

Public Health and Primary Health Care
Communicable Disease Control
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Dear Colleague:

Re: Changes to Varicella (Chickenpox) Protocol Infection Prevention and Control Measures

The content under the Infection Prevention and Control Measures section of the Varicella (Chickenpox) Protocol should be replaced with the following content:

Infection Prevention and Control Measures:

- Refer to the Manitoba Health document *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* available at: <http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/rpap.pdf> .
- Cases who are health care workers should be advised to immediately notify Occupational Health and/or Infection Prevention and Control for the facility/regional program in which they work and in consultation with them determine when it is appropriate to return to work.
- Outpatients and day-surgery patients should be advised to notify staff if they develop chickenpox and are scheduled to come to a health care facility when their lesions are not yet all crusted and dried. If they develop a chickenpox rash within 48 hours of leaving, notification should also occur.
- Visitors who are active cases of chickenpox should not enter a health care facility until all lesions have crusted and dried. If there are any questions regarding this issue, Infection Prevention and Control can be consulted to provide assistance.

The Varicella (Chickenpox) Communicable Disease Management Protocol is available at:

<http://www.gov.mb.ca/health/publichealth/cdc/protocol/varicella.pdf>

Please share this communication with all colleagues in your department, facility or clinic.

Sincerely,

"Original signed by"

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Varicella (Chickenpox)



Public Health Branch

1. Case Definition

1.1 Confirmed Case

Clinical evidence of illness^a and laboratory confirmation of infection:

- Isolation of virus in cell-culture or direct antigen detection of varicella-zoster virus (VZV)^b from an appropriate clinical specimen (e.g., vesicular fluid) using direct fluorescent assay (DFA);
OR
- Detection of VZV DNA in an appropriate clinical specimen (e.g., vesicular fluid, crust from lesion);
OR
- Seroconversion or a significant rise (e.g., fourfold or greater) by any standard serologic assay in varicella-zoster IgG titre between acute and convalescent sera, in the absence of recent immunization with varicella vaccine;
OR
- Positive serologic test for varicella-zoster IgM antibody, in the absence of recent immunization with varicella vaccine;
OR

Clinical evidence of illness^a in a person without laboratory confirmation of infection who has an epidemiologic link to a laboratory-confirmed case of chickenpox or zoster infection (1).

1.2 Probable Case

Clinical evidence of illness^a in the absence of laboratory confirmation and in the absence of an epidemiological link to a laboratory-confirmed case (1).

2. Reporting and Other Requirements

- Individual cases of varicella are not reportable to Manitoba Health.
- Outbreaks of varicella are reportable by health care professional to Manitoba Health. CNPHI (Canadian Network for Public Health

Intelligence) users should login to CNPHI and enter data into the Respiratory/VPD Outbreak Report. Non-CNPHI users may request the form by email: outbreak@gov.mb.ca.

- Adverse events following immunization should be reported by health care professional by completing and returning the form available at: http://www.gov.mb.ca/health/publichealth/cdc/docs/aeft_form.pdf.

3. Clinical Presentation/Natural History

A mild prodrome of fever and malaise may precede the onset of rash (3). Symptoms of varicella include low-grade fever, mild constitutional symptoms, and a generalized, pruritic rash, with lesions at different stages that progress rapidly from macules to papules to vesicular lesions before crusting (4). The lesions initially contain clear vesicular fluid, but over a very short period of time they pustulate and scab (5). The lesions appear on the face and trunk and rapidly spread to involve other areas of the body (5). Healthy infected children usually have 200 to 500 lesions in two to four successive crops (3). Lesions also can occur on mucous membranes of the oropharynx, respiratory tract, vagina, conjunctiva, and the cornea (3). Varicella tends to be more severe in infants, adolescents, and adults than in young children (6). Crusts fall off within one to two weeks after the onset of infection and leave a slightly depressed area of skin but no permanent scarring (5). Asymptomatic varicella infection is unusual (6). Children with impaired immunity are at risk of severe varicella and death (4, 7). In children with human immunodeficiency virus (HIV) infection, recurrent varicella can develop (6). Severe and even fatal varicella has been

