

Appendix A: Disease-Specific Chapters

Chapter: Tularemia

Effective: February 2019

Tularemia

Communicable

Virulent

**Health Protection and Promotion Act:
O. Reg. 135/18 (Designation of Diseases)**

1.0 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.^{1,2} 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).¹ Both subspecies are found in North America.²

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

2.0 Case Definition

2.1 Surveillance Case Definition

Refer to [Appendix B](#) for Case Definitions.

2.2 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.

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.

3.0 Identification

3.1 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.^{1,2}

3.2 Diagnosis

See [Appendix B](#) for diagnostic criteria relevant to the Case Definitions.

For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the Public Health Ontario Laboratory Services webpage: <http://www.publichealthontario.ca/en/ServicesAndTools/LaboratoryServices/Pages/default.aspx>

4.0 Epidemiology

4.1 Occurrence

Tularemia is not internationally reportable. However, it occurs regionally throughout the northern hemisphere and has been reported throughout North America and in many parts of continental Europe, Central Asia, the Middle East, Russia, China and Japan.¹

Seasonality depends on the predominant mode of transmission and can be bimodal, with arthropod-associated infections occurring in the warmer months and rabbit-associated infections occurring in winter.¹

Tularemia is very rarely reported in Ontario. Four human cases were reported in Ontario from 2007 to 2017; two cases were reported in 2010, one in 2015 and one in 2017.*

F. tularensis is known to circulate in Ontario wildlife populations.

Please refer to Public Health Ontario's (PHO) Reportable Disease Trends in Ontario reporting tool and other reports for the most up-to-date information on infectious disease trends in Ontario.

<http://www.publichealthontario.ca/en/DataAndAnalytics/Pages/DataReports.aspx>

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

* Data included in the epidemiological summary are from January 1, 2013 to December 31, 2017. Data were extracted from Query on February 7, 2018 and therefore are considered preliminary.

4.2 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).¹

4.3 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).¹ The average infectious dose for humans is estimated at 10 organisms by subcutaneous inoculation and 25 organisms by aerosol.¹

4.4 Incubation Period

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

4.5 Period of Communicability

Person to person transmission has never been reported.^{1,2} 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.^{2,3}

4.6 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.¹

5.0 Reporting Requirements

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:

- *Ontario Regulation 569* (Reports) under the *Health Protection and Promotion Act* (HPPA);
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.⁴

6.0 Prevention and Control Measures

6.1 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.^{1,2}

6.2 Infection Prevention and Control Strategies

For hospitalized cases, routine practices are recommended.²

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

Refer to PHO's website at www.publichealthontario.ca to search for the most up-to-date information on Infection Prevention and Control.

6.3 Management of Cases

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. Refer to Section 5: 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.

Note: Given the potential for the appearance of tularemia cases to signal a bioterrorism incident, investigation and follow-up may involve the activation of the emergency management system in place in the province, including the Health System Emergency Management Branch of the Ministry of Health and Long-Term Care 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 an emergency. Please see the following link for further information:

http://www.health.gov.on.ca/english/providers/program/emu/emerg_prep/emerg_resp_plan.html

6.4 Management of Contacts

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 <https://emergency.cdc.gov/agent/tularemia/tularemia-biological-weapon-abstract.asp> for case and contact management in this situation.

6.5 Management of Outbreaks

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.

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

7.0 References

1. Heymann DL, editor. *Control of Communicable Diseases Manual*. 20 ed. Washington, D.C: American Public Health Association; 2015.
2. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: Tularemia. In: Kimberlin DW, Brady MT, Jackson MA, Long SS, editors. *Red Book: 2018 Report of the Committee on Infectious Diseases*. 31 ed. Itasca, IL: American Academy of Pediatrics; 2018.
3. Office of Laboratory Security, Public Health Agency of Canada. *Pathogen Safety Data Sheets: Infectious Substances – Francisella tularensis*. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2001. Available from: <https://www.canada.ca/en/public-health/services/laboratory-biosafety-biosecurity/pathogen-safety-data-sheets-risk-assessment/franciscella-tularensis-material-safety-data-sheets-msds.html>
4. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>

