Appendix A: Disease-Specific Chapters

Chapter: Hantavirus pulmonary syndrome

Revised December 2014
Hantavirus pulmonary syndrome

☐ Communicable
☐ Virulent

Health Protection and Promotion Act:
Ontario Regulation 559/91 – Specification of Reportable Diseases

1.0 Aetiologic Agent

Hantavirus is a virus in the family Bunyaviridae. More than 25 antigenically distinguishable viral species exist, each associated primarily with a single rodent species.¹

The viruses associated with hantavirus pulmonary syndrome (HPS) in the Americas include: the Sin Nombre Virus (SNV) - a major cause of HPS in the USA; Bayou virus, which causes sporadic cases in Louisiana; Black Creek Canal virus, responsible for sporadic disease in Florida; and the New York virus, which causes sporadic cases in New York. In recent years, new hantaviruses, including Andes virus, associated with an HPS-like syndrome, have been isolated in South America.²

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 provincial surveillance case definition and the following criteria when establishing an outbreak case definition:

1. Clinical, laboratory 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; and
4. Special attributes of cases (e.g. age, underlying conditions) and/or the aetiologic agent.

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

Given the rarity and severity of this disease, one case should be considered an outbreak.

3.0 Identification

3.1 Clinical Presentation

Hantavirus pulmonary syndrome (HPS) infection often presents as a “flu-like” illness, with fever, intense headache, myalgia, nausea and other gastrointestinal symptoms. This is followed by cough, shortness of breath, dizziness, sweats and arthralgia (usually within 5
days); pulmonary edema and deterioration of cardiopulmonary function may occur rapidly. The case fatality rate is 35-50%.1

3.2 Diagnosis
Laboratory demonstration of hantavirus in appropriate clinical specimens.

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
The disease was first recognized in 1993 in the Southwest USA.1 It was made a nationally notifiable disease in Canada in 2000.2 Incidence appears to coincide with the distribution and population density of infected carrier rodents and their infection levels.1

In Ontario, hantavirus has been identified in deer mice and meadow voles.3 The location of the mice in Ontario included Algonquin Park, Timmins, Killarney Provincial Park and Rondeau Provincial Park (Dr. Robbin Lindsay, Public Health Agency of Canada, personal communication). No human cases of HPS have been reported in Ontario since the disease became reportable in 2001.

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.4, 5

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

4.2 Reservoir
The major reservoir in North America is the deer mouse, found primarily in rural and semi-rural areas, often in barns and old buildings.1

4.3 Modes of Transmission
Infected rodents shed live virus in their saliva, feces and urine; transmission primarily occurs through inhalation of aerosolized rodent saliva, urine or feces; through the bites of infected rodents; and through direct contact of broken skin or mucous membrane with rodent excreta.2

4.4 Incubation Period
Not completely defined, however most often it has been found to be approximately 2 weeks after exposure, with a range from a few days to 6 weeks.1

4.5 Period of Communicability
No person-to-person spread documented in North America, however there have been reports of person-to-person spread of the Andes virus strain in an outbreak in Argentina.1, 2
4.6 Host Susceptibility and Resistance
All persons without prior infection are presumed to be susceptible; however protection and duration of immunity from previous infection is unknown. Rural dwellers, cottagers and campers are most at risk in endemic areas. Any indoor exposure in enclosed, poorly ventilated areas with a viable rodent infestation increases susceptibility to infection.

5.0 Reporting Requirements

5.1 To local Board of Health
Individuals who have or may have hantavirus pulmonary syndrome 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
Cases shall be reported using the integrated Public Health Information System (iPHIS), or any other method specified by the ministry within one (1) business day of receipt of initial notification as per iPHIS Bulletin Number 17: Timely Entry of Cases and Outbreaks.

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

- Ontario Regulation 569 (Reports) under the 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
Rodent control in and around the home is the primary strategy for preventing hantavirus infection:

- Eliminate food sources available to rodents (e.g. storing food meant for humans and animals in a manner that would protect it from rodents)
- Limit possible nesting sites; seal holes and other possible entrances for rodents and use “snap traps” and rodenticides
- Do not sweep or vacuum rodent contaminated areas; use a wet mop or towel moistened with disinfectant. Disinfect rodent contaminated areas by spraying a disinfectant solution, e.g. diluted bleach (1:10)
- Wear gloves when cleaning rodent contaminated areas and perform hand hygiene after cleaning
- Avoid inhalation of dust by using approved respirators when cleaning previously unoccupied areas
- Avoid wild rodents and direct contact with areas where there is evidence of rodents
6.2 Infection Prevention and Control Strategies
If hospitalized, routine practices are recommended.²

Refer to PIDAC Routine Practices and Additional Practices in All Health Care Settings, 2012 (or as current).