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- a Characterized by a rash with rapid evolution of macules to papules, vesicles and crusts; all stages are simultaneously present; lesions are superficial and may appear in crops (1).
 - b The varicella-zoster virus (VZV) causes two distinct diseases, varicella (chickenpox) as the primary infection, and later, when latent VZV reactivates, herpes zoster (shingles) (2).

reported in otherwise healthy children receiving intermittent courses of high-dose corticosteroids (greater than 2 mg/kg of prednisone or equivalent) for treatment of asthma and other illnesses (6). Complications are more common in adolescents, adults and immunocompromised people (4). The main complications of varicella include secondary bacterial skin and soft tissue infections, bacteremia, pneumonia, osteomyelitis, septic arthritis, necrotizing fasciitis, toxic shock-like syndrome, cerebellar ataxia, stroke and encephalitis (4). Reye syndrome following chickenpox has become rare because of decreased use of salicylates during illness (6).

Primary maternal varicella infection in the first 20 weeks of gestation (congenital varicella syndrome) is occasionally associated with a variety of abnormalities in the newborn including low birth weight, hypoplasia of an extremity, skin scarring, localized muscular atrophy, encephalitis, cortical atrophy, chorioretinitis and microcephaly (3). Maternal varicella occurring in the five days before to two days after birth is associated with severe neonatal varicella in 17% to 30% of infants, with high case fatality for the newborn (4).

4. Etiology

Human (alpha) herpesvirus 3 (varicella-zoster virus, VZV), a member of the herpesvirus family (2).

5. Epidemiology

5.1 Reservoir and Source

Humans (2).

5.2 Transmission

VZV is spread by the airborne route as well as by direct contact with the virus shed from skin lesions (4). Humans are infected when the virus comes into contact with the mucosa of the upper respiratory tract or the conjunctiva (6). Occasionally, transmission can occur from fomites, such as articles freshly soiled by discharges from vesicles or, in the case of disseminated zoster, mucous membrane secretions (2, 8). In utero infection occurs as a result of transplacental passage

of virus during maternal varicella infection (6). Transmission of vaccine virus to a susceptible contact appears to be uncommon and occurs primarily if and when the vaccine recipient develops a vaccine-associated rash (3, 4, 9).

5.3 Occurrence

5.3.1 General

Varicella occurs worldwide (4). It occurs seasonally and in epidemics (5). In countries without vaccination programs, varicella is mainly a disease of childhood, developing in 50% of children by the age of five years and 90% by the age of 12 years (4). In countries where universal childhood vaccination against varicella has been adopted, there has been a reduction not only in the number of varicella cases, but also the number of hospitalizations due to its complications (10). Varicella outbreaks among highly vaccinated populations of children in the United States have been described (11). Breakthrough disease, although generally milder, occurred in vaccine recipients during these outbreaks (11). Varicella occurs more frequently in adults who reside in tropical regions than in those who reside in other geographic areas (5). Seroprevalence data from tropical regions suggest that up to 30% of individuals are susceptible to varicella at 20 years of age, and 5-10% remain susceptible at 30 years of age (12). Current evidence suggests that varicella disease is shifting into older age children and even into adults (13). This shift may have clinical implications since adolescents and adults with varicella infection have more severe complications than young children (13).

5.3.2 Canada

In the pre-vaccine era, about 350,000 varicella cases and 1,500 to 2,000 varicella-related hospitalizations occurred each year in Canada (4). In the pre-vaccine era, 90% or more of Canadian children were infected by 12 years of age (14). The effect of varicella immunization programs on the incidence of the disease is difficult to assess as varicella infections are significantly under-reported (4).

5.3.3 *Manitoba*

No reliable data exist as individual cases of varicella are not reportable in Manitoba and outbreaks may or may not be recognized and reported.

