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## Lyme Disease Clinical Signs and Pathology

Lyme disease in humans is usually not a life-threatening illness and one should regard the health risks it does pose with concern rather than alarm. It is most often a mild illness mimicking a summer flu, but serious problems involving the heart, joints and nervous system may develop in some individuals.

### Clinical Signs in Humans

Lyme disease in humans may progress through three stages, depending upon the individual.

**Stage 1 (Acute Localized)-** People may have any combination of the following signs and symptoms:

- headache
- nausea
- fever
- spreading rash
- aching joints and muscles
- fatigue



These signs and symptoms may disappear altogether, or they may reoccur intermittently for several months. A characteristic red rash (see [thumbnail](#)), called erythema migrans (EM) may appear within 3 to 32 days after a person is bitten by an infected tick. The rash is circular in shape, can attain a diameter of 2 to 20 inches, and is not itchy or painful. EM is not restricted to the bite site and more than one lesion may occur on the body. Up to 30% of the people who have Lyme disease do not develop EM lesions, making diagnosis more difficult.

**Stage 2 (Early Disseminated)-** (Weeks to months after initial exposure to the bacterium or after the first symptoms appear), some people may develop complications involving the heart and/or nervous system. Specific disorders may include various degrees of heart block, nervous system abnormalities such as meningitis, encephalitis and facial paralysis (Bell's palsy), and other conditions involving peripheral nerves. Painful joints, tendons, or muscles may also be noted during this stage of the disease.

**Stage 3 (Late Disseminated) -** 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 neurologic disorders, or encephalopathy, the latter usually manifested by cognitive disorders, sleep disturbance, fatigue, and personality changes. Infrequently, Lyme disease illness may be severe, chronic, and disabling ([www.cdc.gov](http://www.cdc.gov)).

### Clinical Signs in Wild and Captive Animals

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Dogs, cats, cattle, horses and other domestic animals may also exhibit a variety of signs, including fever and lameness. Wild animals such as deer, raccoon and mice show no signs and apparently suffer no ill effects from the disease.

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