

# Typhus - Louseborne

## Revision Dates

Case Definition	July 2012
Reporting Requirements	May 2018
Remainder of the Guideline (i.e., Etiology to References sections inclusive)	October 2005

## Case Definition

### Confirmed Case

Clinical illness<sup>(A)</sup> with laboratory confirmation of infection:

- Seroconversion or significant (i.e., fourfold or greater) rise in antibody titre to *Rickettsia prowazekii* by IFA in acute and convalescent phase specimens ideally taken  $\geq$  three weeks apart<sup>(B)</sup>
- OR
- Detection of *R. prowazekii* nucleic acid (e.g., PCR) in an appropriate clinical specimen<sup>(C)</sup> (e.g., blood)
- OR
- Detection of *R. prowazekii* in an appropriate clinical specimen<sup>(C)</sup> by immunostaining (e.g., blood)
- OR
- Isolation of *R. prowazekii* from an appropriate clinical specimen<sup>(C)</sup> (e.g., blood).

*\*The following probable case definition is provided as a guideline to assist with case finding and public health management, and should not be reported to AH.*

### Probable Case\*

Clinical illness<sup>(A)</sup> with a single high ( $\geq 1:256$ ) IFA serologic titre<sup>(D)</sup>

OR

Clinical illness<sup>(A)</sup> in a person epidemiologically linked to a confirmed case.

<sup>(A)</sup> Clinical illness is characterized by a usually sudden and marked onset of symptoms, including headache, chills, prostration, fever and myalgia. A maculopapular rash appears on the upper trunk and extremities (about day 6) and spreads centrifugally. The face, palms and soles are spared.

<sup>(B)</sup> IFA is the most sensitive and specific method. However, it does not discriminate between louseborne and murine typhus unless extra pre-steps are done.

<sup>(C)</sup> Refer to the [Provincial Laboratory for Public Health \(ProvLab\) Guide to Services](#) for current specimen collection and submission information.

<sup>(D)</sup> It is recommended that a convalescent specimen be collected at least three weeks after the initial specimen if clinically indicated to either rule out or confirm infection.

## **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 and probable 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 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 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**

Louseborne typhus is caused by *Rickettsia prowazekii*. It closely resembles the agent that causes murine typhus (*Rickettsia typhi*). They exist in a classically commensal fashion with the insect vectors. *Rickettsia prowazekii* causes the death of its vector (human body louse).

Rickettsiae are bacterial organisms that are obligate intracellular parasites. Typhus group rickettsiae contain endotoxins. They survive only briefly outside a host (reservoir or vector).

## **Clinical Presentation**

The onset of epidemic or louseborne typhus is abrupt and is most frequently manifested by high fever, chills, and myalgia. It is often accompanied by severe headache and malaise. Influenza-like illness is often suspected. A rash appears 4 – 7 days later. Typically, it begins as small pink macules on the trunk and spreads to the limbs with a concentrated eruption in the axillae. The rash becomes petechial or hemorrhagic and may develop into brownish pigmented areas. The face, palms, and soles are not usually affected. Mental status changes with delirium and coma frequently occur. Renal failure or myocardial failure may occur in severe disease. The case fatality rate is from 10 – 40% in the absence of treatment for severe disease.(1) The disease, when mild and untreated, is self-limited lasting about two weeks

Brill-Zinsser disease (a relapse) may occur years later. Affected individuals have either acquired louseborne typhus earlier or lived in an endemic area.(2) It occurs primarily in immigrants from Eastern Europe who were initially infected during World War II. The factors that reactivate the rickettsiae are not known but it is presumed to be precipitated by stress or a waning immune system. The illness is similar to the primary infection but tends to be milder and shorter in duration. The febrile course lasts 7 – 10 days and the rash is often evanescent or absent. There is no risk of mortality.(2)

## **Diagnosis**

The diagnosis is most often made by visualization of rickettsiae in tissues, isolation of the organism, detecting rickettsiae by PCR or the testing of serum specimens obtained during the acute and convalescent phases of the disease. The IFA test is preferred. Specific antibody testing will differentiate louseborne from murine typhus.

