World Health Organization
REGIONAL OFFICE FOR Europe

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TICK-BORNE ENCEPHALITIS in EUROPE

This information leaflet contains five sections and is intended for a generic and public health audience:

1. **TBE is found in certain areas of Europe.**
   What are the risks in European countries?
2. **Ticks can be the carriers of disease.**
   How is the disease transmitted? What are the risk factors?
3. **Disease characteristics of TBE.**
   What are the symptoms and how can it be treated?
4. **Tick-borne diseases are preventable.**
   What measures can be taken to protect yourself?
5. **More information is available.**
   Where can you find more information and guidance on effective prevention and control activities?

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Key messages

- Tick-borne encephalitis (TBE) is a human viral infectious disease (family: Flaviviridae, genus: *Flavivirus*) involving the central nervous system. The virus is transmitted by the bite of infected ticks.
- Approximately 5000-12 000 cases of TBE are reported in Europe each year.
- The risk of contracting a tick-borne infection is determined by the overall number of ticks in the area, the proportion of these ticks carrying the virus, and human behaviour.
- The risk of tick-borne infections is reduced by avoiding tick bites.
- A safe and effective vaccine against the TBE virus exists and is recommended for people who live or work in, or travel to, TBE risk areas.
- Treatment relies on supportive management. Meningitis and encephalitis require hospitalization and care, based on the severity of the disease.
- Most patients with TBE encephalitis will recover but up to one third will suffer long-term complications of the disease.

1. TBE is found in certain areas of Europe

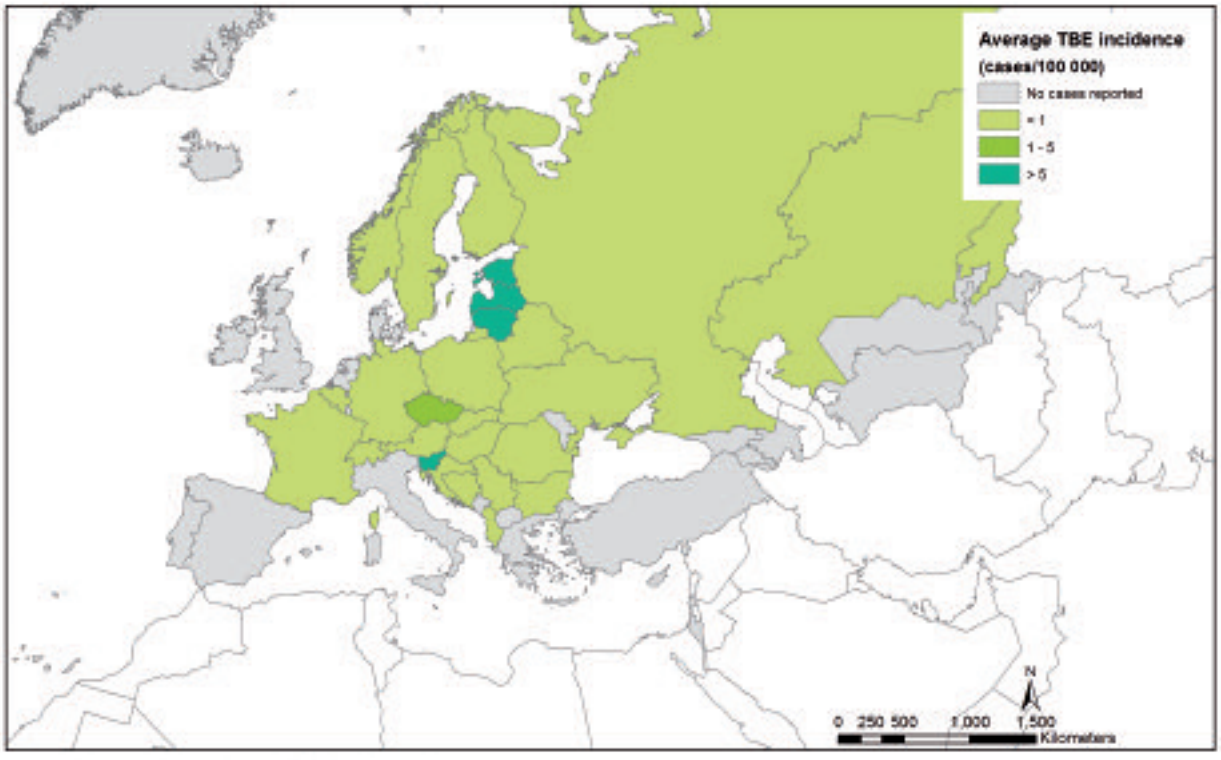
Box 1. What is a vector-borne disease?

