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Unless otherwise stated the content of this guideline has been adapted from
BCCDC Communicable Disease Control Varicella Guideline (July 2004 and (draft) June 2009)

1.0 GOAL

The goal of varicella control in the Yukon is to reduce the mortality and morbidity associated with varicella disease. This will be accomplished through the universal varicella vaccination program and follow-up of high risk persons (refer to **Section 3.8**) exposed to varicella disease.

2.0 CLINICAL DESCRIPTION

Varicella-zoster virus (VZV) is a DNA virus of the herpes virus family. It causes two diseases: varicella (chickenpox), the primary infection, and herpes zoster (shingles), a secondary infection due to a reactivation of latent varicella infection in the dorsal root ganglia.

Chickenpox typically infects children under the age of 10; five to 10 per cent of the population remains susceptible to the disease in adulthood. Lifetime risk of reactivation as zoster/shingles is about 15 to 20 per cent and can occur at any time, most often in the elderly population.

Chickenpox is manifested as a generalized, itchy rash that progresses quickly from macules to papules to vesicular lesions before crusting. The rash usually appears first on the head, then on the trunk and then the extremities. Successive crops of lesions appear over several days, with several stages of maturity present at the same time. Healthy children usually have 200-500 lesions. A mild prodrome including fever and malaise may precede the rash.

In shingles, vesicles with an erythematous base appear in crops in irregular fashion on the surface of the skin innervated by a specific nerve. Severe pain and paresthesia are common.

Complications are more frequent in adolescents, adults, immunocompromised persons and pregnant women. Severe disease, disseminated varicella and zoster are more likely to develop in immunocompromised persons. The complications of chickenpox include secondary bacterial skin and soft tissue infections, otitis media, bacteremia, pneumonia, osteomyelitis, septic arthritis, endocarditis, necrotizing fasciitis, toxic shock-like syndrome, hepatitis, thrombocytopenia, cerebellar ataxia and encephalitis. Herpes zoster may result in permanent neurological damage such as cranial nerve palsy or visual impairment after zoster ophthalmia. The most common debilitating complication of zoster is postherpetic neuralgia, defined as pain that persists after resolution of the zoster rash. This pain may last a year or longer after the episode of zoster. Incidence of zoster and postherpetic neuralgia increases with age.

The incidence of congenital varicella syndrome among infants born to mothers with varicella is approximately two per cent when infection occurs between 13 and 19 weeks of gestation. The syndrome is rare when infection occurs before the 13th or after the 20th week. Congenital varicella syndrome results in a wide clinical spectrum, which may include low birth weight, ophthalmic abnormalities, skin scarring, limb atrophy, cerebral atrophy and other anomalies.

Infants exposed to varicella-zoster virus *in utero* during the second 20 weeks of pregnancy can develop inapparent varicella and subsequent zoster early in life without having had extrauterine varicella.

Varicella infection can be fatal for an infant if the mother develops varicella from five days before to two days after delivery. When varicella develops in a mother more than five days before delivery and gestational age is 28 weeks or more, the severity of disease in the newborn is modified by transplacental transfer of VZV-specific maternal immunoglobulin IgG antibody.

The case fatality rates for varicella are highest among adults (30 deaths/100,000 cases), followed by infants under one year of age (7 deaths/100,000 cases), and lowest among children 1 to 19 years of age (1 to 1.5 deaths/100,000 cases).

Varicella is transmitted from person to person by direct contact, droplet or airborne spread of vesicle fluid or secretions of the respiratory tract of chickenpox cases, or by direct contact with vesicle fluid of patients with herpes zoster. The virus may also be spread indirectly through articles freshly soiled by discharges from vesicles or mucous membranes of infected people. Scabs from varicella lesions are not infective.

The incubation period is 10 to 21 days; however, this may be extended to 28 days if Varicella-zoster immune globulin (VarIlg) is given.

3.0 DEFINITIONS

3.1 Confirmed Case of Varicella

Clinical evidence of illness and laboratory confirmation of infection:

- isolation or direct antigen detection of varicella-zoster virus (VZV) from an appropriate clinical specimen

OR

- detection of VZV DNA

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

OR

- positive serologic test for varicella-zoster IgM antibody

OR

- clinical evidence of illness¹ in a person with an epidemiologic link to a laboratory-confirmed case of chickenpox or VZV infection.

