

## 6.11 Yellow Fever

### Case Definition

#### Confirmed Case

Clinical illness with laboratory confirmation of infection:

- isolation of yellow fever virus

**OR**

- detection of yellow fever viral antigen in body fluids or tissue

**OR**

- detection of yellow fever nucleic acid in body fluids or tissue

**OR**

- a significant (i.e. fourfold or greater) rise in antibody titre to the yellow fever virus in the absence of yellow fever vaccination

**OR**

- a single elevated yellow fever IgM antibody titre in the absence of yellow fever vaccination within the previous two months

#### Probable Case

Clinical illness with laboratory evidence of infection:

- a stable elevated antibody titre to yellow fever virus with no other known cause
- cross-reactive serologic reactions to other flaviviruses must be excluded, and the patient must not have a history of yellow fever vaccination

#### Clinical Presentation

Yellow fever is a mosquito-borne viral illness characterized by acute onset of fever and constitutional symptoms followed by a brief remission and a recurrence of fever, hepatitis, albuminuria and, in some instances, renal failure, shock and generalized hemorrhages. The onset of clinical symptoms can take between 3 and 5 days.

- Symptoms usually include sudden onset of fever, headache, joint pain, loss of appetite, abdominal pain, vomiting and dehydration. Most patients recover after this stage.
- Severe cases, can lead to shock, internal bleeding, jaundice (yellowing of the skin and eyes) and organ failure. This occurs in about 15% of patients. The case fatality ratio for those who develop severe yellow fever disease is 15-50%.

## Diagnosis

Clinical signs and symptoms must be confirmed by laboratory test findings.

## Epidemiology

### Occurrence

Yellow fever is endemic (always present) in many tropical areas of South America and Africa. In South America, the countries considered to have the greatest risk of contracting yellow fever include Bolivia, Brazil, Colombia, Ecuador and Peru. Several Caribbean islands are also at low risk for epidemics. Countries at risk for yellow fever in Africa are typically situated on or around the equator. Yellow fever is not endemic in Asia, however since both the mosquitoes and the non-human primates are present in different parts of Asia, there is potential for future epidemics.

### Reservoir

The main source of Yellow fever is infected mosquitoes- mainly the *Aedes aegypti*, however other *Aedes* species in Africa and *Haemagogus* species in South America also play a role in transmission. A secondary source of Yellow fever is infected humans who carry the disease with them into areas where mosquitoes are capable contracting and spreading the disease.

### Transmission

Spread through the bite of infected mosquitoes. These mosquitoes are domestic, wild, or semi-domestic types. Non-human primates (monkeys) can also be infected with the yellow fever virus, which allows for the virus to remain present in the absence of human hosts.

### Incubation Period

3-6 days in humans; 9-12 days in infected mosquitoes at usual tropical temperatures.

### Period of Communicability

Blood of patients is infective for mosquitoes shortly before the onset of fever and for the first 3-5 days of illness. However the virus has been found in the blood up to 17 days after illness onset. Mosquitoes remain infected for life.

## Control Measures

### Management of Cases

- Reported to the local health authority: Events involving yellow fever are required to be assessed at a national level for potential notification to the

World Health Organization under the *International Health Regulations* (<http://www.who.int/ihr/en/>).

- Isolation: Contact precautions. Prevent access from mosquitoes to patient for at least 5 days after the onset (screening the sickroom, spraying quarters with residual insecticide, and using insecticide-treated bed-nets).
- Disinfect: The homes of patients promptly with an effective insecticide.

### Management of Contacts

- Concurrent disinfection: Disinfect the homes of all contacts as well as homes in the general vicinity promptly with an effective insecticide.
- Immunization of all contacts: Family, neighbors and all other contacts who have not been immunized should be vaccinated promptly

### Management of Outbreaks

- Investigation of contacts and source infection: inquire about all contacts and all places including travel history and forested areas visited by cases, 3-6 days before onset to locate focus of yellow fever; observe other people visiting that area.
- Search places such as the home, place of residence and visiting premises of the case/patient within in several days for mosquitoes capable of transmitting the disease. Apply effective insecticide and investigate unexplained illness/deaths that may suggest yellow fever.
- Mass immunizations beginning with those most exposed to mosquitoes (specifically *Ae. aegypti*-infested areas) and who have not been vaccinated in the last 10 years. Immediately immunize all those living next to forest settings if outbreak occurs in a rural/jungle area.
- Ensure those immunized avoid yellow fever focused areas, such as forested areas where there are potentially infected mosquitoes, for 7-10 days.
- Eliminate or treat all actual and potential breeding locations

### Education and Preventive Measures

- Create a public health program that vaccinates everyone over the age of 9 months against Yellow fever in areas where people are at risk of being infected due to residence, occupation or travel.
- When travelling to endemic areas, travelers should be vaccinated or re-vaccinated every 10 years before trips.
- In urban areas where yellow fever is present, control measures such as mosquito nets and bug repellent could be used to eradicate the vector.
- People who are exposed to areas that make them susceptible to mosquito bites should wear long pants and sleeves/use bug spray.  
(<http://www.phac-aspc.gc.ca/tmp-pmv/info/yf-fj-eng.php>)

## **Reporting Requirements and Procedures**

- Physicians, laboratories and communicable disease control nurses (CDCNs), and infection control practitioners (ICPs) must immediately report suspect or confirmed cases to the Regional Medical Officer of Health (RMOH)
- RMOH office will notify local physicians, nurse practitioners, environmental health officers, community health nurses, CDCNs, and ICPs, in the particular region as required for follow-up and case investigation
- RMOH reports to provincial office as per list B
- CDCN enters the case into the electronic reporting system and completes an outbreak report form if indicated
- Provincial Disease Control
  - Reports the identified case to other health regions
  - Reports the identified case to Public Health Agency of Canada
  - Provides an analysis of the case/s with reports in the Communicable Disease Report (CDR)