Communicable Diseases Protocol

Tularemia

Last updated: 5 May 2017

Public health priority:
Urgent

PHU response time:
Respond to any probable or confirmed cases immediately. Report to Communicable Disease Branch (CDB) on day of identification.

Case management:
PHU should identify the likely source of infection.
If the case is likely to have acquired the disease in Australia, a thorough assessment of the circumstances and a search for other cases is required.

Contact management:
Contacts will be those who may have been exposed to the same source as the case. Management would normally involve collaboration with environment and wildlife authorities (if locally acquired) or communicable disease authorities abroad (if overseas acquired).

1. Reason for surveillance

- To identify cases rapidly in order to control further exposures.

2. Case definitions

Probable case
A probable case requires laboratory suggestive evidence AND clinical evidence.

Laboratory suggestive evidence

- Isolation of a Gram-negative bacillus suggestive of *Francisella tularensis* where the organism identity and pathogenicity have not yet been confirmed by a reference laboratory, OR
- Detection of *F. tularensis* by nucleic acid testing, OR
- Detection of characteristic Gram-negative rods suggestive of *F. tularensis*, confirmed by a reference laboratory.

Clinical evidence
A clinically compatible illness.

Confirmed case
A confirmed case requires laboratory definitive evidence.

Laboratory definitive evidence
Isolation of *F. tularensis.*

Factors to be considered in case identification

- Given laboratory confirmation in 2016 of *F. tularensis* (type B) in ringtail possums in NSW and following two reported cases in humans scratched/bitten by ringtail possums in Tasmania, presence of the organism in susceptible animals and the environment needs to be considered in further investigations.
- Due to the low index of suspicion for tularemia in Australia by clinicians, and the lack of specialised diagnostic testing techniques such as NAT, direct fluorescent antibody (DFA), and immunohistochemistry tests, diagnosis of early cases is likely to be delayed. Suspicion of local transmission may be triggered by exposure to Australian wildlife in people with no overseas travel history.
- Exposures in suspected cases with a travel history overseas should be considered in light of the epidemiology and known sources of tularemia transmission in countries visited.
- Serendipitious discovery of the organism in the laboratory is another possibility and this is more likely to occur as a result from direct examination of specimens or by culturing the organism. *F. tularensis* is only occasionally isolated from blood so positive cultures are more likely to result from respiratory specimens.
- Handling *F. tularensis* can represent a biosafety hazard and specialised laboratory safety procedures are required.

Laboratory testing process

- CIDML at ICPMR-Pathology West is the only human health laboratory in NSW that can test for *F. tularensis*. If a case is suspected to have tularemia or a suspected isolate is cultured from clinical samples by a pathology provider the on-call microbiologist at CIDML should be contacted immediately by the treating physician to determine appropriateness of tests, timelines of testing and specimen transport etc.

3. Notification criteria and procedure

Tularemia is to be notified to the PHU by laboratories (ideal reporting by telephone on same day as notification).

4. The diseases

Infectious agent
The bacterium *Francisella tularensis*, a Gram-negative rod.

Two types of *F. tularensis* occur, A and B. Type A is highly virulent in humans and animals and is the most common sub-type in North America. Type B usually produces a mild ulceroglandular infection, is less virulent, and is thought to cause most of the human cases in Europe and Asia. Both A and B types are found in a diverse range of mammals including rodents and rabbits, and can also be isolated from contaminated water, soil and vegetation.

To date, only Type B (*F. tularensis* subspecies *holarctica*) has been isolated from common ringtail possums (Pseudocheirus peregrinus) in NSW. There have been two reported cases of human transmission after scratches/bites by ringtail possums in Tasmania. These are the first records of *F. tularensis* in Australia and the southern hemisphere. In countries where tularemia is endemic, Type B is also associated with streams, ponds, lakes, rivers and from diseased semi-aquatic animals such as beavers and muskrats, and infected blood feeding arthropods including ticks.

Of the possible agents that could be used in a bioterrorist attack, *F. tularensis* is included in the high risk category (Tier 2 security sensitive biological agent under the *National Health Security Act 2007*).

