



# Varicella-Zoster Virus (VZV) & Herpes Zoster (HZ)

VZV refers to the virus that causes varicella, also known as chickenpox, and reactivation of VZV results in HZ, also known as shingles.

## CHAPTER CONTENT

1. [Case Definition](#)
2. [Diagnosis](#)
3. [Reporting](#)
4. [Overview](#)
5. [Public Health Measures](#)
6. [Education](#)
7. [Epidemiology](#)
8. [References](#)
9. [Annex A-Management of Healthcare Worker Contacts](#)

The following chapter is adapted with permission from Alberta Health, for additional guidance related to the management of Varicella and Herpes Zoster see: [Alberta Public Health Disease Management Guidelines: Varicella \(Chicken Pox\)](#) and [Alberta Public Health Disease Management Guidelines: Varicella Zoster \(Shingles\)](#)

## 1. CASE DEFINITION

### Confirmed Case- Varicella Laboratory Confirmation

- Clinical illness\* with laboratory confirmation of infection:
  - Isolation or direct antigen detection of Varicella-Zoster Virus (VZV) from an appropriate clinical specimen\*\* **OR**
  - Detection of VZV deoxyribonucleic acid (DNA) (e.g., polymerase chain reaction (PCR)) in an appropriate clinical specimen **OR**
  - Seroconversion or significant change between acute and convalescent varicella zoster IgG titre by any standard serologic assay in the absence of recent administration of any blood product or immunization with varicella vaccine **OR**
  - Positive serologic test for VZV IgM antibody in the absence of recent immunization with varicella vaccine

### Epidemiologic Confirmation



- Clinical illness in a person with an epidemiologic link to a laboratory-confirmed case of HZ (shingles) or VZV (varicella) infection

### **Congenital**

- Any stillborn or neonate\*\*\* who has clinical evidence of congenital varicella syndrome **AND**
  - History of mother with confirmed or probable primary varicella infection in the first 20 weeks of pregnancy; **OR**
  - Laboratory confirmed case of varicella infection in the absence of maternal confirmation of primary varicella infection in the first 20 weeks of pregnancy

### **Neonatal**

- Clinical illness\* with laboratory confirmation of varicella infection in a neonate\*\*\* whose mother develops varicella rash from 5 days before to 2 days after delivery.

### **Probable Case**

Clinical illness\* in the absence of laboratory confirmation or epidemiologically link to a laboratory confirmed case

\*Clinical illness is characterized by a rash with rapid evolution of macules to papules, vesicles, and crusts

- Lesions can be preceded by fever, malaise, headache, and anorexia
- Lesions are superficial and may appear in crops.
- Clinical illness less than 14 days and more than 42 days after immunization is significant, and if confirmed, is reportable as an Adverse Event Following Immunization to the Office of the Chief Public Health Officer (OCPHO).

\*\*Appropriate clinical specimens are:

- Swabs of fresh lesions,
- Cerebrospinal fluid (CSF),
- Eye fluid aspirate

\*\*\* Neonate is defined as a newborn up to and including 28 days of age

### **Confirmed Case- Herpes Zoster**

- Clinical illness\* with or without laboratory confirmation\*\* of infection:
  - Isolation or direct antigen detection of varicella zoster virus (VZV)\*\*\* from an appropriate clinical specimen (e.g., swab from fresh lesion, CSF, eye fluid aspirate) **OR**
  - Detection of VZV nucleic acid (e.g., PCR) in an appropriate clinical specimen (e.g., CSF) **OR**



- Seroconversion or significant change between acute and convalescent varicella zoster IgG titre by any standard serologic assay in the absence of recent administration of any blood product or immunization with varicella or shingles vaccine \*\*\*\* **OR**
- Positive serologic test for varicella zoster IgM antibody in the absence of recent immunization with varicella or shingles vaccine\*\*\*\*\*.

\*Clinical Illness: Unilateral vesicular eruption with a dermatomal distribution which may or may not be accompanied by acute neuritis and/or post herpetic neuralgia. Disseminated VZ may occur in immunocompromised individuals.

\*\* Similar laboratory findings can be found in patients with chickenpox (varicella) or varicella zoster (shingles).

\*\*\* Shingles is also referred to as herpes zoster. Varicella Zoster refers to the virus that causes varicella and reactivation of varicella virus results in herpes zoster.

\*\*\*\*Refer to the Provincial Laboratory for Public Health (PLPH) Guide to Services for current specimen collection and submission information.