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
Information that must be reported to the medical officer of health is specified in Ontario Regulation 569 under the HPPA.⁸ ⁶

Investigate cases of hantavirus pulmonary syndrome to determine the source of infection. Refer to Section 5: Reporting Requirements above for relevant data to be collected during case investigation. The following disease-specific information should also be obtained during case management:

- Symptoms and date of symptom onset;
- Exposure history, including travel and occupational history involving handling of rodents in the previous 6 weeks.

Treatment for respiratory symptoms is under the direction of the attending health care provider. No specific treatment or cure.

Provide education about the illness and how to prevent exposure.

6.4 Management of Contacts
Not applicable unless exposed to a common source, then as above.

6.5 Management of Outbreaks
Given the rarity of this disease, one case should be considered an outbreak.

Provide public health management of outbreaks or clusters in order to identify the source of illness and stop the outbreak. Outbreak management should focus on:

- Rodent control;
- Public education about rodent avoidance and control;
- Surveillance for hantavirus infection in wild rodents.

As per the Infectious Diseases Protocol, 2013 (or as current), 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>
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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 4.6 changed from “Susceptibility and Resistance” to “Human Host Susceptibility and Resistance”.</td>
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<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>Second paragraph change from: “…and Bayou virus, Black Creek Canal virus, and the New York virus sporadic causes in Louisiana, Florida and New York respectively” to “…and Bayou virus which causes sporadic cases in Louisiana; Black Creek Canal virus, responsible for sporadic disease in Florida; and the New York virus, which causes sporadic cases in New York.”</td>
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</table>
| December 2014 | 2.2 Outbreak Case Definition | First paragraph: addition that consideration should be given to the “provincial surveillance case definition” in addition to the list provided. Second paragraph: addition of “Outbreak” at beginning of paragraph. New paragraph inserted: “Given the rarity and
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<tr>
<td>December 2014</td>
<td>3.1 Clinical Presentation</td>
<td>Removal of “and then” before “pulmonary edema”. Change from: “The crude fatality rate is 40-50%” to “The case fatality rate is 35-50%”.</td>
</tr>
<tr>
<td>December 2014</td>
<td>3.2 Diagnosis</td>
<td>Entire section revised.</td>
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</table>
| December 2014 | 4.1 Occurrence | Paragraph removed: “There have been no confirmed cases of HPS reported in Ontario. Given the severity and rarity of Hantavirus infection, a single confirmed case constitutes an important public health issue”.
New paragraph added: “In Ontario, hantavirus has been identified in deer mice and meadow voles. The location of the mice…”
Addition of referral to PHO Monthly Infectious Diseases Surveillance Reports. |
| December 2014 | 5.1 To Local Board of Health | At beginning of paragraph, deletion of “Confirmed and suspected cases…” replaced by “Individuals who have or may have hantavirus pulmonary syndrome…”
Addition of “as soon as possible”. |
| December 2014 | 5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry | At beginning of paragraph, deletion of “Report only case classifications specified in the case definition to PHD…” replaced by “Cases shall be reported…”
“The disease-specific User Guides published by the ministry, and” changed to “The iPHIS User Guides published by PHO, and”.
“Bulletins and directives issued by the ministry” changed to “Bulletins and directives issued by PHO”. |
| December 2014 | 6.3 Management of Cases | Addition of “Information that must be reported to the medical officer of health is specified in Ontario Regulation 569 under the HPPA.”
Insertion of “hantavirus pulmonary syndrome” |
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| December 2014 | 6.5 Management of Outbreaks | Deletion of: “An outbreak is defined as two or more cases linked in place and time”.
Addition of: **Given the rarity of this disease, one case should be considered an outbreak.**
Inserted reference to *Infectious Diseases Protocol* at beginning of third paragraph. |
| December 2014 | 7.0 References | Updated. |
| December 2014 | 8.0 Additional Resources | Updated. |