3.2 Probable Case

Clinical evidence of illness¹ in the absence of laboratory confirmation or epidemiologic link to a laboratory-confirmed case.

3.3 Varicella Immune Individual

Any person with one of the following:

- self reported history of varicella or herpes zoster at ≥ 12 months of age
- physician-diagnosed varicella or herpes zoster at ≥ 12 months of age
- documentation of positive VZV IgG
- isolation of varicella virus from an appropriate clinical specimen
- documented receipt of one dose of live varicella vaccine for those 12 months to 12 years of age at time of immunization, or two doses of vaccine at least one month apart for those ≥ 13 years of age at time of documented receipt of immunization.

3.4 Varicella Susceptible Individual

Any person with one of the following:

- history of varicella illness occurring before 12 months of age
- no or uncertain history of chickenpox or herpes zoster at ≥ 12 months of age
- negative serology (VZV IgG negative)
- receipt of stem cell transplant (within the post-transplantation period) regardless of a history of varicella or positive serologic test results

Note: Adults who have emigrated from tropical/subtropical areas have lower rates of seropositivity and, hence, are more often susceptible to VZV.

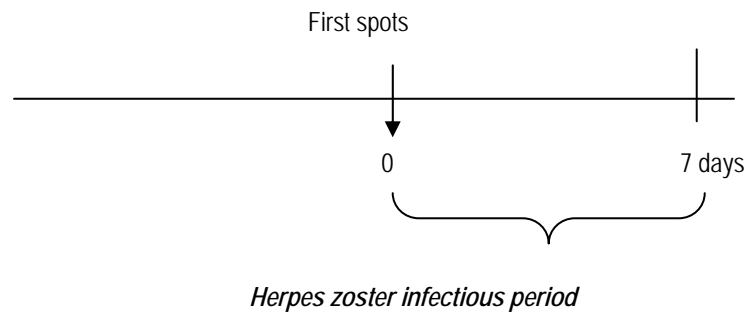
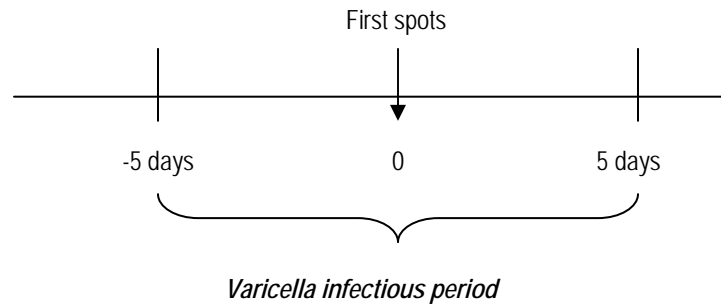
¹ Clinical illness is characterized by a rash with rapid evolution of macules to papules, vesicles, and crusts; all stages are simultaneously present; lesions are superficial and may appear in crops.

3.5 Indications for Laboratory Testing

- Serology for VZV IgG is recommended for those individuals aged ≥ 13 years, assessed as possibly non-immune before immunization (i.e., unknown or no history of chickenpox). Such individuals may present for immunization at any time and/or may be identified as contacts of a case of varicella or zoster.
- The laboratory requisition should indicate a **VZV IgG immune status** test. All testing will be submitted to the Whitehorse General Hospital laboratory and will be forwarded to the BCCDC Laboratory Services for analysis.
- VZV IgG results are reported as “reactive,” indicating immunity, or as “non-reactive,” indicating susceptibility. There will be occasions when an equivocal result will be reported. These are results that fall very close to the positive cut-off value for the test. It is not possible to interpret these as they could be truly positive or negative. BCCDC Laboratory Services uses a conservative approach and suggests that these tests should be considered “non-reactive.”
- Routine post-vaccination testing is not necessary.
- Medical specialists may elect to test some immunocompromised clients post-vaccination (e.g., susceptible immunocompromised children). Testing for VZV antibody should be done four weeks after vaccine administration. Specify on the requisition that the client is immunocompromised. If antibody is not detected, offer VarI_g to the client on subsequent exposures to wild-type varicella.

3.6 Period of Communicability

- Persons with varicella are contagious from five days (but usually one to two days) before onset of rash until all lesions have crusted (usually five days). In some cases this may be delayed until two weeks or more after rash onset.
- Persons with zoster may be sources of infection for a week after the appearance of their vesiculopustular lesions.
- Contagiousness may be prolonged in persons with altered immunity.



