

Ontario Public Health Standards:
Requirements for Programs, Services and Accountability

Infectious Disease Protocol

Appendix 1:

Case Definitions and Disease-Specific Information

Disease: Smallpox and other Orthopoxviruses including mpox

Effective: April 2024

Smallpox and other Orthopoxviruses including mpox

Communicable

Virulent

[Health Protection and Promotion Act \(HPPA\)](#)¹

[Ontario Regulation \(O. Reg.\) 135/18 \(Designation of Diseases\)](#)²

Provincial Reporting Requirements

Confirmed case

Probable case

Suspect case

Person under investigation

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:

- [O. Reg. 569](#) (Reports) under the HPPA;
- The [iPHIS User Guides](#) published by Public Health Ontario (PHO);
- For certain vaccines, information to be entered into the applicable provincial inventory system (i.e., Panorama); and
- Bulletins and directives issued by PHO.^{3,4,5}

Smallpox

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 smallpox 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 (WHO) under the International Health Regulations.

Reporting of smallpox 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. The Public Health Ontario Laboratory (PHOL) duty officer must also be contacted at 416-605-3113 to discuss the case with a microbiologist.

Mpox

Suspect, probable or confirmed cases of mpox do not need to be reported immediately to the ministry.⁶ Reports shall comply with the timely entry of case requirements within one business day of the public health unit receiving initial notification of the case/encounter/episode/incident as set out in *iPHIS Bulletin "Timely entry of cases and outbreaks for diseases of public health significance"* (2020, or as current).⁷

Type of Surveillance

Case-by-case

Case Definition

Smallpox

Confirmed Case

Laboratory confirmation of infection:

- Isolation of variola virus from an appropriate clinical specimen (e.g., whole blood, lesion [vesicular or pustular] fluid, crust material)

OR

- Detection of variola virus nucleic acid

Note: Any testing related to suspected smallpox should be carried out under level 4 containment facilities at the National Microbiology Laboratory (NML).

Probable Case

- Clinical evidence of illness (see Clinical Evidence section) in a person who is epidemiologically linked to a laboratory-confirmed case or to a probable case

Suspect Case

- Clinical evidence of illness in a person who is not epidemiologically linked to a laboratory-confirmed case or to a probable case of smallpox.

OR

- Atypical lesion known to be associated with the variola virus on a person who is epidemiologically linked to a laboratory-confirmed or probable case.

Mpox

Confirmed Case

A person who is laboratory-confirmed for monkeypox virus (MPXV) by detection of unique sequences of viral DNA either by nucleic acid amplification test (NAAT) (e.g., real-time polymerase chain reaction [PCR]) and/or sequencing.

Probable Case

A person of any age who meets the suspect case definition.

AND

Meets at least one of the following within the 21 days before their symptom onset:

- a. Has an epidemiological link⁸ to a probable or confirmed mpox case.⁸
- b. Has an epidemiological link to a location/event where transmission of mpox is suspected or known to have occurred.

Suspect Case

A person of any age who meets the criteria in 1 OR 2:

⁸ Exposure risk categories are defined in the [Recommendations for the management of cases and contacts of mpox in Ontario](#) (2022, or as current).

1. An unexplained[†] acute skin rash[‡] or lesions

AND

has at least one of the following signs or symptoms:

- Headache
- Fever
- Chills and/or sweats
- Lymphadenopathy (swollen lymph nodes)
- Myalgia (muscle/ body aches, back pain)
- Prostration or asthenia (profound weakness)
- Fatigue
- Pharyngitis (sore throat)
- Proctitis (rectal inflammation/pain)

2. An unexplained acute genital, perianal, anorectal, and/or perioral, oral, or oropharyngeal lesion(s)[§]

[†] Common infectious causes of an acute rash are enteroviruses including coxsackieviruses (e.g. hand-foot-and-mouth disease), varicella zoster, herpes zoster, measles, herpes simplex, syphilis, chancroid, lymphogranuloma venereum.

[‡] Mpox illness presentation includes a progressively developing rash that usually starts on the face and then spreads elsewhere on the body. The rash can also affect the mucous membranes in the mouth, tongue, and genitalia. The rash may affect the palms of hands and soles of the feet. The rash can last for 2–4 weeks and progresses through the following stages: macules, papules, vesicles, pustules, and scabs. There are case reports from North America of an atypical mpox illness presentation starting with genital, perianal, or oral rash/lesion(s) which may precede other typical signs and symptoms of MPXV.

[§] Mpox lesions commonly present as genital, perianal, anorectal, and/or perioral, oral, or oropharyngeal lesions. Anorectal lesions can manifest as anorectal inflammation (proctitis), pain, and/or bleeding.

