

## Diagnosis of Lyme disease

A doctor's diagnosis is based on symptoms, patient history and the results of two blood tests. Early Lyme disease can be recognized by the presence of erythema migrans or EM, but some people with Lyme disease may not have this rash or the rash may occur in an area that goes undetected. The blood test for Lyme disease may be negative during the early stage.

## Treatment of Lyme disease

Antibiotics are used to treat Lyme disease. The earlier Lyme disease is diagnosed, the easier it is to treat. Advanced stages seldom occur when the early illness is treated with appropriate antibiotics. Oral antibiotics are effective in the early stages. In the later stages, intravenous antibiotics are sometimes used.

## Prevention of Lyme disease

The best way to prevent Lyme disease is to avoid tick bites. When outdoors in tick-infected areas, wear long-sleeved shirts and long-legged pants. Light colored clothing allows easier tick detection. Tuck the shirttail into pants and pant cuffs into socks. Stay on paths and trails as much as possible. Use repellents to keep ticks away. Check the body and clothing for ticks at least twice daily and remove all ticks immediately. The sooner a tick is removed, the less chance there is for it to transmit disease. Remember that it takes at least 24 hours of attachment for an infected tick to transmit the Lyme disease microbe.

## Removing Ticks

1. When removing ticks, use tweezers or tissue-covered fingers. Fluids from the tick could transmit disease.
2. Grab the tick close to the skin and slowly pull straight back.
3. Do not twist the tick or the mouthparts may be broken off in the skin.
4. Treat the area with an antiseptic product and wash your hands when finished.
5. Note the date of the bite, watch for symptoms of Lyme disease and report them to your doctor.
6. Do not use home remedies to remove ticks. Once a tick has become firmly attached to the skin, use of petroleum jelly, fingernail polish, kerosene or a hot match will not dislodge it.

Around the home, tick problems usually result from wild animals or pets. Veterinarians have very good treatments against ticks that are applied to a pet's skin or given by mouth. Pets confined to the backyard will not pick up as many ticks as those that roam. Where possible, keep grass and brush trimmed and remove or burn leaf litter. These are places where ticks may rest and lay eggs. An insecticide labeled for tick control can be used if necessary. Follow the label directions carefully.

### NEED MORE INFORMATION?

Contact your local health department or the Public Health Pest Management Section at  
(919) 733-6407



N.C. Department of Environment  
and Natural Resources  
Division of Environmental Health  
Public Health Pest Management Section  
<http://www.deh.enr.state.nc.us/phpm/index.htm>

Rev. Feb. 2010

# Lyme Disease



# Some Facts

## What is Lyme Disease?

Lyme disease is an illness spread by infected ticks. It was first recognized during the 1970's when parents in Lyme, Connecticut, and nearby towns became alarmed by the large number of children with arthritis. While ticks were believed to carry the disease, it was not until 1982 that the microbe for Lyme disease was discovered.

## The Causes of Lyme Disease

Lyme disease is caused by *Borrelia burgdorferi*, a corkscrew-shaped bacteria called a spirochete.

## Where Lyme Disease Occurs

Lyme disease has been found in most states and many foreign countries. In the United States, it is now the most frequently reported disease carried by ticks. It is most common in the northeastern states and upper midwest where thousands of cases occur each summer. Lyme disease also occurs in North Carolina but the transmission cycle is not fully understood. Other tick borne diseases occur in North Carolina such as Rocky Mountain spotted fever (RMSF) and ehrlichiosis.

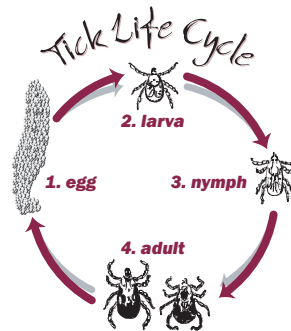
## Lyme Disease Transmission

Lyme disease is a 'zoonosis' - a disease that is

normally found in animals but sometimes spreads to humans.

The carriers or vectors of Lyme disease are ticks. Ticks have four stages of growth - eggs, larva, nymph and adult. The larva hatches from the egg, takes a blood meal and becomes a nymph. It is usually the nymph, that transmits Lyme disease to humans. The adult female feeds and produces eggs. Each feeding stage may take blood from a different type of animal such as field mice and deer.

Not all ticks can transmit Lyme disease bacteria. In the eastern United States, the tick that is associated with the transmission of Lyme disease is *Ixodes scapularis*, commonly called the black-legged tick. The adult black-legged tick is active



during the fall and spring as well as warm days during the winter. Nymphs are active during spring and summer.

Another illness that produces milder symptoms and a rash much like the rash associated with Lyme disease is called Southern Tick Associated Rash Illness (STARI). STARI is present in North Carolina and is associated with the bite of the Lone Star tick, *Amblyomma americanum*.

Dogs, horses, and cattle may also be affected by Lyme disease, but the disease must be passed by ticks to infect humans and cannot be caught

directly from animals.

Lyme disease, like other tick-borne disease, is most likely to occur in the warm weather months. Because the bacteria can attack so many parts of the body, Lyme disease has been confused with other ailments. The symptoms change with time and can last for years if untreated.

### Lyme Disease May Appear in Stages:

#### Early Lyme Disease

One to four weeks after the tick bite, a red circular or oblong rash with a clear center called an erythema migrans (EM), often develops at or near the bite. The size of the rash increases and may become more than 12 inches across. It is not usually painful or itchy, but may be warm when touched. Other similar but smaller rashes may appear. The rash may last for two to three weeks. Not everyone will get a rash. Headache, fever, muscle aches, tiredness and other flu-like symptoms are also common at this time. These early signs of Lyme disease may disappear, but most people will have other problems if not treated. Other problems with the nervous or cardiac system may develop. These symptoms include facial paralysis, meningitis, nerve root inflammation and partial heart block.

#### Late Lyme Disease

Months to years after the tick bite, arthritis of one or more large joints, such as knees and shoulders, may occur. Affected joints are painful, swollen and red. Without treatment, joint damage may become permanent. However, most cases of arthritis are not caused by Lyme disease.

Up to five percent of untreated patients may develop chronic neurological complaints months to years after infection. These include shooting pains, numbness or tingling in the hands or feet, and problems with concentration and short term memory.