

MEASLES SURVEILLANCE PROTOCOL FOR ONTARIO HOSPITALS

Developed by the Ontario Hospital Association and
the Ontario Medical Association
Joint Communicable Diseases Surveillance Protocols Committee

Approved by
The OHA and the OMA Board of Directors
The Ministry of Health and Long-Term Care –
The Minister of Health and Long-Term Care

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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 regulation requires each hospital to have by-laws that establish and provide for the operation of a health surveillance program including a communicable disease surveillance program in respect of all persons carrying on activities in the hospital. The communicable disease program is to include the tests and examinations set out in any applicable communicable disease surveillance protocol. The regulation states that the communicable disease surveillance protocols that hospitals must adopt are those "published jointly by the Ontario Hospital Association (OHA) and the Ontario Medical Association (OMA) and approved by the Minister (of Health and Long-Term Care)."

This Protocol has been reviewed since the previous version; changes have been highlighted in yellow for easy identification. Protocols are reviewed on a regular basis, every two years or as required.

The protocol reflects clinical knowledge, current data and experience, and a desire to ensure maximum cost effectiveness of programs, while protecting health care workers and patients. It is intended as a minimum standard that is practical to apply in most Ontario hospital settings. It does not preclude hospitals from adopting additional strategies that may be indicated by local conditions.

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Rationale for Measles Surveillance Protocol

Health care workers (HCWs) are at risk for occupationally acquired measles infection. Although cases are infrequent, they will seek healthcare, therefore HCWs are at higher risk than the general population of exposure to measles infection. HCWs should be immune to prevent acquisition and transmission of measles to others.

Measles is a highly contagious viral infection that can lead to serious consequences including encephalitis, otitis media, severe diarrhea, pneumonia and death. On average, 14 days after exposure to an infected person (range 7 to 18 days), a maculopapular rash appears first on the face and behind the ears, and then spreads downwards to the trunk and extremities.¹⁻³ Symptoms of cough, fever, coryza, malaise and conjunctivitis occur 3 to 7 days prior to the appearance of the rash. Koplik spots on the buccal mucosa emerge shortly before the rash. The infectious period is from four days before the onset of rash, and up to four days after the onset of the rash.^{1,3}

Encephalitis is estimated to occur in 1/1000 cases, while otitis media (middle ear infection) is reported in 5-15% of cases and pneumonia in 5-10% of cases.^{1,2} The disease is more severe in infants and children under the age of five. Before measles vaccine became available in Canada, there were 300,000 to 400,000 cases annually and 90% of children were infected with measles by the age of 10.⁴ People who recover from measles have life-long immunity.

The measles virus is spread by airborne droplet nuclei, close personal contact, or direct contact with the nasal or throat secretions of infected persons, and can remain active and contagious in the air, depending on the number of air changes, for up to two hours.^{1-3,5,6} Since the virus is airborne, close or direct contact is not required for transmission.

In Ontario, measles-containing vaccine became available in 1967. After introduction of a live further attenuated measles virus vaccine in 1970 measles cases decreased by 95%. Outbreaks continued to occur until a two-dose measles vaccine schedule was implemented in 1996.⁷ Endemic transmission of measles in Canada has been eliminated since 1998;³ however, cases imported from other countries remain an important source of infection, especially for children under one year of age.

In Ontario between 2008 and 2017, an average of 15.7 measles cases per year (range 3 to 58) was reported, with rates during this period averaging 0.12 (range, 0.02 to 0.45) per 100,000 population.⁸

The efficacy of a single dose of measles vaccine at 12 or 15 months of age is estimated to be 85-95%. With a second dose, efficacy is almost 100%.² Vaccination

provides the best protection against measles infection. Vaccination coverage needs to be at least 95% to develop herd immunity in a population and prevent transmission of the disease ².

The only effective control of transmission of measles in hospital settings is immunization. Susceptible HCWs are at risk of acquiring measles as well as transmitting measles to others. All HCWs, as a condition of employment, should provide evidence of immunity as per this protocol. It is important to ensure prompt reporting of any suspect or confirmed case to the local public health unit.

This protocol is only one component of an infection prevention and control program; HCWs must consistently adhere to Routine Practices.

Measles Surveillance Protocol for Ontario Hospitals

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I. Purpose

The purpose of this protocol is to provide direction to hospitals to prevent the transmission of measles among health care workers (HCWs) and patients. This protocol provides the minimum standard required under the Ontario Public Hospitals Act, Regulation 965.

II. Applicability

This protocol applies to **all persons carrying on activities in the hospital**, including but not limited to employees, physicians, nurses, contract workers, students, post-graduate medical trainees, researchers and volunteers. The term health care worker (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 training students or hiring contract workers, the hospital must inform the school/supplying agency that the school/agency is responsible for ensuring that their students/contractors are managed according to this protocol.