5.4 Incubation Period

Ranges from 10-21 days, usually 14-16 days (6). Incubation may be prolonged to as long as 28 days after passive immunization against varicella and may be shorter in the immunodeficient (2). Varicella can develop between two and 16 days after birth in infants born to mothers with active varicella around the time of delivery; the usual interval from onset of rash in a mother to onset in her neonate is nine to 15 days (6).

5.5 Susceptibility and Resistance

The estimated attack rate for varicella among susceptible contacts in household settings is 65% to 87% (4). Adults, in particular pregnant women, are at increased risk of severe disease (4). Persons who are immunocompromised have a higher incidence of chickenpox (5).

5.6 Period of Communicability

Patients with chickenpox are infectious for approximately 48 hours before vesicle formation and generally for four to five days after, until all vesicles have crusted (5). Immunocompromised persons infected with VZV can have a prolonged duration of communicability. Susceptible individuals should be considered potentially infectious from day 10 through day 21 following exposure to chickenpox (2), (from day 10 through day 28 following exposure if varicella-zoster immune globulin [VarIg] was given) (6).

6. Diagnosis

History and physical examination are important. Refer to Section 1 *Case Definition* for laboratory tests.

7. Key Investigations for Public Health Response

- Immunization history.

- Investigate source of infection (e.g., usually a case of varicella but in rare instances could be a case of herpes zoster):
 - Household
 - Day care/school
 - Travel
 - Other
- Contact identification.

8. Control

8.1 Management of Cases

- The medical management of chickenpox in the otherwise healthy host is directed toward reduction of complications (5). Hygiene is important, including bathing, astringent soaks, and closely cropped fingernails to avoid a source for secondary bacterial infection associated with scratching of the pruritic lesions (5).
- Children with varicella should not receive salicylates or salicylate-containing products, because administration of salicylates to such children increases the risk of Reye syndrome (6). Acetaminophen may be used to reduce fever in patients with varicella (5).

Treatment:

Antiviral therapy is moderately effective in treating chickenpox (2). The decision to use antiviral therapy and the route and duration of therapy should be determined by specific host factors, extent of infection, and initial response to therapy (6). Therapy initiated early in the course of the illness, especially within 24 hours of rash onset, maximizes efficacy (6).

- Routine use of oral acyclovir or valacyclovir is not recommended in otherwise healthy children with varicella (6).
- Oral acyclovir or valacyclovir should be considered (if it can be initiated within 24 to 48 hours) for otherwise healthy people at increased risk of moderate to severe varicella including:
 - unvaccinated people over 12 years of age;
 - people with chronic cutaneous or pulmonary disorders;

- people receiving long-term salicylate therapy;
- people receiving short, intermittent, or aerosolized courses of corticosteroids;
- pregnant women, especially during the second and third trimesters (6).
Intravenous acyclovir is recommended for the pregnant patient with serious complications of varicella (6).
- Some experts also recommend use of oral acyclovir or valacyclovir for secondary household cases in which the disease is usually more severe than in the primary case (6).
- Intravenous acyclovir therapy is indicated for persons at increased risk of severe disease which includes but is not limited to those who are immune suppressed, premature neonates, infants born to a mother with chickenpox at or within 48 hours of delivery, and hospitalized patients. Oral acyclovir should not be used to treat immunocompromised children with varicella because of poor bioavailability (6).
- Infections caused by acyclovir-resistant VZV strains, which generally are limited to immunocompromised hosts (6), should be managed by an expert in Infectious Diseases.

Infection Prevention and Control Measures:

- Airborne and contact precautions are indicated for hospitalized patients until all lesions have crusted and dried. Refer to the Manitoba Health document *Routine Practices and Additional Precautions: Preventing the Transmission of Infection in Health Care* available at:
<http://www.gov.mb.ca/health/publichealth/cdc/docs/ipc/tpap.pdf>.
- Cases who are health care workers should be advised to immediately notify Occupational Health and/or Infection Prevention and Control for the facility/regional program in which they work and in consultation with them determine when it is appropriate to return to work.
- Outpatients and day-surgery patients should be advised to notify staff if they develop chickenpox and are scheduled to come to hospital when

their lesions are not all crusted and dried. If they develop a chickenpox rash within 48 hours of leaving, notification should also occur.

