Public Health Ontario | Santé publique Ontario

AT A GLANCE

Measles: Information for Health Care Providers

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Introduction

This document outlines considerations and information to assist with timely identification and management of individuals suspected to have measles and information about measles prevention through immunization. It is intended for use by health care providers.

All suspect cases of measles should immediately be reported to your local public health unit. Do not wait for laboratory confirmation.

Summary

- Immunization is the best way to protect against measles infection and serious complications, and to interrupt measles transmission.
- Individuals planning to travel to areas of concern for measles, either domestically or internationally, should be aware of additional vaccine recommendations. [1]
- If an individual's immunization records are unavailable, immunization with measles-containing vaccine is generally preferable to ordering serology to determine immune status. There is no harm in giving measles-containing vaccine to an individual who is already immune.
    - For pregnant individuals who have an unknown immunization history, measles IgG serology can assist in identifying measles susceptibility to inform timely advice for measles post-exposure prophylaxis and the offer of measles-mumps-rubella (MMR) vaccine post-partum.
- Signs and symptoms of measles include fever and maculopapular rash, starting on the face and spreading from head to toe, often accompanied by cough, runny nose and conjunctivitis (non-purulent). Koplik spots are pathognomonic and may be present in the prodromal period.
- Clinicians should consider measles in patients presenting with these signs and symptoms, especially if they are unvaccinated, partially vaccinated, or immunocompromised and there is a potential exposure risk, including:
    - recent travel to areas of concern for measles, domestically or internationally
    - known contact with a case of measles or an identified location where a measles exposure may have occurred

- If you suspect measles infection in a patient presenting to you:
    1. Provide the patient with a medical mask (if able to tolerate use and no contraindications).
    2. Promptly place the patient in a negative pressure room (airborne infection isolation room [AIIR/AIR]) with the door closed, if available (if not available, place in a single patient room with the door closed).
    3. Only health care workers (HCWs) with presumptive immunity to measles should provide care to patient with suspect/confirmed measles due to increased risk of transmission of measles to susceptible individuals.[2-4]
    4. Obtain specimens for testing while practicing recommended infection prevention and control (IPAC) measures (e.g., use of PPE [fit-tested, seal checked N95 respirator, eye protection, gown, gloves]) during collection of the specimen. [5]
    5. Contact your local public health unit (PHU) immediately to report the suspect case and to receive additional guidance (do not wait for laboratory confirmation).
    6. Provide isolation guidance to the patient while results are pending.
- If you are referring a patient for further assessment or diagnostic testing, the receiving facility (e.g., hospital emergency department) must be notified ahead of the patient's arrival to allow IPAC measures to be implemented to prevent exposures.

Background

Measles is a highly contagious respiratory virus that causes a febrile rash illness and poses significant health risks. Before the introduction of the measles vaccine and a routine immunization program, measles was a common childhood illness that infected most individuals before the age of 20 years and caused over 2 million deaths each year worldwide.[6] The introduction of routine measles vaccination led to a dramatic decline in the incidence of measles. Measles was eliminated (i.e., no sustained circulation) in Canada in 1998.

In October 2024, an imported case of measles led to a large multi-jurisdictional outbreak of over 5,000 cases across several Canadian provinces, including more than 2,000 cases in Ontario. Although the outbreak in Ontario was declared over as of October 6, 2025, continued endemic transmission of measles in Canada resulted in the loss of Canada's elimination status in November 2025. While measles cases are declining nationally, there is ongoing risk of importation through travel from regions of Canada[7] and other countries[8] where transmission is occurring.

Measles can easily be spread to individuals who have not been previously infected or immunized against measles. Measles infection and chains of transmission can be avoided by ensuring high rates of measles vaccine coverage, ensuring measles protection through vaccination prior to travel to areas with measles activity and the prompt isolation of suspect measles cases.

Measles Prevention through Immunization

Immunization is the best way to protect against measles infection and serious complications, and to interrupt measles transmission. Everyone in Ontario is recommended to stay up-to-date with measles-containing vaccines according to the Publicly Funded Immunization Schedules for Ontario.[9]

Health care providers should advise individuals travelling to destinations within and outside of Canada to review their measles vaccination history and ensure they are adequately vaccinated for measles prior to travel. MMR vaccine recommendations outside of the routine schedule, particularly for infants 6 to 11 months old, should be based on individual risk, including planned travel to areas with ongoing measles transmission.[10]

Table 1 provides an overview of the routine immunization schedules in Ontario and measles vaccination recommendations for travel.

