

Appendix A: Disease-Specific Chapters

Chapter: Varicella (Chickenpox)

Effective: February 2019

Varicella (Chickenpox)

Communicable

Virulent

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

1.0 Aetiologic Agent

Human (alpha) herpesvirus 3 (varicella-zoster virus [VZV]), a deoxyribonucleic acid (DNA) virus of the *Herpesvirus* group.^{1,2}

2.0 Case Definition

2.1 Surveillance Case Definition

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

2.2 Outbreak Case Definition

The outbreak case definition varies with the outbreak under investigation. Please refer to the *Infectious Diseases Protocol, 2018* (or as current) for guidance in developing an outbreak case definition as needed.

The outbreak case definitions are established to reflect the disease and circumstances of the outbreak under investigation. The outbreak case definitions should be developed for each individual outbreak based on its characteristics, reviewed during the course of the outbreak, and modified if necessary, to ensure that the majority of cases are captured by the definition. The case definitions should be created in consideration of the outbreak definitions.

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

3.0 Identification

3.1 Clinical Presentation

VZV causes two separate diseases: varicella (chickenpox) and herpes zoster (shingles). Varicella is the primary infection and is a reportable disease. Herpes zoster is caused by the reactivation of latent varicella infection in the dorsal root ganglia and is not a reportable disease.¹

Varicella is an acute illness characterized by fever and generalized, pruritic, vesicular rash numbering 250-500 lesions in varying, successive stages of development called “crops”.^{1,3} Lesions progress rapidly from maculopapular rash to vesicular rash, then

crusts, resulting in granular scabs.^{1,4} In children, the first sign of disease is often rash, while in adults, mild prodromal symptoms of fever and malaise may precede 1-2 days from the onset of rash.^{4,5}

“Breakthrough varicella” can occur among vaccinated individuals characterized by mild, atypical and inapparent infections. Individuals are afebrile, have uncharacteristic lesions numbering ≤50 with papules that do not progress to vesicles.¹

Fetal infection as a result of maternal varicella infection during the first and early second trimester of pregnancy occasionally results in fetal death, congenital varicella syndrome (CVS) and other complications.⁶

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

Varicella is still endemic in Ontario and there is substantial under-reporting. Aggregate cases of varicella reported in Ontario decreased from 9,784 in 2007 to 2,449 in 2014.*

Please refer to Public Health Ontario’s (PHO) Reportable Disease Trends in Ontario reporting tool and other reports for the most up-to-date information on infectious disease trends in Ontario.

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

For additional national and international epidemiological information, please refer to the Public Health Agency of Canada and the World Health Organization.

4.2 Reservoir

Humans.¹

4.3 Modes of Transmission

Person-to-person by direct contact, droplet or airborne spread of vesicle fluid or secretions of the respiratory tract of infected cases or indirectly by freshly contaminated fomites. Scabs from lesions are not infectious. Transmission during pregnancy to the fetus can also occur.¹

* Data included in the epidemiological summary are from Public Health Ontario’s Reportable Disease Trends 2014 Report. Data are currently not available in Query.

4.4 Incubation Period

Ten to 21 days; commonly 14-16 days; may be shortened in the immunodeficient and prolonged as long as 28 days after passive immunization against varicella.¹

4.5 Period of Communicability

As long as five days but usually one to two days before onset of rash and until all lesions are crusted, usually about five days after the rash onset. Contagiousness may be prolonged in individuals with altered immunity.¹

4.6 Host Susceptibility and Resistance

Susceptibility is universal in persons not previously infected or vaccinated. Infection usually confers lifelong immunity. VZV remains latent in the dorsal root ganglia and disease may recur years later as herpes zoster (shingles) in about 15% of older adults and sometimes in children.¹

5.0 Reporting Requirements

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);⁷
- The iPHIS User Guides published by PHO; and
- Bulletins and directives issued by PHO.

Report individual cases that are:

- Confirmed cases (See [Appendix B](#));
- Hospitalized cases; and
- Cases with complications, including death.

In addition, all cases of chickenpox should be reported as aggregate. This includes those that have been entered as individual cases since aggregate data cannot be linked to individual cases.

6.0 Prevention and Control Measures

In the event that publicly funded vaccine doses are needed for case and contact management, the public health unit should contact the Ministry of Health and Long-Term Care’s (ministry) immunization program at vaccine.program@ontario.ca as soon as possible.