This protocol is for the use of the Occupational Health Service (OHS) in hospitals. It is expected that OHS collaborate with Infection Prevention and Control (IPAC) and other departments, as appropriate.

III. Pre-placement

At the time of hiring, OHS must ask all HCWs for evidence of immunity. Only the following should be accepted as proof of measles immunity.^{1,2}

- documentation of receipt of 2 doses of measles-containing vaccine on or after the first birthday, with doses given at least four weeks apart (regardless of year of birth),² **OR**
- laboratory evidence of immunity

Note: The previously accepted pre-placement assumption of immunity if the HCW was born before 1970 has been removed.² There are recent cases of measles in

Ontario reported in persons born before 1970. Although this is an acceptable assumption for the general public, it is not sufficient for HCWs. **Therefore, all HCWs regardless of year of birth must be asked to provide proof of immunity.**

The OHS should make all reasonable efforts, together with the new hire/placement, to obtain previous immunization records. If this documentation is not available, the OHS must ensure that the HCW has received 2 doses of measles containing vaccine (available as trivalent measles mumps rubella [MMR] vaccine). Documentation of each HCW's status must be kept up to date with current requirements and available in the occupational health record. While there is no known fetal risk to giving measles vaccine during pregnancy, because MMR vaccine is a live vaccine, it should not be given to pregnant women.² Females of child-bearing age must first assure the OHS that they are not pregnant, and will not become pregnant for one month after receiving this vaccine.

For reasons of patient safety, hospitals should make documented proof of immunity to measles a condition of employment. The OHS must counsel susceptible HCWs of the infection risks related to their activities in the hospital.

Measles ***revaccination*** should be offered to all HCWs who:

- have not received age appropriate measles vaccine (two doses of measles containing vaccine on or after their first birthday); or
- received immune globulin, blood or blood products containing immune globulin within 5 months of receiving measles-containing vaccine, if this was counted as one of the measles vaccine doses.

Serologic testing is not recommended either before or after receiving measles-containing vaccine.² For an HCW who has received a single dose of measles-containing vaccine, a second dose should be administered. If an HCW is already immune, there is no increased risk of adverse reaction from vaccination.

In the event that an HCW who has had two documented doses of appropriately administered (as defined in II) MMR or measles containing vaccine is tested serologically, and is negative, an additional dose is not recommended; the HCW should be considered immune.

Only immune HCWs should be assigned to care for patients with known/suspected measles. If no immune staff are available and patient safety would be compromised, the susceptible HCW must wear a fit-tested, seal-checked N95 respirator. Theoretically, the respirator could provide protection from the airborne measles virus; however, there are no efficacy data for N95 respirators for this application.

IV. Continuing Surveillance

No routine continuing surveillance of any HCWs carrying on activities in the hospital is required. Follow-up is required for susceptible female personnel unable to be vaccinated pre-placement due to pregnancy. These HCWs have a responsibility to report to the OHS when they are no longer pregnant. The OHS must ensure that these women are offered measles immunization (i.e. MMR vaccine) when they are no longer pregnant.

Pre-placement requirements, including recommended vaccines and vaccine dosing change over time. HCWs who are not fully immunized may be exposed to measles when patients with measles seek care. A catch up program is recommended, particularly for groups of HCWs at higher likelihood of coming into contact with measles cases, e.g. Emergency Department and Family Practice staff.

HCWs who have previously received only one dose of measles containing vaccine (given on or after the first birthday) and who do not have documented laboratory evidence of immunity should receive a second dose of MMR. Further, for those born before 1970 who do not have documented laboratory evidence of immunity and have never received live measles containing vaccine, 2 doses of MMR should be administered.

V. Exposure

Measles is a **highly** contagious disease spread by the airborne route, i.e., the virus is aerosolized by the patient and can be inhaled and produce disease in susceptible persons. Fit-tested, seal-checked N95 respirators may not provide complete protection for a susceptible person; therefore, a susceptible HCW could still have an exposure to an infectious patient even if wearing a respirator. Exposure to measles is considered significant if it involves sharing the same air space, either simultaneously or for up to two hours afterwards, depending on the number of air changes, as a clinical case of measles.

Any HCW who has a significant exposure to a person who has measles, either in the health care setting or the community, must report this exposure to the OHS.