\*\*\*\*\*If case was recently immunized, serology should be confirmed with a second confirmatory test.

## 2. DIAGNOSIS

- Laboratory confirmation of varicella is required.
- Varicella-like rash that occurs within two weeks of immunization **OR** greater than 42 days post immunization is most likely caused by wild type VZV.
- Varicella-like rash that occurs greater than or equal to two weeks and less than or equal to 42 days after immunization is most likely due to a reaction from the vaccine.
- Varicella-like rash that is moderate (50-500 lesions) or severe (more than 500 lesions and/or associated with hospitalization), and occurs within 7-21 days of vaccination with a varicella-containing vaccine, is a reportable Adverse Event Following Immunization (AEFI).
- Vaccine and wild-type VZV strains can be differentiated by PCR-based protocol available at the National Microbiology Laboratory; this testing must be authorized by the Chief Public Health Officer (CPHO).
- For more information, refer to the [Alberta Provincial Laboratory Guide to Services](#).

## 3. REPORTING



## As a complications of Varicella Zoster virus, Shingles (Herpes Zoster) is **not** reportable under the NWT Public Health Act.

### Health Care Professionals

- Confirmed or probable cases are to be reported to the Office of the Chief Public Health Officer (OCPHO) **within 24 hours** by telephone (867) 920-8646, fax (867) 873-0442, or email after diagnosis is made or opinion is formed, **AND**
- **Within 24 hours** complete and fax (867) 873-0442 the [NWT Communicable Disease Reporting Form](#) to the OCPHO
- **Immediately** report all outbreaks or suspect outbreaks by telephone to the OCPHO.

### Laboratories

- Report all positive results to the OCPHO **within 24 hours** by fax (867) 873-0442

## 4. OVERVIEW

### Causative Agent

- Varicella Zoster Virus (VZV) is a DNA virus, a member of the Herpesvirus family.
- VZV causes a primary infection of varicella (chickenpox) usually during childhood and latent infection known as Herpes Zoster (shingles).

### Clinical Presentation and Major Complications

For information regarding Varicella presentation and complications see, [Alberta Public Health Disease Management Guidelines: Varicella \(Chickenpox\)](#).

For more information regarding the Clinical Presentation and Major Complications of Shingles, see: [Alberta Public Health Disease Management Guidelines: Varicella Zoster \(Shingles\)](#)

### Transmission

- VZV can only be passed on to individuals who are not immune to this virus.
- Infection with VZV usually confers lifelong immunity.
- **Varicella (chickenpox)**
  - Varicella is highly contagious
  - It is transmitted from person to person by airborne route, environmental contamination, direct contact of vesicle fluid, or secretions of the respiratory tract.
  - People with breakthrough varicella are also contagious.
  - Communicability is usually 1-2 days before the onset of symptoms and until all lesions are crusted (usually a 3-7-days).
- **Herpes Zoster (shingles)**



- Reactivation of the varicella zoster virus years later may result in a herpes zoster (HZ) infection (shingles)
- Herpes zoster is not transmitted from person to person; however, direct contact with HZ vesicle fluid can cause varicella in susceptible individuals
- Transmission of varicella by airborne route can occur if a person has disseminated herpes zoster.
- Persons with varicella zoster virus may be infectious for a week after the appearance of the lesions; however, un-disseminated herpes zoster is much less contagious than varicella.

### Incubation Period

- Typically, from 14-16 days. It can be as early as 10 days, or as late as 21 days.
- Incubation may be prolonged to 28 days in persons who have received passive immunization (eg: varicella zoster immune globulin).
- Incubation period may be shorter in those who are immunocompromised.

### Clinical Guidance

- For patient-specific clinical management consult your local healthcare professional, paediatrician, infectious disease specialist, the [NWT Clinical Practice Guidelines](#).

## 5. PUBLIC HEALTH MEASURES

### Management of Cases-Varicella

- **If clinical illness is suspected but laboratory confirmation is delayed, contact OCPHO (867) 920- 8646.**
- Confirm that the client meets the case definition.
- Obtain a history of illness including symptoms and date of rash onset.
- Proof of immunity for healthy pregnant women, immunocompromised individuals, and health care workers with significant exposure to VZV:
  - Documented evidence of immunization with two doses of a varicella-containing vaccine or
  - Laboratory evidence of immunity
- Assess for breakthrough infection.
- Determine occupation, source of infection, pregnancy status, and period of communicability.
- Children and adults with mild clinical illness, (i.e., disease with no complications) should not attend school or work until lesions have crusted.
  - Exclusion also applies to activities where all other persons attending that activity have not previously been exposed, such as a weekly club or dance class.
- In circumstances when an immunocompromised individual is present in the facility, the immunocompromised individual should be excluded (not the case) and referred to their healthcare professional.



