Wappingers Central School District

Lyme Disease & Tick Awareness

Lyme Disease

Updated: October 2011

What is Lyme disease?

Lyme disease is caused by bacteria transmitted by the deer tick (Ixodes scapularis). Lyme disease may cause symptoms affecting the skin, nervous system, heart and/or joints of an individual. Over 95,000 cases have been reported to the New York State Department of Health since Lyme disease became reportable in 1986.

Who gets Lyme disease?

Lyme disease can affect people of any age. People who spend time in grassy and wooded environments are at an increased risk of exposure. The chances of being bitten by a deer tick are greater during times of the year when ticks are most active. Young deer ticks, called nymphs, are active from mid-May to mid-August and are about the size of poppy seeds. Adult ticks, which are approximately the size of sesame seeds, are most active from March to mid-May and from mid-August to November. Both nymphs and adults can transmit Lyme disease. Ticks can be active any time the temperature is above freezing. Infected deer ticks can be found throughout New York State.

How is Lyme disease transmitted?

Not all deer ticks are infected with the bacteria that cause Lyme disease. Ticks can become infected if they feed on small animals that are infected. The disease can be spread when an infected tick bites a person and stays attached for a period of time. In most cases, the tick must be attached for 36 hours or more before the bacteria can be transmitted. Lyme disease does not spread from one person to another. Transfer of the bacteria from an infected pregnant woman to the fetus is extremely rare.

What are the symptoms of Lyme disease?

In 60-80 percent of cases, a rash resembling a bull's eye or solid patch, about two inches in diameter, appears and expands around or near the site of the bite. Sometimes, multiple rash sites appear. The early stage of Lyme disease is usually marked by one or more of the following symptoms: chills and fever, headache, fatigue, stiff neck, muscle and/or joint pain, and swollen glands. If Lyme disease is unrecognized or untreated in the early stage, more severe symptoms may occur. As the disease progresses, severe fatigue, a stiff aching neck, and tingling or numbness in the arms and legs, or facial paralysis can occur. The most severe symptoms of Lyme disease may not appear until weeks, months or years after the tick bite. These can include severe headaches, painful arthritis, swelling of the joints, and heart and central nervous system problems.

When do symptoms appear?

Early symptoms usually appear within three to 30 days after the bite of an infected tick.

Does past infection with Lyme disease make a person immune?

Lyme disease is a bacterial infection. Even if successfully treated, a person may become reinfected if bitten later by another infected tick.

What is the treatment for Lyme disease?

Early treatment of Lyme disease involves antibiotics and almost always results in a full cure. However, the chances of a complete cure decrease if treatment is delayed.

Although not routinely recommended, taking antibiotics within three days after a tick bite may be beneficial for some persons. This would apply to deer tick bites that occurred in areas where Lyme disease is common and there is evidence that the tick fed for 36 or more hours. In cases like this you should discuss the possibilities with your doctor or licensed health care provider.

Wappingers Central School District

Lyme Disease & Tick Awareness

What can be done to prevent Lyme disease?

When in tick-infested habitat - wooded and grassy areas - take special precautions to prevent tick bites, such as wearing light-colored clothing (for easy tick discovery) and tucking pants into socks and shirt into pants. Check after every two to three hours of outdoor activity for ticks on clothing or skin. Brush off any ticks on clothing before skin attachment occurs. A thorough check of body surfaces for attached ticks should be done at the end of the day. If removal of attached ticks occurs within 36 hours, the risk of tick-borne infection is minimal.

Repellents can be effective at reducing bites from ticks that can transmit disease. But their use is not without risk of health effects, especially if repellents are applied in large amounts or improperly. Repellents commonly available to consumers contain the active ingredients DEET (N, N-diethyl-m-toluamide), picaridin (also known as KBR 3023), oil of lemon eucalyptus, permethrin, or botanical oils. DEET products have been widely used for many years, but have occasionally been associated with health effects. Skin reactions (particularly at DEET concentrations of 50 percent and above) and eye irritation are the most frequently reported health problems. Picaridin and oil of lemon eucalyptus have been shown to offer long-lasting protection against mosquitoes but there are limited data regarding their ability to repel ticks. Products containing permethrin are for use on clothing only, not on skin. Rather than acting as a repellent, permethrin kills ticks and insects that come in contact with treated clothes. Permethrin can cause eye irritation. Insect repellents containing botanical oils, such as oil of geranium, cedar, lemongrass, soy or citronella are also available, but there is limited information on their effectiveness and toxicity. **If you decide to use a repellent, use only what and how much you need for your situation**. In addition:

- Be sure to follow label directions.
- Use repellents only in small amounts, avoiding unnecessary repeat application. Try to reduce the use of repellents by dressing in long sleeves and pants tucked into socks or boots.
- Children may be at greater risk for reactions to repellents, in part, because their exposure may be greater. Do not apply repellents directly to children. Apply to your own hands and then put it on the child.
- Do not apply near eyes, nose or mouth and use sparingly around ears. Do not apply to the hands of small children.
- After returning indoors, wash treated skin with soap and water.

How should a tick be removed?

Grasp the mouthparts with tweezers as close as possible to the attachment (skin) site. Be careful not to squeeze, crush or puncture the body of the tick, which may contain infectious fluids. After removing the tick, thoroughly disinfect the bite site and wash hands. See or call a doctor if there are concerns about incomplete tick removal. Do not attempt to remove ticks by using petroleum jelly, lit cigarettes or other home remedies because these may actually increase the chance of contracting a tick-borne disease.

