

Appendix A: Disease-Specific Chapters

Chapter: Legionellosis

Effective: February 2019

Legionellosis

Communicable

Virulent

**Health Protection and Promotion Act:
Ontario Regulation 135/18 (Designation of Diseases)**

1.0 Aetiologic Agent

Legionellae species are fastidious aerobic bacilli that stain gram-negative after recovery on artificial media. At least 20 of the more than 60 species have been implicated in human disease, but *Legionella pneumophila* (*L. pneumophila*) is most commonly associated with disease in humans.¹

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).

3.0 Identification

3.1 Clinical Presentation

Legionellosis is comprised of two distinct illnesses:

- Legionnaires' Disease – Characterized by anorexia, malaise, myalgia, headache, productive cough, temperature > 39 degrees Celsius, pneumonia, confusion, chills, nausea, diarrhea; and

- Pontiac Fever – A milder form of the illness without pneumonia. It is characterized by anorexia, malaise, myalgia, headache, productive cough, temperature > 37.5 degrees Celsius.

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>

Note:

- Seroconversion requires up to eight weeks for antibody levels to peak.
- A fourfold increase in antibody levels requires two samples taken 3-6 weeks apart.
- Positive urinary antigen for *L. pneumophila*.

Urinary antigen testing is the most rapid and sensitive test however only detects infection with *L. pneumophila* serogroup 1.² Cases with positive urine antigen are recommended to have confirmatory cultures.

Consider the diagnosis of legionellosis infection in any cluster of respiratory illness with pneumonia, or an individual presenting with a respiratory illness and pneumonia.

4.0 Epidemiology

4.1 Occurrence

Cases have been reported in Canada, the US, Europe, Asia, Australia, Africa and South America.²

In Ontario, cases, outbreaks and clusters are typically observed in late summer and the fall. Cases are more commonly reported among males and individuals over the age of 50. Between 2013 and 2017, an average of 172 cases was reported annually in Ontario.*

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 epidemiology 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

Legionellae are ubiquitous in nature, especially in aquatic environments; outbreaks and sporadic cases have been linked to air-conditioning cooling towers, evaporative condensers, humidifiers, whirlpool spas, respiratory therapy devices, ponds and soil from their banks, decorative fountains and potable water systems which can be found in hospitals and among other places.^{1,2}

4.3 Modes of Transmission

Legionella are pathogens most commonly associated with water-droplet transmission to humans through inhalation of aerosolized contaminated water.¹

4.4 Incubation Period

For Legionnaires' disease it is 2-10 days, most often 5-6 days, but can be up to 19 days.^{1,2}

For Pontiac fever it is 5-72 hours, most often 24-48 hours.²

4.5 Period of Communicability

Person-to-person transmission has not been documented.²

4.6 Host Susceptibility and Resistance

Illness occurs most frequently with increasing age (most cases are at least 50 years of age). Persons who smoke, have diabetes, lung, or renal disease, malignancy and compromised immunity are at most risk.² Generally, more men than women contract Legionnaires' disease. The disease is rare in persons under 20 years of age.³ Outbreaks are often identified among institutionalized patients/residents.²

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);⁴
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.

6.0 Prevention and Control Measures

6.1 Personal Prevention Measures

- Avoidance of exposure to aerosolized contaminated water.

6.2 Infection Prevention and Control Strategies

- Total eradication of *legionellae* from all artificial systems is not possible because of the high prevalence of the organism in water; however, the risk can be minimized by appropriate maintenance and disinfection of water cooling towers and adequate treatment of water supplies where these sources have been implicated.²
- There are standards that aim to reduce the risk of legionellosis by implementing an effective preventative maintenance program along with effective hazard control measures, e.g. ASHRAE 188-2015 - Legionellosis: Risk Management for Building Water Systems.⁵
- If hospitalized, routine practices are recommended.¹

Refer to Public Health Ontario's website at www.publichealthontario.ca to search for the most up-to-date information on Infection Prevention and Control (IPAC).

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. Additional disease specific information may include:

- Travel history;
- History of exposure to air conditioners, humidifiers, water fountains or spas and other high risk area during the 14 days prior to illness;
- Any risk factors such as smoking or any medical conditions;
- Earliest and latest exposure dates;
- Occupation; and
- Residency or attendance at a facility or institution.