8.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
December 2014	General	<p>New template.</p> <p>Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”.</p> <p>Title of Section 5.2 changed from “To Public Health Division (PHD)” to “To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry”.</p> <p>Section 9.0 Document History added.</p>
December 2014	1.0 Aetiologic Agent	<p>Second paragraph, addition of “<i>F. tularensis</i>”.</p>
December 2014	2.2 Outbreak Case Definition	<p>First paragraph, addition of “provincial surveillance case definition and”.</p> <p>Addition of fifth bullet, “5. Occupation (e.g. trapper, veterinarian).”</p> <p>Second paragraph, addition of “cases”.</p> <p>Addition of third paragraph, “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.”</p>
December 2014	3.2 Diagnosis	<p>Paragraph one, “See Appendix B” removed.</p> <p>Addition of new paragraph one, “Laboratory demonstration of <i>F. tularensis</i> obtained from blood or an appropriate clinical specimen.”</p> <p>Second paragraph added, “For further information about human diagnostic testing, contact the Public Health Ontario Laboratories or refer to the Public Health Ontario Laboratory Services webpage...”</p> <p>Third paragraph added, “See Appendix B for diagnostic criteria relevant to Case Definitions.”</p>

Revision Date	Document Section	Description of Revisions
December 2014	4.1 Occurrence	<p>Second paragraph, “Five cases of tularemia were reported in Ontario between 2003 to 2005...” replaced with “Two human cases were reported in Ontario from 2007 to 2011; both cases occurred in 2010.”</p> <p>Third paragraph added “<i>F. tularensis</i> is known to circulate in Ontario wildlife populations.”</p> <p>Fourth paragraph added, “Please refer to the Public Health Ontario Monthly Infectious Diseases Surveillance Reports and other infectious diseases reports for more information on disease trends in Ontario...”</p>
December 2014	4.3 Modes of Transmission	<p>First paragraph, replaced “or handling or eating...” with “and handling or eating...”</p> <p>Second paragraph, “or handling contaminated pelts or paws of animals” replaced with “contact with contaminated animal pelts or paws, and handling sick domestic pets.”</p>
December 2014	4.5 Period of Communicability	First paragraph, addition of “their”.
December 2014	5.1 To local Board of Health	<p>First sentence, changed “Confirmed and suspected cases should be reported immediately” to “Individuals who have or may have tularemia shall be reported as soon as possible”.</p> <p>First sentence, addition of “(HPPA)”.</p>
December 2014	5.2 To the Ministry of Health and Long-Term Care (the ministry), or Public Health Ontario (PHO), as specified by the ministry	<p>First paragraph, first sentence removed.</p> <p>Bullet two, changed from “The disease-specific User Guides published by the Ministry” to “The iPHIS User Guides published by PHO”.</p> <p>Bullet three, replaced “the Ministry” with “PHO”.</p>

Revision Date	Document Section	Description of Revisions
December 2014	6.1 Personal Prevention Measures	<p>First bullet, “wearing light coloured clothing to observe ticks easier; long sleeved shirts and pants” replaced with “wearing long sleeved shirts and pants and light coloured clothing to observe ticks more easily”.</p> <p>Second bullet, replaced “(e.g. trappers)” with “(e.g. wildlife rehabilitators)”.</p>
December 2014	6.2 Infection Prevention and Control Strategies	<p>Addition of second paragraph, “Refer to PIDAC <i>Routine Practices and Additional Practices in All Health Care Settings</i>, 2012 (or as current).”</p> <p>Addition of third paragraph, “Refer to Public Health Ontario’s website at www.publichealthontario.ca to search for the most up-to-date Provincial Infectious Diseases Advisory Committee (PIDAC) best practices on Infection Prevention and Control (IPAC). PIDAC best practice documents can be found at...”</p>
December 2014	6.3 Management of Cases	Entire section revised.
December 2014	6.4 Management of Contacts	First paragraph, replaced “same” with “a common”.
December 2014	6.5 Management of Outbreaks	<p>Addition of new paragraph one, “A single case of tularemia should be managed with urgency. If there is suspicion of a bioterrorism incident, notify Emergency Management Ontario.”</p> <p>Third paragraph, addition of “The occurrence of”.</p> <p>Fourth paragraph changed “As per this Protocol, outbreak management shall comprise of but not be limited to the following general steps” to “As per the <i>Infectious Diseases Protocol</i>, 2008 (or as current), outbreak management shall be comprised of, but not limited to, the following general steps”.</p>

Revision Date	Document Section	Description of Revisions
December 2014	7.0 References	Updated.
December 2014	8.0 Additional Resources	Updated.
February 2019	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance. Common text included in all Disease Specific chapters: Surveillance Case Definition, Outbreak Case Definition, Diagnosis, Reporting Requirements, Management of Cases, and Management of Outbreaks. The epidemiology section and references were updated and Section 8.0 Additional Resources was deleted.
February 2019	1.0 Aetiologic Agent	First paragraph revised.
February 2019	3.1 Clinical Presentation	Minor revisions to entire section.
February 2019	4.1 Occurrence	Entire section revised.
February 2019	4.3 Modes of Transmission	Entire section revised.