I, _____, have read and fully understand the information provided above pertaining to Lyme Disease. I have also been given a package of information written by the CDC detailing Lyme Disease and ticks for further review and reference.

If I have any need of safety equipment, I will contact my Supervisor immediately.

_____ _____

Signature of Employee Date

Ticks and Lyme Disease

For more information about Lyme disease, visit http://www.cdc.gov/Lyme

How to prevent tick bites when working outdoors

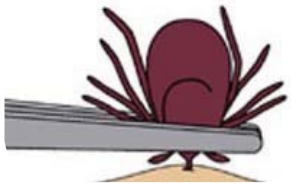
Ticks can spread disease, including Lyme disease. Protect yourself:

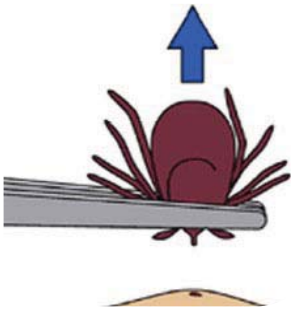
- Use insect repellent that contains 20 - 30% DEET.
- Wear clothing that has been treated with permethrin.
- Take a shower as soon as you can after working outdoors.
- Look for ticks on your body. Ticks can hide under the armpits, behind the knees, in the hair, and in the groin.
- Put your clothes in the dryer on high heat for 60 minutes to kill any remaining ticks.

How to remove a tick

1. If a tick is attached to you, use fine-tipped tweezers to grasp the tick at the surface of your skin.
2. Pull the tick straight up and out. Don't twist or jerk the tick—this can cause the mouth parts to break off and stay in the skin. If this happens, remove the mouth parts with tweezers if you can. If not, leave them alone and let your skin heal.
3. Clean the bite and your hands with rubbing alcohol, an iodine scrub, or soap and water.
4. You may get a small bump or redness that goes away in 1-2 days, like a mosquito bite. This is not a sign that you have Lyme disease.

Note: *Do not put hot matches, nail polish, or petroleum jelly on the tick to try to make it pull away from your skin.*





If you remove a tick quickly (within 24 hours) you can greatly reduce your chances of getting Lyme disease.

National Center for Emerging and Zoonotic Infectious Diseases
Division of Vector Borne Diseases | Bacterial Diseases Branch

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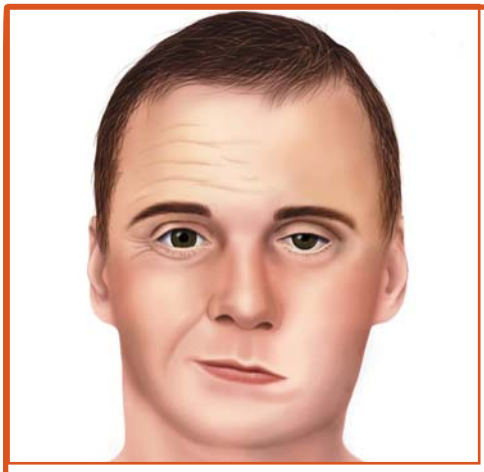


Facial paralysis.

Bull's eye rash on the back.

Arthritic knee.

When to see your doctor

See a doctor if you develop a fever, a rash, severe fatigue, facial paralysis, or joint pain within 30 days of being bitten by a tick. Be sure to tell your doctor about your tick bite. If you have these symptoms and work where Lyme disease is common, it is important to get treatment right away.

If you do not get treatment, you may later experience severe arthritis and problems with your nerves, spinal cord, brain, or heart.

Antibiotics are used to treat Lyme disease

Your doctor will prescribe specific antibiotics, typically for 2-3 weeks. Most patients recover during this time. You may feel tired while you are recovering, even though the infection is cured.

If you wait longer to seek treatment or take the wrong medicine, you may have symptoms that are more difficult to treat.

Looking ahead to recovery

Take your antibiotics as recommended. Allow yourself plenty of rest. It may take time to feel better, just as it takes time to recover from other illnesses.

Some people wonder if there is a test to confirm that they are cured. This is not possible. Your body remembers an infection long after it has been cured. Additional blood tests might be positive for months or years. Don't let this alarm you. It doesn't mean you are still infected.

Finally, practice prevention against tick bites. You can get Lyme disease again if you are bitten by another infected tick.

Additional information

1. http://www.cdc.gov/Lyme
2. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America http://cid.oxfordjournal.org/content/43/9/1089.full.
3. Tick Management Handbook (Connecticut Agricultural Experiment Station, New Haven) http://www.ct.gov/cases/lib/caes/documents/special_features/tickhandbook.pdf

The bite of a blacklegged tick can transmit the bacteria that cause Lyme disease.

