VARICELLA ZOSTER VIRUS (VZV) Protocol

1. Varicella Zoster (Chickenpox) and Herpes Zoster (Shingles)

Varicella (commonly known as chickenpox) is a highly contagious infection caused by the varicella-zoster virus. It is spread through respiratory droplets in the air formed when an infected person coughs or sneezes. It is also spread through direct contact with skin lesions caused by the virus. People infected with chickenpox generally become immune, but they can be at risk of developing shingles later in life. Primary infection with varicella-zoster virus (VZV) results in the development of chickenpox. VZV remains latent in the dorsal root ganglia during primary infection. Reactivation of the virus results in the development of herpes zoster (shingles). A second episode of chickenpox rarely occurs.

2. Varicella Zoster (Chickenpox)

2.1. Cause/Epidemiology

Chickenpox is caused by the human herpes virus – varicella zoster virus. It appears worldwide, and infection with the virus is nearly universal. Chickenpox is commonly considered a disease of childhood, with approximately 95% of individuals in industrialized countries having had chickenpox by age 15. Epidemics are most common in late winter and early spring, with children between the ages of 5 and 9 accounting for 50% of all cases. In most cases getting Chickenpox once means you will not get it again.

2.2. Clinical Presentation

Prior to the onset of chickenpox rash, a patient may experience a mild fever and symptoms of generalized malaise. In children, the rash is often the first sign of disease. In adults, the fever and generalized symptoms may occasionally be severe in nature. Chickenpox is characterized by a generalized, pruritic (itchy), vesicular rash, typically consisting of numerous (200 – 500) lesions. The rash is itchy and maculopapular (flat spots [macules] and tiny bumps [papules]) for a few hours and subsequently becomes vesicular and leaves scabs. Alternatively, the lesions may be so few in number as to escape detection.
2.3. Images of a Typical Chickenpox Rash

![Note: maculopapular lesions](image1)

![Note: vesicular lesions](image2)

Node: scabbed lesions

Chickenpox lesions may occur in successive crops, with several stages of maturity present at the same time. The lesions tend to be more abundant on covered parts of the body, and may appear on the scalp, axilla, mucous membranes/mouth, upper respiratory tract, and on the conjunctivae.

2.4. Potential Complications of Chickenpox

- bacterial super-infection of skin lesions
- thrombocytopenia
- arthritis
- hepatitis
- cerebellar ataxia
- encephalitis
- meningitis
- glomerulonephritis
- streptococcal disease (increasing)
- pneumonia (most common complication in adults)
- cerebellar ataxia
- meningitis
- streptococcal disease (increasing)
- pneumonia (most common complication in adults)

In immunocompromised children, progressive severe varicella is characterized by continuing eruptions of lesions and a high fever into the second week of the illness. As well, encephalitis, hepatitis, or pneumonia can develop.

Severe and even fatal varicella has been reported in otherwise healthy children receiving an intermittent course of corticosteroids for treatment of asthma and other illnesses. The risk is especially dangerous when corticosteroids are given during the incubation period for chickenpox.

Fetal infection after maternal varicella during the first or early second trimester of pregnancy occasionally results in varicella embryopathy, characterized by limb atrophy and scarring of the skin of the extremity (congenital varicella syndrome). Varicella infection can be fatal for an infant if the mother develops varicella from 5 days before to 2 days after delivery. When varicella develops in a mother more than 5 days before delivery and gestational age is 28 weeks or more, the severity of disease in the newborn is modified by transplacental transfer of varicella-zoster virus specific maternal immunoglobulin (IgG antibody).
2.5. Prevention/Treatment Options

Varicella vaccine is a live-attenuated vaccine, and is licensed for use in Canada in healthy persons >12 months of age, who have **not** had chickenpox. The development of chickenpox infection upon exposure to varicella in vaccine recipients occurs and is correlated to the time since immunization and inversely related to the number of doses. When it does occur, it is generally milder than that occurring in unimmunized individuals. At times, the disease is so mild in vaccine recipients it is not easily recognizable, and this may lead to potential transmission to susceptible persons.

Varicella-Zoster immune globulin (VarIg) is indicated for susceptible exposed individuals whose immune systems are either too young, or weak to fight the disease. When VarIg is indicated, give within 96 hours of exposure to VZV. The administration of VarIg does not always prevent the disease from occurring in susceptible exposed contacts. Chickenpox infection may be treated with antiviral medications, although these drugs have a limited window of opportunity to affect the infection outcome.

2.6. Incubation Period

The incubation period ranges from 10 – 21 days, with the usual being 14 – 16 days after exposure. This period is prolonged for up to 28 days if VarIg has been administered.

2.7. Transmission

Person-to-person transmission occurs primarily by direct contact and airborne spread. Persons are most contagious for 1 to 2 days before and shortly after the onset of rash. Communicability however, can persist until crusting of lesions, which typically occurs in 5 days. In an immunocompromised patient with progressive varicella, contagiousness likely lasts throughout the period of eruption of new lesions.

2.8. Infection Prevention & Control Practices

**Active Chickenpox** – Implement Airborne and Contact Precautions for a patient with active chickenpox disease. Additional Precautions should remain in effect until all lesions are crusted and dried. Healthcare workers, roommates and caregivers should be immune to chickenpox.