Person Under Investigation (PUI)

A person with a pending monkeypox virus NAAT result

AND

Does not meet criteria for a suspect, probable, or confirmed case of mpox.

Laboratory-Based Case of Reinfection

A previous confirmed case that has a subsequent confirmed mpox infection where there is laboratory evidence supporting two different infections (i.e., genome sequencing indicates two distinct mpox infections belong to different genetic lineages).

Outbreak Case Definition

Smallpox

A single case of smallpox is a public health emergency.

Mpox

Declaring an outbreak in a hospital/health care settings

- **Suspect outbreak:** a single probable case of nosocomially-acquired mpox
- **Confirmed outbreak:** a single confirmed case of nosocomially-acquired mpox

Declaring an outbreak in a long-term care home or congregate setting

- **Suspect outbreak:** a single probable case of mpox acquired in the home/setting
- **Confirmed outbreak:** a single confirmed case of mpox acquired in the home/setting

Declaring an outbreak over

An outbreak may be declared over by the local public health agency when there are no new cases in residents or staff linked to exposures in the setting after 42 days (two incubation periods) have passed from the last date that others were potentially

exposed to an infectious case.

Clinical Information

Clinical Evidence

Smallpox

Smallpox is characterized by a febrile prodrome consisting of fever $> 38.3^{\circ}\text{C}$ and systemic symptoms (prostration, headache, back pain, abdominal pain, and/ or vomiting), which generally lasts two to four days and is followed by the development of a characteristic rash.

The rash consists of deep, firm, well-circumscribed pustules that are mostly all in the same stage of development. The lesions are characteristically umbilicated. The lesions initially appear as macules, evolving into papules, vesicles and then pustules in a matter of days. Finally, crusted scabs form; they then fall off several weeks after the initial appearance of the rash.

Lesions initially appear in the oral mucosa/palate and then progress in a centrifugal pattern to involve the face, arms, legs, palms and soles. Atypical presentations include flat velvety lesions that do not evolve into vesicles and more severe forms with confluent or hemorrhagic lesions.

Mpox

Mpox closely resembles smallpox clinically, but lymphadenopathy is a more prominent feature in the prodrome and early stages of mpox illness. The prodrome period usually lasts one to three days before the rash develops. Like smallpox, lesions appear and evolve through stages of macules, papules, vesicles, pustules, to crusts/scabs before falling off.⁹ Atypical presentations include initial signs of a genital or perianal rash prior to prodrome symptoms which may not spread to other parts of the body and having lesions at different stages of development.¹⁰

Clinical Presentation

Smallpox

Smallpox is a systemic viral disease.¹¹ 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.¹¹ After 2-4 days the fever begins to fall, followed by a characteristic eruption of a rash of skin lesions.¹¹ 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.¹¹

Mpox

Mpox is usually self-limiting and closely resembles the clinical presentation of smallpox. The prodrome symptoms include fever, chills, myalgia, fatigue, headache, backache, and sometimes sore throat and cough. The rash develops after one to three days and usually lasts two to four weeks, progressing through successive stages of macules, papules, vesicles, and pustules before the lesions crust and fall off with new skin formed.⁹

Laboratory Evidence

Smallpox

Laboratory Confirmation

Any of the following will constitute a confirmed case of Smallpox:

- Positive variola virus culture in an appropriate clinical specimen (e.g., whole blood, lesion [vesicular or pustular] fluid, crust material)
- Positive for variola virus nucleic acid detection by nucleic acid amplification test (NAAT)

Approved/Validated Tests

- Standard culture for variola virus
- NAAT for variola virus

Indications and Limitations

- Polymerase Chain Reaction (PCR) can definitively diagnose infection with variola virus; all other tests screen for orthopoxviruses
- Diagnostic investigation should include ruling out varicella-zoster virus and other common conditions that cause a vesicular/pustular rash illness (e.g., enterovirus)
- Any testing related to suspected smallpox should be carried out under level 4 containment facilities at NML
- In the event of a suspected case, immediately contact the PHOL Customer Service Centre at 416-235-6556/1-877-604-4567 or the after-hours Duty Officer at 416-605-3113. PHOL medical and clinical microbiologists will provide advice prior to sampling. PHOL can assist with arranging safe transportation of clinical specimens to NML in compliance with the [*Transportation of Dangerous Goods Act, 1992*](#).¹²
- For further information about human diagnostic testing, contact the [Public Health Ontario Laboratories](#)

Mpox

Refer to PHOL's Laboratory testing information at: [Monkeypox Virus | Public Health Ontario](#).¹³

Case Management

Smallpox

The WHO regards even a single case of smallpox anywhere in the world as a global health emergency; the identification of a single case constitutes a public health emergency.¹¹

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.