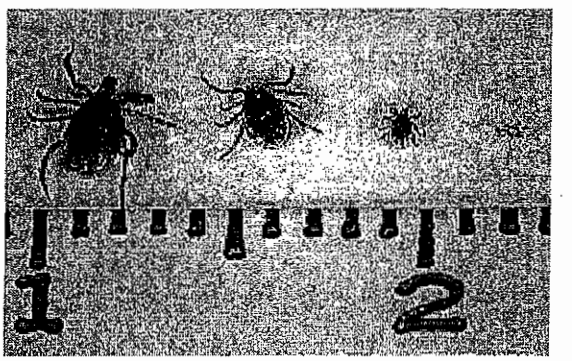
For more information please contact Centers for Disease Control and Prevention
1600 Clifton Road NE, Atlanta, GA 30333
Telephone: 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-63548
Email: cdcinfo@cdc.gov Web: www.cdc.gov

Division of Vector-Borne Infectious Diseases

Lyme Disease: Introduction

Introduction: Lyme disease is an infection caused by the corkscrew-shaped bacteria Borrelia burgdorferi that is transmitted by the bite of deer (Ixodes scapularis) and western black-legged (Ixodes pacificus) ticks. The deer tick, which normally feeds on the white-footed mouse, the white-tailed deer, other mammals, and birds, is responsible for transmitting Lyme disease bacteria to humans in the northeastern and north-central United States. On the Pacific Coast, the bacteria are transmitted to humans by the western black-legged tick.

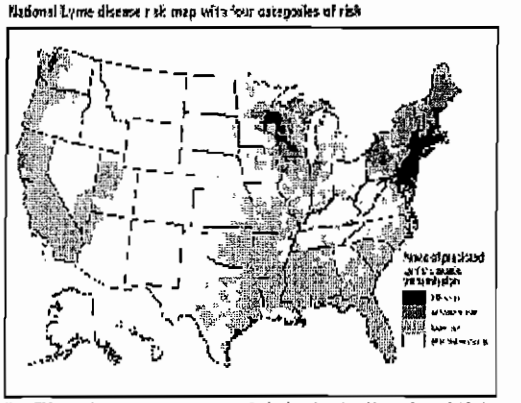
Ixodes ticks are much smaller than common dog and cattle ticks. In their larval and nymphal stages, they are no bigger than a pinhead. Adult ticks are slightly larger. Ticks feed on blood by inserting their mouth parts (not their whole bodies) into the skin of a host animal. They are slow feeders: a complete blood meal can take several days. As they feed, their bodies slowly enlarge.



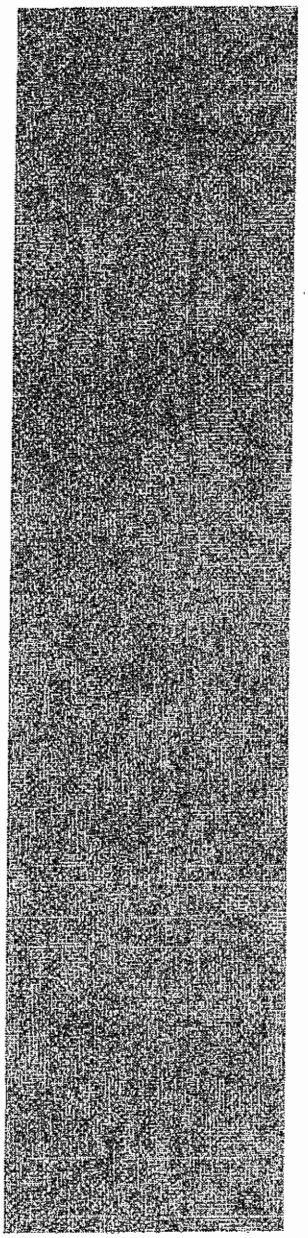
From left to right: The deer tick (Ixodes scapularis) adult female, adult male, nymph, and larva on a centimeter scale.

Risk: The number of annually reported cases of Lyme disease in the United States has increased about 25-fold since national surveillance began in 1982, and a mean of approximately 12,500 cases annually were reported by states to the Centers for Disease Control and Prevention (CDC) from 1993-1997. In the United States, the disease is mostly localized to states in the northeastern, mid-Atlantic, and upper north-central regions, and to several counties in northwestern California.

National Lyme disease risk map with four categories of risk



Most B. burgdorferi infections are thought to result from periresidential exposure to infected ticks during property maintenance, recreation, and leisure activities. Thus, individuals who live or work in residential areas surrounded by woods or overgrown brush infested by vector ticks are at risk of getting Lyme disease. In



getting Lyme disease. In addition, persons who participate in recreational activities away from home such as hiking, camping, fishing and hunting in tick habitat, and persons who engage in outdoor occupations, such as landscaping, brush clearing, forestry, and wildlife and parks management in endemic areas may also be at risk of getting Lyme disease.

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Division of Vector-Borne Infectious Diseases

