Appendix A: Disease-Specific Chapters

Chapter: Varicella (Chickenpox)

Revised January 2014
Varicella (Chickenpox)

☑ 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

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

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).

3.0 Identification

3.1 Clinical Presentation

VZV causes two separate diseases: varicella and herpes zoster (shingles). Varicella is the primary infection and is a reportable disease. Herpes zoster is the secondary infection 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 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 will occasionally result 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](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. Between 2007 and 2011, an average of 7,581 cases of varicella were reported per year in Ontario. For more information on infectious diseases activity in Ontario, refer to the current versions of the Ontario Annual Infectious Diseases Epidemiology Reports and the Monthly Infectious Diseases Surveillance Report.\(^7,8\)

#### 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.\(^1\)

#### 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 in about 15% of older adults and sometimes in children.\(^1\)
5.0 Reporting Requirements

5.1 To local Board of Health

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).

5.2 To the Ministry of Health and Long-Term Care (the ministry) or Public Health Ontario (PHO), as specified by the ministry

Individual and aggregate case counts shall be reported using the integrated Public Health Information System (iPHIS), or any other method specified by the ministry, within five business days of receipt of initial notification as per iPHIS Bulletin #17: Timely Entry of Cases. Reports received as aggregate numbers should be reported to PHO as such.

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 Guide published by PHO; and
- Bulletins and directives issued by PHO.

Report individual cases that are:

- Confirmed cases (See Appendix B)
- Hospitalized cases
- 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

6.1 Personal Prevention Measures

Immunize as per the current *Publicly Funded Immunization Schedules for Ontario*. Immunization efficacy in children is estimated to be 94.4% after the first dose and 98.3% after the second dose of varicella vaccine. Susceptible household contacts of immunocompromised, immunodeficient and/or pregnant persons should receive varicella-containing vaccination as appropriate for age and risk factors. Varicella vaccination is indicated in women of child-bearing age to prevent CVS and reduce maternal morbidity.

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.

Adverse reactions following varicella immunization are generally mild; a varicella-like rash occurs at the injection site in 3%-5% of vaccinees after the first dose and 1% after the second dose. A similar proportion of individuals will develop generalized varicella-like papules or vesicles that appear within five to 26 days after immunization. A varicella-like rash occurring between 5-42 days after varicella vaccination should be reported as an adverse
event following immunization (AEFI) if they meet the provincial case definition specified in Appendix B: AEFI, unless wild-type virus is detected. Varicella-like rashes that occur within two weeks after immunization may be due to either wild-type or vaccine-virus. Appropriate specimen(s) should be collected for laboratory determination of wild-type vs. vaccine strains.2

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 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
Cases should be investigated to determine the source of infection, including inquiring about travel history or exposure to persons who have recently travelled and documenting location of travel. Investigation should commence promptly after receiving the initial report. Collect specified information as per Ontario Regulation 569 under the HPPA11 and include the following data in the investigation:

- Demographic information;
- Clinical: symptoms and date of symptom onset, hospitalization, complications;
- Laboratory: specimen type, specimen source;
- Immunization status, specifically dates of vaccination with varicella-containing vaccines; and
- Epidemiologic: (i.e. contact history [see below], travel history including location and dates, attendance at daycare/school/educational institution).

Cases of varicella that present with mild illness or are uncomplicated can be permitted to return to daycare or school as soon as cases are afebrile and well enough to participate in normal activities, regardless of the state of the rash.6,14 Transmission is greatest in the prodromal period, therefore exclusion of children from school or daycare after the onset of the varicella rash will not slow down the transmission of the virus and is too late to prevent spread.14 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. Please refer to the Ontario Hospital Association and the Ontario Medical Association (OHA/OMA) Varicella Protocol.15

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. Children in whom varicella disease occurred at <12 months of age should receive the routine two-dose varicella-containing vaccine schedule.

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 eight to 21 days following exposure. Exposure to VZV is considered significant if it involves:

- 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 of a person with active varicella.
- 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.

Susceptible contacts include those without:

- Self-reported history of varicella if born before 2004 (except for HCWs).
- A health care provider diagnosis of varicella or herpes zoster, for those born in 2004 or later and HCWs.
- Documented evidence of immunization with 2 doses of a varicella-containing vaccine.
- A history of laboratory confirmed varicella infection.
- Laboratory evidence of immunity.

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. Varicella vaccine administration to susceptible individuals within three to five days after exposure has been shown to be effective in preventing or reducing the severity of varicella.

Immunocompromised persons, HIV-infected persons, newborn infants of mothers who develop varicella and neonatal or pediatric intensive care settings should be advised to consult with their physician or infectious diseases specialist promptly. Varicella zoster immune globulin (VarIg) is recommended for these susceptible persons. Optimal benefit of VarIg is achieved if administered within 96 hours after first exposure and duration of protection conferred is approximately three weeks.

Pregnant contacts should be advised to consult with their physician promptly to confirm history of varicella vaccination or disease. VarIg should be offered if serologic testing shows no evidence of immunity. Although there is no assurance that administering VarIg to a
pregnant contact will prevent congenital malformation in the fetus, it may modify maternal varicella severity.\(^1\)

Susceptible exposed 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 and exposure to dried scabs from varicella or zoster lesions does not constitute significant exposure.\(^15\) Refer to the OHA/OMA Varicella Protocol.\(^15\)

### 6.5 Management of Outbreaks

Post-exposure immunization with varicella vaccine may be of value to prevent or limit further outbreaks in childcare facilities, hospitals and homeless shelters.\(^2\)

### 7.0 References

10 Ontario. Ministry of Health and Long-Term Care. Timely entry of cases. iPHIS bulletin. Toronto, ON: Queen’s Printer for Ontario; 2012:17 (or as current).


8.0 Additional Resources

Ontario Agency for Health Protection and Promotion (Public Health Ontario), Provincial Infectious Diseases Advisory Committee. Routine practices and additional precautions in all health care settings. 3rd ed. Toronto, ON: Queen’s Printer for Ontario; 2012. Available from: [Link to Ontario Agency for Health Protection and Promotion guide]


Public Health Agency of Canada..VarizigTM as the varicella zoster immune globulin for the prevention of varicella in at-risk patients. Can Commun Dis Rep. 2006 [cited 2013 Aug...
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>January 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 “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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<tr>
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<td></td>
<td>Section 9.0 Document History added.</td>
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<tr>
<td></td>
<td>1.0 Aetiological Agent</td>
<td>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”.</td>
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<td>3.1 Clinical Presentation</td>
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<td>3.2 Diagnosis</td>
<td>Addition of direction to contact Public Health Ontario Laboratories or PHO website for additional information on human diagnostic testing.</td>
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<td>4.1 Occurrence</td>
<td>Entire section revised.</td>
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|               |                  | and prolonged as long as 28 days after passive immunization against varicella”.
| 4.5 Period of Communicability | Addition of final sentence (“Contagiousness may be prolonged…”). |
| 5.1 To Local Board of Health | The following was deleted: “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.”. 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)”.
<p>| 6.1 Personal Prevention Measures | Entire section revised. |
| 6.3 Management of Cases | Entire section revised. |
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