

# Tick-Borne Encephalitis

## Traveler Summary

### Key Points

- | Tick-borne encephalitis (TBE) is a viral infection occurring in focal areas of Europe and Asia that is acquired through the bite of an infected tick.
- | Risk exists for travelers hiking, camping, or engaging in outdoor activities in affected countries, especially during the months of April through November.
- | Symptoms include fever, headache, muscle ache, and fatigue.
- | Consequences of infection can include brain inflammation, nervous system complications, muscle paralysis, and death.
- | Prevention includes wearing long, light-colored trousers tucked into boots when hiking, as well as observing personal protective measures against tick bites.
- | TBE vaccine (not available in the U.S. or Canada) may be given in 2 or 3 doses, usually over a period of 1 year. Accelerated schedules are available.
- | Vaccine side effects are most commonly injection-site reactions, fever, tiredness, and diarrhea.
- | Duration of vaccine protection is 3 to 5 years; a booster dose is recommended if at continued risk.

### Introduction

TBE is a viral infection occurring in focal areas of Europe and Asia that is transmitted via the bite of an infected tick. Travelers with exposure in tick-infested areas are at risk of acquiring this potentially serious infection. No curative treatment is available after infection.

### Risk Areas

TBE occurs in focal areas of Europe and Asia, extending from eastern France to northern Japan and from northern Russia to Albania. Although Russia has the largest number of reported cases annually, Czech Republic, Estonia, Latvia, Lithuania, Slovenia, and western Siberia have the highest frequency of infection. Many central European countries, particularly Austria, Germany, Poland and Switzerland have significant regions of infection, and incidence seems to be increasing in the Scandinavian countries. TBE-infected ticks infesting areas of wooded suburbs and peri-urban and urban parks have been reported in Europe, Scandinavia, the Baltic states, Russia, and China.

Ticks are most active in spring and summer, and TBE commonly occurs from April through November. Exposure is restricted to forested areas with adjacent grasslands, forest glades, riverside meadows, marshlands, parks, and gardens, up to an altitude of about 1,500 m (4,900 ft), with most cases occurring in areas with an altitude of less than 750 m (2,500 ft).

### Transmission

The TBE virus is transmitted to humans through the saliva of biting ticks in affected areas. Although ticks may stay attached for several days, transmission can occur within seconds of being bitten. Rarely, the virus is transmitted by consuming unpasteurized dairy products from infected farm animals, especially goats.

### Risk Factors

Risk exists for travelers hiking, camping, or participating in other outdoor activities in rural, forested areas of TBE-risk countries or walking in peri-urban and urban parks in some northern European towns.

### Symptoms

Symptoms appear about 8 days (range: 4-28 days) following exposure and include an influenza-like illness (fever, headache, muscle aches, and fatigue), which may either resolve completely in a few days or resolve temporarily and relapse as a more severe illness. TBE is more severe in people 50 years and older.

## Consequences of Infection

Consequences of infection include brain inflammation, nervous system complications, and muscle paralysis. Death occurs in about 20% to 40% of TBE cases, depending on the virus subtype.

## Need for Medical Assistance

Travelers who develop symptoms of TBE, a generalized illness, or marked local reaction within 2 to 3 weeks of a known tick bite should seek medical attention. No specific treatment is available for TBE.

## Prevention

### Nonvaccine

When in a risk area, observe the following tick precautions:

- | Wear long, light-colored trousers tucked into boots when hiking, cover as much of the body surface as practicable when walking through brushy vegetation, and observe personal protective measures against tick bites.
- | Apply DEET (N,N-diethyl-meta-toluamide;  $\geq 20\%$ ) directly to skin.
- | Treat outer clothing, boots, camping gear, bed netting, and screens with permethrin (or other pyrethroid).
- | Avoid camping at sites close to animal habitation and sleep in screened tents.
- | Perform a thorough body check at least once a day and remove any ticks, preferably with forceps, to reduce the risk of infection after visiting a tick-infested habitat.
- | Avoid unpasteurized dairy products, especially goat milk.

See *Infestations in Travelers*.

### Vaccine

TBE vaccination may be recommended for travel to some countries. Travelers who cannot obtain TBE vaccine in their home country should arrange to receive the vaccine upon arrival at their destination, if possible. TBE vaccines are not available in the U.S. and Canada but are available in Europe and Australia.

For travel, vaccination with TBE vaccines is *recommended* for:

- | All expatriates and travelers with prolonged stays in highly affected countries, due to the likelihood of occasional travel to forested risk areas or exposure in the outskirts of urban areas.
- | All travelers with either short or prolonged stays that include hiking, camping, or other outdoor activities in forested risk areas with more than minimal risk.
- | Persons who consume unpasteurized dairy products (milk and cheese) from goats, cows, or sheep.

### Side Effects

Side effects are usually mild to moderate and include injection-site reactions (redness and swelling), headache, fatigue, dizziness, nausea and vomiting, diarrhea, and muscle aches. Fever, which is common in very young children, occurs occasionally in older children and is infrequent in adults.

Persons with underlying medical conditions or who have concerns about the vaccine should speak to their health care provider before vaccine administration.

### Timing

The primary series consists of 2 or 3 doses given over a 1-year period. Depending on the vaccine used, doses are given at 0, 1-3 months, and 5-12 months (or 9-12 months) after dose 2; or at 0 and 1-7 months (or 5-7 months) after dose 1; followed by a booster, 12 months after dose 2.

Several accelerated schedules, which require several weeks to be effective, are also available and may be considered if arriving during the peak season.

A booster dose is recommended 3 to 5 years later if at continued or new risk.