- Visitors who are cases of chickenpox should not be allowed to enter hospitals until all lesions have crusted and dried.
- Infection Prevention and Control should be consulted regarding patients and visitors who are cases.

Public Health Measures:

- A child with mild illness should be allowed to return to school or day care as soon as he or she is well enough to participate normally in all activities, regardless of the state of the rash (15).
- Parents, particularly parents of immunosuppressed children, should be notified that chickenpox is in the class. They should also be provided with information on the VZV incubation period and how to detect early VZV (15).

8.2 Management of Contacts

Salicylate therapy should be stopped in a child who has been exposed to varicella (6).

Definition of Significant Exposure:

For post-exposure prophylaxis purposes, a significant exposure in a susceptible person^c is defined as one or more of the following when the

^c Individuals who have one or more of the following are considered immune to varicella. Individuals who do not have ANY of the following are considered susceptible to varicella:

- Self-reported history of varicella if born before 2004 (except for health care workers);
- For those born in 2004 or later and for health care workers, a health care provider diagnosis of varicella or herpes zoster;
- Documented evidence of immunization with two doses of a varicella-containing vaccine;
- A history of laboratory-confirmed varicella infection;
- Laboratory evidence of immunity (4).

Recipients of hematopoietic stem cell transplant should be considered susceptible in the post-transplantation period regardless of a history of varicella disease or vaccination, or positive serologic test results (4).

case is contagious (usually 48 hours before vesicle formation and until four to five days thereafter until all vesicles have crusted) (3, 6):

- Continuous household contact (living in the same dwelling) with a person with varicella.
- Being indoors for more than one hour with a case of varicella.
- Being in the same hospital room for more than one hour with a case of varicella (Note: health care organizations may choose to use less than one hour).
- Face-to-face contact for 15 or more minutes with a case of varicella.
- Touching the lesions of a person with active varicella (4).

Post-exposure Serologic Testing:

Immunity to VZV should be assessed as soon as possible for pregnant women and immunocompromised individuals (4). If serology results can be obtained within 96 hours, those who are IgG antibody negative should receive varicella-zoster immune globulin (VarIg) as detailed below (4). If serology results cannot be obtained within 96 hours (i.e., still do not know if person is IgG antibody negative or positive), VarIg should be administered (4).

Post-exposure Prophylaxis:

Univalent Varicella Vaccine:

- Univalent varicella vaccine given as soon as possible, within three days but up to five days after a significant exposure, is recommended for susceptible, healthy, non-pregnant persons who are 12 months of age or older (4). Varicella vaccination is not indicated for post-exposure management of infants less than 12 months of age, as the vaccine is not authorized for this age group and these infants are generally protected by maternal antibodies (4). There are no data on the use of MMRV (measles-mumps-rubella-varicella) vaccine in varicella post-exposure or outbreak situations (4).

NOTE: Systemic antiviral therapy (such as acyclovir, valacyclovir, famciclovir) should be

avoided in the peri-immunization period, as it may reduce the efficacy of varicella-containing vaccine (4).

Ordering and Administration of Varicella Vaccine:

- During regular business hours, contact the Provincial Vaccine Warehouse at 204-948-1333 or 1-855-683-3306. A current Biologics/Vaccine Order Form is available by calling the warehouse. After regular office hours the on-call warehouse staff may be contacted at 204-805-4096.
- Univalent varicella vaccine should be administered subcutaneously (SC) (4). Refer to product monograph for dosing and other information.

Varicella-Zoster Immune Globulin (VarIg):

Varicella-zoster immune globulin should be considered for the following susceptible^d individuals if it can be given within 96 hours of the most recent significant exposure (4). If more than 96 hours have elapsed since the last exposure, the benefit of administering VarIg is uncertain (4). If VarIg is being considered, consultation with an infectious diseases or infection control specialist is recommended (4).

