

# **VARICELLA/ZOSTER (CHICKENPOX/SHINGLES) SURVEILLANCE PROTOCOL FOR ONTARIO HOSPITALS**

Developed by the Ontario Hospital Association and the  
Ontario Medical Association  
Joint Communicable Diseases Surveillance Protocols Committee  
in collaboration with the Ministry of Health and Long-Term Care

Approved by:  
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Reviewed and Revised November 2010

This protocol was developed jointly by the Ontario Hospital Association and the Ontario Medical Association to meet the requirements of the *Public Hospitals Act 1990*, Revised Statutes of Ontario, Regulation 965.

This protocol is based on current scientific and medical knowledge and a desire to ensure maximum cost effectiveness of programs while protecting health care workers. It is intended as a minimum practical standard for Ontario hospitals. However, hospitals may adopt additional strategies when indicated by local conditions.

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# Rationale for Varicella Surveillance Protocol

Varicella (chickenpox) is a common childhood infection caused by varicella/zoster virus (VZV), a herpes virus. Following primary infection, the virus becomes latent, and may reactivate later as herpes zoster (shingles). VZV is highly contagious and is spread by the airborne route and by direct contact with the skin lesions or oral secretions. Among susceptible household contacts attack rates are in the range of 60-90%. Attack rates in other settings are less well documented, but likely to be lower. In Canada, chickenpox is most common in childhood, with 50% of children infected by 5 years of age and 90% by 12 years. Higher rates of susceptibility may exist among persons from southern climates.

The incubation period is usually 14-16 days (range 10-21 days). Symptoms of chickenpox in healthy children include a generalized, vesicular, pruritic rash with a mild fever and systemic symptoms. Infected individuals are infectious 1-2 days prior to onset of the rash, and continue to be until the last lesion of the rash has crusted. Severe complications can occur including secondary bacterial infection, thrombocytopenia, arthritis, hepatitis, pneumonia, meningitis or encephalitis. About 5-10% of previously healthy children will develop complications, manifested mainly as skin infections. These include staphylococcal infections but also more severe invasive group A streptococcal infection, the risk of which is about 50-fold higher than in the absence of chickenpox. About half of children with chickenpox will see a physician for their illness, and about 0.5% will be hospitalized. The majority of hospitalizations and deaths occur among previously healthy children.

Complications are more likely to occur when chickenpox is acquired in adolescence or adulthood, with higher rates of pneumonia, encephalitis and death. Case fatality rates among adults are 10-30 times higher than in children.

Health care workers are at risk of exposure to and occupational acquisition of chickenpox, which may lead to further exposure of and transmission to staff and patients. Management of nosocomial outbreaks of varicella is costly, and US estimates suggest annual infection control costs in acute care hospitals range from about US\$41,000 - 56,000, with the cost of an outbreak about US\$9,000 - 19,000.

With the licensing of live attenuated varicella vaccine in Canada, varicella is a preventable disease. Current estimates are that the vaccine will provide over 70-90% protection against varicella of any degree of severity and 95% protection against severe varicella for at least 7-10 years post-vaccination.

Transmission of vaccine virus is rare, and to date has only been documented when the vaccinee has experienced a post-vaccination rash. Contraindications include a prior history of hypersensitivity to any component of the vaccine, immunosuppression and

pregnancy.

Varicella vaccine is recommended for those aged 12 months and older. **Two doses are recommended for all ages.** For those 13 years and older, two doses are given at least **six weeks** apart. Vaccine is given subcutaneously. The schedule need not be restarted if the second dose is delayed. A booster is not recommended at this time. Although it is not harmful to immunize a previously immune person, the vaccine need not be given if the person has a history of prior varicella or zoster. A history of past varicella or zoster is a highly reliable indicator of immunity in all age groups. A history of no varicella is less reliable, in that subclinical or inapparent infection occurs, and among adults born in North America, over 80% without a history of varicella will be immune serologically.

The immune status of all health care workers should be ascertained by history, and for those with a negative history of varicella, serological testing of immunity should be done. **Health care workers are considered a priority group for immunization by the National Advisory Committee on Immunization (NACI).** **All susceptible health care workers should be immunized, preferably prior to employment or immediately upon employment, using the 2-dose schedule.** This measure will minimize loss of time and outbreaks due to varicella in health care settings.

# Varicella/Zoster (Chickenpox/Shingles) Surveillance Protocol for Ontario Hospitals

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## I. Purpose

The purpose of this protocol is to provide direction to hospitals to prevent transmission of varicella/zoster virus (VZV) between health care workers (HCWs) and patients.

Infected persons and their personal physicians are responsible for follow-up care and therapy.

## II. Applicability

This protocol applies to all persons carrying on activities in patient care areas of the hospital, including employees, students, volunteers, post-graduate medical trainees, physicians and contract workers. The term HCW is used in this protocol to describe these individuals.

This protocol does not apply to patients or residents of the facility or to visitors.

When hiring contract workers or training students, the hospital must inform the supplying agency/school that the agency/school is responsible for appropriate immunization and follow-up of their personnel.

**These guidelines are for use by the occupational health service (OHS) in hospitals.**

## III. Preplacement

At the time of hiring or placing, the occupational health nurse must ask HCWs and persons carrying on activities in the hospital whether they have ever had chickenpox (varicella) or shingles (zoster). Any person who has a definite history of chickenpox or zoster can be assumed to be immune. This immunity must be recorded in the person's health record kept in the OHS, for reference in case of exposure to varicella or zoster. In the case of contract workers, this information must be kept by the supplying agency.