- Vector-borne diseases are illnesses caused by pathogens in human populations.
- These diseases are spread by vectors: living organisms that can transmit pathogens between humans or from animals to humans.
- Many vectors are bloodsucking insects, which ingest pathogens during a blood meal from infected hosts (humans or animals) and transfer them to new hosts during subsequent blood meals.
- Mosquitoes are the best known disease vectors. Others include certain species of ticks, flies, sandflies, and fleas.

TBE is a relatively common tick-borne disease in Europe. Countries with increased numbers of reported TBE cases include Estonia, Latvia, Lithuania, the Czech Republic and Slovenia; TBE is also prevalent in the Russian Federation (Fig. 1). The Far Eastern and Siberian strain of the disease cause a more severe form of the disease than the central European strains.

Ticks infected with the TBE virus are found only in certain areas, and within these areas only a few ticks carry the virus. It is important to know where the TBE risk areas are and to take precautions to reduce the risk of infection if exposure is likely. Many TBE-endemic countries communicate updated information on the risk of tick-borne diseases within their borders.

Fig. 1. Average TBE incidence (cases/100 000) as reported to WHO Centralized Information System for Infectious Diseases (CISID), 1990-2010.



2. Ticks can be the carriers of disease

TBE is a viral infectious disease transmitted by ticks. It requires the presence of competent reservoir hosts, such as small rodents, tick vectors, and the pathogen, for transmission to occur. The main vectors of TBE in Europe are the ticks, *Ixodes ricinus* and *Ixodes persulcatus*.

The risk of contracting a tick-borne infection is determined by the overall number of ticks in the area, the proportion of these ticks carrying the disease, and human behaviour. In risk areas, people with outdoor recreational or occupational activities (e.g. hunting, fishing, camping, foraging, forestry, farming, military training) are at increased risk of being bitten by ticks.

Although rare, humans may also become infected by ingesting unpasteurized milk from infected domestic animals.

Ixodes ricinus ticks are sensitive to climatic conditions, requiring relative humidity (at least 80%), and are restricted to areas of moderate to high rainfall with good vegetation. Therefore, they are observed across Europe primarily in deciduous woodland and mixed forests, but can be found in a range of habitats that support their blood hosts and a moist microclimate, such as parks and gardens. The geographical distribution of *Ixodes ricinus* ticks has changed in a number of countries in recent years and they are being observed at higher altitudes and more northern latitudes.

3. Disease characteristics of TBE

TBE most often manifests itself as a two-phase illness. The first phase is associated with symptoms like fever, fatigue, headache, muscular ache and nausea. In the second phase, the TBE virus can infect the brain and cause TBE (inflammation of the brain, often also involving the meninges). About one third of those infected with the TBE virus develop symptoms of encephalitis, which include high fever, severe headache and, sometimes, paralysis and convulsions. Most patients with TBE encephalitis will recover but some will suffer long-term complications of the disease.

The virus found in western and central Europe is associated with a milder form of disease than is the case in the easternmost part of Europe where 20–30% of patients experience the second phase. Mortality rates are up to 2%, and 10% of patients suffer long-term neurological complications. The course of the disease is more severe in the elderly than in young people. In children, the second phase is usually limited to meningitis, whereas adults over 40 years of age are at increased risk of developing encephalitis, with higher mortality and long-lasting consequences in those over the age of 60.

There is no specific treatment for TBE; rather, treatment relies on supportive management. Meningitis and encephalitis require hospitalization.

4. Tick-borne diseases are preventable

Vaccination

Immunization offers the most effective protection against TBE. Current vaccines appear to protect against all circulating TBE-virus subtypes. Since the incidence of TBE may vary considerably between and even within geographical regions, public immunization strategies should be based on risk assessments conducted at the country, regional or district levels. Therefore, establishing case reporting of the disease is essential before deciding on the most appropriate preventive measures to be taken.