Smallpox may also be used as a bioterrorism agent. If bioterrorism is suspected, the Provincial Emergency Operations Centre (PEOC) will be activated to coordinate and direct the province's response under the [Emergency Management and Civil Protection Act](#).¹⁴ The PEOC can be contacted by email at EOCOperations.MOH@ontario.ca.

Mpox

In addition to the requirements set out in the Requirement #2 of the "Management of Infectious Diseases – Sporadic Cases" and "Investigation and Management of Infectious Diseases Outbreaks" sections of the *Infectious Diseases Protocol, 2018* (or as current), the board of health shall investigate cases to determine the source of infection.³ Refer to Provincial Reporting Requirements above for relevant data to be collected during case investigation.

Decisions regarding treatment of individual cases, including the use of antiviral medications, are at the discretion of the attending clinicians. In general, treatment is supportive as the infection is self-limiting in nature. Antivirals may be considered for individuals who are severely ill and/or at high risk for severe disease; for more information on antivirals, refer to the Ministry of Health's [Mpox Antiviral Guidance for Health Care Providers](#) document.¹⁵

Cases in whom hospitalization is not clinically indicated should **self-isolate at home** and follow public health recommendations until the end of the period of communicability (**i.e., until lesion scabs have fallen off and new intact skin has formed below**, a process which varies by individual but typically takes **2-4 weeks**).

Ending of the self-isolation period should be assessed on an individual case basis by the local public health agency and in consultation with a health care provider, if required.

For more information on case management of mpox and criteria for ending self-isolation, refer to [Recommendations for the management of cases and contacts of mpox in Ontario](#) (2022, or as current).⁸

Contact Management

Smallpox

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.

Mpox

Contacts of a probable or a confirmed case of mpox should monitor for signs and symptoms for 21 days from last exposure: e.g., new skin rash/lesions, fever, chills, headache, lymphadenopathy, pharyngitis, proctitis. If contacts develop any symptoms of mpox including prodromal symptoms, they should self-isolate immediately. Quarantine is not indicated for asymptomatic contacts and boards of health should provide information on risk mitigation measures as described in the Recommendations for the management of cases and contacts of mpox in Ontario (2022, or as current).⁸

The exposure risk categories for close contacts are described in the Recommendations for the management of cases and contacts of mpox in Ontario (2022, or as current) and should be used to inform contact management recommendations and identify individuals eligible for post-exposure vaccination.⁸ For guidance on the eligibility and priority for administration of post-exposure vaccination, see [Mpox Vaccine \(Imvamune®\) Guidance for Health Care Providers](#) (2022, or as current).¹⁶

For additional vaccine information and guidance, visit [Monkeypox Virus](#).

Outbreak Management

Smallpox

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.^{17,18}

Mpox

Refer to the Recommendations for the management of cases and contacts of mpox in Ontario (2022, or as current).⁸

Prevention and Control Measures

There is no cure or specific treatment for smallpox and mpox. Prevention is by vaccination and case isolation. Imvamune® is a live attenuated, non-replicating vaccine that is approved in Canada for protection against smallpox, mpox, and other orthopoxvirus related illness; it is 3rd generation smallpox vaccine. Administering Imvamune® within four days after exposure can ameliorate illness in nearly all cases of smallpox exposure and may prevent mpox infection or lessen disease severity in those who go on to develop mpox infection. 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, several antiviral drugs are currently being tested.¹⁹ Tecovirimat (TPoxx®) is authorized by Health Canada under an extraordinary use indication for the treatment of smallpox disease in adults and pediatric patients weighing at least 13kg. TPoxx® does not have approved indication for the treatment of mpox in Canada, however a licensed healthcare professional may request TPoxx® for eligible patients based on their clinical judgement for treating severe mpox infections. For information on TPoxx® refer to [Mpox Antiviral Guidance for Health Care Providers](#) and [TPoxx® Information Sheet](#).^{8,20} For additional resources, visit [Monkeypox Virus](#).

For more information on indications, eligibility, and access to vaccinia vaccine and antiviral drugs, refer to the National Advisory Committee on Immunization (NACI)

[interim guidance](#) on the use of Imvamune® and the ministry's website: [Monkeypox Virus](#).²¹

Smallpox

The Government of Canada has adopted a "search and contain" strategy recommended by public health experts in Canada and around the world, including NACI, Canada's Council of Chief Medical Officers of Health, and the WHO.¹⁹

"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.¹⁹

Mpox

A ring vaccination strategy is used to contain the spread of mpox. Imvamune® is offered to eligible individuals as pre-exposure vaccination or post-exposure vaccination. This approach is continually being evaluated as the epidemiology evolves and vaccine supply expands. For information on the use of Imvamune® for pre-exposure vaccination or post-exposure vaccination, refer to Mpox Vaccine (Imvamune®) Guidance for Health Care Providers (gov.on.ca) (2022, or as current).¹⁶ For additional vaccine information and guidance, visit Monkeypox Virus (gov.on.ca).