## **Epidemiology**

### **Reservoir**

Humans are the principle reservoir and the human body louse is the vector. Humans are responsible for maintaining the infection during interepidemic periods. Flying squirrels may be associated with sporadic cases.

### **Transmission**

The body louse (*Pediculus humanus corporis*) becomes infected while feeding on the blood of an individual with acute typhus fever. An individual becomes infected by rubbing feces or crushing lice into the bite or other superficial abrasions. The infected lice excrete rickettsiae in their feces and often defecate at the time of feeding. In rare circumstances, the inhalation of infected louse feces in dust may account for infections. Direct person-to-person transmission does not occur in the absence of the vector. Transmission from the flying squirrel may be through the bite but this is not documented. The infectious dose is fewer than 10 organisms.(1)

### **Incubation Period**

The incubation period is from 1 – 2 weeks and is most commonly 12 days.

### **Period of Communicability (1)**

The disease is not directly transmitted person-to-person; rather it is passed from an infective person to louse to person. Individuals are infective (for lice) during the febrile illness and possible for two to three days after the temperature returns to normal. The louse passes the rickettsiae within 2 – 6 days after exposure, or earlier if crushed. The louse will die within two weeks after infection. The rickettsiae may remain viable in the dead louse for weeks.

### **Host Susceptibility**

Susceptibility is general. One attack confers life-long immunity.

### **Occurrence**

#### **General**

Cases are rare but have occurred throughout the world. Areas where poverty, crowding, poor sanitary conditions, lack of bathing, and poor personal hygiene exist are all contributors to the spread of lice and therefore, disease. Louseborne typhus is endemic in the mountainous regions of Central and South America, in Africa, and Asia. The last louseborne outbreak in the United States was in 1921. The disease now exists as a zoonosis of flying squirrels.(1)

#### **Canada**

Although typhus cases have been reported in Canada, the incidence cannot be obtained. Louseborne typhus is not a nationally notifiable disease.

#### **Alberta (3)**

No specific information on louseborne typhus is available, however, one case of typhus was reported in 2001 (type unknown).

## **Key Investigation**

### **Single Case/Household Cluster**

- Assess for recent infestation with body lice or recent contact with flying squirrels.
- Determine recent camping or occupational exposure.
- Identify contacts. Contacts include:
  - persons living in the same household and
  - persons exposed to the same source.

## **Control**

### **Management of a Case**

- Thorough delousing of the individual.
- Consultation with an infectious diseases physician is advised.

### **Treatment of a Case (1)**

- If the individual is seriously ill with possible louseborne typhus, treatment should be started without waiting for laboratory confirmation.
- Chloramphenicol and tetracycline are both effective against louseborne typhus. The treatment is typically 7 – 10 days in duration but should be continued for 2 – 3 days after defervescence.
- Treatment before serious complications occur generally eliminates fatal illness.

**Management of Contacts**

- Keep all contacts under surveillance for two weeks.(1)
- Thoroughly delouse all contacts. Several applications of an appropriate insecticide may be necessary as the lice eggs may be resistant to most insecticides.
- Wash clothing in hot water to kill lice and eggs.

**Preventive Measures**

- Control of the human body louse and conditions that foster proliferation i.e., infrequent bathing and changing of clothes, crowded conditions, and the presence of lice.
- Prevent flying squirrels from living in human dwellings.

## References

- (1) Public Health Agency of Canada. *Infectious substances: Rickettsia prowazekii, rickettsia canadensis (Formerly R. canada)*. Office of Laboratory Security. Material Safety Data Sheet. January 2001.  
<http://www.phac-aspc.gc.ca/msds-ftss/msds128e.html>
- (2) *Rickettsial infections*. The Merck Manual Second Home Edition Online. Infections. 2004.  
<http://www.merck.com/mmhe/sec17/ch195/ch195a.html>
- (3) Alberta Health and Wellness, Disease Control and Prevention. *Communicable Disease Reporting System*. May 2003.