- Rationale: other individuals in the facility may be incubating varicella creating further potential exposures. These decisions are made on a case-by-case basis.
- Air travel is not recommended until lesions have crusted due to the recirculation of cabin air. **If inadvertent exposure occurs during air travel, no follow-up of contacts will take place**
- Swimming in public pools is not recommended until lesions have healed and crusts are no longer present to avoid exposing individuals not previously exposed.

### Management in Hospitals

- In addition to routine practices, airborne and contact precautions are appropriate due to the risk of serious varicella in susceptible immunocompromised persons.
- The infection prevention and control practitioner must be notified immediately (See the [NWT Infection Prevention and Control Manual](#) for more information).
- Persons with varicella should not enter the hospital until all lesions have crusted, including visitors and healthcare workers.
- Outpatients and day-surgery patients should be advised to notify staff if they develop varicella and should be rescheduled to come to hospital when their lesions have crusted.
- The hospital unit should be notified if a patient or visitor develops a varicella rash within 48 hours of leaving the hospital.
- Prior to returning to work, health care workers should notify Occupational Health and Safety immediately if they suspect they may have varicella ([See Annex A](#)).

### Management of cases-Herpes Zoster

- Educate client to keep lesions covered.
- In hospital, isolate clients, and place on contact precautions.
- Clients with disseminated shingles should be managed in the same way as varicella (airborne & contact precautions).
- Prior to returning to work, health care workers should notify Occupational Health and Safety immediately if they have been diagnosed with Herpes Zoster.

### Management of Contacts

- Investigate contacts immediately and evaluate to determine the need for post-exposure prophylaxis including immunization and/or use of varicella immunoglobulin for those with a significant exposure to VZV.
- Assess disease history or serological evidence of disease including shingles.
- Assess vaccine history.
- Advise susceptible household contacts of a confirmed or probable case to avoid contact with immunocompromised persons, pregnant women, hospitalized premature infants, and infants born to susceptible mothers for the duration of their incubation period.
- Advise susceptible household contacts to avoid airline travel for 8-21 days after exposure, although there is no public health follow up for contacts exposed to a case while traveling by airline.
- Significant exposure as a result of a contact with a person with varicella includes:
  - Continuous household contact



- 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
- Significant exposures as a result of a contact with a person with HZ
- Continuous household contact (that is, living in the same dwelling) with an immunocompromised person with HZ or a person with disseminated HZ prior to or within first 24 hours of antiviral treatment
- Being indoors for more than 1 hour with an immunocompromised person with HZ or a person with disseminated HZ prior to or within first 24 hours of antiviral treatment
- Being in the same hospital room for more than 1 hour, or more than 15 minutes of face-to-face contact with an immunocompromised person with HZ or a person with disseminated HZ prior to or within first 24 hours of antiviral treatment
- Touching the lesions or articles freshly soiled by discharges from vesicles of a person with active HZ
- Susceptible Contacts include:
  - Newborns
  - Immunocompromised individuals
  - Hospitalized patients
  - Persons who have never had varicella disease, shingles, or varicella vaccine

#### Management of Healthcare workers

- Susceptible HCWs in acute care and community settings who have unprotected exposure to a confirmed or probable case should be excluded from day 8 after first exposure and to day 21 after last exposure (See [Annex A](#))
- Unprotected exposure includes,
  - Face to face contact with a case for  $\geq 5$  minutes without appropriate personal protective equipment (PPE)
  - Same room as case for  $\geq 1$  cumulative hour without appropriate PPE
  - Touching the lesions or articles freshly soiled by discharge from vesicles of a case without appropriate PPE

#### Post-exposure Prophylaxis:

##### Varicella-Zoster Immunoglobulin (VarIg)

- NOTE: VarIg refers to all approved forms of varicella-zoster immunoglobulin, in the NWT we use the VariZig product.
- VarIg should be considered **within 96 hours of exposure to the following individuals** upon consultation with the Chief Public Health Officer (or designate) or an infectious disease specialist.
- VarIg is recommended for those persons at increased risk of severe varicella if
  - Significant exposure (see management of contacts) has occurred or
  - Contact has contraindications for post-exposure varicella vaccine
  - The exposed person is susceptible to varicella
- Strong candidates for VarIg include,
  - Susceptible pregnant women