Lyme Disease: Prevention and Control

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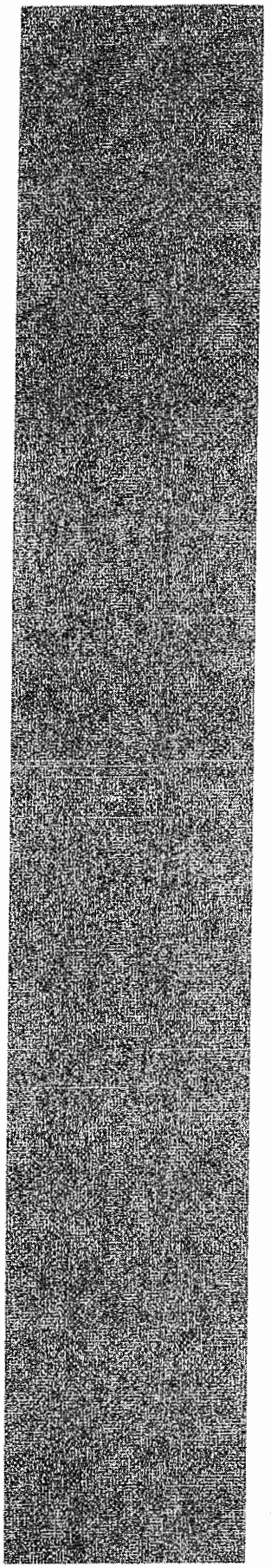
Avoidance of tick habitat: Whenever possible, persons should avoid entering areas that are likely to be infested with ticks, particularly in spring and summer when nymphal ticks feed. Ticks favor a moist, shaded environment, especially that provided by leaf litter and low-lying vegetation in wooded, brushy or overgrown grassy habitat. Both deer and rodent hosts must be abundant to maintain the enzootic cycle of B. burgdorferi. Sources for information on the distribution of ticks in an area include state and local health departments, park personnel, and agricultural extension services.

Personal protection: Individuals who are exposed to tick infested areas should wear light-colored clothing so that ticks can be spotted more easily and removed before becoming attached. Wearing long-sleeved shirts and tucking pants into socks or boot tops may help keep ticks from reaching the skin. Ticks are usually located close to the ground, so wearing high rubber boots may provide additional protection. Application of insect repellents containing DEET (n,n-diethyl-m-toluamide) to clothes and exposed skin, and permethrin (which kills ticks on contact) to clothes, should also help reduce the risk of tick attachment. DEET can be used safely on children and adults but should be applied according to Environmental Protection Agency guidelines to reduce the possibility of toxicity.

Tick check and removal: Since transmission of B. burgdorferi from an infected tick is unlikely to occur before 36 hours of tick attachment, daily checks for ticks and their prompt removal will help prevent infection. Embedded ticks should be removed using fine-tipped tweezers. DO NOT use petroleum jelly, a hot match, nail polish, or other products. Grasp the tick firmly and as closely to the skin as possible. With a steady motion, pull the tick's body away from the skin. The tick's mouthparts may remain in the skin, but do not be alarmed. The bacteria that cause Lyme disease



are contained in the tick's midgut. Cleanse the area with an antiseptic.

Prophylaxis after tick bite: The relative cost-effectiveness of post-exposure treatment of tick bites to avoid Lyme disease in endemic areas is dependent on the probability of B. burgdorferi infection after a tick bite. In most circumstances, treating persons who only have a tick bite is not recommended. Individuals who are bitten by a deer tick should remove the tick and seek medical attention if any signs and symptoms of early Lyme disease, ehrlichiosis, or babesiosis develop over the ensuing days or weeks.

Strategies to reduce tick abundance: The number of ticks in endemic residential areas may be reduced by removing leaf litter, brush- and wood-piles around houses and at the edges of yards, and by clearing trees and brush to admit more sunlight and reduce the amount of suitable habitat for deer, rodents, and ticks. Tick populations have also been effectively suppressed through the application of pesticides to residential properties. Community-based interventions to reduce deer populations or to kill ticks on deer and rodents have not been extensively implemented, but may be effective in reducing community wide risk of Lyme disease. The effectiveness of deer feeding stations equipped with pesticide applicators to kill ticks on deer, and other baited devices to kill ticks on rodents, is currently under evaluation.

Early diagnosis and treatment: The early diagnosis and proper antibiotic treatment of Lyme disease are important strategies to avoid the morbidity and costs of complicated and late-stage illness.

Lyme disease vaccine description: LYMErix™ is made from lipidated rOspA of B. burgdorferi sensu stricto. The rOspA protein is expressed in Escherichia coli and purified. Each 0.5 ml dose of LYMErix™ contains 30 μg of purified rOspA lipidated protein adsorbed onto aluminum hydroxide adjuvant. Evidence from several studies in animals indicates that B. burgdorferi in a vector tick undergoes substantial antigenic change between the time of tick attachment on a mammalian host and subsequent transmission of the bacterium to the host. The spirochetes residing in the tick gut at the initiation of tick feeding express primarily OspA. As tick feeding begins, the expression of outer-surface protein C (OspC) is increased and the expression of OspA is decreased, so that spirochetes that reach the mammalian host after passing through the tick salivary glands express primarily OspC. Thus, the rOspA vaccine may exert its principal protective effect by eliciting antibodies that kill Lyme disease spirochetes within the tick gut.

Route of administration, vaccination schedule, and dosage: LYMErix™ is administered by intramuscular injection, 0.5 ml (30μg), into the deltoid muscle. Three doses are required for optimal protection, with the first dose followed by a second dose one month later and a third dose 12 months after the first. Vaccine administration should be timed so that the second dose of the vaccine (year one), and the third dose (year two) are given several weeks before the beginning of the B. burgdorferi transmission season, which usually begins in April. The safety and immunogenicity of alternate dosing schedules are currently being evaluated.

Recommendations for the Use of Lyme Disease Vaccine: The Advisory Committee on Immunization Practices (ACIP) provides recommendations for use of a newly developed recombinant outer-surface protein A (rOspA) Lyme disease vaccine (LYMErix™, SmithKline Beecham Pharmaceuticals) for persons aged 15-70 years in the United States. The purpose of these recommendations is to provide health-care providers, public health authorities, and the public with guidance regarding the risk for acquiring Lyme disease and the role of vaccination as an adjunct to preventing Lyme disease. The Advisory Committee on Immunization Practices recommends that decisions regarding vaccine use be made on the basis of assessment of individual risk, taking into account both geographic risk and a person's activities and behaviors relating to tick exposure.