6.1 Personal Prevention Measures

Immunize as per the current *Publicly Funded Immunization Schedules for Ontario*.⁸

In Ontario, the *Immunization of School Pupils Act* (ISPA) is the legislation that governs the immunization of school pupils for the designated diseases that are included in the Act. All students born in 2010 or later without a valid exemption must have documented receipt of two doses of varicella containing vaccine according to the specified schedule.⁹

In Ontario, the *Child Care and Early Years Act, 2014* (CCEYA) is the legislation that governs licensed child care settings. Pursuant to *Ontario Regulation 137/15* under the CCEYA, children who are not in school and who are attending licensed child care settings must be immunized as recommended by the local medical officer of health prior to being admitted. Under the CCEYA parents can provide a medical reason as to why the child should not be immunized or object to immunization on religious/conscience grounds.¹⁰

In children, vaccine effectiveness is estimated to be 94.4% after the first dose and 98.3% after the second dose of varicella vaccine.² Susceptible household contacts of immunocompromised, immunodeficient and/or pregnant persons should receive varicella-containing vaccination as appropriate for age and risk factors.² Varicella vaccination is indicated in women of child-bearing age to prevent CVS and reduce maternal morbidity.²

The one-dose varicella immunization program was introduced in Ontario in 2004. The program was expanded in August 2011 to include a second dose to mediate breakthrough infections from waning immunity in individuals who previously received a single dose.

6.2 Infection Prevention and Control Strategies

For hospitalized cases, in addition to routine practices, airborne and contact precautions are recommended for a minimum of five days after onset of rash and until all lesions are crusted, which can be ≥ 1 week for immunocompromised patients. Airborne and contact precautions are recommended for neonates born to mothers with varicella infection.⁶

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

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. Refer to Section 5: Reporting Requirements above for relevant data to be collected during case investigation.

Cases of varicella that present with mild illness may be permitted to return to child care settings or school as soon as cases are well enough to participate in normal activities, regardless of the state of the rash.¹¹ Exclusion of children from school or child care settings after the onset of the varicella rash is not expected to slow down the

transmission.¹¹ Parents and staff should be notified of varicella in a classroom, particularly those of immunocompromised children, in addition to pregnant staff.

Health care workers (HCWs) with acute varicella illness must be excluded from work until lesions are dried and crusted. Refer to the Varicella/ Zoster (Chickenpox/Shingles) Surveillance Protocol for Ontario Hospitals when dealing with cases that work in health care settings.¹²

Treatment of cases where indicated is under the direction of the attending health care provider. Varicella infection in pregnancy requires prompt treatment initiated within 24-48 hours of rash onset to prevent maternal and fetal sequelae.¹³ Children in whom varicella disease occurred at <12 months of age should receive the routine two-dose varicella-containing vaccine schedule.²

6.4 Management of Contacts

A contact of varicella is any susceptible individual who has had significant exposure (defined below) with a case during the period of communicability. Susceptible persons should be considered potentially infectious between eight to 21 days following exposure.⁶ Exposure to VZV is considered significant if it involves:²

- Continuous household contact (living in the same dwelling) with a person with varicella. Occurrence rate among susceptible household contacts is approximately 65%-87%.
- Being indoors for more than 1 hour with a case of varicella.
- Being in the same hospital room for more than 1 hour, or more than 15 minutes of face-to-face contact with a patient with varicella.
- Touching the lesions or articles freshly soiled by discharge from vesicles.
- Close exposure with a person with herpes zoster.²
- HCWs with direct face-to-face contact with persons who have varicella or disseminated zoster, or any direct contact with fluid from lesions or objects contaminated with this fluid.¹²

Susceptible contacts include those without:²

- Documented evidence of immunization with 2 doses of a varicella-containing vaccine;
- A history of laboratory confirmed varicella infection;
- Laboratory evidence of immunity;
- Self-reported history or health care provider diagnosis of varicella before 2004 (year that the one-dose varicella program was introduced in Ontario) for healthy individuals, including pregnant women without a significant exposure and HCWs currently or previously employed in a Canadian health care setting. In general, healthy adults 50 years of age and older are presumed to be immune to varicella.²

Contacts should be advised about signs and symptoms of VZV infection that can occur within 21 days after exposure and seek medical attention upon symptom onset.

