Appendix A: Disease-Specific Chapters

Chapter: Q Fever

Revised December 2014
Q Fever

☒ 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 Aetiology Agent

Q fever is caused by *Coxiella burnetii*, an intracellular rickettsial organism. It is classified in the gamma subgroup of Proteobacteria. The organism has unusual stability, can reach high concentrations in animal tissues, particularly the placenta, and is highly resistant to many disinfectants.

*C. burnetii* may be used as a bioterrorism agent.

2.0 Case Definition

2.1 Surveillance Case Definition

See Appendix B

2.2 Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Consideration should be given to the following when establishing an outbreak case definition:

1. Clinical, laboratory and/or epidemiological criteria;
2. The time frame for occurrence;
3. The geographic location(s) or place(s) where cases live or became ill/exposed; and
4. Special attributes of cases (e.g. age, underlying conditions).

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

3.0 Identification

3.1 Clinical Presentation

Q fever can cause acute or chronic illness in humans. The acute symptoms caused by infection with *C. burnetii* usually develop within 2-3 weeks of exposure, although as many as half of humans infected with *C. burnetii* do not show symptoms.

Symptoms commonly seen with acute Q fever include: high fever, severe headache, general malaise, myalgia, chills/sweats, non-productive cough, nausea, vomiting, diarrhea, abdominal pain and chest pain, however, it is important to note that the combination of symptoms varies greatly from person-to-person.
Although most persons with acute Q fever infection recover, others may experience serious illness with complications that may include pneumonia, granulomatous hepatitis, myocarditis and central nervous system complications. Pregnant women who are infected may be at risk for pre-term delivery or miscarriage.\textsuperscript{1,2}

Chronic Q fever is a severe disease occurring in <5% of acutely infected patients. It may present soon (within 6 weeks) after an acute infection, or may manifest years later. The three groups at highest risk for chronic Q fever are pregnant women, immunosuppressed persons and patients with pre-existing heart valve defects. Endocarditis is the major form of chronic disease, comprising 60-70% of all reported cases. The estimated case fatality rate in untreated patients with endocarditis is 25-60%. Other forms of chronic Q fever include aortic aneurysms and infections of the bone, liver or reproductive organs, such as the testes in males.\textsuperscript{1,2}

\textit{Coxiella burnetii} has the ability to persist for long periods of time in the host after infection. Although the majority of people with acute Q fever recover completely, a post-Q fever fatigue syndrome has been reported to occur in 10-25% of some acute patients. This syndrome is characterized by constant or recurring fatigue, night sweats, severe headaches, photophobia, pain in muscles and joints, mood changes, and difficulty sleeping.\textsuperscript{1,2}

3.2 Diagnosis

Laboratory demonstration of \textit{C. burnetii} obtained from blood or an appropriate clinical specimen.

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

See Appendix B for diagnostic criteria relevant to Case Definitions

4.0 Epidemiology

4.1 Occurrence

Q fever has been reported from all continents; the true incidence is greater than the reported number of cases because of the mild clinical manifestation of many cases, under-diagnosis and lack of laboratory services.\textsuperscript{1}

The number of cases of Q fever per year has fluctuated in Ontario and remains fairly low. Between 2007 and 2011, an average of eight cases of Q fever were reported per year in Ontario.

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\textsuperscript{3,4}

http://www.publichealthontario.ca/en/DataAndAnalytics/Pages/DataReports.aspx
4.2 Reservoir
Sheep, cattle, goats, cats, dogs, some wild mammals (e.g. rodents), birds and ticks are natural reservoirs. Infected animals, including sheep and cats, are usually asymptomatic but shed massive numbers of organisms in placental tissues at parturition.

4.3 Modes of Transmission
When infected, animals shed the bacteria in urine, feces, milk and especially birth products such as placenta. Humans are most often infected following inhalation of contaminated aerosols; organisms are shed in high numbers during the birthing process of infected animals in amniotic fluid and the placenta. Humans can inhale dust contaminated by these products and contaminated dust can be carried downwind one kilometer or more. This can result in sporadic cases occurring at a distance from sources of contaminated animals. Infections may also occur from direct exposure to infected animals or tissues or through exposure to contaminated materials such as wool, straw, or even laundry. Consuming raw milk from infected cows may be an infrequent source of human infection; direct transmission by blood or marrow transfusion has been reported.

4.4 Incubation Period
Depends on the size of the infectious dose, usually 2-3 weeks for acute Q fever. Chronic Q fever can develop years after an initial infection.

4.5 Period of Communicability
Direct person-to-person transmission occurs rarely, if ever.

4.6 Host Susceptibility and Resistance
Susceptibility is general. Those who recover from infection may possess lifelong immunity against re-infection.

5.0 Reporting Requirements

5.1 To local Board of Health
Individuals who have or may have Q fever shall be reported as soon as possible to the medical officer of health by persons required to do so under the Health Protection and Promotion Act, R.S.O. 1990 (HPPA).