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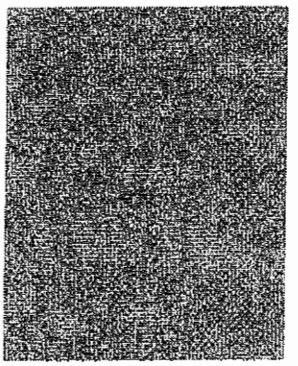

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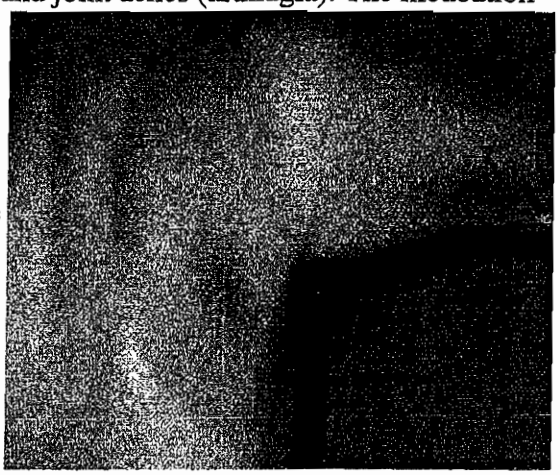
Division of Vector-Borne Infectious Diseases

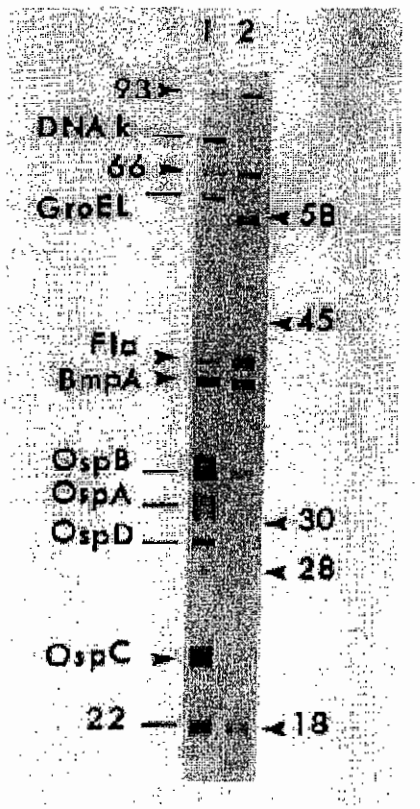
Lyme Disease: Diagnosis

Clinical Description: Lyme disease most often presents with a characteristic "bull's-eye" rash, erythema migrans, accompanied by nonspecific symptoms such as fever, malaise, fatigue, headache, muscle aches (myalgia), and joint aches (arthlagia). The incubation period from infection to onset of erythema migrans is typically 7 to 14 days but may be as short as 3 days and as long as 30 days. Some infected individuals have no recognized illness (asymptomatic infection determined by serological testing), or manifest only non-specific symptoms such as fever, headache, fatigue, and myalgia.



Lyme disease spirochetes disseminate from the site of the tick bite by cutaneous, lymphatic and blood-borne routes. The signs of early disseminated infection usually occur days to weeks after the appearance of a solitary erythema migrans lesion. In addition to multiple (secondary) erythema migrans lesions, early disseminated infection may be manifest as disease of the nervous system, the musculoskeletal system, or the heart. Early neurologic manifestations include lymphocytic meningitis, cranial neuropathy (especially facial nerve palsy), and radiculoneuritis. Musculoskeletal manifestations may include migratory joint and muscle pains with or without objective signs of joint swelling. Cardiac manifestations are rare but may include myocarditis and transient atrioventricular blocks of varying degree. B. burgdorferi infection in the untreated or inadequately treated patient may progress to late disseminated disease weeks to months after infection. The most common objective manifestation of late disseminated Lyme disease is intermittent swelling and pain of one or a few joints, usually large, weight-bearing joints such as the knee. Some patients develop chronic axonal polyneuropathy, or encephalopathy, the latter usually manifested by cognitive disorders, sleep disturbance, fatigue, and personality changes. Infrequently, Lyme disease morbidity may be severe, chronic, and disabling. An ill-defined post-Lyme disease syndrome occurs in some persons following treatment for Lyme disease. Lyme disease is rarely, if ever, fatal.

Diagnosis: The diagnosis of Lyme disease is based primarily on clinical findings, and it is often appropriate to treat patients with early disease solely on the basis of objective signs and a known exposure. Serologic testing may, however, provide valuable supportive diagnostic information in patients with endemic exposure and objective clinical findings that suggest later stage disseminated Lyme disease. When serologic testing is indicated, CDC



