

Appendix A: Disease-Specific Chapters

Chapter: Smallpox

Effective: February 2019

Smallpox

Communicable

Virulent

**Health Protection and Promotion Act:
O. Reg. 135/18 (Designation of Diseases)**

1.0 Aetiologic Agent

Infectious agent is the *variola virus*, a species of *Orthopoxvirus*.¹

The virus used in the live smallpox vaccine is known as the *vaccinia virus*, also a member of the genus *Orthopoxvirus*.¹

In 1979, the World Health Organization (WHO) declared that smallpox (variola) had been eradicated successfully worldwide however, it remains a potential weapon for bioterrorism.^{1,2}

2.0 Case Definition

2.1 Surveillance Case Definition

Refer to [Appendix B](#) for Case Definitions.

Smallpox has been eradicated globally; a single confirmed case of smallpox constitutes a public health emergency.

Boards of health must notify the Ministry of Health and Long-Term Care (ministry) via the Health Care Provider Hotline at 1-866-212-2282 when a case is suspected. The Public Health Ontario Laboratory (PHOL) duty officer must also be contacted at 416-605-3113 to discuss the case with a microbiologist.

2.2 Outbreak Case Definition

A single case is a public health emergency.

3.0 Identification

3.1 Clinical Presentation

Smallpox is a systemic viral disease.¹ Clinical presentation in the prodromal period has been described as sudden onset of high fever, malaise, severe headache and backache, prostration, occasional abdominal pain and vomiting.¹ After 2-4 days the fever begins to fall, followed by a characteristic eruption of a rash of skin lesions.¹ The rash on any one part of the body is in the same phase of development and progresses through successive stages of macules, papules, vesicles, pustules described as “pearls of pus”, then crusted scabs that fall off 3 - 4 weeks later.¹

3.2 Diagnosis

See [Appendix B](#) for diagnostic criteria relevant to the Case Definitions.

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>

4.0 Epidemiology

4.1 Occurrence

Formerly, smallpox was a widespread worldwide disease, however the last occurrence of endemic smallpox was in Somalia in 1977 and the last case in the world was a laboratory acquired infection in 1978 in England.¹ Global eradication of smallpox was certified by the World Health Organization (WHO) in 1979.^{1,2}

4.2 Reservoir

Smallpox is an exclusively human disease with no other known reservoirs.¹

Currently the virus exists only in two WHO reference laboratories in the United States and Russia.¹

4.3 Modes of Transmission

Infection usually occurred by respiratory tract via droplet spread or by skin inoculation.¹

4.4 Incubation Period

From 7-19 days; commonly 10-14 days from infection to onset of illness, then 2-4 more days to onset of rash.¹

4.5 Period of Communicability

From the time of development of the earliest lesions and until the disappearance of all scabs about 3 weeks after the onset of rash.¹ Risk of transmission appears to be highest at the appearance of the earliest lesions through droplet spread from the oropharyngeal enanthem.¹

4.6 Host Susceptibility and Resistance

All unvaccinated individuals are susceptible.¹

5.0 Reporting Requirements

Canada is certified as being smallpox-free. In any country that has previously interrupted transmission of smallpox, a single case is considered a public health emergency.

Please note that this disease requires immediate notification to the ministry. The reporting of this event will be notified to the Public Health Agency of Canada (PHAC)

and the World Health Organization under the International Health Regulations. Reporting of this disease is by phone and through the ministry during business hours by calling 416-327-7392. After-hours and on weekends and holidays please call the ministry's Health Care Provider Hotline at 1-866-212-2272.

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:

- *Ontario Regulation 569 (Reports)* under the *Health Protection and Promotion Act (HPPA)*;³
- 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

There is no cure or specific treatment for smallpox. Prevention is by vaccination and isolation. Administering smallpox vaccine (vaccinia vaccine) within four days after exposure can ameliorate illness in nearly all cases. The disease is stopped because the immune response to the vaccine is fast enough to stop the virus. Once a person shows symptoms, however, treatment is limited to supportive therapy and antibiotics to treat secondary bacterial infections. As well, a number of antiviral drugs are currently being tested.⁴

The Government of Canada has adopted a "search and contain" strategy recommended by public health experts in Canada and around the world, including Canada's National Advisory Committee on Immunization, Canada's Council of Chief Medical Officers of Health, and the World Health Organization. This is the same approach that was used to eliminate smallpox globally in the late 1970s.⁴

"Search and contain" starts immediately upon the confirmation of a case of smallpox. Anyone that may have come into contact with the virus is rapidly identified and vaccinated within the four-day window. Vaccinated individuals are isolated to help ensure containment.⁴

6.2 Infection Prevention and Control Strategies

Airborne and contact precautions are required in addition to routine practices. A single room for suspected cases with negative air flow and a closed door is required in healthcare settings. The disease can also be transmitted by contaminated clothes and bedding, though the risk of infection from this source is much lower.⁵

Refer to PHO's website at www.publichealthontario.ca to search for the most up-to-date information on Infection Prevention and Control.

