Appendix A: Disease-Specific Chapters

Chapter: Pneumococcal disease, invasive

Revised December 2014
Pneumococcal disease, invasive

☒ 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

*Streptococcus pneumoniae*, also known as pneumococcus, is a Gram-positive encapsulated coccus of which there are 90 known capsular serotypes.¹

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:

- Clinical and/or epidemiological criteria;
- The time frame for occurrence (i.e., increase in endemic rate);
- A geographic location(s) or place(s) where cases live or became ill/exposed;
- Special attributes of cases (e.g., age, underlying conditions); and
- 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). If secondary transmission occurs, an outbreak case definition may be developed based on a review of the epidemiology. The outbreak case definition may evolve over time to reflect the changing dynamics of the outbreak.
3.0 Identification

3.1 Clinical Presentation
Invasive pneumococcal disease (IPD) most often presents as bacteremic pneumonia, bacteremia, and meningitis.\(^1,2\)

Persons with pneumococcal meningitis generally present with high fever, headache, lethargy or coma, vomiting, irritability, nuchal rigidity, seizures and signs of meningeal irritation.\(^1\)

3.2 Diagnosis
See Appendix B for diagnostic criteria relevant to the Case Definition.

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.publichealthonario.ca/en/ServicesAndTools/LaboratoryServices/Pages/default.aspx

4.0 Epidemiology

4.1 Occurrence
Endemic throughout the world; occurrence is highest in infants, young children, the elderly, and persons with underlying medical conditions.\(^1,2\) It occurs in all climates and seasons, but the incidence is highest in winter and spring.\(^1\)

Invasive pneumococcal disease is relatively common in Ontario. In 2011, 1,238 cases of IPD were reported in Ontario, representing an incidence rate of 9.3 cases per 100,000 population during that year.

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.\(^3,4\)

http://www.publichealthonario.ca/en/DataAndAnalytics/Pages/DataReports.aspx

4.2 Reservoir
Pneumococci are ubiquitous; reservoir is humans; usually colonized in upper respiratory tract of healthy persons (carriers).\(^1\) Children carry \textit{S. pneumoniae} more often than adults do.\(^1\)

4.3 Modes of Transmission
Transmission is person-to-person by contact with the respiratory droplets of an infected person or asymptomatic carrier.\(^1\) Illness among casual contacts is infrequent.\(^1\) Pneumococcus often asymptptomatically colonizes the human nasopharynx; duration of carriage varies, although generally longer in children than adults.\(^1\)

4.4 Incubation Period
Incubation period may be as short as 1-3 days.\(^1\)
4.5 Period of Communicability

Presumably until discharges from mouth and nose no longer contain virulent pneumococci in significant numbers.\textsuperscript{1} Usually no longer communicable after 24 hours of initiating effective antibiotic therapy.\textsuperscript{1}

4.6 Susceptibility and Resistance

The risk of disease is highest in persons 65 years of age and older, children less than 2 years of age, and those persons with certain medical conditions that put them at increased risk for IPD.\textsuperscript{2, 3}

Although serotype-specific immunity may last for several years following infection, persons previously infected with pneumococcal disease should still receive immunization due to the number of known pneumococcal serotypes.\textsuperscript{1}

5.0 Reporting Requirements

5.1 To local Board of Health

Individuals who have or may have invasive disease caused by \textit{S. pneumoniae} shall be reported to the medical officer of health by persons required to do so under the \textit{Health Protection and Promotion Act}, R.S.O. 1990 (HPPA).\textsuperscript{5}

Serotype, sensitivity and antibiotic resistance results shall also be reported to, and noted by, the medical officer of health.

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 \textbf{within five business days of receipt of initial notification} as per iPHIS Bulletin Number 17: Timely Entry of Cases.\textsuperscript{6}

The minimum data elements to be reported for each case is specified in the following:

- \textit{Ontario Regulation 569} (Reports) under the \textit{Health Protection and Promotion Act} (HPPA),\textsuperscript{7, 5}
- The disease-specific User Guides published by PHO; and,
- Bulletins and directives issued by PHO.
6.0 Prevention and Control Measures

6.1 Personal Prevention Measures
Measures:
Immunize as per the current Publicly Funded Immunization Schedules for Ontario for both routine immunizations and according to the high risk eligibility criteria.8

6.2 Infection Prevention and Control Strategies
Strategies:
- Routine practices are recommended, including respiratory isolation and the use of personal protective equipment by health care workers.1, 9
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
Refer to Regulation 569 under the HPPA for relevant data to collect.7, 5 Case investigation should include the following:
- Clinical: symptoms and date of symptom onset, complications, risk factors for infection, outcome;
- Laboratory: specimen type, specimen source, antibiotic sensitivities and/or resistance, serotype;
- Immunization: status, dates of administration and type of pneumococcal vaccine;
Provide education about IPD and promote/facilitate timely immunization in the future. Treatment is under the direction of the attending health care provider.

