

## TICK-BORNE ENCEPHALITIS

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### GENERAL INFORMATION

#### Introduction

Tick-borne encephalitis (TBE) is a viral infection that is usually transmitted by infected ticks. TBE occurs in forested and rural areas of endemic regions between April and November.

#### Transmission

The TBE virus is transmitted in the saliva of biting ticks in endemic areas (see below). Rarely, it is transmitted by consuming unpasteurized dairy products from infected farm animals. TBE is not transmitted from person to person.

Travelers are bitten by ticks when camping or hiking in TBE-infected areas. Ticks may stay attached for several days, but transmission can occur within seconds of being bitten.

#### Epidemiology

The European form of TBE is found in central and eastern Europe, particularly Austria, southern Germany, the Baltic states (Estonia, Latvia, Lithuania), Czech Republic, Hungary, and Poland, and, to a lesser extent, in Scandinavian countries and the Adriatic coast of Italy.

The Far-Eastern form of TBE is found from northeast Europe to China and Japan; a Siberian form extends from northern Europe across Russia through Siberia.

#### Risk

Travelers in TBE-infected areas are at risk during spring, summer, and autumn when hiking or camping in rural areas, woodlands, farmland, and the taiga forest in Russia. Ticks crawl onto humans in search of a blood meal. Walking in peri-urban parks in some northern European towns may also pose a risk.

#### Symptoms

Symptoms of TBE include flu-like symptoms and fever, usually beginning 1-2 weeks after a bite occurs; nausea, dizziness, and muscle aches follow shortly thereafter. These symptoms usually resolve after about a week; however, in some cases the illness proceeds to a second phase that can be very serious, with fever accompanied by neurological symptoms and muscle paralysis.

#### Need for Medical Assistance

Travelers who develop a generalized illness or marked local reaction within 2-3 weeks of a known tick bite should seek medical advice.

### PREVENTION

#### Non-Vaccine

Observe tick precautions when in a risk area.

- Hikers should wear long trousers tucked into boots; ticks are easier to spot on light-colored clothing.
- N,N-diethylmetatoluamide (DEET) should be applied directly to skin.

- Permethrin-containing compounds should be used on clothing, camping gear, bed netting, and screens.
- Campers should avoid sites close to animal habitation and sleep in screened tents.
- After visiting a tick-infested habitat, a thorough body search and removal of ticks, preferably with forceps, reduces the risk of infection.
- Travelers should avoid unpasteurized dairy products, especially goat milk.

## Vaccine

Vaccination may be indicated for travel to some countries. Travelers who cannot obtain TBE vaccine in their home country should make arrangements to receive the vaccine upon arrival at destination, if possible. (TBE vaccines are not available in the United States.)

A primary series usually requires 3 doses over a period of up to 1 year. Booster doses are required for persons who remain at risk or who are at new risk.

TBE vaccine is 90-100% effective after 3 doses.

## Who Should Receive the Vaccine

TBE vaccine is recommended for:

- Travelers with prolonged stays that include hiking, camping, agricultural work, or similar outdoor activities in wooded regions of risk areas
- All long-term urban expatriates in highly endemic countries due to the likelihood of occasional rural travel or exposure in the outskirts of urban areas
- Travelers who consume unpasteurized dairy products (milk or cheese) from goats, sheep, or cows

## Who Should Not Use the Vaccine

- Persons who have had a severe allergic reaction to a previous dose of TBE vaccine generally should not receive the vaccine.
- Persons who have a severe egg allergy should receive the vaccine only under close monitoring.
- The safety of TBE vaccine has not been established when used during pregnancy or breastfeeding.

## Risks and Side Effects

Side effects are usually mild to moderate local reactions (redness and swelling at the injection site).

Fever, headache, tiredness, dizziness, nausea and vomiting, diarrhea, and muscle aches have been reported in a small proportion of people receiving this vaccine. Fever is common in very young children, occurs occasionally in older children, and is infrequent in adults.

## Timing

Two or three doses are given for the primary series, usually over a period of 1 year.

- Depending on the vaccine used, doses are given at 0, 1-3 months, and 5-12 months after dose 2; or at 0 and 1-7 months, followed by a booster 12 months after dose 2.
- Several accelerated schedules are also available.

Boosters are given 3-5 years later if at continued or new risk.