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 using the integrated Public Health Information System (iPHIS), or any other method specified by the ministry within five (5) business days of receipt of initial notification as per iPHIS Bulletin Number 17: Timely Entry of Cases.

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),8, 6
• 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
Preventive measures:
• Education of workers in high risk occupations such as sheep and dairy farmers, veterinary researchers, abattoir workers, veterinarians and meat workers about the sources of infection and the need for adequate disinfection and disposal of animal products of parturition;1
• Education on proper hygiene practices; and
• Consumption of only pasteurized milk and dairy products from cows, goats and sheep.

6.2 Infection Prevention and Control Strategies
Routine practices are recommended for hospitalized cases.
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:
http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/PIDAC/Pages/PIDAC_Documents.aspx

6.3 Management of Cases
Investigate the case to determine source of infection. Information required to be reported to the medical officer of health is specified in Ontario Regulation 569 under the HPPA.8, 6
Inquire about the following disease-specific information during the investigation:
• Date of symptom onset;
• Travel history;
• History of exposure during 2-3 weeks prior to symptom onset;
• Earliest and latest exposure date;
• Occupation; and
• Residency/living near a farm or livestock operation.
Treatment is under the direction of the attending health care provider; acute cases generally require treatment with doxycycline or chloramphenicol for 15-21 days.1
Provide cases with information about the infection and how it spreads as listed above.
If a source has been identified ask the case(s) for a list of persons who may also have come in contact with the infectious item or area.

6.4 Management of Contacts

None, except if exposed to same source, then manage contacts as indicated above in Management of Cases and monitor contacts for clinical signs and symptoms of Q fever. Contacts should seek medical attention if they display signs and symptoms of Q fever.

6.5 Management of Outbreaks

Outbreaks are generally of short duration; control measures include primarily the elimination of sources of infection, observation of exposed persons and provision of antibiotics.¹

An outbreak is defined as two or more cases linked in time. Cases involved in foodborne transmission may not display localized geographical clustering. Non-foodborne illness outbreaks of Q fever will tend to manifest with geographically linked cases.

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

- Confirm diagnosis and verify the outbreak;
- Establish an outbreak team;
- Develop an outbreak case definition;
- 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.

7.0 References


8.0 Additional Resources


9.0 Document History

Table 1: History of Revisions

<table>
<thead>
<tr>
<th>Revision Date</th>
<th>Document Section</th>
<th>Description of Revisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>December 2014</td>
<td>General</td>
<td>New template. Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”. 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”. Section 9.0 Document History added.</td>
</tr>
<tr>
<td>Revision Date</td>
<td>Document Section</td>
<td>Description of Revisions</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>December 2014</td>
<td>2.1 Outbreak Case Definition</td>
<td>Removed “For use during outbreaks”.</td>
</tr>
<tr>
<td>December 2014</td>
<td>3.1 Clinical Presentation</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>3.2 Diagnosis</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>4.1 Occurrence</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>4.3 Modes of Transmission</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>4.4 Incubation Period</td>
<td>Addition of “for acute Q Fever.”</td>
</tr>
<tr>
<td>December 2014</td>
<td>5.1 To Local Board of Health</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>5.2 To the Ministry of Health and Long-</td>
<td>Removal of “PHD”.</td>
</tr>
<tr>
<td></td>
<td>Term Care (the ministry) or Public</td>
<td>“The disease-specific User Guides published by the Ministry, and” changed to “The iPHIS User Guides published by PHO, and”.</td>
</tr>
<tr>
<td></td>
<td>Health Ontario (PHO), as specified by</td>
<td>“Bulletins and directives issued by the Ministry” changed to “Bulletins and directives issued by PHO”.</td>
</tr>
<tr>
<td></td>
<td>the ministry</td>
<td></td>
</tr>
<tr>
<td>December 2014</td>
<td>6.1 Personal Prevention Measures</td>
<td>Removal of second bullet “Recommend that infections in domesticated animal population be identified by a veterinarian”.</td>
</tr>
<tr>
<td>December 2014</td>
<td>6.2 Infection Prevention and Control</td>
<td>Addition of “Refer to Public Health Ontario’s website…”</td>
</tr>
<tr>
<td></td>
<td>Strategies</td>
<td></td>
</tr>
<tr>
<td>December 2014</td>
<td>6.3 Management of Cases</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>6.4 Management of Contacts</td>
<td>Entire section revised.</td>
</tr>
<tr>
<td>December 2014</td>
<td>6.5 Management of Outbreaks</td>
<td>Addition of “Cases involved in foodborne transmission may not display localized geographical clustering…”</td>
</tr>
<tr>
<td>December 2014</td>
<td>7.0 References</td>
<td>Updated.</td>
</tr>
<tr>
<td>December 2014</td>
<td>8.0 Additional Resources</td>
<td>Updated.</td>
</tr>
</tbody>
</table>