recommends testing initially with a sensitive first test, either an enzyme-linked immunosorbent assay (ELISA) or an indirect fluorescent antibody (IFA) test, followed by testing with the more specific Western immunoblot (WB) test to corroborate equivocal or positive results obtained with the first test . Although antibiotic treatment in early localized disease may blunt or abrogate the antibody response, patients with early disseminated or late-stage disease usually have strong serological reactivity and demonstrate expanded WB immunoglobulin G (IgG) banding patterns to diagnostic B. burgdorferi antigens. Antibodies often persist for months or years following successfully treated or untreated infection. Thus, seroreactivity alone cannot be used as a marker of active disease. Neither positive serologic test results nor a history of previous Lyme disease assures that an individual has protective immunity. Repeated infection with B. burgdorferi has been documented. B. burgdorferi can be cultured from 80% or more of biopsy specimens taken from early erythema migrans lesions. However, the diagnostic usefulness of this procedure is limited because of the need for a special bacteriologic medium (modified Barbour-Stoenner-Kelly medium) and protracted observation of cultures. Polymerase chain reaction (PCR) has been used to amplify genomic DNA of B. burgdorferi in skin, blood, cerobro-spinal fluid, and synovial fluid, but PCR has not been standardized for routine diagnosis of Lyme disease.

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Division of Vector-Borne Infectious Diseases

Lyme Disease: Natural History

NEW
Meryl Streep narrates Lyme disease documentary
Program Contents
Introduction
The Bacterium
Natural History
Diagnosis
Epidemiology
Prevention and Control
Vaccine Recommendations
Questions and Answers
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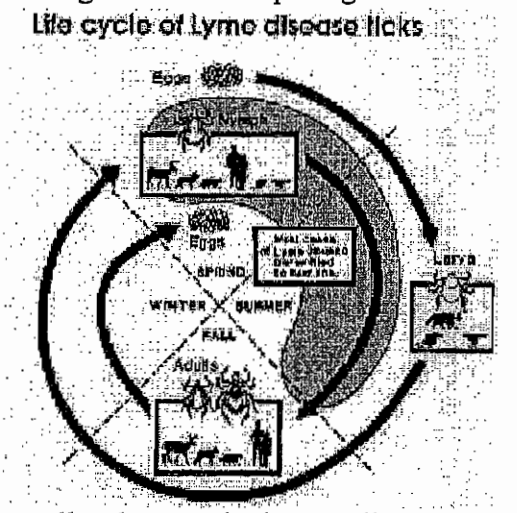
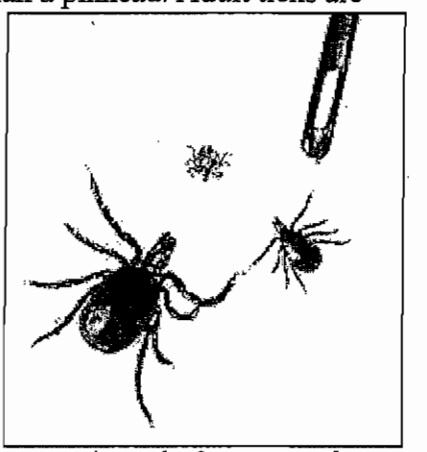
White-tailed deer are natural feeding and breeding sites for deer ticks.

Life cycle of the deer tick: For Lyme disease to exist in an area, at least three closely interrelated elements must be present in nature: (1) the Lyme disease bacteria, (2) ticks that can transmit the bacteria, and (3) mammals (such as mice and deer) to provide food for the ticks in their various life stages. Ticks that transmit Lyme disease can be found in temperate regions that may have periods of very low or high temperature and a constant high relative humidity at ground level. Knowing the complex life cycle of the ticks that transmit Lyme disease is important in understanding the risk of acquiring the disease and in finding ways to prevent it: The life cycle of these ticks requires 2 years to complete. Adult ticks feed and mate on large animals, especially deer, in the fall and early spring. Female ticks then drop off these animals to lay eggs on the ground. By summer, eggs hatch into larvae. Larvae feed on mice and other small mammals and birds in the summer and early fall and then are inactive until the next spring when they molt into nymphs. Nymphs feed on small rodents and other small mammals and birds in the late spring and summer and molt into adults in the fall, completing the 2-year life cycle. Larvae and nymphs typically become infected with Lyme disease bacteria when they feed on infected small animals, particularly the white-footed mouse. The bacteria remain in the tick as it changes from larva to nymph or from nymph to adult. Infected nymphs and adult ticks then bite and transmit Lyme disease bacteria to other small rodents, other animals, and humans, all in the course of their normal feeding



behavior.

Transmission: Lyme disease is spread by the bite of ticks of the genus Ixodes that are infected with Borrelia burgdorferi. The deer (or bear) tick, which normally feeds on the white-footed mouse, the white-tailed deer, other mammals, and birds, is responsible for transmitting Lyme disease bacteria to humans in the northeastern and north-central United States. (In these regions, this tick is also responsible for the spreading of babesiosis, a disease caused by a malaria-like parasite.) On the Pacific Coast, the bacteria are transmitted to humans by the western black-legged tick, and in the southeastern states possibly by the black-legged tick. Ixodes ticks are much smaller than common dog and cattle ticks. In their larval and nymphal stages, they are no bigger than a pinhead. Adult ticks are slightly larger. Ticks can attach to any part of the human body but often attach to the more hidden and hairy areas such as the groin, armpits, and scalp. Research in the eastern United States has indicated that, for the most part, ticks transmit Lyme disease to humans during the nymph stage, probably because nymphs are more likely to feed on a person and are rarely noticed because of their small size. Thus, the nymphs typically have ample time to feed and transmit the infection (ticks are most likely to transmit infection after approximately 2 or more days of feeding). Tick larvae are smaller than the nymphs, but they rarely carry the infection at the time of feeding and are probably not important in the transmission of Lyme disease to humans. Adult ticks can transmit the disease, but since they are larger and more likely to be removed from a person's body within a few hours, they are less likely than the nymphs to have sufficient time to transmit the infection. Moreover, adult Ixodes ticks are most active during the cooler months of the year, when outdoor activity is limited.