- Immune HCWs (with evidence of immunity as defined in III above) may continue to work without disruption.
- HCWs who have received one dose of live measles containing vaccine who do not have laboratory evidence of immunity should receive a second dose of measles vaccine (i.e. MMR) if no contraindications exist, and measles IgG should be ordered. **Work restrictions may apply while waiting for serology results** (see below). If measles IgG is positive, the HCW is immune and may work. If measles IgG is negative, the HCW is considered

to be susceptible and will be excluded from work.^{3,4}

- Susceptible exposed HCWs i.e. those who have negative serology for measles antibodies and who have never received measles containing vaccine, should receive measles containing vaccine (i.e. MMR) as soon as possible after the exposure if no contraindication exists, and should be excluded from work (see below). MMR given within 72 hours of exposure may provide protection after exposure, and when given beyond 72 hours may provide protection for subsequent exposures. If clinical measles does not develop after exposure, a second dose of measles-containing vaccine (i.e. MMR) should be given at least four weeks after the first.
- Susceptible exposed HCWs in whom vaccine is contraindicated for medical reasons, (e.g. immunocompromised, pregnancy) must be offered human immune globulin (Ig)^{2,5,9,10} within 6 days of exposure to prevent or modify measles. It is important to consider that Ig only provides short-term protection. For HCWs who can later receive MMR vaccine (e.g. pregnant HCWs), MMR vaccine should be postponed 5 to 6 months after Ig is administered.²
- HCWs who have no documentation of immunity (as defined in III above) should receive one dose of measles containing vaccine (i.e. MMR) if no contraindications exist. They are considered susceptible and should be excluded from work (see below). Serology should be performed; if measles IgG positive, they may return to work. If IgG negative, work restrictions apply (see below).
- **Women should be advised to delay pregnancy for at least 4 weeks following immunization with MMR vaccine.²**

Work Restrictions

Susceptible exposed HCWs must be excluded from any work in the hospital or any health care setting from 5 days after the first exposure until 21 days after the last exposure, regardless of whether they received MMR or immune globulin after the exposure.³

HCWs must be excluded from work while waiting for serology results if they are still within the period of work exclusion defined above.

HCWs who are excluded from work should not work in any other health care setting. These HCWs should be counselled to disclose their work restrictions to other health care employer(s).

VI. Acute Disease

If clinical measles develops, the HCW must remain off work until 4 complete days have passed after the onset of the rash.³ Infected HCWs and their personal physicians are responsible for follow up care and treatment.

OHS should inform IPAC of HCWs with suspected or confirmed measles when exposure of patients or other HCWs may have occurred.

VII. Reporting

Suspect or confirmed reportable diseases (as per Ontario Regulation 135/18 and amendments under the Health Protection and Promotion Act), such as measles, must be reported to the local Medical Officer of Health.

In accordance with the Occupational Health and Safety Act and its regulations, an employer must provide written notice within 4 days of being advised that a worker has an occupational illness, including an occupationally-acquired infection, and/or a Workplace Safety and Insurance Board (WSIB) claim has been filed by or on behalf of the worker with respect to an occupational illness, including an occupational infection, to the:

- Ministry of Labour,
- Joint Health and Safety Committee (or health and safety representative), and
- trade union, if any.

Occupationally-acquired infections and illnesses are reportable to the WSIB.

VIII. Glossary

Ontario MOHLTC Surveillance Case Definition for Measles¹¹

Confirmed Case:

Laboratory confirmation of infection with clinically compatible signs and symptoms (See Clinical Evidence) in the absence of recent immunization with measles-containing vaccine:[†]

- Isolation of measles virus from an appropriate clinical specimen (e.g., nasopharyngeal swab/aspirate/wash and urine); **OR**
- Detection of measles virus ribonucleic acid (RNA) from an appropriate clinical specimen; **OR**
- Seroconversion or a significant (i.e., fourfold or greater) rise in measles Immunoglobulin G (IgG) titre by any standard serologic assay between acute and convalescent sera; **OR**
- Positive serologic test for measles Immunoglobulin M (IgM) antibody using a recommended assay in a person who is either epidemiologically linked to a laboratory-confirmed case **OR** has recently travelled[‡] to an area of known measles activity; **OR**
- Clinically compatible signs and symptoms in a person with a known epidemiologic link to a laboratory-confirmed case of measles.

Probable Case:

Clinical evidence of infection (see Clinical Evidence) in the absence of immunization with measles- containing vaccine in the last 5 – 42 days; **AND**

- A positive serologic test for measles IgM antibody using a recommended assay;
OR
- In a person who has recently travelled[‡] to an area of known measles activity.

Clinical Evidence:

Clinically compatible signs and symptoms are characterized by **ALL** of the following:

- Fever ≥ 38.3 degrees Celsius (oral);
- Cough, coryza or conjunctivitis;
- Generalized maculopapular rash for at least three days.

[†] Individuals with suspect measles who have been immunized with measles-containing vaccine in the last 5-42 days require specimen collection for viral detection (e.g. nucleic acid amplification testing) and subsequent genotyping. If wild-type measles virus is detected, the case would be classified as confirmed. Those with evidence of vaccine-derived measles virus on genotyping should be classified as adverse events following immunization (AEFI).

[‡]Travel within 21 days of rash onset

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