Infection Prevention and Control Strategies

Smallpox

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 are 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.¹⁸

Mpox

For individuals with suspected, probable, or confirmed mpox, refer to PHO's [Infection Prevention and Control \(IPAC\) Recommendations for Monkeypox in Health Care Settings](#) (2022, or as current).²²

For more information on general IPAC, refer to PHO's [Infection Prevention and Control](#) website.

Disease Characteristics

Aetiologic Agent

Smallpox - Infectious agent is the variola virus, a species of *Orthopoxvirus*.¹¹

The virus used in the live smallpox vaccine is known as the vaccinia virus, also a member of the genus *Orthopoxvirus*.¹¹

In 1979, the World Health Organization (WHO) declared that smallpox (variola) had been eradicated successfully worldwide, however it remains a potential weapon for bioterrorism.^{11,23}

Mpox - Infectious agent is the monkeypox virus, a species of *Orthopoxvirus*.¹¹ There are two genetically distinct clades of monkeypox virus: Clade one (I) (formerly referred to as the Congo Basin clade) and Clade two (II) (formerly referred to as the West African clade).²⁴ Additionally, Clade II consists of two subclades: Clade IIa and Clade IIb.²⁴ The Clade II of monkeypox virus is generally associated with less severe disease compared to Clade I.⁹

Modes of Transmission

Smallpox - Infection from smallpox usually occurred by respiratory tract via respiratory secretions or by skin inoculation.¹¹

Mpox - Human infection historically occurred from exposure to an infected animal.¹¹ In outbreaks which began in 2022, person-to-person transmission usually occurs via direct contact with skin lesions/scabs, bodily fluids, respiratory secretions, mucus membranes, and materials contaminated with monkeypox virus (e.g., contaminated bedding, linens, towels, lesion dressings).⁹

Incubation Period

Smallpox - From 7-19 days; commonly 10-14 days from infection to onset of illness, then 2-4 more days to onset of rash.¹¹

Mpox - From 6-13 days; commonly 5-21 days from infection to onset of illness, then

1-3 more days to onset of rash.⁹

Period of Communicability

Smallpox - Communicable from the time of development of the earliest lesions and until the disappearance of all scabs about 3 weeks after the onset of rash.¹¹ Risk of transmission appears to be highest at the appearance of the earliest lesions through droplet spread from the oropharyngeal enanthem.¹¹

Mpox - Transmission may take place during the prodromal period, but generally starts with the onset of rash until all lesions have crusted, fallen off, and new skin has formed, about 2 to 4 weeks.⁹ Recent evidence suggests that some cases may be infectious up to 4 days before the onset of symptoms.²⁵ It is currently unknown what proportion of mpox cases transmit the virus pre-symptomatically, and if the likelihood of pre-symptomatic transmission varies by route of transmission.²⁵

Reservoir

Smallpox - Exclusively human disease with no other known reservoirs.¹¹

Currently the virus exists only in two WHO reference laboratories in the United States and Russia.¹¹

Mpox - A viral zoonosis with some non-human primates, rodents, hedgehogs, opossums, and rabbits known to harbour the virus. There are no known endemic animal reservoirs in Canada.^{9,11}

Host Susceptibility and Resistance - All unvaccinated individuals are susceptible.¹¹

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.¹⁰ Global eradication of smallpox was certified by the World Health Organization (WHO) in 1979.^{11,23}

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Document History

Revision Date	Document Section	Description of Revisions
April 2022	Entire Document	New template. Appendix A and B merged. No material content changes.
April 2022	Epidemiology: Occurrence section	Removed.
April 2022	ICD Codes	Removed.

Revision Date	Document Section	Description of Revisions
June 2022	Entire Document	Addition of content on orthopoxviruses (including monkeypox) as it was designated a DOPHS on June 16, 2022. Updated laboratory information for smallpox testing.
July 2022	Entire document	Information was removed and instead included in the new reference document for monkeypox. Monkeypox: outbreak case definitions added and reference to iPHIS Bulletin for data entry.
October 2022	Disease Characteristics	Monkeypox variant names updated.
March 2023	Entire document	Monkeypox name changed to mpox and monkeypox virus abbreviated as MPXV.
March 2023	Case Management	Added bioterrorism language.
May 2023	Case Management	Addition of contact information.
February 2024	Case Definition	Updated case definitions for mpox.
March 2024	Disease Characteristics	Added information to the period of communicability on pre-symptomatic transmission.