The incubation period for varicella is usually 14 to 16 days, but may be as short as 10 or as long as 21 days after contact. It may be prolonged for up to 28 days if Varlg was given.

Susceptible persons should be considered potentially infectious 10 to 21 days following exposure to varicella disease (up to 28 days if individual received Varlg).

3.7 Contact

An individual is considered a contact if they have had any of the following types of interaction with someone known to have varicella during the period of communicability, with someone having disseminated zoster, or with an immunocompromised host with zoster:

- 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
- sharing the same hospital room for more than one hour or having more than 15 minutes of face-to-face contact with a patient with varicella
- touching the lesions of a person with active varicella or zoster (shingles)

Note: The following is not considered an exposure: contact with an immunocompetent person whose non-disseminated zoster lesions are well covered by clothing or dressings.

3.8 Individuals at High Risk for Complications of Varicella Disease if Susceptible and Exposed

- those who are immunocompromised due to disease or therapy
- premature infants (< 37 weeks gestation) exposed during their first weeks of life
- newborns whose mothers develop varicella disease five days before to 48 hours after delivery
- pregnant women
- those with cystic fibrosis
- those awaiting solid organ transplant or haematopoietic stem cell transplant (HSCT)
- recipients of a solid organ transplant or HSCT
- those undergoing hemo- or peritoneal dialysis
- those with nephrotic syndrome
- those on chronic salicylate therapy

3.9 Vaccine-Modified Disease

Vaccine-modified disease is defined as a varicella infection occurring after exposure to wild-type virus, more than 42 days following vaccination.

A vaccine-modified infection is usually mild. Individuals typically develop fewer than 50 skin lesions (and the lesions more commonly are atypical, with papules that do not progress to vesicles) and experience a shorter duration of illness and lower incidence of fever than those with natural infection who were not vaccinated. However, approximately 25 to 30 per cent of vaccine-modified illnesses are not mild, with clinical features more similar to those in unvaccinated children.

There have been varying estimates of the rate of vaccine-modified disease. In the U.S., during a ten-year surveillance period (1995-2004) the rate of vaccine-modified disease was 9.5 per cent. The severity and incidence of vaccine-modified disease among vaccinees increased with the time since vaccination.

Both primary and secondary vaccine failures can occur; following vaccination there is waning immunity over time, and less opportunity to boost immunity through circulating VZV (due to a less susceptible population as a result of vaccination).

4.0 CASE MANAGEMENT

For information regarding communicability and symptom management, direct client to BC Health File #44a Facts about Chickenpox available at www.bchealthguide.org/healthfiles/hfile44a.stm.

If case is in hospital or facility, see section **6.0 Control of Varicella Disease in Health Care Settings**.

Many schools and daycare centres have policies that require children with chickenpox to stay home for five days after their rash appears. The goal is to protect other children from the disease. Unfortunately, this does not stop chickenpox from spreading.

Exclusion policies typically do not work because by the time it's known that a child has chickenpox, it has already been passed on to other children.

Parents/guardians should be informed of the following:

If your child is too sick to take part in regular activities, or if he has a fever, he should stay home. Many children with mild chickenpox are otherwise well. For mild cases (low fever for a short period of time and only a little rash, less than 30 spots) children can go to child care or school as long as they feel well enough to take part in regular activities, even if they still have the rash.

(adapted from the Canadian Pediatric Society retrieved July 18, 2011 from website:
<http://www.caringforkids.cps.ca/immunization/ChickenpoxFacts.htm>)

Children with zoster whose lesions cannot be covered should be considered infectious and should be excluded until seven days after the rash appears or until the lesions have crusted. Lesions that are covered seem to pose little risk to susceptible people.

5.0 CONTACT MANAGEMENT

The priority for contact follow up is identification of those **susceptible contacts at high risk for complications of varicella disease**, as listed in **Subsection 3.6**.

Provide immunoprophylaxis with either varicella vaccine or varicella-zoster immune globulin (VarIg). Refer to the current edition of the Canadian Immunization Guide for VarIg passive immunization recommendations for contacts for whom varicella vaccine or VarIg is indicated.