6.4 Management of Contacts
No special management required.

6.5 Management of Outbreaks
An outbreak is defined by the usual epidemiological principles of a greater than expected number of cases that are spatially and temporally linked.
Provide public health management of outbreaks or clusters in order to identify the source of illness, stop the outbreak and limit secondary spread. Offer immunization to high risk individuals as per the current Publicly Funded Immunization Schedules for Ontario.8
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;
• 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;
• Coordinate and collect appropriate clinical specimens where applicable;
• Prepare a written report; and
• Declare the outbreak over in collaboration with the outbreak team.

For outbreaks in institutions refer to the ministry resources listed below.

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>
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<tbody>
<tr>
<td>December 2014</td>
<td>General</td>
<td>New template.</td>
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<tr>
<td></td>
<td></td>
<td>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”.</td>
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<td>Section 9.0 Document History added.</td>
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<tr>
<td>December 2014</td>
<td>1.0 Aetiologic Agent</td>
<td>Changed from “…which 90 serotypes are known to cause disease. Current data suggest that the 11 most common serotypes cause at least 75%</td>
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<tr>
<td>December 2014</td>
<td>2.2 Outbreak Case Definition</td>
<td>Entire section revised.</td>
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<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>Addition of “for diagnostic criteria relevant to the Case definition.”</td>
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<tr>
<td></td>
<td></td>
<td>Addition of direction to contact Public Health Ontario Laboratories or PHO website for additional information on human diagnostic testing.</td>
</tr>
<tr>
<td>December 2014</td>
<td>4.1 Occurrence</td>
<td>First paragraph changed from: “…and it occurs particularly in infants, old age and in persons…” to “…occurrence is highest in infancy, young children, the elderly, and persons….”</td>
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<td></td>
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<td>Two paragraphs deleted.</td>
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<td>Addition of paragraph: “Invasive pneumococcal disease is relatively common in Ontario. In 2011, 1,238 cases of IPD were reported in Ontario, representing an incidence rate of 9.3 cases per 100,000 population during that year.”</td>
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<td>Addition of reference to Public Health Ontario Infectious Diseases Surveillance Reports.</td>
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<td>December 2014</td>
<td>4.3 Modes of Transmission</td>
<td>Entire section revised.</td>
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<tr>
<td>December 2014</td>
<td>4.5 Period of Communicability</td>
<td>Sentence removed: “Antibiotic treatment will stop communicability within 24-48 hours”.</td>
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<tr>
<td></td>
<td></td>
<td>Sentence added: “Usually no longer communicable after 24 hours of initiating effective antibiotic therapy.”</td>
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<tr>
<td>December 2014</td>
<td>4.6 Susceptibility and Resistance</td>
<td>Reference to Canadian Immunization Guide removed and “invasive pneumococcal disease” changed to “IPD”.</td>
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|               |                                         | New paragraph added: “Although serotype-specific immunity may last for several years following infection, persons previously infected with pneumococcal disease should still receive immunization due to the number of known
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<tr>
<td>December 2014</td>
<td>5.1 To Local Board of Health</td>
<td>The following was deleted: “All positive cultures/test for <em>Streptococcus pneumonia</em> obtained from specimens from normally sterile sites as indicated above shall be reported to the medical officer of health by persons required to do so under the <em>Health Protection and Promotion Act</em>, R.S.O. 1990.” And replaced with: “Individuals who have or may have invasive disease caused by S. pneumoniae shall be reported to the Medical Officer of Health (MOH) by persons required to do so under the Health Protection and Promotion Act, R.S.O. 1990 (HPPA).” Addition to beginning of second paragraph: “Serotype...”</td>
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<td>December 2014</td>
<td>5.2 To the Ministry of Health and Long-Term Care (the Ministry) or Public Health Ontario (PHO), as specified by the Ministry</td>
<td>The following removed from the end of the first paragraph: “to PHD”. Under the third paragraph the end of the second and third bullets changed from: “...by the Ministry” to “…by PHO”.</td>
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<td>December 2014</td>
<td>6.1 Personal Prevention Measures</td>
<td>Entire section revised.</td>
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<td>6.2 Infection Prevention and Control Strategies</td>
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<td>Entire section revised.</td>
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<tr>
<td>December 2014</td>
<td>6.4 Management of Contacts</td>
<td>End of sentence removed “…unless the contact is in the setting of an institutional outbreak.”</td>
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<tr>
<td>December 2014</td>
<td>6.5 Management of Outbreaks</td>
<td><em>Publicly Funded Immunization Schedule for Ontario</em> capitalized and italicized.</td>
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<tr>
<td>December 2014</td>
<td>7.0 References</td>
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<tr>
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