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1.0 GOAL

The goal of the BC Varicella Control Program is to reduce the mortality and morbidity associated with varicella disease. This will be accomplished through targeted varicella vaccination programs and follow-up of high risk persons exposed to varicella disease.

2.0 DISEASE DESCRIPTION

Varicella zoster virus (VZV) is the causative agent of 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 years; 5 - 10% of the population remain susceptible to the disease in adulthood. Lifetime risk of reactivation as zoster/shingles is about 15 - 20 % and can occur at any time, most often in the elderly population. In shingles, vesicles with an erythematous base appear in crops in irregular fashion along nerve pathways. Severe pain and paresthesia are common.

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 of vesicle fluid of patients with herpes zoster **and** 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 between 10-21 days; however, this may be extended to 28 days if VZIG is given.

Complications are more frequent in immunocompromised and pregnant persons, as well as in adults. 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, pneumonitis, osteomyelitis, septic arthritis, endocarditis, necrotizing fasciitis, toxic shock-like syndrome, hepatitis, thrombocytopenia, cerebellar ataxia, and encephalitis.

There is currently no evidence that gestational varicella is associated with an increase in spontaneous abortion, stillbirth, or prematurity. However, transplacental or perinatal infection can have other serious outcomes. The incidence of congenital varicella syndrome (characterized by limb atrophy and scarring of the skin of the extremities) among infants born to mothers with varicella is approximately 2% when infection occurs before 20 weeks of gestation. Central nervous system and eye manifestations also can occur.



Children 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 5 days before to 2 days after delivery.

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

3.0 DEFINITIONS

Confirmed case of varicella:

1. Laboratory confirmation of infection:

- Isolation of varicella virus from an appropriate clinical specimen
OR
- Significant rise in serum varicella IgG antibody level by any standard serologic assay

OR

2. Clinical illness in a person who is epidemiologically linked to a confirmed case. 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.

Varicella immune individual: Any person with one of the following:

- self reported history of varicella or herpes zoster
- physician-diagnosed varicella or herpes zoster
- documentation of positive VZV IgG
- isolation of varicella virus from an appropriate clinical specimen
- documented receipt of 2 doses of live varicella vaccine, given at least one month apart (for those ≥ 13 years of age); one dose for those 12 months to ≤ 12 years of age

Varicella susceptible individual: Any person with one of the following:

- no or uncertain history of chickenpox or herpes zoster
- negative serology (VZV IgG negative)

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



Period of varicella communicability: Persons are contagious from 5 days (but usually 1 to 2 days) before onset of rash until all lesions have crusted. In some cases this may be delayed until two weeks or more after rash onset. Contagiousness may be prolonged in persons with altered immunity. Persons with zoster may be sources of infection for a week after the appearance of their vesiculopustular lesions. Susceptible persons should be considered potentially infectious 8 to 21 days following exposure (28 days if VZIG was given).

Contact: An individual is considered a contact if they have had one or more of the following types of contact 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)
- sharing the same hospital room
- face-to-face contact for **five** or more minutes
- direct contact with zoster or varicella vesicular fluid

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

Individuals at high risk for complications of varicella disease include:

- 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 5 days before or 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

Breakthrough disease is defined as a case of wild-type varicella occurring after exposure to wild-type virus, more than 42 days following vaccination. A breakthrough infection is usually mild; individuals typically develop fewer than 50 skin lesions and experience a shorter duration of illness than those with natural infection who were not vaccinated. The rate of breakthrough disease is estimated to be approximately 4% of vaccinees per year and does not appear to increase with length of time since vaccination.



4.0 CONTACT MANAGEMENT

Identify susceptible contacts at high risk for complications of varicella disease (as listed in [Section 3.0 DEFINITIONS](#)) and provide immunoprophylaxis with either Varicella Zoster Immune Globulin (VZIG) or varicella vaccine.

If the high risk contact can safely receive varicella vaccine, and it is within 3 to 5 days after exposure, offer varicella vaccine. Varicella vaccination has been shown to be effective in preventing or reducing the severity of varicella if given to a susceptible individual within 3 to 5 days after exposure to wild-type varicella. **Note:** Publicly-funded post-exposure vaccine is only available for susceptible high risk contacts.

Varicella zoster immune globulin (VZIG) given within 96 hours of exposure may prevent or modify disease in susceptible close contacts of cases. VZIG is available from Canadian Blood Services at (604) 876-7219 for certain high risk persons as follows:

Infants and children:

- Immunocompromised clients (congenital or acquired) due to treatment or disease including some clients receiving high doses of corticosteroids. Clients receiving regular IGIV may not require VZIG.
- Newborn infants whose mothers develop varicella disease 5 days before or 48 hours after delivery.
- Hospitalized premature infants exposed during their first weeks of life. Exposed infants of < 28 weeks' gestational age should receive VZIG regardless of maternal immune status.
- Exposed infants of 29 to 37 weeks' gestational age should receive VZIG if mother was not immune.