VarIg given within **96** hours of exposure may prevent or modify disease in susceptible close contacts of cases for whom varicella vaccine is contraindicated. VarIg is available through the Whitehorse General Hospital laboratory for certain high risk persons as follows:

- immunocompromised clients (congenital or acquired) due to treatment or disease including some clients receiving high doses of corticosteroids. Clients receiving monthly IGIV may not require VarIg;
- newborn infants whose mothers develop varicella disease five days before to 48 hours after delivery;
- infants and children in neonatal or pediatric intensive care settings, as determined by infectious disease/infection control specialist;

- stem cell transplant recipients; and
- susceptible pregnant women.

If a second varicella exposure occurs more than three weeks after a dose of Varlg, another dose of Varlg should be given.

Varicella vaccination has been shown to be effective in preventing or reducing the severity of varicella if given to a susceptible individual within three to five days after exposure to wild-type varicella.

For contacts ≥ 13 years of age with negative or uncertain history of prior varicella infection, have serology done for VZV IgG. Contact WGH lab and inform them of need for results stat. If results will not be available in a timely fashion (i.e., within five days of exposure to varicella), give first dose of vaccine. Lab results will determine if the vaccine series needs to be completed.

Note: Where resources permit, health care providers may identify healthy susceptible contacts and offer varicella vaccine. Please note that this will not be undertaken by YCDC.

For contact management of Health Care Workers, refer to **Section 6.2 Post-Exposure Management Following HCW/Student Contact with a Case of Varicella.**

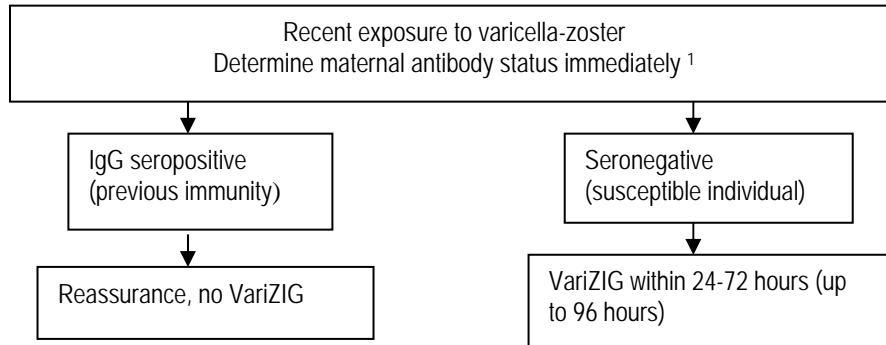
Management of Varicella exposure in pregnancy

Pregnant women should be evaluated in the same manner as other adults; however, because such women are at higher risk for severe varicella and complications (8, 13, 118), Varicella Zoster Immune Globulin (VZIG) should be strongly considered for susceptible pregnant women who have been exposed.

Administration of VZIG to susceptible, pregnant women has not been found to prevent viremia, fetal infection, congenital varicella syndrome or neonatal varicella. Thus, the primary indication for VZIG in pregnant women is to prevent complications of varicella in the mother, rather than to protect the fetus. VZIG may extend the incubation period of the virus from 10 to 21 days to greater than or equal to 28 days. Neonates born to mothers who have signs and symptoms of varicella within five days preceding or two days after delivery should receive VZIG— regardless of whether or not the mother received VZIG.

CDC, MMWR- Recommendations and Reports, Prevention of Varicella: Recommendations of the Advisory Committee on Immunization Practices (ACIP), July 12, 1996/ 45(RR11); pg. 20

Refer to **Clinical Description (Section 2.0)** for further information on VZV infection in pregnancy.



Accessing Varlg

Varlg can be access by a licensed Yukon physician. The Whitehorse General Hospital is the sole location storing Varlg for the territory.

Refer to **Section 7.0 Notification and Reporting**.

Whitehorse

During regular business hours, if Varlg is indicated, notify the WGH Laboratory (867-393-8739). Arrange for administration to occur in the WGH ER.

After hours, call the WGH admitting and discharge desk (867-393-8700) and ask that the lab technologist on call be paged. Please note the lab technologist on call should only be paged if the situation requires the immediate administration of the product, otherwise the WGH lab is staffed from 8 a.m. to 12 p.m. daily (including weekends).

Communities

During regular business hours, if Varlg is indicated, notify the WGH Laboratory (867-393-8739). Arrange for the product to be shipped to the requesting Community Health Centre or Clinic. See above for after hours.