In areas where the disease is highly endemic (that is, where the average prevaccination incidence of clinical disease is ≥ 5 cases/100 000 population per year), WHO recommends that vaccination be offered to all age groups, including children. Depending on the epidemiological situation, inclusion of the TBE vaccination in immunization programmes at the regional or national levels can be considered.

People travelling from non-endemic areas to endemic areas should be offered the vaccination if their visits are to include extensive outdoor activities.

Preventing tick bites

Ixodes ticks live on the ground and climb 20-70 cm onto grasses and bushes where they wait for hosts. The tick bite is painless and it is often impossible to sense a tick moving on the skin.

An integrated approach to avoiding tick bites and tick-transmitted pathogens is necessary. This includes using both protective clothing and tick repellents, checking the entire body daily if exposed to ticks and promptly removing attached ticks. Although the last-mentioned measure would not prevent the transmission of TBE, as ticks can harbour different pathogens, removing an attached tick may prevent the transmission of other diseases, such as Lyme borreliosis.

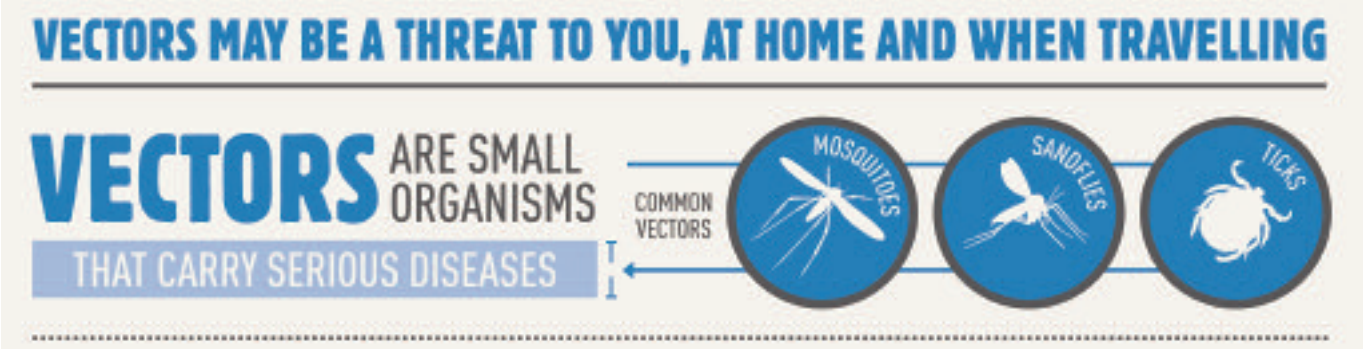
An attached tick should be removed using tweezers or fine-pointed forceps, grasping it as closely as possible to where it is attached to the skin and pulling it gently upwards, trying not to break off the mouth parts. A skin disinfectant should be applied after removal of the tick to prevent infection.

When checking the skin for ticks, particular attention should be paid to skin folds as ticks seek the more humid parts of the body, such as the groins, the armpits, the waistband area, under the breasts and behind the knees. In young children, the head (including the scalp) and the neck area should also be checked carefully as tick bites are relatively more common at these sites in this age group. Before entering homes, clothing, bags and other belongings should be examined thoroughly for ticks.

The best ways to avoid tick bites are to:

- avoid tick risk areas;
- be informed about how to remove ticks and recognize early symptoms;
- use insect repellent on skin and clothing when in risk areas;
- wear protective clothing with long sleeves, and long trousers tucked into socks or boots.

As infected dairy animals can shed the TBE virus in their milk, the consumption of unpasteurised milk or dairy products in TBE risk areas is not recommended.



5. More information is available

WHO documents

Tick-borne encephalitis. In: Immunization, vaccine and biologicals [website]. Geneva: World Health Organization; 2011 (http://www.who.int/immunization/topics/tick_encephalitis/en/).

Tick-borne encephalitis vaccine. In: Biologicals [website]. Geneva: World Health Organization; 2014 (http://www.who.int/biologicals/areas/vaccines/tick_encephalitis/en/).

