyme spirochete, although infectivity wanes more rapidly in robins than in mice.<sup>2</sup> In the southern United States, both *Borrelia burgdorferi* and other related spirochetes exist. The range of tick vectors appears wider in the southern states than in other parts of the country.<sup>3</sup> Babesiosis is a malaria-like illness. HGE is an acute febrile illness characterized by leukopenia, thrombocytopenia, and increased serum hepatic transaminases.<sup>4</sup> In one rural New Jersey county, 55% of adult *I. scapularis* ticks carried at least one disease (LD, 43%; babesiosis, 5%; and

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HGE, 17%). Ten percent of ticks carried more than 1 of the 3 diseases.<sup>5</sup> In Wisconsin and Minnesota, a study of patients with a diagnosis of LD, babesiosis, or HGE showed that coinfection with more than 1 of the 3 diseases is common.<sup>6</sup> In addition to its role as a disease vector in rural and suburban areas, *I scapularis* has been reported to carry LD and HGE in New York City parks.<sup>7</sup> In Europe, *Ixodes* ticks carry viral encephalitis.<sup>8</sup>

There is some evidence that Lyme spirochetes can be transmitted between mating pairs of ticks. Although it is tempting to speculate that the spirochete could be spread as a venereal disease between ticks, it may simply be the result of vampirism (sucking blood from a mate).

Although *Ixodes* ticks have been implicated as a cause of tick paralysis, *Dermacentor* ticks are the typical and primary cause of tick paralysis in the United States. Tick paralysis carries a mortality of greater than 10%. This is largely because *Dermacentor* ticks attach to the head and neck and frequently are hidden by scalp hair. In contrast, *Ixodes* ticks tend to attach to the skin of the upper trunk and proximal extremities, as well as the head and neck, hence their nickname "shoulder tick." *Amblyomma* ticks often attach below the knees.

Although there is currently no role for routine antibiotic prophylaxis after every tick bite, in certain situations antibiotic prophylaxis may still be considered. The benefit of antibiotic prophylaxis is likely to be greatest in an area where LD is highly endemic, when the tick is heavily engorged (a sign of prolonged tick attachment),<sup>9,11</sup> and the tick is accurately identified as *I scapularis*. More study is needed to determine the risk-benefit ratio and cost-effectiveness of antibiotic prophylaxis to treat tick bites in cases where all of these factors are present. Until such studies are conducted and their results reported, physicians must discuss the risks and potential benefit and cost with their patients and reach a decision based on the data currently available. A recent study suggests that single-dose doxycycline given within 72 hours after an *I scapularis* bite can reduce the risk of LD.<sup>12</sup> In the setting of scrub typhus, a study showed that even a single dose of antibiotic could prevent disease in half of the subjects. A second supplementary dose prevented disease in the remaining subjects.<sup>13</sup> A study in guinea pigs showed that even a single dose of tetracycline could prevent Rocky Mountain spotted fever if given shortly before expected onset of the disease.<sup>14</sup> A single dose given more than 48 hours before the expected onset of disease only delayed the onset of symptoms. There

is no evidence that a full course of antibiotic given during the incubation period is any less effective than one initiated after the onset of symptoms. Single dose prophylaxis may be possible and more cost-effective<sup>15</sup>; however, until more studies are done, prophylactic courses of antibiotic should be continued for the length of a full course of treatment.

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