For staff working in patient care areas of the hospital who have not had chickenpox or are not certain whether they have had chickenpox: screen at the time of placement for VZV antibodies, using a sensitive/specific serological test such as immunofluorescent antibody (IFA), Latex agglutination (LA) or the ELISA-

IgG. Staff already working in high-risk areas whose varicella status was not determined at the time of placement should be screened in the same way. Results of the screening test must be recorded in the person's health record kept in the OHS, for reference in case of exposure to varicella.

Varicella vaccine is recommended at the expense of the hospital for all non-immune staff working in patient care areas; refusal of vaccination should be documented in the medical record. If after vaccination a varicella-like rash localized to the injection site develops, the person may continue to work if the rash is covered. A small proportion (approximately 5.5% after the first injection and 0.9% after the second injection) of vaccinated persons will develop a varicella-like rash not localized to the injection site; these persons should be excluded from work with high-risk patients (i.e., children, newborns, obstetrical patients, transplant patients, oncology patients) until lesions are dry and crusted, unless lesions can be fully covered. The effects of varicella vaccine on the fetus are unknown; therefore, pregnant women should not be vaccinated. Nonpregnant women who are vaccinated should avoid becoming pregnant for one month following each injection.

Serologic testing for immunity after immunization is not recommended; currently available serologic tests, although useful to determine natural immunity, are not sensitive enough to determine post-vaccine immunity.

**Only HCWs known to be immune may be assigned to care for patients with chickenpox or zoster.** If no immune staff are available and patient safety would be compromised by not allowing the susceptible HCW to attend the patient, the susceptible HCW must wear a fit-tested, seal-checked N95 respirator. There is no efficacy data for N95 respirators for this application.

#### **IV. Continuing Surveillance**

No routine continuing surveillance of any persons carrying on activities in the hospital is needed for varicella or zoster.

#### **V. Exposure to Varicella**

Exposure to VZV is considered significant if it involves direct or face-to-face contact with persons who have chickenpox or disseminated zoster, or any direct contact with fluid from lesions or objects contaminated with this fluid. Exposure to dried scabs from varicella or zoster lesions does not constitute significant exposure.

Chickenpox and disseminated zoster are spread by direct or indirect contact with vesicle fluid, and by the airborne route. Surgical masks do not provide complete protection for a susceptible individual. Therefore, a susceptible individual could

still have a significant exposure to an infectious patient, even if a mask is worn. Patients are highly infectious the day before onset of rash.

When determining whether a person has had significant exposure to VZV, consider the following:

- frequency of contact with the infected patient;
- proximity to the infected patient; and
- duration of face-to-face contact with the infected patient.

Localized zoster is transmitted by direct contact with fluid from lesions, or by contact with objects contaminated with this fluid. The role of airborne spread of localized zoster is not clear.

Any **susceptible HCW or HCW whose immune status is unknown** with a significant exposure to a person who has acute chickenpox or zoster must report this exposure to the OHS. If the immune status of the HCW is unknown (i.e., by history or antibody testing), the HCW must be tested immediately for the presence of VZV antibodies. If the VZV antibody cannot be determined within 10 days of the exposure, the HCW must be regarded as susceptible until results are obtained.

Immune HCWs with a significant exposure may continue to work without disruption of their work pattern.

Susceptible exposed HCWs must be excluded from any work in the hospital from 10 days after the first exposure until 21 days after the last exposure. If clinical chickenpox develops during that period, the person must remain off work until all lesions are dried and crusted.

Varicella vaccine is effective in preventing or modifying severity of varicella if used within 72 hours of exposure. If the exposure does not result in infection, post-exposure vaccination should induce protection against subsequent exposures; give the second dose at the usual time, if illness does not develop. Since illness may still occur, the post-exposure vaccinated HCW should remain off work from day 10 after the first exposure until day 21 after the last exposure.

Varicella vaccine gives 70-90% protection against varicella of any severity and 95% protection against severe varicella, when used pre-exposure. Since varicella may develop in persons previously immunized with varicella vaccine, such exposed persons working in patient care areas may continue to work, but should be assessed at the start of each working day from day 10 until day 21 for signs/symptoms of varicella. If varicella develops during that period, the person must remain off work until lesions are dried and crusted.

Varicella-susceptible pregnant women may be at higher risk for serious complications than adults in general. Passive immunoprophylaxis with Varicella-Zoster Immune Globulin is indicated for these women after significant exposure. Varicella-Zoster Immune Globulin may prolong the incubation period; staff who receive Varicella-Zoster Immune Globulin must be excluded from any work in the hospital from 10 days after the first exposure until 28 days after the last exposure. Varicella-Zoster Immune Globulin may also be indicated for some susceptible immunocompromised people.

## **VI. Acute Disease**

HCWs with acute chickenpox or disseminated zoster must be excluded from work anywhere in the hospital until lesions are dried and crusted. HCWs with localized zoster may work in most cases if appropriate barriers are used (i.e., all lesions are covered and good hand hygiene is used before patient contact). HCWs with zoster may not work with high-risk patients (i.e., children, newborns, obstetrical patients, transplant patients, oncology patients) until lesions are dried and crusted.

Chickenpox is reportable to the local Medical Officer of Health. If chickenpox results from an occupational exposure, it is reportable to the Ministry of Labour and the Workplace Safety and Insurance Board.

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