

Ontario Public Health Standards:
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

Appendix 1: Case Definitions and Disease- Specific Information

Disease: Tularemia

Effective: May 2023

Tularemia

Communicable

Virulent

[Health Protection and Promotion Act \(HPPA\)](#)¹

[Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#)²

Provincial Reporting Requirements

Confirmed case

Probable case

As per Requirement #3 of the "Reporting of Infectious Diseases" section of the *Infectious Diseases Protocol, 2018* (or as current), the minimum data elements to be reported for each case are specified in the following:

- [O. Reg. 569](#) (Reports) under the HPPA;
- The iPHIS User Guides published by Public Health Ontario (PHO); and
- Bulletins and directives issued by PHO.^{3,4}

Type of Surveillance

Case-by-case

Case Definition

Confirmed Case

Laboratory confirmation of infection with clinically compatible signs and symptoms:

- Isolation of *Francisella tularensis* (*F. tularensis*) from an appropriate clinical specimen (e.g., blood, sputum)

OR

- A significant (i.e., fourfold or greater) rise in serum antibody titre to *F. tularensis*

antigen

Probable Case

Laboratory support of infection with clinically compatible signs and symptoms, and

- Detection of *F. tularensis* by nucleic acid amplification testing (NAAT)

OR

- Detection of *F. tularensis* in a clinical specimen (e.g., lymph node aspirates, ulcer exudate) by fluorescent assay

OR

- $\geq 1:128$ microagglutination titre or $\geq 1:160$ tube agglutination in a single serum specimen

Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.³

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified, if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

Outbreak cases may be classified by levels of probability (*i.e.*, confirmed and/or probable).

Given the rarity of tularemia in Ontario, the occurrence of two or more cases linked in time and place to a common exposure is suggestive of an outbreak.

Clinical Information

Clinical Evidence

- Clinically compatible signs and symptoms are characterized by several distinct syndromes, including the following:
 - Ulcero-glandular – cutaneous ulcer with regional lymphadenopathy;
 - Glandular – regional lymphadenopathy with no ulcer;
 - Oculoglandular – purulent conjunctivitis and palpebral ulcers with preauricular lymphadenopathy;
 - Oropharyngeal – stomatitis or pharyngitis, or tonsillitis and cervical lymphadenopathy;
 - Pneumonic – primary pleuropulmonary disease; and
 - Typhoidal – febrile illness without early localizing signs and symptoms.
- Clinical diagnosis is supported by evidence or history of a tick or deerfly bite, exposure to the tissues of a mammalian host of *F. tularensis*, or exposure to potentially contaminated food or water.

Clinical Presentation

Clinical presentation is typically sudden, with an abrupt onset of high fever, chills, fatigue, myalgia, nausea and headache. The nature of the illness depends on the site of inoculation and the virulence of the infecting organism, usually conforming to one of several clinical syndromes, including the following:

- Ulcero-glandular – cutaneous ulcer with regional lymphadenopathy at the entry site (most common);
- Glandular – regional lymphadenopathy with no ulcer;
- Oculoglandular – purulent conjunctivitis and punctate palpebral ulcers, with preauricular lymphadenopathy;
- Oropharyngeal – stomatitis or pharyngitis (with or without ulcers), or tonsillitis

and cervical lymphadenopathy, which may be unilateral;

- Pneumonic – primary (due to inhalation of the organism) or secondary (due to hematogenous spread of the organism to the lungs) pleuropulmonary disease; and
- Typhoidal – febrile illness without localizing signs and symptoms.^{5,6}

Laboratory Evidence

Laboratory Confirmation

Any of the following will constitute a confirmed case of tularemia:

- A significant (*i.e.*, fourfold or greater) rise in *F. tularensis* antibody titre
- Positive *F. tularensis* culture (See Approved/Validated Tests below)

Approved/Validated Tests

- *F. tularensis* serology
- Standard culture for *F. tularensis*
- Direct fluorescent antibody (DFA) for *F. tularensis* cellular antigens
- *F. tularensis* NAAT
- Slide agglutination for *F. tularensis*

Indications and Limitations

Not applicable.

For further information about human diagnostic testing, contact the [Public Health Ontario Laboratories](#).

Case Management

In addition to the requirements set out in the Requirement #2 of the “Management of Infectious Diseases – Sporadic Cases” and “Investigation and Management of Infectious Diseases Outbreaks” sections of the *Infectious Diseases Protocol, 2018* (or

as current), the board of health shall investigate cases to determine the source of infection.³ Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation.

Every case should be followed up as soon as possible to determine the source of exposure and eliminate the potential that the case is a result of bioterrorism.

Epidemiological investigation

Inquire about the following:

- Contact with animals, especially muskrats and rabbits;
- History of bite from ticks, flies or mosquitoes.