Ticks search for host animals from the tips of grasses and shrubs (not from trees) and transfer to animals or persons that brush against vegetation. Ticks only crawl; they do not fly or jump. Ticks found on the scalp usually have crawled there from lower parts of the body. Ticks feed on blood by inserting their mouth parts (not their whole bodies) into the skin of a host animal. They are slow feeders: a complete blood meal can take several days. As they feed, their bodies slowly enlarge. Although in theory Lyme disease could spread through blood transfusions or other contact with infected blood or urine, no such transmission has been documented. There is no evidence that a person can get Lyme disease from the air, food or water, from sexual contact, or directly from wild or domestic animals. There is no convincing evidence that Lyme disease can be transmitted by insects such as mosquitoes, flies, or fleas. Campers, hikers, outdoor workers, and others who frequent wooded, brushy, and grassy places are commonly exposed to ticks, and this may be important in the transmission of Lyme disease in some areas. Because new homes are often built in wooded areas, transmission of Lyme disease near homes has become an important problem in some

areas of the United States. The risk of exposure to ticks is greatest in the woods and garden fringe areas of properties, but ticks may also be carried by animals into lawns and gardens.

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Lyme Disease: Questions and Answers

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NEW
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Q. How is Lyme disease transmitted?
A. By ticks (deer ticks and western black-legged ticks) that become infected with bacteria that cause Lyme disease.

Q. How do people get Lyme disease?
A. By the bite of ticks infected with the Lyme disease bacteria.

Q. What is the basic transmission cycle?
A. Immature ticks become infected by feeding on small rodents, such as the white-footed mouse, and other mammals that are infected with the bacteria Borrelia burgdorferi. In later stages, these ticks then transmit the Lyme disease bacteria to humans and other mammals during the feeding process. The Lyme disease bacteria are maintained in the blood systems of small rodents.

Q. Could you get Lyme disease from another person?
A. No, Lyme disease bacteria are NOT transmitted from person-to-person. For example, you cannot get the bacteria from touching or kissing a person who has Lyme disease, or from a health care worker who has treated someone with the disease.

Q. What are the signs and symptoms of Lyme disease?
A. Within days to weeks following a tick bite, 80% of patients will have a red, slowly expanding "bull's-eye" rash (called erythema migrans), accompanied by general tiredness, fever, headache, stiff neck, muscle aches, and joint pain. If untreated, weeks to months later some patients may develop arthritis, including intermittent episodes of swelling and pain in the large joints; neurologic abnormalities, such as aseptic meningitis, facial palsy, motor and sensory nerve inflammation (radiculoneuritis) and inflammation of the brain (encephalitis); and, rarely, cardiac problems, such as atrioventricular block, acute inflammation of the tissues surrounding the heart (myopericarditis) or enlarged heart (cardiomegaly).

Q. What is the incubation period for Lyme disease?
A. For the red "bull's-eye" rash (erythema migrans), usually 7 to 14 days following tick exposure. Some patients present with later manifestations without having had early signs of disease.

Q. What is the mortality rate of Lyme disease?
A. Lyme disease is rarely, if ever, fatal.

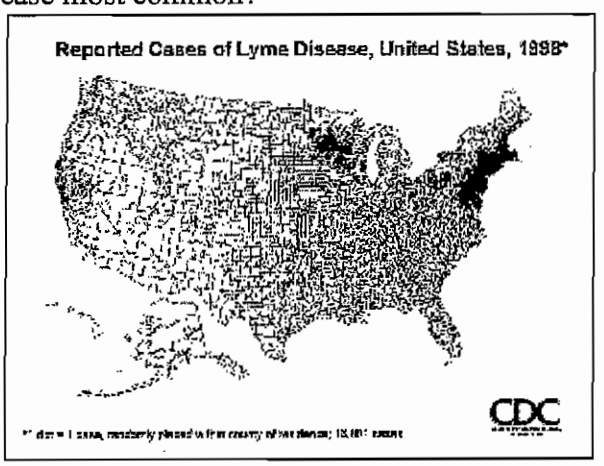
Q. How many cases of Lyme disease occur in the U.S.?
A. Lyme disease is the leading cause of vector-borne infectious illness in the U.S. with about 15,000 cases reported annually, though the disease is greatly underreported. Based on reported cases, during the past ten years 90% of cases of Lyme disease occurred in ten states:

State	Total Number Cases Reported 1989-1998	Annual Incidence per 100,000 persons
New York	39,370	21.6
Connecticut	17,728	54.2
Pennsylvania	14,870	12.3
New Jersey	13,428	16.9
Wisconsin	4,760	9.3
Rhode Island	3,717	37.5
Maryland	3,410	6.8
Massachusetts	2,712	4.5
Minnesota	1,745	3.8
Delaware	1,003	14.0