Mode of transmission
The bacteria can enter the body through the skin, eyes, mouth, throat or lungs. Infection can be acquired by:

- Skin contact with sick or dead *infected* animals, including bites/scratches
- Bites of *infected* blood-feeding arthropods, such as ticks and deer fly
- Drinking contaminated water or eating undercooked meat of an *infected* animal
- Laboratory exposure
- Inhalation of contaminated dusts or aerosols.

In Australia:

- Bite/scratch from *infected* ringtail possums should be considered suspicious

The risk of transmission from other native Australian marsupials or insects cannot be excluded.

F. tularensis is listed by the Centers for Disease Control as a potential agent for bioterrorism. It is not spread from person to person.

Timeline
The incubation period for tularemia ranges from 1-14 days, but is usually 3-5 days. *F. tularensis* bacteria are hardy, and can survive weeks to months in the environment.

Clinical Presentation and Course
Tularemia can manifest as one or more clinical syndromes. The syndrome depends on the route of transmission, the size of the inoculum, and the virulence of the infecting strain. However, most cases are characterised by a rapid onset of headache, chills, nausea, vomiting, high fever, lymphadenopathy and prostration.

Illness usually falls into one of the following categories:

- *Ulceroglandular*: (80% of cases) this is the most common type and follows inoculation via a skin lesion. Patients present with a primary local ulcerative lesion and tender, regional lymphadenopathy. Systemic symptoms are prominent
- *Pneumonic (pulmonary)*: occurs as a primary infection following inhalation of organisms, and in 10-15% of those with ulceroglandular tularemia and 50% of those with typhoidal tularemia. The presenting symptoms are those of atypical pneumonia. This form is the most probable one in the event of a bioterrorist attack. Untreated, it has a 30-60% mortality rate
- *Typhoidal*: (10% of cases) a severe form of tularemia, with prominent systemic and gastrointestinal symptoms. Half the cases will develop pneumonic tularemia
- *Oculoglandular*: (1% of cases) a combination of painful conjunctivitis (usually unilateral) with local lymphadenopathy. Follows inoculation via the conjunctiva
- *Glandular*: similar to ulceroglandular form but without skin lesions
- *Oropharyngeal*: a rare form that occurs after ingestion of organisms. The patient develops stomatitis or pharangitis accompanied by regional lymphadenopathy.

5. Managing single notifications

Response time

Investigation
On the same day as notification of a probable or confirmed case, begin the investigation and telephone the Communicable Diseases Branch (CDB).
In the situation of a suspected deliberate exposure contact CDB immediately.

Data entry
Within 1 working day of notification, enter probable and confirmed cases on NCIMS.

Response procedure
Given the recent isolation of *F. tularensis* in ringtail possums for the first time in Australia, and unknown status of the bacterium in other Australian wildlife, early response to a notification is required to better understand the epidemiology of tularemia in Australia.

The response to a notification will normally be carried out in collaboration with the case's health carers, but regardless of who does the follow-up, PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend the tests be done
- Determine if the case or relevant care-giver has been informed of the diagnosis is before beginning the interview
- Seek the doctor's permission to contact the case or relevant care-giver
- Determine the likely source of infection, such as a laboratory that handles infectious specimens, local exposures or exposure overseas
- If found to be locally acquired, coordination with the Department of Primary Industries for further wildlife or environmental assessments of causal agent will be coordinated by CDB

Case management

Investigation and treatment
See the latest edition of the *Therapeutic Guidelines: Antibiotic.*

Education
The case or relevant care-giver should be informed about the nature of the infection and the mode of transmission.

Exposure investigation
Obtain a history of overseas and domestic travel as well as possible exposures to wild or domestic animals (including common ringtail possums), farms, recent tick bites, contact with or drinking water from natural sources including lakes, rivers, streams and ponds, and eating wild game or potentially contaminated imported products, in the two weeks prior to symptom onset.

Isolation and restriction
Standard precautions.

Environmental evaluation
In the case of local acquisition, environmental evaluation would be recommended in conjunction with officials from NSW Department of Primary Industries, who may need to initiate animal control measures.

Contact management

Identification of contacts
Contacts are those who may have been exposed to the same source as the case. If the case is an imported one, communication with the relevant communicable diseases authorities in the country of acquisition would normally be carried out by CDB in collaboration with the Australian Government Department of Health.