6.3 Management of Cases

The WHO regards even a single case of smallpox anywhere in the world as a global health emergency;¹ the identification of a single case constitutes a public health emergency.

At time of a case, the Ministry Emergency Operations Centre (MEOC)* will be activated to coordinate and direct the health system's response to a case of smallpox. This will include providing supports and guidance to assist medical officers of health, other board of health staff, health care providers and other health workers in managing a case of smallpox.

6.4 Management of Contacts

The MEOC will be activated to coordinate and direct the health system's response to a case of smallpox. This will include providing supports and guidance to assist medical officers of health, other board of health staff, health care providers and other health workers in managing all contacts.

6.5 Management of Outbreaks

The MEOC will be activated to coordinate and direct the health system's response to a case of smallpox. This will include providing supports and guidance to assist medical officers of health, other board of health staff, health care providers and other health workers managing a case of smallpox.

For additional information on bioterrorism preparedness, please refer to information posted on the WHO and the Centres for Disease Control and Prevention's (CDC) web sites.^{5,6}

7.0 References

1. Heymann DL, editor. *Control of Communicable Diseases Manual*. 20 ed. Washington, D.C: American Public Health Association; 2015.
2. Committee on Infectious Diseases, American Academy of Pediatrics. Section 3: Summaries of Infectious Diseases: Smallpox (Variola). 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.

* As the appearance of a single smallpox case may pose a risk to the health of Ontarians, the ministry will activate its Ministry Emergency Operations Centre (MEOC) to coordinate and direct the health system's response. The Ministry Emergency Response Plan (MERP) provides information on the ministry's response processes, including the role of PHO in providing technical and scientific guidance. The MERP also outlines the role of the Ministry of Labour in providing guidance on the Occupational Health & Safety Act.⁷

It is also likely that other provincial ministries will activate their response structures to respond to a case, such as ministries with responsibilities for security and law enforcement as identified in the Emergency Management and Civil Protection Act and associated Order in Council.⁸ See the Provincial Emergency Response Plan for more information.

3. Health Protection and Promotion Act, R.S.O. 1990, Reg. 569, Reports, (2018). Available from: <https://www.ontario.ca/laws/regulation/900569>
4. Public Health Agency of Canada. Emergency Preparedness: Smallpox [Internet]. Ottawa, ON: Her Majesty the Queen in Right of Canada; 2004 [updated July 23, 2004; cited April 17, 2018]. Available from: <http://www.phac-aspc.gc.ca/ep-mu/smallpox-eng.php>
5. Centers for Disease Control and Prevention. Smallpox: Bioterrorism [Internet]. 2016 [updated December 19, 2016; cited April 17, 2018]. Available from: <https://www.cdc.gov/smallpox/bioterrorism/public/index.html>
6. World Health Organization. Emergencies preparedness, response : Frequently asked questions and answers on smallpox [Internet]. Geneva: World Health Organization; 2016 [updated June 28, 2016; cited April 17, 2018]. Available from: <http://www.who.int/csr/disease/smallpox/faq/en/>
7. Occupational Health and Safety Act, R.S.O. 1990, c. O.1. Available from: <https://www.ontario.ca/laws/statute/90o01>
8. Emergency Management and Civil Protection Act, R.S.O. 1990, c. E.9. Available from: <https://www.ontario.ca/laws/statute/90e09>

8.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
February 2019	General	Minor revisions were made to support the regulation change to Diseases of Public Health Significance. Common text included in all Disease Specific chapters: Surveillance Case Definition, Outbreak Case Definition, Diagnosis and Reporting Requirements. The epidemiology section and references were updated and Section 8.0 Additional Resources was deleted. Contact details updated for the ministry and Public Health Ontario Laboratories.
February 2019	6.1 Personal Prevention Measures	Section revised.
February 2019	6.3 Management of Cases	Section revised.

Revision Date	Document Section	Description of Revisions
February 2019	6.4 Management of Contacts	Section revised.
February 2019	6.5 Management of Outbreaks	Section revised.