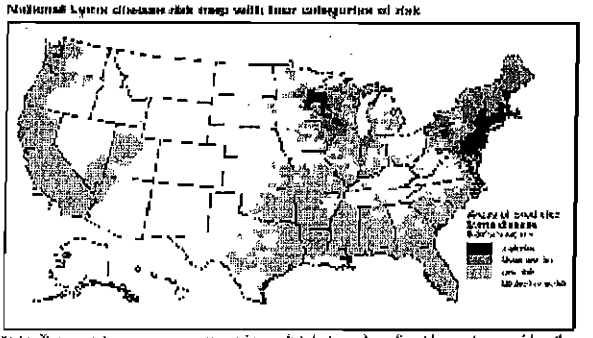
Q. How is Lyme disease treated?
A. According to treatment experts, antibiotic treatment for 3-4 weeks with doxycycline or amoxicillin is generally effective in early disease. Cefuroxime axetil or erythromycin can be used for persons allergic to penicillin or who cannot take tetracyclines. Later disease, particularly with objective neurologic manifestations, may require treatment with intravenous cefriaxone or penicillin for 4 weeks or more, depending on disease severity. In later disease, treatment failures may occur and retreatment may be necessary.

Q. Is the disease seasonal in its occurrence?
A. Yes, Lyme disease is most common during the late spring and summer months in the U.S. (May through August) when nymphal ticks are most active and human populations are frequently outdoors and most exposed.

Q. Where is Lyme disease most common?
A. Click on the map at right that shows reported cases of Lyme disease in 1997 by patient's county of residence. Generally, the Lyme disease is endemic in the northeastern and upper midwest states.



Q. Who is at risk for getting Lyme disease?



A. Persons in endemic areas who frequent sites where infected ticks are common, such as grassy or wooded locations favored by white-tailed deer in the northeastern and upper midwest states, and along the northern Pacific coast of California.

Q. Who should be vaccinated against Lyme disease?
A. Below is a summary table of abbreviated recommendations for use of recombinant outer-surface protein A vaccine (LYMErix™) for the prevention of Lyme disease from the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices. The complete recommendations are published in the Morbidity and Mortality Weekly Report, Recommendations and Reports series, June 04, 1999;48(RR07):1-17.

Summary of CDC Advisory Committee on Immunization Practices (ACIP) Recommendations Regarding LYMErix™ Vaccine	
Persons who reside, work, or recreate in areas of high or moderate risk	
Persons aged 15-70 years whose exposure to tick-infested habitat is frequent or prolonged	Should be considered
Persons aged 15-70 years who have some exposure to tick-infested habitat but whose exposure is neither frequent nor prolonged	May be considered
Persons whose exposure to tick-infested habitat is minimal or none	Not recommended
Persons who reside, work, or recreate in areas of low or no risk	Not recommended
Travelers to areas of high or moderate risk	
Travelers aged 15-70 whose exposure to tick-infested habitat is frequent or prolonged	Should be considered
Children aged <15 years	Not recommended
Pregnant women Health-care providers are encouraged to register vaccinations of pregnant women by calling SmithKline Beecham, toll free, at (800) 366-8900, ext. 5231	Not recommended
Persons with immunodeficiency	No available data
Persons with musculoskeletal disease	Limited data available
Persons with previous history of lyme disease	
Persons aged 15-70 years with previous uncomplicated Lyme disease who are at continued high risk	Should be considered
Persons with treatment-resistant Lyme arthritis	Not recommended
Persons with chronic joint or neurologic illness related to Lyme disease and persons with second- or third-degree atrioventricular block	No available data
Other Recommendations	
Vaccine schedule	

Vaccine schedule
• Three doses administered by intramuscular injection • Initial dose, followed by a second dose 1 month later, followed by a third dose 12 months after the first dose • Second dose (year 1) and third dose (year 2) administered several weeks before the beginning of the disease-transmission season (usually April)
Boosters Existing data suggest boosters might be needed, but additional data is required to make recommendations regarding booster schedules.
Simultaneous administration with other vaccines Additional data needed If simultaneous administration is necessary, use separate syringes and separate injections sites

Q. Does the Lyme disease vaccine cause arthritis? Are individuals with certain HLA-DR4 genetic subtypes more susceptible to getting arthritis from the vaccine?
A. An association between naturally acquired treatment-resistant Lyme disease arthritis, certain HLA-DR4 genetic subtypes, and high levels of antibody to OspA of naturally acquired *Borrelia burgdorferi* has been described in the medical literature (1,2,3). Because of the relationship between OspA antibodies and treatment-resistant arthritis from naturally acquired infection, CDC's Advisory Committee on Immunization Practices (ACIP) has stated that the vaccine should not be given to persons with treatment-resistant Lyme arthritis (4). However, at this writing there is no scientific evidence that the currently licensed Lyme disease vaccine increases the recipient's risk of arthritis. To the contrary, there is good evidence that the risk of arthritis in vaccine recipients is not significantly different from the risk in individuals who have received placebo without OspA (5). ACIP has not recommended screening of HLA type prior to vaccination. In the absence of evidence that the vaccine causes arthritis, screening for HLA-DR4 subtypes before vaccination would not seem to be a beneficial use of health resources.

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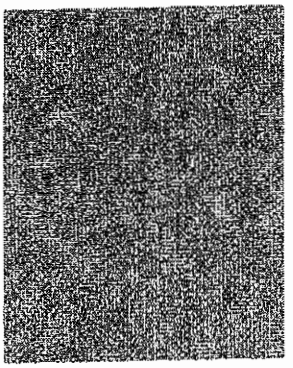

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