Japanese Encephalitis

Revision Dates

| Case Definition                                      | March 2011 |
| Reporting Requirements                               | May 2018   |
| Remainder of the Guideline (i.e., Etiology to References sections inclusive) | March 2011 |

Case Definition

**Confirmed Case**
Clinical illness(A) with laboratory confirmation of infection:
- Isolation of japanese encephalitis virus (JE) from an appropriate clinical specimen
- Detection of JE viral nucleic acid (e.g., PCR) in an appropriate clinical specimen
- Seroconversion or significant difference between acute and convalescent phase JE HAI titres ideally taken at least 2 weeks apart and confirmed by PRNT(B,C).

**Probable Case**
Clinical illness(A) and one of the following:
- Seroconversion or significant difference between acute and convalescent phase JE HAI titres ideally taken at least 2 weeks apart but not confirmed by PRNT(B)
- Stable elevated serial HAI titres(D) to JE that occur during a period when and where arboviral transmission is likely(E)
- Single elevated HAI titre(D) to JE that occurs during a period when and where arboviral transmission is likely(E).

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(A) Clinical illness is characterized by a febrile illness of variable severity associated with neurological symptoms ranging from headache to aseptic meningitis or encephalitis. Arboviral encephalitis cannot be distinguished clinically from other central nervous system (CNS) infections. Symptoms can include headache, confusion or other alteration in sensorium, nausea and vomiting. Signs may include fever, meningismus, cranial nerve palsies, paresis or paralysis, sensory deficits, altered reflexes, convulsions, abnormal movements and coma of varying degree.

(B) Seroconversion indicates recent infection with a flavivirus (e.g., dengue fever, California serogroup, West Nile virus or yellow fever) but cannot pinpoint which one due to antibody cross-reactivity. These are considered probable cases. PRNT confirmatory testing may be requested at National Microbiology Laboratory through the PLPH.

(C) Recent immunization with JE vaccine should be considered when interpreting results although it is not known how extensive it cross reacts with other flaviviruses (personal communication, K Fonseca, PLPH, September 16, 2010).

(D) A single elevated antibody titre ≥ 1:320 by HAI suggests recent infection. It is recommended that a second specimen be collected. A second laboratory result with a stable (unchanged/static or ≤ 2-fold rise) elevated antibody titre is suggestive of recent infection.

(E) JE exposure is most likely to occur at any time in western Pacific islands from the Republic of Korea to the Philippines and to Pakistan, through southern and SE Asia, extending to far North Queensland, Australia.
Reporting Requirements

1. **Physicians, Health Practitioners and others**
   
   Physicians, health practitioners and others shall notify the Medical Officer of Health (MOH) or designate of the zone, of all confirmed acute cases in the prescribed form by mail, fax or electronic transfer within 48 hours (two business days).

2. **Laboratories**
   
   All laboratories shall report all positive laboratory results by mail, fax or electronic transfer within 48 hours (two business days) to the:
   
   - Chief Medical Officer of Health (CMOH) (or designate), and
   - MOH (or designate) of the zone.

3. **Alberta Health Services and First Nations and Inuit Health Branch**
   
   - The MOH (or designate) of the zone where the case currently resides shall forward the initial Notifiable Disease Report (NDR) of all confirmed and probable cases to the CMOH (or designate) within two weeks of notification and the final NDR (amendment) within four weeks of notification.
   
   - For out-of-province and out-of-country reports, the following information should be forwarded to the CMOH (or designate) by phone, fax or electronic transfer within 48 hours (two business days):
     
     - name,
     - date of birth,
     - out-of-province health care number,
     - out-of-province address and phone number,
     - positive laboratory report, and
     - other relevant clinical / epidemiological information.
Etiology
Japanese encephalitis virus (JE) is a member of the Flaviviridae family along with Powassan encephalitis, St. Louis encephalitis, West Nile virus and yellow fever. (1) It is a single-stranded RNA virus.