Univalent varicella vaccine should be administered to susceptible individuals within 3

days of exposure. Administration up to five days after exposure has been shown to be effective in preventing or reducing the severity of varicella.²

Varicella zoster immune globulin (Varlg) should be considered for individuals at increased risk of severe varicella, including newborns of mothers who develop varicella, neonates in intensive care settings, immunocompromised persons and hematopoietic stem cell transplant (HSCT) recipients.² Optimal benefit of Varlg is achieved if administered within 96 hours after first exposure, with protection lasting approximately three weeks.² If Varlg is used between 96 hours to 10 days after exposure it may help to attenuate disease.²

Pregnant contacts should be advised to consult with their physician promptly to confirm history of varicella vaccination or disease. In the absence of a history of vaccination or disease, serologic testing should be performed. Varlg should be offered if serologic testing shows no evidence of immunity or serologic testing results cannot be obtained within 96 hours if there has been a significant exposure.²

Susceptible HCWs with significant exposure are required to be excluded from any work in hospital from 10 days after the first exposure until 21 days after the last exposure. Contact with dried scabs from varicella or zoster lesions does not constitute significant exposure.¹²

6.5 Management of Outbreaks

Please see the *Infectious Diseases Protocol, 2018* (or as current) for the public health management of outbreaks or clusters in order to identify the source of illness, manage the outbreak and limit secondary spread.

7.0 References

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8.0 Document History

Table 1: History of Revisions

Revision Date	Document Section	Description of Revisions
January 2014	General	<p>New template.</p> <p>Title of Section 4.6 changed from “Susceptibility and Resistance” to “Host Susceptibility and Resistance”</p> <p>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”</p> <p>Section 9.0 Document History added.</p>
January 2014	1.0 Aetiological Agent	<p>Changed from “Varicella-zoster virus, (VZV), the human (alpha) herpesvirus 3, is a member of the herpesvirus group” to “Human (alpha) herpesvirus 3 (varicella-zoster virus [VZV]), a deoxyribonucleic acid (DNA virus) of the Herpesvirus group”.</p>
January 2014	2.2 Outbreak Case Definition	<p>Changed from “Not applicable, Chickenpox is endemic in Ontario” to “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...”</p>
January 2014	3.1 Clinical Presentation	<p>Entire section revised.</p>
January 2014	3.2 Diagnosis	<p>Addition of direction to contact Public Health Ontario Laboratories or PHO website for additional information on human diagnostic testing.</p>
January 2014	4.1 Occurrence	<p>Entire section revised.</p>

Revision Date	Document Section	Description of Revisions
January 2014	4.4 Incubation Period	Changed from “2-3 weeks; commonly 14-16 days; may be prolonged in the immunodeficient and after passive immunization against varicella” to “Ten to 21 days; commonly 14-16 days; may be shortened in the immunodeficient and prolonged as long as 28 days after passive immunization against varicella”.
January 2014	4.5 Period of Communicability	Addition of final sentence (“Contagiousness may be prolonged...”).
January 2014	5.1 To Local Board of Health	<p>The following was deleted:</p> <p>“Laboratory confirmed cases shall be reported to the medical officer of health by persons required to do so under the Health Protection and Promotion Act, R.S.O. 1990. Health units must report the following individual cases of chickenpox: All lab reported cases, All cases with complications, All hospitalized cases, All deaths due to complications of varicella. Health units are required to create a new outbreak each month including the reporting of chickenpox aggregate counts regardless of whether or not any counts were observed for a given month. Reporting processes include: Creating new monthly outbreak; Reporting information; Entering aggregate (summary) chickenpox counts, and Closing and confirming the outbreak.”.</p> <p>And replaced with “Individuals who have or may have varicella 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)”. “Health units must enter all cases of chickenpox as aggregate. This includes those that have been entered as individual cases since aggregate data cannot be linked to individual cases” moved to section 5.2.</p>

Revision Date	Document Section	Description of Revisions
January 2014	6.1 Personal Prevention Measures	Entire section revised.
January 2014	6.2 Infection Prevention and Control Strategies	Addition of reference to PIDAC IPAC best practices documents.
January 2014	6.3 Management of Cases	Entire section revised.
January 2014	6.4 Management of Contacts	Entire section revised.
January 2014	6.5 Management of Outbreaks	Changed from “Not applicable, Chickenpox is endemic in Ontario; cases and contacts are managed as stated above” to “Post-exposure immunization with varicella vaccine may be of value to prevent or limit further outbreaks in childcare facilities, hospitals and homeless shelters”.
January 2014	7.0 References	Updated.
January 2014	8.0 Additional Resources	Updated.
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, Reporting Requirements, Management of Cases, and Management of Outbreaks. The epidemiology section and references were updated and Section 8.0 Additional Resources was deleted.
February 2019	6.0 Prevention and Control Measures	Updates regarding the ordering of publicly funded vaccines for case and contact management.
February 2019	6.1 Personal Prevention Measures	Updates to information on Immunization of School Pupils Act and Child Care and Early Years Act.
February 2019	6.4 Management of Contacts	Updates made to section including use of immune globulin and susceptibility.