Vaccines against tick-borne encephalitis: WHO position paper. Weekly epidemiological record. 2011:86;241-256 (http://who.int/wer/2011/wer8624.pdf?ua=1).

ECDC resources

ECDC communication toolkit on tick-borne diseases. Stockholm: European Centre for Disease Prevention and Control; (http://www.ecdc.europa.eu/en/healthtopics/emerging_and_vector-borne_diseases/tick_borne_diseases/public_health_measures/pages/communication_toolkit.aspx).

Epidemiological situation of tick-borne encephalitis in the European Union and European Free Trade Association countries. Stockholm: European Centre for Disease Prevention and Control; 2012 (http://www.ecdc.europa.eu/en/healthtopics/emerging_and_vector-borne_diseases/tick_borne_diseases/tick_borne_encephalitis/Pages/Publications.aspx).

Factsheet for health professionals – Lyme borreliosis [website]. Stockholm: European Centre for Disease Prevention and Control; 2010 (http://www.ecdc.europa.eu/en/healthtopics/emerging_and_vector-borne_diseases/tick_borne_diseases/lyme_disease/factsheet-health-professionals/Pages/factsheet_health_professionals.aspx).

Ixodes ricinus [website]. Stockholm: European Centre for Disease Prevention and Control; 2014 (http://www.ecdc.europa.eu/en/healthtopics/vectors/ticks/Pages/ixodes-ricinus.aspx).

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Tick species – distribution maps. In: Tick maps [website]. Stockholm: European Centre for Disease Prevention and Control; 2010 (http://www.ecdc.europa.eu/en/healthtopics/vectors/vector-maps/Pages/VBORNET-maps-tick-species.aspx).

External resources

Günther G, Lindquist L. Surveillance of tick-borne encephalitis in Europe and case definition Eurosurveillance. 2005;10(1) (http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=510).

Heinz F et al. Vaccination and tick-borne encephalitis, central Europe. Stockholm: European Centre for Disease Prevention and Control; 2013 (http://wwwnc.cdc.gov/eid/article/19/1/pdfs/12-0458.pdf).

Süss J. Tick-borne encephalitis 2010: epidemiology, risk areas, and virus strains in Europe and Asia - an overview. Ticks and Tick Borne Diseases. 2011;(1):2-15.

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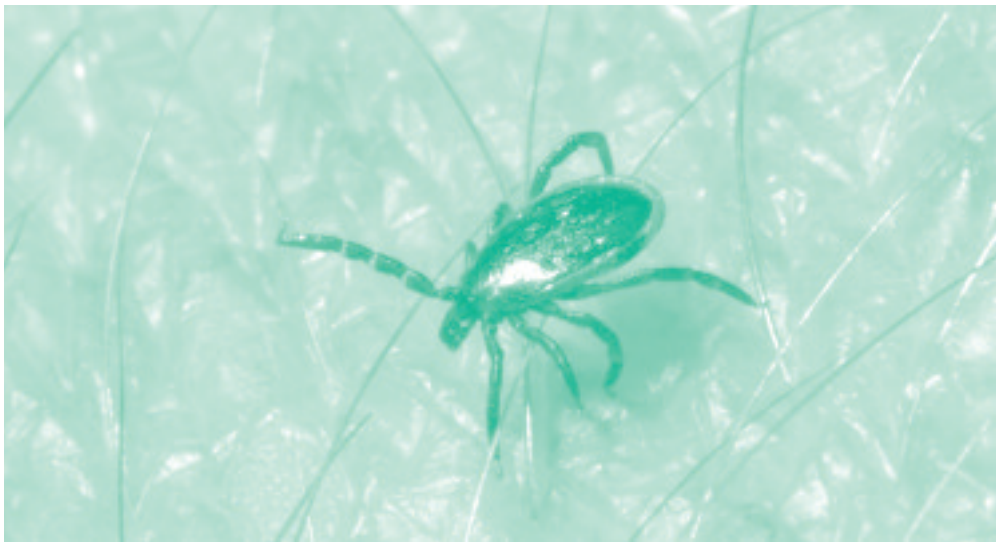

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