

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

Infectious Disease Protocol

# **Appendix 1:**

## **Case Definitions and Disease-Specific Information**

### **Disease: Legionellosis**

Effective: May 2022

# Legionellosis

Communicable

Virulent

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

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

## 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;<sup>4</sup>
- The iPHIS User Guides published by Public Health Ontario (PHO); and
- Bulletins and directives issued by PHO.

## Type of Surveillance

Case-by-case

## Case Definition

### Confirmed Case

Laboratory confirmation of infection with clinically compatible signs and symptoms:

- Isolation of *Legionella* spp. or detection of the antigen from appropriate clinical specimens (e.g., lung tissue, pleural fluid, sputum);

**OR**

- A significant (i.e., fourfold or greater) rise in *Legionella* spp. total antibody titre

between acute and convalescent sera;

**OR**

- Single specimen or standing total antibody titre  $\geq$  1:256 against *Legionella* spp.;

**OR**

- Demonstration of *L. pneumophila* serogroup 1 antigen in urine.

## **Probable Case**

Clinically compatible signs and symptoms with:

- Demonstration of *Legionella* spp. DNA by nucleic acid amplification test (NAAT), such as PCR;
- Detection of specific *Legionella* antigen or staining of the organism in respiratory secretions, lung tissue, or pleural fluid by direct fluorescent antibody (DFA) staining, Immunohistochemistry (IHC), or other similar method.

## **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).

# Clinical Information

## Clinical Evidence

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.

## Clinical Presentation

See Clinical Evidence above.

# Laboratory Evidence

## Laboratory Confirmation

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

- Positive *Legionella* spp. Culture;
- A significant (i.e., fourfold or greater) rise in *Legionella* spp. total antibody titre between acute and convalescent sera;
- A positive *Legionella* urinary antigen test.

## Approved/Validated Tests

- Standard culture for all *Legionella* species with confirmation to species level.
- Serogrouping of *L. pneumophila* and other Legionellae with 2 or more serogroups.
- *L. pneumophila* serum antibody tests.
- *L. pneumophila* serogroup 1 urine antigen test.

- NAAT for *L. pneumophila* and *Legionella* spp.

## Indications and Limitations

- Standard culture for *L. pneumophila*.
- All *Legionella* spp. (as well as former members of the genus *Legionella* which taxonomically belong to other genera (*Tatlockia micdadei*, *Tatlockia maceachernii*, *Fluoribacter bozemanii*, *Fluoribacter dumoffii*, and *Fluoribacter gormanii*)), are considered to be pathogenic although they are implicated much less frequently than *L. pneumophila*.

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

### 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.<sup>2</sup> 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.**

## 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. Refer to Provincial 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.

## Contact Management

Not applicable: Person to person transmission of legionellosis has not been documented.<sup>2</sup>

## 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.

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.

## Prevention and Control Measures

### Personal Prevention Measures

- Avoidance of exposure to aerosolized contaminated water.

### 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.<sup>2</sup>
- 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.<sup>5</sup>
- If hospitalized, routine practices are recommended.<sup>1</sup>

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

# Disease Characteristics

**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.<sup>1</sup>

**Modes of Transmission** - *Legionella* are pathogens most commonly associated with water-droplet transmission to humans through inhalation of aerosolized contaminated water.<sup>1</sup>

**Incubation Period** – For Legionnaires' disease it is 2-10 days, most often 5-6 days, but can be up to 19 days.<sup>1,2</sup>

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

**Period of Communicability** - Person-to-person transmission has not been documented.<sup>2</sup>

**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.<sup>1,2</sup>

**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.<sup>2</sup> Generally, more men than women contract Legionnaires' disease. The disease is rare in persons under 20 years of age.<sup>3</sup> Outbreaks are often identified among institutionalized patients/residents.<sup>2</sup>

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.



## 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.

## Case Definition Sources

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Ontario Agency for Health Protection and Promotion (Public Health Ontario). Labstract – April 2012: Legionella – Change in testing methodology to Real-Time PCR Testing [Internet]. Toronto, ON: Ontario Agency for Health Protection and Promotion; 2012 [updated April 1, 2012; cited December 11, 2012]. Available from: [https://www.publichealthontario.ca/-/media/Documents/Lab/lab-sd-084-legionella-realttime-pcr-testing.pdf?sc\\_lang=en](https://www.publichealthontario.ca/-/media/Documents/Lab/lab-sd-084-legionella-realttime-pcr-testing.pdf?sc_lang=en)

# 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.