

## JAPANESE ENCEPHALITIS

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### GENERAL INFORMATION

#### Introduction

Japanese encephalitis (JE) is a potentially severe viral disease caused by infected mosquitoes. JE is the leading cause of mosquito-borne encephalitis (brain inflammation) in Asia.

#### Transmission

Humans become infected through the bite of an infected *Culex* mosquito.

The natural cycle of transmission is between wading birds and mosquitoes that breed in rice fields and pools of water. The mosquitoes become infected when they bite birds that carry the JE virus and then pass it on to humans. Domestic pigs can also carry the virus and can increase transmission around villages.

#### Epidemiology

JE virus is found in a wide belt from Japan and northern coastal China, throughout Southeast Asia, and across India to Pakistan. It is present through the Western Pacific islands from Indonesia to Papua New Guinea and as far north as the Philippines.

In temperate zones (Japan and China) transmission is seasonal, occurring toward the end of the summer rains. In tropical zones (including Thailand, Vietnam, Indonesia, and the Philippines) transmission is year-round. However, altitude and local variations in rainfall and temperature affect mosquito breeding and place and seasonality of transmission. As a result, precise definitions of risk areas are not always possible.

#### Risk

Risk of infection is greatest in rural and agricultural areas where mosquitoes can feed on birds wading in rice fields. In many parts of Asia, similar conditions exist within or near the outskirts of cities and towns close to agriculture. Among local populations, about 50,000 cases are reported annually. Children are at highest risk.

Risk factors can include long duration of stay, travel in countries with large populations of domesticated pigs (Thailand, Bali, China), seasonal travel, rural travel, residence on or near a farm, staying in unscreened accommodations, and participating in trekking or other outdoor activities. However, cases have occurred in short-term visitors traveling out of season and whose only rural travel has been to beach resorts. So far, no case has been reported among purely urban travelers.

- Overall risk is very low for short-term travelers and those who confine their travel to urbanized areas or brief daytime exposures during typical tourist excursions.
- Risk is greatest for travelers and expatriates staying for prolonged periods in rural areas where JE is endemic or epidemic.
- Travelers with extensive unprotected outdoor, evening, or nighttime exposure in rural areas (activities such as biking, hiking, camping, and certain occupational activities) might be at high risk even if the trip is brief.

#### Symptoms

The incubation period is 6-16 days. Onset of illness is abrupt, with high fever, nausea, vomiting, headache, and altered mental status. Convulsions, muscular paralysis, and respiratory difficulties may follow.

In a study of 55 cases of travelers with JE, 10 died (case fatality rate 18%). Of those who survived, 24 (44%) had sequelae, 12 recovered completely, and 9 had an uncertain outcome. Sequelae were severe (neuropsychological

or physical, including total incapacitation) in 10 cases (42%), and non-severe (mild tremor, poor concentration, or memory problems) in 7.

Among local residents, more than 99% of infections are asymptomatic; asymptomatic rates among travelers are not known.

### **Need for Medical Assistance**

Medical assistance should be sought in the event of onset of acute fever within 16 days of leaving an endemic zone, especially if there are neurological symptoms. JE should be considered a possible cause of fever in travelers recently returned from Asia.

### **PREVENTION**

**Non-Vaccine:** Mosquito precautions in late afternoon, evening, and nighttime are recommended when in risk situations, regardless of vaccination status. See Insect Precautions.

**Vaccine:** Cell culture vaccines are safe and effective, and are available in the U.S. and elsewhere. These vaccines induce protective antibody in 100% of recipients within 7 days of administration of the second dose of a 2-dose primary series.

- Ixiaro, a cell culture vaccine available in the U.S., is licensed for persons aged 2 months and older.

### **Who Should Receive the Vaccine**

#### ***Routine***

Vaccination is routinely recommended for laboratory workers with a potential for exposure to JE virus.

#### ***Travel***

Vaccination is recommended for:

- Laboratory workers with a potential for exposure to JE virus
- Certain travelers:
  - Those with prolonged stays or frequent short stays in rural farming areas of countries at risk, particularly in areas where flooding irrigation is practiced
  - Those who are traveling to an area with a current known epidemic or outbreak
  - Those with shorter rural travel to endemic areas during transmission season by persons with extensive outdoor exposure (e.g., hikers, bikers, adventure travelers)
  - Long-stay urban expatriates, due to likelihood of occasional rural travel or repeated short visits to endemic areas of the country
  - Risk-averse travelers desiring maximum pre-travel protection and traveling for short stays in risk areas, because very occasional sporadic cases have occurred in this situation

Vaccination may be considered for:

- Short-term (less than a month) travel to endemic areas during the JE transmission season if the traveler plans to travel outside of an urban area and will have an increased risk for JEV exposure
- Travel to endemic areas if the traveler is uncertain of specific destinations, activities, or duration of travel

### **Who Should Not Receive the Vaccine**

Vaccination is not recommended for short-term travelers (less than 1 month) whose travel will be limited to urban areas or limited to brief, daytime-only tours to risk areas.

Other persons who should not receive this vaccine include:

- Persons who have had a severe allergic response to a previous dose or to a constituent of the vaccine
- Pregnant and nursing women, unless the benefit of the vaccine clearly outweighs the disease risk
- Persons who are moderately or severely ill usually should wait until they recover before getting this vaccine.
- Persons with a bleeding disorder should discuss with their health care providers options for receiving this vaccine, because it is given intramuscularly (IM).

### **Risks and Side Effects**

The most common local side effects are pain, swelling, redness, and tenderness at the injection site. Systemic reactions are generally mild and include headache, muscle aches, influenza-like illness, and fatigue.

There is a rare chance that serious problems or even death could occur after receiving any medicine or vaccine. If a significant or unusual problem occurs after receiving the vaccine, the patient should call or visit the health care provider.

### **Timing**

#### Primary series:

Ixiaro: 2 doses given 28 days apart

#### Booster:

- One (1) booster dose of Ixiaro is given if the primary Ixiaro series was given 1-2 years previously.
- One (1) booster dose of Ixiaro is given if a primary series of JE-VAX (an older, mouse brain vaccine that is no longer available) or other mouse brain vaccine was given 2 years previously.

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