- Pregnant women.

d Individuals who have one or more of the following are considered immune to varicella. Individuals who do not have ANY of the following are considered susceptible to varicella:

- Self-reported history of varicella if born before 2004 (except for health care workers);
- For those born in 2004 or later and for health care workers, a health care provider diagnosis of varicella or herpes zoster;
- Documented evidence of immunization with two doses of a varicella-containing vaccine;
- A history of laboratory-confirmed varicella infection;
- Laboratory evidence of immunity (4).

Recipients of hematopoietic stem cell transplant should be considered susceptible in the post-transplantation period regardless of a history of varicella disease or vaccination, or positive serologic test results (4).

- Newborn infants of mothers who develop varicella during the five days before to 48 hours after delivery.
- Children exposed to varicella in neonatal or pediatric intensive care settings.
- Immunocompromised persons, except those receiving regular monthly infusions of 400 mg/kg or more of intravenous immune globulin and whose most recent dose was within three weeks before exposure to varicella (4). For immunocompromised persons who are outside the 96-hour window for VarIg administration, antiviral prophylaxis from days seven to 14 post-exposure could be considered (4). **Manitoba Health does not cover the cost of antiviral prophylaxis.**
- HIV-infected persons who are severely immune suppressed (CD4 cell count $< 200 \times 10^6$ /L or CD4 percentage $< 15\%$). For HIV-infected persons who are not severely immune suppressed, post-exposure vaccination is recommended as detailed above. Post-exposure VarIg is not necessary for HIV-infected persons without severe immune suppression who have completed an appropriate two-dose vaccination series or who have had natural varicella infection (4);
- Recipients of hematopoietic stem cell transplantation (HSCT) regardless of a history of varicella disease or vaccination or positive serologic test results (4).

Ordering and Administration of VarIg:

- VarIg is obtained through Canadian Blood Services. Call 204-789-1034.
- The recommended dose of VarIg is 125 IU/10 kg of body weight up to a maximum of 625 IU (4). The minimum dose is 125 IU (4). In immunocompromised persons, more than this amount may be required; consultation with an expert is recommended.
- VarIg should be given by the intramuscular (IM) route (4). Refer to product monograph for more information.
- As protection conferred by VarIg lasts approximately three weeks, subsequent exposures occurring more than three weeks after a dose of VarIg require additional doses of VarIg (4).

Immunization Follow-up of Contacts:

- A second dose of varicella vaccine may be indicated to complete the vaccination series for those who received one post-exposure dose of vaccine, but no doses of vaccine prior to the exposure. Refer to the Manitoba Health website <http://www.gov.mb.ca/health/publichealth/cdc/div/schedules.html> for more information on the recommended schedule.
- Susceptible pregnant women should be given univalent varicella vaccine after delivery, assuming the recommended minimum interval (5 months) (16) has passed since VarIg was administered (4).

8.3 Outbreak Management

- Post-exposure immunization as per section 8.2 above is useful in preventing or limiting varicella outbreaks in hospitals, child care facilities and homeless shelters (4).
- Serologic testing for susceptibility is not necessary prior to immunization in an outbreak situation (4).

8.4 Preventive Measures

- Immunization with varicella vaccine as recommended by the current *Canadian Immunization Guide* <http://www.phac-aspc.gc.ca/publicat/cig-gci/p04-vari-eng.php> . Refer to Manitoba Health's *Eligibility Criteria for Publicly-Funded Vaccines* for more information on varicella immunization in Manitoba. Available at: <http://www.gov.mb.ca/health/publichealth/cdc/vaccineeligibility.html> .
- Prenatal assessment of women for evidence of varicella immunity is recommended and upon completion or termination of pregnancy those who are not immune should be vaccinated (13). Breastfeeding is not a reason to delay vaccination with varicella vaccine (13).

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