- Newborn infants of mothers who develop varicella during 5 days before to 48 hours after delivery
- Susceptible immunocompromised persons
- Susceptible HIV-infected persons
- Recipients of hematopoietic stem cell transplant

**Immunization:**

- **Varicella vaccination, when provided within 72 hours and no longer than 5 days after exposure to VZV, has been effective in preventing or reducing the severity of varicella.**
- Post-exposure vaccination may be helpful in controlling or preventing varicella outbreaks in hospitals, daycare centers, schools, homeless shelters, and correctional facilities.
- Provide immunization as soon as possible to susceptible, healthy, non-pregnant clients 12 months and over who have had significant exposure to VZV.
- Provide a second dose of varicella immunization to those who are under 50 years old, and have only received 1 dose of varicella vaccine in the past.

**Summary of Post Exposure Prophylaxis**

Post Exposure intervention	Healthy non-pregnant (12 months of age and older)	Pregnant	Immunocompromised
Vaccinate with varicella vaccine	Yes	No	No
Check VZV IgG	No	Yes	Yes
If VZV IgG are negative, administer Varig	Not Applicable	Yes	Yes

If serology results cannot be obtained within 96 hours consult with OCPHO (867)-920-8646.

**Prevention**

**Varicella**

- Varicella is a vaccine preventable disease.
- The vaccine for varicella is publicly funded in the NWT and offered according to the [NWT Immunization Schedule](#).
- Educate the public about the risks of varicella infection.
- Educate the public on how to prevent transmission of varicella:
  - Practicing good hand hygiene and respiratory etiquette
  - Avoid sharing drinks or any other items used on the nose or mouth
  - Clean frequently touched household surfaces
- Health care workers should demonstrate proof of immunity upon hire.
  - Proof of immunity includes history of disease or serological evidence of disease or documented age-appropriate doses of varicella vaccine.
- Advise susceptible pregnant women to avoid individuals with varicella and report any contact with a case to their physician immediately.

**Herpes Zoster (Shingles)**

- Herpes Zoster is vaccine preventable.





- The vaccine for herpes zoster is not publicly funded in the NWT but is available for purchase through local public health clinics according to the [NWT Immunization Schedule](#).
- For more information on varicella and herpes zoster vaccination follow the [Canadian Immunization Guide](#).

## 6. PUBLIC & HEALTH PROFESSIONAL EDUCATION

For more information about VZV/HZ:

- The Government of Canada: [Varicella/HZV](#)
- Centers for Disease Control and Prevention: [Varicella](#)
- Alberta Public Health notifiable disease management guidelines: [Varicella \(chickenpox\)](#)
- BC Center for Disease Control: [Shingles](#)
- BC Center for Disease Control: [Chickenpox/Varicella](#)

## 7. EPIDEMIOLOGY

- Varicella occurs globally and is prominent as a childhood disease in countries without immunization programs.
- After the introduction of childhood varicella immunization programs, there has been a decrease in the incidence of VZV; however, cases are under-reported and therefore the effect of immunization programs on the incidence of varicella infections is difficult to determine.
- For more information on the epidemiology of Varicella in the Northwest Territories (NWT) see: [Epidemiological Summary of Communicable Diseases HSS Professionals](#)

## 8. REFERENCES

Information for this chapter was adapted with permission from Alberta Health's Public Health Disease Management Guidelines: [Varicella \(chickenpox\)](#) and Alberta Public Health Disease Management Guidelines: [Varicella Zoster \(Shingles\)](#).

Additional resources used in this chapter include:

1. BC Center for Disease Control: Chickenpox/Varicella: <http://www.bccdc.ca/health-info/diseases-conditions/chickenpox-varicella>
2. BC Center for Disease Control: Shingles: <http://www.bccdc.ca/health-info/diseases-conditions/shingles>
3. Public Health Agency of Canada, An Advisory Statement National Advisory Committee on Immunization, Varicella Proof of Immunity:  
<https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/healthy-living/varicella-proof-immunity-2015-update/varicella-varicelle-eng.pdf>
4. The Canadian Immunization Guide, Varicella (chickenpox) vaccine:  
<https://www.canada.ca/en/public-health/services/publications/healthy-living/canadian-immunization-guide-part-4-active-vaccines/page-24-varicella-chickenpox-vaccine.html>



## ANNEX A- Management of Healthcare Worker Contacts

### Contact Recommendations for Health Care Workers (HCW) that are Exposed to cases of Varicella or Disseminated Zoster (Shingles)