Provide education about the illness and how to prevent spread as mentioned above.

F. tularensis may also be used as a bioterrorism agent. If bioterrorism is suspected, the Provincial Emergency Operations Centre (PEOC) will be activated to coordinate and direct the province's response under the [Emergency Management and Civil Protection Act](#).⁷

Note: Given the potential for the appearance of tularemia cases to signal a bioterrorism incident, investigation and follow-up may involve notification of law enforcement. If tampering, sabotage, or bioterrorism is suspected, the health unit shall immediately notify their local police service and the Health System Emergency Management Branch (HSEMB) Health Care Provider Hotline at 1-866-212-2272. A bioterrorism event would trigger activation of the provincial emergency operations centre, including the HSEMB of the ministry and relevant health emergency response plans, as well as those additional ministries with responsibilities for security, law enforcement, or other relevant areas of concern, as identified in the [Emergency Management and Civil Protection Act](#) and associated Order in Council. The [Ministry Emergency Response Plan \(MERP\)](#) provides information on how the ministry would respond to a health emergency. Any requests for federal supplies of medical countermeasures for a tularemia bioterrorism incident must be made through HSEMB.^{7,8} The Provincial Emergency Operations Centre (PEOC) can be contacted by email at EOCOperations.MOH@ontario.ca.

Contact Management

None, except if exposed to a common source, then same as above.

Use of prophylactic antibiotics is recommended for children and adults after exposure to an intentional release of tularemia.² Please see the [Centers for Disease Control and Prevention Abstract](#) for case and contact management in this situation.⁹

Outbreak Management

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.³

The occurrence of two or more cases linked in time and place to a common exposure is suggestive of an outbreak.

Prevention and Control Measures

Personal Prevention Measures

Preventive measures:

- Provide education to the public about avoiding bites of ticks, flies, and mosquitoes; using insect repellent; wearing long sleeved shirts and pants and light coloured clothing to observe ticks more easily; and checking for ticks frequently;
- Educate the public about avoiding contact with untreated water;
- Provide education to hunters, trappers AND others that handle wildlife (e.g. wildlife rehabilitators); and
- Provide education about cooking game meat thoroughly and using impervious gloves when dressing game, especially rabbits.^{5,6}

Infection Prevention and Control Strategies

For hospitalized cases, routine practices are recommended.⁶

Refer to [PIDAC Routine Practices and Additional Practices in All Health Care Settings](#) (2012, or as current).¹⁰

Refer to [PHO's website](#) to search for the most up-to-date information on Infection Prevention and Control (IPAC).

Disease Characteristics

Aetiologic Agent - Tularemia (also known as rabbit fever) is a zoonotic bacterial disease caused by the bacterium *Francisella tularensis* (*F. tularensis*), which is a highly infectious, small, weakly staining, gram-negative, pleomorphic coccobacillus.^{5,6} The majority of human infections are caused by 2 subspecies that differ in distribution and virulence: *F. tularensis* subsp. *tularensis* (Jellison type A), and *F. tularensis* subsp. *holarctica* (Jellison type B).⁵ Both subspecies are found in North America.⁶

F. tularensis may be used as a potential bioterrorism agent.

Modes of Transmission - Humans become infected through tick bites, handling infected animal tissues, ingestion of contaminated food or water, and inhalation of contaminated aerosols (such as those generated while sorting contaminated hay or mowing).⁵ The average infectious dose for humans is estimated at 10 organisms by subcutaneous inoculation and 25 organisms by aerosol.⁵

Incubation Period – Related to size of inoculum; usually 3 – 5 days with a range of 1 – 14 days⁵

Period of Communicability - Person to person transmission has never been reported.^{5,6} Unless treated, infectious agent may be found in blood during first 2 weeks of disease and in lesions for a month; flies are infective for 14 days and ticks throughout their lifetime (two years); frozen rabbit meat has remained infective for more than three years.^{6,11}

Reservoir - Wild animals, especially rabbits, hares, voles, muskrats, beavers and some domestic animals, as well as various hard ticks (including American dog ticks or wood ticks, Rocky Mountain wood ticks, and lonestar ticks).⁵

Host Susceptibility and Resistance - All ages are susceptible, and long-term

immunity follows recovery; reinfection is extremely rare and has been reported only in laboratory staff.⁵

Please refer to [PHO's Reportable Disease Trends in Ontario reporting tool](#) for the most up-to-date information on infectious disease trends in Ontario.

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.

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Document History

Revision Date	Document Section	Description of Revisions
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.
March 2023	Bioterrorism	Addition of bioterrorism guidelines.
May 2023	Case Management	Addition of contact information.