Adults:

- VZIG should be given to exposed susceptible pregnant women.
- Immunocompromised adults (congenital or acquired) due to disease or treatment, including clients receiving corticosteroid treatment. Clients receiving regular monthly infusions of IGIV may not require VZIG.



5.0 CONTROL OF VARICELLA DISEASE IN HEALTH CARE SETTINGS

5.1 Role of employer

The role of the employer in the control of varicella in their health care facility includes the following:

- Developing a plan for immunization of new and current susceptible employees
- Maintaining documentation of varicella immunization/immune status of employees
- Maintaining documentation of employee refusal of immunization
- Developing policies and procedures for exclusion from work and or reassignment/restriction from work for those susceptible HCWs who are exposed to varicella or become infected.

5.2 Immunization of health care workers/students

Varicella vaccine is publicly-funded for susceptible health care workers and HCW students. These are susceptible employees providing direct client care and/or having face to face contact with high risk clients for more than 5 minutes, within a health care facility, home care, home support, long term care or community health care setting.

Immunization of health care workers is the responsibility of the employer.
Immunization of HCW students is the responsibility of the educational institution.

All health care workers and HCW students should be assessed for immunity to varicella and offered vaccine if susceptible. A personal history of chickenpox has a high positive predictive value for serologic evidence of immunity. Serology for VZV IgG is recommended for those assessed as possibly non-immune before immunization (i.e. unknown or no history of chickenpox).

The laboratory requisition should indicate a **VZV IgG immune status** test. All testing will be done at BCCDC Laboratory Services. The lab requisition can be accessed at www.bccdc.org: click on Resources/ Publications, scroll to Laboratory Services and choose Clinical Requisition Forms. 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”.

If a rash develops after varicella vaccination, the rash should be covered where possible. If not possible, HCW/student contact with susceptible high risk persons should be minimized for the duration of the rash.



Vaccinated health care workers or HCW students working in a health care setting 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 (4 weeks after the second dose). There is no need for post-vaccination serology to determine immunity. No special precautions need to be taken if exposure to high-risk patients occurs 4 weeks after receipt of the second dose of vaccine.

5.3 Post-exposure management following HCW/student exposure to a confirmed or clinical case of varicella

Confirm the diagnosis and nature of exposure of susceptible HCW/student.

Review the immune status of the HCW/student. If it is unknown, or if only one dose of vaccine has been received, order serology for VZV IgG.

If serology negative, start immunization within 3 days of exposure for the susceptible HCW (providing there are no contraindications to receipt of varicella vaccine).

If the susceptible HCW is not eligible for immunization, or if serology results can not be promptly obtained, refer to a physician for clinical management, which may include prophylaxis with antiviral and VZIG if the HCW is at high risk for complications of varicella disease.

Exclude susceptible non-immunized HCW/students from work from days 8 through days 21 post-exposure. Extend the exclusion to 28 days, if VZIG is given.

5.4 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 meet the criteria for diagnosis. Inform the local public health unit if a varicella outbreak is suspected.



6.0 POST-VACCINATION SEROLOGY

Routine post-vaccination testing is not required.

Medical specialists may elect to test some immunocompromised clients post-vaccination (e.g. susceptible immunocompromised children). Testing for VZV IgG should be done 6 to 8 weeks after vaccine administration. If the client has a non-reactive test result, indicating they are susceptible to varicella, they should be re-immunized once only (with the number of doses recommended for their age).

The laboratory requisition should indicate a **VZV IgG immune status** test. All testing will be done at BCCDC Laboratory Services. The lab requisition can be accessed at www.bccdc.org: click on Resources/ Publications, scroll to Laboratory Services and choose Clinical Requisition Forms.

7.0 CONTROL OF VARICELLA DISEASE IN A COMMUNITY SETTING

Children with varicella in daycare, preschool, or school settings should be excluded from these settings until 5 days after the start of the rash.

Advise vaccine recipients 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. A varicella-like rash occurring more than 42 days following receipt of varicella vaccine indicates breakthrough disease, (i.e., wild varicella virus infection).

8.0 REPORTING

Varicella disease is not reportable in BC. However, using the Adverse Event tab in the Public Health Services Module in iPHIS, report the following to BCCDC:

- Anyone, especially immunocompromised hosts or pregnant women, who develops vaccine-strain chickenpox within 6 weeks of being in contact with a vaccine recipient (with or without a post vaccine rash).
- Breakthrough disease occurring months to years after varicella vaccination. The severity of the breakthrough rash/illness should be indicated as follows:
 - Mild (< 50 vesicular lesions)
 - Moderate (50-500 vesicular lesions), or
 - Severe (with any one of the following: > 500 vesicular lesions, associated complications, or admission to hospital).
- Other reportable vaccine-associated adverse events or serious/unusual events with onset within 42 days of vaccine receipt.



9.0 REFERENCES

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