**Susceptible high-risk contacts** should receive varicella zoster immunoglobulin (VarIg) as soon as possible, latest within 96 hours of exposure.

Airborne Precautions should be taken with neonates born to mothers with varicella onset <5 days before delivery. Prevent exposure of susceptible persons and immunosuppressed patients.
Susceptible Contact – One who has no history of Varicella illness, immunization or VZV IgG antibodies and exposed to a person with chickenpox or disseminated zoster. Implement Airborne Precautions from 8 days after first contact until 21 days after last contact with rash (28 days if given Varlg). Healthcare workers, roommates and caregivers should be immune to chickenpox.

Outpatients – Advise patients/clients 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. They should also be advised to notify staff if they develop a chickenpox rash within 48 hours of leaving the facility.

Visitors – Visitors with active cases of chickenpox shall not enter a health care facility until all lesions have crusted and dried. If there are special circumstances regarding this issue, Infection Prevention and Control can be consulted to provide assistance. They also should avoid unnecessary visitation if they have had a known contact and should wear a surgical mask if they need to visit during the incubation period. (10-21 days)

2.9. Occupational Health Considerations (OESH)

Contact Occupational and Environmental Safety and Health (OESH) for staff assessment and/or concerns.

3. Herpes Zoster (Shingles)

3.1. Cause/Epidemiology

Reactivation of varicella zoster virus (VZV) later in life results in the development of herpes zoster infection (shingles). It is not known what precipitates shingles episodes, but they are more common among the elderly, and those who are immunocompromised. Furthermore, the immunocompromised patient is at increased risk of developing severe disease. Children exposed to chickenpox in utero during the second 20 weeks of pregnancy can develop in apparent varicella and subsequent zoster early in life without having had extrauterine chickenpox.

Disseminated zoster is more likely to develop in children with congenital T-cell defects or acquired immunodeficiency syndrome than in children with B-cell abnormalities.

3.2. Clinical Presentation

Prior to the appearance of a shingles rash, the patient may experience a headache, photophobia (sensitivity to bright light), and generalized malaise.

The appearance of a shingles rash is commonly grouped vesicular lesions, in the distribution of 1 to 3 sensory dermatomes. The rash most commonly appears on the trunk along a thoracic dermatome, and is often accompanied by localized pain, pruritus, and tingling sensation.
Localized zoster is the appearance of vesicles along a single or associated group of nerve roots/dermatomes. The lesions appear in crops, in an irregular fashion along the nerve root.

Disseminated zoster is the appearance of vesicles along more than one nerve pathway/dermatome with lesions appearing outside the primary dermatomes and with visceral complications. Shingles infections can occasionally become disseminated in immunocompromised patients. Adults with cancer (especially of lymphoid tissue, with or without steroid therapy), immunodeficient persons, and those on immunosuppressive therapy may have an increased frequency of severe zoster.

The shingles-associated rash usually lasts 7 – 10 days, and heals within 2 – 4 weeks.

3.3. Examples of a typical Shingles rash

![Image](image.png)

Note: lesions along sensory dermatome

3.4. Potential Complications of Shingles

- acute neuritis (inflammation of a nerve or group of nerve characterized by pain, loss of reflexes, and atrophy of the affected muscles)
- postherpetic neuralgia (persistent neuropathic pain after the eruption is healed that persists >1 month)
- zoster ophthalmicus (sight threatening eye infection)
- CNS infection
- nerve palsy (e.g., Guillain-Barre Syndrome)
- secondary bacterial infections

3.5. Prevention/Treatment Options

Herpes zoster infections may be treated with antiviral medications.

3.6. Incubation Period

The mechanism of VZV reactivation that results in herpes zoster is unknown.

3.7. Transmission

People do not catch shingles. A non-immune person/someone who has never had primary varicella zoster (chickenpox) may develop chickenpox from exposure to zoster (shingles). Exposure may be via airborne and/or contact routes, depending on the immune status of the host patient and the extent/spread of chickenpox (i.e., localized versus disseminated).
3.8. Infection Prevention and Control Practices

Disseminated Zoster – Implement Airborne and Contact Precautions for a patient with disseminated shingles. Precautions remain in effect until all lesions have crusted and dried.

Localized Zoster in the Immunocompromised Host – Implement Airborne and Contact Precautions for a patient with shingles localized in the immunocompromised host. Precautions remain in effect until 24hrs after antiviral therapy has been started and all lesions have crusted and dried.


Outpatients – Outpatients and day-surgery patients should be advised to notify staff if they develop herpes zoster and are scheduled to come to a health care facility when their lesions are not yet all crusted and dried.

Visitors – Visitors with active shingles lesions should not enter a health care facility until all lesions have crusted and dried. If lesions are localized and can be covered, consult Infection Prevention and Control to determine if a visit should occur.

3.9. Occupational Health Considerations (OESH)

Contact Occupational and Environmental Safety and Health (OESH) for staff assessment and/or concerns.

Specific Disease Protocol Contact: Janice Briggs, RN, BA, MScN, CIC, IP&C Specialist, WRHA Infection Prevention & Control Program

4. REFERENCES