6.0 CONTROL OF VARICELLA DISEASE IN HEALTH CARE SETTINGS

6.1 Isolation of the hospitalized patient

- Hospitalized patients who develop varicella should be placed in strict isolation (airborne and contact) for at least five days after onset of rash and until all lesions are crusted. For exposed susceptible patients, airborne and contact precautions are recommended from 10 until 21 days after the exposure to the infected patient. Isolation precautions should be maintained until 28 days post exposure for those who received Varlg.

¹ If diagnostic evaluation is delayed, consider empiric use of VariZIG if susceptibility is suspected

- Persons with zoster need only routine precautions provided they do not have disseminated disease or are not immunocompromised, and lesions are either crusted or well covered by clothing or dressing. If zoster is disseminated or is not disseminated but occurs in an immunocompromised person, airborne precautions are required. (CD Management Protocol Manitoba 2001.)

6.2 Immunization of health care workers/students

- The role of the employer in the prevention and control of varicella in their health care facility includes the following:
 - assessing varicella susceptibility of new and current employees;
 - ensuring all susceptible employees are offered varicella immunization;
 - maintaining documentation of varicella immunization/immune status of employees;
 - maintaining documentation of employee refusal of immunization; and
 - developing policies and procedures for exclusion from work and/or reassignment/restriction from work for those susceptible health care workers (HCWs) who are exposed to varicella or become infected.

Students who will be entering health care settings or having close contact with high risk individuals should be assessed for varicella susceptibility. Susceptible students may be offered vaccine.

Note: Varicella vaccine is publicly-funded for all susceptible individuals, including susceptible Health Care Workers (HCWs) and students.

- Advise immunized HCWs/students who develop a varicella-like rash within 42 days of vaccine receipt that they should keep it covered. If this is not possible, they should minimize contact with susceptible high-risk or immunocompromised individuals for the duration of the rash.
- Vaccinated HCWs/students who cannot cover their rash should be excluded or change their work assignments if they are involved in the care of high-risk patients.
- Individuals who have been fully immunized are considered to be immune (four weeks after the second dose). There is no need for post-vaccination serology to determine immunity.

6.3 Post-Exposure Management Following HCW/Student contact with Varicella

- Confirm the diagnosis and nature of contact.
- Assess susceptibility of HCW/student. If it is unknown, or if only one dose of vaccine has been received, order serology for VZV IgG.

- If serology negative or if serology results can't be promptly obtained, start immunization within three to five days of exposure for the susceptible HCW/student (providing there are no contraindications to receipt of varicella vaccine).
- If vaccine is contraindicated for the susceptible HCW, assess eligibility for Varlg and refer to a physician for clinical management.
- Exclude susceptible non-immunized HCW/students from work from day 10 through day 21 post-exposure. Extend the exclusion to 28 days, if Varlg is given.

6.4 When a HCW/Student Has a Suspect, Confirmed or Clinical Case of Varicella

- Refer the HCW/student to their physician for confirmation of diagnosis and clinical management.
- Exclude HCW/student from work until lesions are dry and crusted and no new lesions are forming.

An outbreak may be a possibility if more than one HCW/student or patient on the same unit meets the criteria for diagnosis. Inform Yukon Communicable Disease Control or MOH (if after hours and on weekends), if a varicella outbreak is suspected.

7.0 NOTIFICATION AND REPORTING

Please notify Yukon Communicable Disease Control by the next business day of any of the following:

- Susceptible contacts of a varicella/zoster case requiring Varlg.
- Suspect outbreaks (facility): two or more cases of varicella in the same geographical area (unit) within a health care facility, one of which can be a staff member.
- Laboratory confirmation of varicella.

Varicella disease and vaccine-modified disease are not currently reportable in Yukon.

8.0 AUTHORITY

Yukon Public Health and Safety Act (2009). Available at www.hss.gov.yk.ca/ifo_professionals.php

9.0 REFERENCES

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Public Health Agency of Canada (December 2008 Draft) Case Definitions for Communicable Diseases under national Surveillance.

10.0 CONTACT INFORMATION

Yukon Communicable Disease Control
Hours: Monday- Friday (08:30 to 16:30)
#4 Hospital Road, Whitehorse, YT Y1A 3H8
Telephone: Local (867) 667-8323
Within Yukon 1-800-661-0408, ext. 8323
Fax: (867) 667-8349

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Whitehorse General Hospital
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Telephone: (867) 393-8700
Fax: (867)393-8707
WGH Laboratory telephone: (867) 393-8739