Exposure investigation:

- Determine if the case was community or institutionally acquired and whether a common source of exposure has occurred;
- Contact the Public Health Ontario Laboratory (during working hours call customer service at: 1-877-604-4567 or 416-235-6556; after hours 416-605-3113) for advice prior to commencing environmental sampling;
- Environmental sampling should be reserved for investigations involving institutions and disease clusters or an outbreak where a potential common exposure has been identified; and
- Provide education about the illness and how it is acquired.

Treatment is under the direction of the attending health care provider.

6.4 Management of Contacts

Not applicable: Person to person transmission of legionellosis has not been documented.²

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.

When two or more cases are linked in time and place, an investigation should be conducted to determine if a cluster or outbreak is occurring.

For more information on outbreak investigations in the community and special settings such as health care facilities, refer to the following resources:

- Recommendations of CDC and Healthcare Infection Control Practices Advisory Committee (HICPAC) on guidelines for environmental infection control in healthcare facilities.
- Investigation of Legionnaire disease in a long-term care facility-Quebec.

7.0 References

1. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: *Legionella pneumophila* Infections. 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.
2. Heymann DL, editor. Control of Communicable Diseases Manual. 20 ed. Washington, D.C: American Public Health Association; 2015.
3. Government of Canada. Legionella [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2015 [updated May 14, 2015; cited June 14, 2018]. Available from: <https://www.canada.ca/en/public-health/services/infectious-diseases/legionella.html>
4. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>
5. ASHRAE. ASHRAE 188-2015 - Legionellosis: Risk Management for Building Water Systems. Atlanta, GA: ASHRAE; 2015.

8.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
January 2013	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>
January 2013	1.0 Aetiologic Agent	Change from “More than 35 species have been recognized...” to “More than 50 species have been recognized...”
January 2013	2.2 Outbreak Case Definition	<p>First sentence of second paragraph changed from “The outbreak case definition varies with the outbreak under investigation” to “The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be created in consideration of the provincial surveillance case definition. For example, confirmed outbreak cases must at a minimum meet the criteria specified for the provincial surveillance confirmed case classification.”</p> <p>Addition of point #5: “Further strain characterization and typing as appropriate, which may be used to support linkage.”</p>
January 2013	3.1 Clinical Presentation	Entire section revised.
January 2013	4.1 Occurrence	Entire section revised.
January 2013	4.4 Incubation Period	Changed from “For Legionnaires’ disease it is 2-10 days” to “For Legionnaires’ disease it is 2-14 days”

Revision Date	Document Section	Description of Revisions
January 2013	5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry	Final paragraph: Changed from “The disease-specific User Guides published by the ministry; and, Bulletins and directives issued by the ministry” to “The iPHIS User Guides published by PHO ; and, Bulletins and directives issued by PHO ”
January 2013	6.2 Infection Prevention and Control Strategies	Addition of the second bullet: “There are standards that aim to reduce the risk...”
January 2013	6.3 Management of Cases	<p>Third bullet point under first paragraph changed from “...and other high risk area during the 10 days prior to illness” to “...and other high risk area during the 14 days prior to illness”</p> <p>Addition of the following second bullet point to second paragraph: “Contact the Public Health Ontario Laboratory...”</p> <p>Third bullet in second paragraph changed from “Environmental sampling should be reserved for investigations involving disease clusters or an outbreak where there is a potential common exposure” to “Environmental sampling should be reserved for investigations involving institutions and disease clusters or an outbreak where a potential common exposure has been identified”</p>
January 2013	6.5 Management of Outbreaks	Addition of the following to the third bullet point of the third paragraph: “These definitions should be reviewed during the course of the outbreak...”
January 2013	7.0 References	Updated.
January 2013	8.0 Additional Resources	Updated.

Revision Date	Document Section	Description of Revisions
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: Surveillan 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	Second sentence changed from “More than 50 species have been recognized...” to “At least 20 of the more than 60 species have been implicated in human disease...”
February 2019	4.4 Incubation Period	Incubarion period for Legionnaires’ disease added: “but can be up to 19 days”.
February 2019	4.6 Host Susceptibility and Resistance	Second sentence added: “malignancy and compromised immunity”. Added: “Generally, more men that women contract Legionnaires’ disease.”

