NSW Health

Lyme disease

Lyme disease is caused by infection with the bacteria *Borrelia burgdorferi (s.l).*
Typical symptoms include fever, headache, fatigue, sore muscles and joints, and a characteristic skin rash called *erythema migrans*.

Although locally-acquired Lyme disease cannot be ruled out, there is little evidence that it occurs in Australia. There is a continuing risk of Lyme disease for overseas travellers.

What is the disease?

Lyme disease is a tick-borne infection caused by bacteria in the *Borrelia burgdorferi sensu lato* group.

The first symptom is usually a characteristic pink or red rash that starts as a small red spot that gradually spreads in a much larger circle with a characteristic bulls-eye appearance called *erythema migrans*. This normally happens between 3 and 32 days after being bitten by an infected tick. Not everyone with Lyme disease gets the rash. There may also be fever, headaches, tiredness. Joint pains are particularly prominent with infections acquired in North America.

If left untreated, the Lyme disease infection can spread through the bloodstream and can cause infection in the brain and membranes surrounding the brain (meningo-encephalitis) and infection in or around the heart (endocarditis, myocarditis or pericarditis). The disease can also cause inflammation of joints and cause joint pain and long-term neurological symptoms.

How is Lyme disease spread?

Lyme disease is transmitted following the bite of certain types of ticks if they have been infected with particular *Borrelia* bacteria.

Only some species of ticks are capable of being infected by the *Borrelia* bacteria and only these infected ticks can pass the infection on to humans. These ticks are commonly found in parts of Asia, Europe and North America. Related ticks occur in Australia but these have not been shown to be infected with Lyme disease *Borrelia* bacteria.

Ticks with *Borrelia* infection live in temperate forested areas of northern Asia and Europe (especially central and eastern Europe) and the United States (especially north-eastern, north central and Pacific coastal USA).

Although it is possible that Lyme disease may be transmitted from a pregnant woman with the infection to the developing foetus, this has not been documented conclusively. Lyme disease is not spread from person to person.

How is Lyme disease diagnosed?

Lyme disease is diagnosed based on symptoms, physical findings (such as a characteristic rash called *erythema migrans*), and the possibility of exposure to infected ticks. Laboratory testing is helpful in the later stages of disease.

Diagnosis of any infectious disease requires a combination of clinical experience and assessment by the doctor and understanding of the lab tests and their limitations. Laboratory tests are rarely definitive and all tests have a proportion of results which are false positive (test indicates disease in someone without the disease) and false negative (test indicates that there is no disease in someone with the disease). When tests are done in places where a disease is rare or absent (for example, Lyme disease in Australia), many positive tests will be falsely positive.

The tests to diagnose Lyme disease are technically complex and require specialist expertise. It is important for people who want to be tested to make sure the laboratory that performs the test has accreditation with the National Association of Testing Authorities (NATA).

Lyme disease is most commonly diagnosed by a screening test called ELISA and this is then confirmed using a western blot test. Both of these tests detect antibodies that are produced by the immune system of someone with Lyme disease.

Lyme disease can also be diagnosed by testing a sample of the skin lesion by nucleic acid testing (eg PCR) or culture. (See the NSW Health **testing advice for clinicians** fact sheet for more information).

Occasionally, tests performed in Australia for Lyme disease show evidence of an infection. When these cases have been followed up in the past, the cases have been found to have acquired the infection while overseas.

The Royal College of Pathologists of Australia (RCPA) have advised caution in interpreting the results of tests for Lyme disease performed in non-NATA/RCPA accredited laboratories in Australia and overseas (mainly USA and Germany), as many of the tests performed by such laboratories have not been validated to diagnose Lyme disease.

For further testing information see the RCPA Position Statement - ***Diagnostic Laboratory testing for Borreliosis ('Lyme Disease' or similar syndromes) in Australia and New Zealand. March 2016***.

What is 'Lyme-like illness'?

The term 'Lyme-like illness' is used by some patients and health practitioners to describe constellations of symptoms, but what is included and what is not included within the spectrum of 'Lyme-like illness' has not been defined.

Unlike most other diseases or conditions for which there are published, widely accepted definitions of the criteria required to be met in order to make a diagnosis of that disease or condition, the term 'Lyme-like illness' is applied to a variety of illnesses which range from an acute illness with headache, fever and fatigue which lasts weeks or months to a non-specific chronic illness with symptoms such as headache, myalgia, and arthralgia.

How is Lyme disease treated?

Most cases of Lyme disease can be treated successfully with a few weeks of an appropriate antibiotic, such as doxycycline, which are widely available in NSW.

Can ticks in NSW transmit infections?

A species of paralysis tick called *Ixodes holocyclus* can be found along Australia's east coast and can cause tick paralysis, tick typhus and allergic reactions.

While there is no evidence that Lyme disease is caused by Australian ticks, there may be other infections carried by Australian ticks which may cause an infection which is similar to Lyme disease. These infections remain poorly characterised.

How to prevent tick bites

Ticks tend to live in coastal areas in NSW. Some simple measures to reduce the risk of tick bites include the following:

- Wear appropriate clothing when outdoors in tick areas including long sleeved shirts, long pants tucked into socks and a wide brimmed hat. Ticks are more easily detected on light coloured clothing.
- Spray clothes and hats with an insect repellent and wear a repellent that contains DEET or Picaridin.
- When walking through tick-infested areas try to keep to the centre of cleared paths as much as possible and try to avoid brushing up against plants and grasses as you walk.
- When returning from an area known to have ticks, remove clothing and search for ticks, especially behind the ears, on the back of the head, groin, armpits and back of knees. Be careful where clothes are placed as they may introduce ticks inside the house. Don't forget to check children and pets.

Ticks in the nymph stage are tiny (e.g. as big as a poppy seed) but can still transmit infections so it's important to have a very close look at your skin in good light to see any small ticks that may be feeding. People are sometimes not aware that they have been bitten by a tick.

People living in tick-infected areas should:

- mow grass in the backyard and keep mulch and leaf litter away from the main entrance to the house
- trim shrubs overhanging paths and play areas.

When travelling in the Northern Hemisphere remember that the risk of tick bites (and so of Lyme disease) is greatest in late spring, summer and early autumn. This is when the nymph ticks are more abundant and when people visit habitats where ticks live such as forests and other densely vegetated areas, especially areas with high grass and lots of leaf litter. Lyme disease is more likely to affect people participating in outdoor activities such as hiking or mountain biking in tick-infested areas.

What to do if bitten by a tick

Follow the Department of Health and Aged Care advice here: **Management of tick bites in Australia**

What is the public health response?

Lyme disease is not a notifiable condition in NSW.

Further information

See the following resources for additional information:

- NSW Health **Lyme disease testing advice for clinicians**
- Commonwealth Department of Health **Tick bite prevention fact sheet**

For further information please call your local public health unit on **1300 066 055**.