Clinical Presentation
Most human cases of JE are asymptomatic. (2) It has been estimated that the ratio of symptomatic disease to asymptomatic infection ranges from 1:25 to 1:1000. (3) Symptoms can range from mild (fever and headache), to severe (acute onset of headache, high fever, meningeal signs, altered mental state, tremors, occasionally convulsions and rarely acute flaccid paralysis). (1; 4) In children, gastrointestinal pain and dysfunction may predominate initially; convulsions are also common. (3) Neurological sequelae, including permanent disability, can occur in up to 50% of cases and the case fatality rates can be as high as 25% (mostly in children under the age of 10). (3; 5; 6)

Diagnosis
The diagnosis of JE is based upon evidence of a diagnostic rise or decrease in JE virus specific antibody titres taken during the acute and convalescent phases of illness. Virus-specific antibodies are usually detectable 7 to 10 days after the onset of illness. (7) Viremia in humans is brief and neutralizing antibodies are usually present by the time distinctive clinical symptoms are recognized. (3; 7)

Epidemiology
Reservoir
JE virus is found mainly in wild and domesticated animals such as pigs and birds. (1) Pigs have prolonged and elevated viremias; birds can maintain, amplify and spread JE to new geographical areas. (3)

Transmission
JE virus is transmitted by the bite of an infected mosquito, mainly Culex tritaeniorhynchus and C. vishnui complex, night-time biters that breed in stagnant water such as rice paddy fields. (1; 3) Humans can also become infected coincidentally through proximity to JE virus-infected animals and birds. (3)
JE virus, rarely, may also be transmitted person-to-person through blood transfusion, organ transplantation, intrauterine transmission and possibly breast milk. (9)

**Incubation Period**
The incubation period is 4 to 15 days, average of 6 to 8 days. (1)

**Period of Communicability**
Humans can be infectious to mosquitoes while viremic (first few days of illness) but not to other humans except in special circumstances (see Transmission). (1) Mosquitoes are infective for life.

**Host Susceptibility**
Young children in endemic areas are most susceptible since older children and adults generally acquire immunity through earlier asymptomatic exposure; the elderly are also affected. (4)

**Occurrence**

**General**
JE is the most common cause of encephalitis in Asia. (7) It is most prevalent in South East Asia and the Far East and can occur year round, although epidemics usually begin during the rainy season. (10) In temperate areas of Asia, transmission of JE in humans usually peaks in the summer and fall. (7;10) The incidence has been decreasing in some areas of Asia (e.g., China, Japan) while increasing in other areas (e.g., Thailand, India and Bangladesh). (10)

It is estimated to cause 50,000 cases and 15,000 deaths worldwide each year. (4;11) It is estimated that the overall risk for JE virus transmission to travellers to Asia is low, roughly 1:1,000,000; however, this risk increases to 1:5,000 per month of travel for travellers going to rural areas in Asia during transmission season. (12)

**Canada**
JE is not nationally notifiable so it is difficult to estimate the burden of this travel-related disease in Canada. It may not normally be considered or tested for in the differential diagnosis of viral meningitis/encephalitis in Canada.

**Alberta**
JE became notifiable in Alberta in 2011. Information in this section will be updated as it becomes available.

**Key Investigation**

**Single Case/Household Cluster**
- Determine history of recent living in, immigration from or travel to Asia and northern Australia including:
  - geographic location,
  - season,
  - duration of exposure, and
  - occupational and recreational activities (while travelling).
- Determine history of mosquito bites.
- Determine immunization history (i.e., recent receipt of JE vaccine).
Control
Management of a Case
- Supportive care.
- Routine practices for hospitalized individuals.

Treatment of a Case
- There is no specific treatment for JE; treatment is provided for the relief of symptoms.

Management of Contacts
- There is no follow-up of contacts as the disease is not generally spread directly from person to person (see Transmission), but rather person-mosquito-person. It may be prudent to identify others who may have been in the same location in the two weeks prior to the case becoming ill to find unreported or undiagnosed cases.

Preventive Measures
- Travelers should be advised to confirm their need for JE vaccine with the appropriate clinic before traveling and receiving the vaccine.
  - Immunize with JE vaccine prior to travel when appropriate.
- Use mosquito precautions.
  - Remain in well screened or completely enclosed, air-conditioned areas when mosquitoes are active.
  - Wear loose fitting, light colored clothing with full length pant legs and sleeves.
  - Use insect repellent (e.g., DEET containing) on exposed skin and clothing.
References


