

Appendix A: Disease-Specific Chapters

Chapter: Legionellosis

Revised January, 2013

Legionellosis

Communicable

Virulent

Health Protection and Promotion Act:

Ontario Regulation 558/91 – Specification of Communicable Diseases

Health Protection and Promotion Act:

Ontario Regulation 559/91 – Specification of Reportable Diseases

1.0 Aetiologic Agent

Legionellae species are fastidious aerobic bacilli that stain gram negative after recovery on artificial media. More than 50 species have been recognized of which *Legionella pneumophila* (*L. pneumophila*) is most commonly associated with disease in humans (4).

2.0 Case Definition

2.1 Surveillance Case Definition

[See Appendix B](#)

2.2 Outbreak Case Definition

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. Consideration should also be given to the following when establishing outbreak case definitions:

1. Clinical and/or epidemiological criteria;
2. The time frame of occurrence;
3. The geographic location(s) or place(s) where cases live or became ill/exposed;
4. Special attributes of cases (e.g., age, underlying conditions); and
5. Further strain characterization and typing as appropriate, which may be used to support linkage.

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

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](#)

Note:

- Seroconversion requires up to eight weeks for antibody levels to peak.
- A four fold 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 (1). 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 individual presenting with a respiratory illness and pneumonia.

4.0 Epidemiology

4.1 Occurrence

Cases have been reported in Canada, the US, Europe, Australia, Africa and South America (1).

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 2005 and 2009, an average of 71 cases was reported annually in Ontario.

For more information on infectious diseases activity in Ontario, refer to the current version of the annual provincial epidemiology report and the Monthly Infectious Diseases Surveillance Reports.

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 opportunistic pathogens most commonly associated with water-droplet transmission to humans through inhalation of aerosolized contaminated water (2).

4.4 Incubation Period

For Legionnaires' disease it is 2-14 days, most often 5-6 days (5).

For Pontiac fever it is 5-72 hours, most often 24-48 hours (1).

4.5 Period of Communicability

Person-to-person transmission has not been documented (1).

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 are at most risk. The disease is rare in persons under 20 years of age. Outbreaks have occurred among institutionalized patients/residents (1).

5.0 Reporting Requirements

5.1 To local Board of Health

Laboratory confirmed and suspect cases shall be reported to the medical officer of health by persons required to do so under the *Health Protection and Promotion Act*, R.S.O. 1990.

5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry

Report only case classifications specified in the case definition.

Cases shall be reported using the integrated Public Health Information System (iPHIS), or any other method specified by the ministry **within one business day of receipt of initial notification** as per iPHIS Bulletin Number 17: Timely Entry of Cases (3).

The minimum data elements to be reported for each case is 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.

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.
- 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. the proposed New BSR/ASHRAE Standard 188P (6).
- If hospitalized, routine practices are recommended.

6.3 Management of Cases

Investigate the case to determine source of infection. Refer to *Ontario Regulation 569* under the HPPA for relevant data to collect and make sure to inquire about the following in the epidemiological investigation:

- Symptoms and date of symptom onset;
- 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: 1-800-604-4567 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.

Determine who should be notified and how often and if a media release is required.
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.

6.5 Management of Outbreaks

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.

As per this protocol, outbreak management shall comprise of, but not be limited to the following general steps:

- Confirm diagnosis and verify the outbreak;
- Establish an outbreak team;
- Develop an outbreak case definition - These definitions should be reviewed during the course of the outbreak, and modified if necessary, to ensure that the majority of cases are captured by the definitions;
- Implement prevention and control measures;
- Implement and tailor communication and notification plans depending on the scope of the outbreak;
- Conduct epidemiological analysis on data collected;
- Conduct environmental inspections of implicated premise where applicable;
- Coordinate and collect appropriate clinical specimens where applicable;
- Prepare a written report; and
- Declare the outbreak over in collaboration with the outbreak team.

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 – See additional resources.

Investigation of Legionnaire disease in a long-term care facility-Quebec – See Additional resources.

7.0 References

- 1 Heymann D, editor. Control of communicable diseases manual. 19th ed. Washington, DC: American Public Health Association; 2008.

- 2 Pickering LK, Baker CJ, Long SS, McMillan JA, editors. Red book: 2012 report of the Committee on Infectious Diseases. 29th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012. Section 3, Summaries of infectious diseases; p. 461-462.
- 3 Public Health Ontario. Timely entry of cases. iPHIS Bulletin. 2012 Jan: 17.
- 4 Edelstein PH, Edelstein MA, Shephard LJ, Ward KW, Ratcliff RM. Legionella steelei sp. nov., isolated from human respiratory specimens in California, USA, and South Australia. Int J Syst Evol Microbiol. 2012 Aug;62(Pt 8):1766-71.
- 5 Mandell GL, Bennett JE, Dolin R, editors. Principles and practice of infectious disease. 7th ed. Philadelphia, PA: Churchill Livingstone; 2010.
- 6 ASHRAE. BSR/ASHRAE Standard 188P: Prevention of legionellosis associated with building water systems: second public review draft. Atlanta, GA: ASHRAE; 2011 [cited 2012 Dec 11]. Available from:
<https://osr.ashrae.org/Public%20Review%20Draft%20Standards%20Lib/Std-188P-PPR2%20Final%206%2010%202011.pdf>

8.0 Additional Resources

Schulster L, Chinn RY; Healthcare Infection Control Practices Advisory Committee. Guidelines for environmental infection control in health-care facilities. MMWR Recomm Rep. 2003; 52(RR-10):1-42. Available from:
<http://www.cdc.gov/MMWR/preview/mmwrhtml/rr5210a1.htm>

Pilon P, Tremblay M, Valiquette L, Bernier F. Investigation of Legionnaire disease in a long-term care facility Quebec. Can Commun Dis Rep. 1998; 24(14):113-6. Available from:
<http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98vol24/index.html>

Health Protection and Promotion Act, RSO 1990, c H7. Available from: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90h07_e.htm

Gregg MB, editor. Field epidemiology. 3rd ed. New York, NY: Oxford University Press; 2008.

Ministry of Health and Long-Term Care. Infectious diseases protocol. Toronto, ON: Queen’s Printer for Ontario; 2009 [cited 2012 Dec 12]. Available from:
http://www.health.gov.on.ca/english/providers/program/pubhealth/oph_standards/ophs/infdis_pro.html

9.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
January 2013	General	New template. Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host

Revision Date	Document Section	Description of Revisions
		<p>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>
	1.0 Aetiologic Agent	Change from “More than 35 species have been recognized...” to “More than 50 species have been recognized...”
	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>
	3.1 Clinical Presentation	Entire section revised.
	4.1 Occurrence	Entire section revised.
	4.4 Incubation Period	Changed from “For Legionnaires’ disease it is 2-10 days” to “For Legionnaires’ disease it is 2- 14 days”
	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 ”
	6.2 Infection Prevention and Control Strategies	Addition of the second bullet: “There are standards that aim to reduce the risk...”

Revision Date	Document Section	Description of Revisions
	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>
	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..."
	7.0 References	Updated.
	8.0 Additional Resources	Updated.

