



## Human pathogen information sheet

### What is borreliosis?

Borreliosis is a disease transmitted by ticks. The symptoms and severity of the disease may vary greatly, primarily affecting the skin, the nervous system and the joints. It is also called Lyme borreliosis or Lyme disease. Borreliosis is caused by bacteria of the *Borrelia burgdorferi* type, which can be transmitted by ticks anywhere in Germany. This distinguishes it from the viral disease TBE (tick-borne encephalitis), which is also transmitted by ticks, although only in certain regions (see pathogen fact sheet TBE). The risk of contracting borreliosis is particularly high between March and October.

### How is borreliosis transmitted?

#### *By direct animal contact*

The pathogen can be transmitted to humans via a tick bite. From 1 in 20 to 1 in 3 ticks in Germany carry *Borrelia*. However, not every bite by an infected tick leads to an infection. In Germany, about 1 to 6 in 100 persons bitten by a tick become infected with *Borrelia*. The risk of infection is lower if the tick is removed quickly and increases after the tick has been attached for more than twelve hours. Most infections are asymptomatic. Only about every third or fourth infected person develops symptoms.

*Note: The disease is not transmitted between humans.*

### What symptoms do the patients show?

The symptoms vary greatly and may appear at various points in time, individually or in combination, which is why borreliosis is not always easy to recognise.

A typical symptom that occurs in up to 90% of all cases is what is called bull's-eye rash (erythema migrans). The bull's-eye rash develops a few days or weeks after the tick bite, predominantly in the vicinity of the bite itself, but it may also occur on other parts of the body. It appears as a circular area of redness of at least 5 cm in size, which is typically paler at the centre than at the edges and slowly expands outwards over several days. In adults, the bull's-eye rash most frequently occurs on the legs; in children, the head or neck area is affected more often. Unspecific symptoms such as fever as well as muscular pain and headache may occur in addition. Far less frequently, in 2% of cases, nodular or bluish-red swelling of the skin may occur weeks or months after a tick bite. These skin changes are found predominantly on the ears or the nipples, less commonly on other parts of the body such as the nose, fingers or toes. With a comparably low incidence, *Borrelia* may also attack the nervous system. Typical symptoms in adults include burning neuralgia, which usually worsens at night. Inflammatory irritations of the nerves, leading to numbness, visual or hearing disorders and, in rare cases, to paralysis of the trunk, arms or legs, are also possible. In children, non-suppurative meningitis occurs more commonly, which may be accompanied by severe headache and sudden facial paralysis.

Months or years after the infection, 5 in 100 patients may experience joint inflammations as a late-stage form of untreated borreliosis. They most commonly affect the knee joint, less commonly the ankle or elbow joints, and usually progress in stages and periodically. In isolated cases (no more than 1% of cases), other late-stage forms of borreliosis may occur. In the event of chronic skin inflammation (acrodermatitis chronica atrophicans), the skin on the inner sides of the arms, legs, fingers and toes undergoes changes, becoming paper-thin and bluish. Inflammations or arrhythmia of the heart as well as chronic neuroborreliosis, an inflammation of the brain and the medulla, may occur as well.

### What is the incubation period and how long are you contagious?

Many infections do not cause any visible symptoms. As a typical early symptom of the infection, bull's-eye rash may develop a few days or weeks after the tick bite. By contrast, the late-stage forms may occur months or even years after the tick bite.

*Ill persons are not contagious.*

### Who is most at risk?

Ticks sit on grass blades, bush branches and undergrowth, from where they drop onto their host and move on the skin to other body regions. Ticks can also be transmitted by wild and domestic animals that spend time outdoors. For this reason, people staying outdoors in grass or near low bushes or having close contact with animals are at particular risk.



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### What should I do if I fall ill?

- ▶ In the early stage of borreliosis, antibiotic therapy has proved most effective. It can prevent late-stage forms as well as chronic progression of the disease.
- ▶ Preventive administration of antibiotics after an asymptomatic tick bite is not recommended.
- ▶ If you notice the above-described bull's-eye rash, you should seek immediate medical advice, even if you cannot remember having been bitten by a tick. Please also consult your doctor if you experience symptoms such as fever, muscular pain or headache after a tick bite.
- ▶ If the bull's-eye rash is present, the doctor can diagnose borreliosis by means of a physical examination. In the case of other symptoms suggesting borreliosis, a laboratory blood test can be performed.
- ▶ Overcoming borreliosis will not protect you from becoming infected again.

### How can I protect myself?

Vaccination against borreliosis has so far not been available in Europe. Vaccination against TBE (tick-borne encephalitis) provides no protection against borreliosis. The best protection against borreliosis is avoiding being bitten and discovering any tick bites as quickly as possible.

#### Avoid tick bites

- ▶ When spending time in forests or fields, always wear closed shoes, long-sleeved shirts and long trousers. Pull your socks up over your trouser cuffs.
- ▶ If possible, wear light-coloured clothing to make it easier to see and remove the tiny dark ticks.
- ▶ Before spending time in forests or fields, apply tick repellent to protect your skin.  
Remember: Tick repellent only works for a limited period and does not offer complete protection.
- ▶ When going on a walk, stay on paved roads and avoid direct skin contact with undergrowth, tall grass and plants close to the ground.
- ▶ Even if you take precautions, always check your whole body for ticks thoroughly after spending time outdoors. As bloodsuckers, they like warm, soft places on the skin. Therefore, be especially careful to check the back of your knees, your groin, your armpits, behind your ears and on your head and hairline.

#### Remove ticks as quickly as possible

Always remove ticks as quickly as possible. If the tick is removed quickly, the risk of infection is very low.

- ▶ Grab the tick near its head and as close to your skin as possible, then carefully pull it out in one straight motion. It is best to use tweezers or a special instrument for tick removal.
- ▶ Do not apply oil or creams to the tick or squeeze it, as this may cause an increased release of pathogens.
- ▶ After removal, thoroughly disinfect the small wound around the site of the bite.
- ▶ Once the tick is removed, parts of it may remain in the skin, which may cause a mild skin inflammation, but will not increase the risk of borreliosis.

### Where can I find out more?

Your local health authority can provide you with further advice and information.

More (specialist) information is also available online from the Robert Koch Institute ([www.rki.de/borreliose](http://www.rki.de/borreliose)).

For more information about infection prevention, please visit the website of the Federal Centre for Health Education ([www.infektionsschutz.de](http://www.infektionsschutz.de), [www.kindergesundheit-info.de/zeckenschutz](http://www.kindergesundheit-info.de/zeckenschutz)).



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