Table 1: Routine Immunization Schedules and Travel Immunization Recommendations

Age Group	Ontario's publicly funded routine immunization schedule	Measles immunization recommendations for travel*
Infants (6 to 11 months)	Not recommended	One dose of MMR vaccine
Children (12 months and over)	**Two doses** of measles-containing vaccine: • One dose of MMR at 1 year of age • One dose of MMRV between 4 and 6 years of age (prior to school entry)	Two doses of measles-containing vaccine: • One dose of MMR at 1 year of age • Children 1 to 4 years of age may receive an early second dose of measles-containing vaccine **
Adults (18 years and older)	Adults of any age who have had only one dose of MMR may receive a second dose if they are: • Health care workers • Post-secondary students • OR based on a health care provider's clinical judgement	A second dose of MMR is recommended for all adults born in or after 1970 (for those who have not previously received 2 doses of MMR)

* These recommendations apply to those who are travelling to areas where measles is of concern, either domestically or internationally (please see the Government of Canada's **Travel Health Notices** or refer to provincial and territorial websites for more information).[11,]
**Measles-containing vaccines (Measles, Mumps, Rubella [MMR]; Measles, Mumps, Rubella, Varicella [MMRV]) should be separated by a minimum interval of ≥ 4 weeks, from one another and other live attenuated vaccines.

Key immunization principles

- Infants who receive their first dose of MMR vaccine between 6–11 months of age require two additional doses after the 1st birthday to ensure long term protection and for school immunization requirements.
- All adults are eligible for one dose if they have never received an MMR vaccine. However, most adults born before 1970 are immune from past exposure to measles.
- If immunization status is unknown, offering a measles vaccine is preferred to ordering serology to determine immune status. There is no harm in receiving an additional dose.

Immunization Guidance for Pregnant and Breastfeeding Individuals

Measles-containing vaccines are not routinely recommended **in pregnancy** because they contain a live, weakened form of the measles virus. Immunity to measles should be reviewed in people of reproductive age who may become pregnant, and immunization should be completed before pregnancy. Measles-containing vaccine can also be given to susceptible individuals anytime after giving birth, including while breastfeeding.[1]

Immunization of Individuals with Missing Immunization Records

If a patient's immunization records are unavailable, immunization with measles-containing vaccine is preferable to ordering serological testing to determine immune status.[1] This avoids the potential for false positive and/or false negative results, reduces the risk of missed opportunities for immunization, and is consistent with advice from the Canadian Immunization Guide. It is safe to give additional doses of MMR vaccine to those who are already immune. Serological testing to determine immunity in healthy individuals is not routinely recommended.[12]

Serological Testing for Measles Immunity

Serological testing is not recommended before or after receiving measles-containing vaccine; however, serological testing may be indicated to determine immune status when immunization history is unknown. If serology is inadvertently completed on a fully vaccinated individual (i.e., two documented doses of measles-containing vaccine), and the result does not demonstrate immunity (i.e., IgG non-reactive), measles re-immunization is not necessary.[12]

Measles IgG serology can assist in identifying susceptibility in pregnant individuals with an unknown measles immunity history and can also help inform timely measles post-exposure prophylaxis (PEP) recommendations for those who have been exposed to a case of measles (see Contact Management and Post-exposure Prophylaxis).

Clinical Presentation of Measles

Following exposure to measles, the incubation period from exposure to prodromal symptoms averages 10 to 12 days. The time from exposure to rash onset averages 14 days (range: 7 to 21 days).[13,14] It may be longer (up to 28 days) for those who have received immuneglobulin for post-exposure prophylaxis.[15] The period of communicability is defined as four days prior to rash onset (with the date of rash onset as day zero) to four days after rash onset.[13]

Clinically compatible signs or symptoms include:

- Prodromal fever (≥ 38.3◦C - oral), cough, coryza (runny nose) and conjunctivitis.
- Koplik spots (tiny blue-white spots on the buccal mucosa) may also be present during the prodromal period.[13]
- Red maculopapular rash appears 3–7 days after these symptoms, first appearing on the face at the hairline spreading downward to the neck, trunk, arms, legs and feet usually lasting 5 to 6 days.[13]

The most frequent complications of measles infection include diarrhea, otitis media, bronchopneumonia, and laryngotracheobronchitis (croup), and are more common in young children. Among adults, people who are immunocompromised and pregnant individuals are at increased risk of complications.[1,14] Measles during pregnancy can lead to increased risk of maternal complications, premature labour, spontaneous abortion/miscarriage, and low birth weight infants.[16] Measles during pregnancy can also lead to congenital measles infection, which is when measles infection is diagnosed in an infant within the first 10 days of life.[17]

Diagnosis of Measles

All suspected measles cases require prompt diagnostic testing. Laboratory diagnostic testing may include both:

- Measles virus detection by polymerase chain reaction (PCR). Testing multiple specimen types, including nasopharyngeal swab, throat swab, and a urine specimen, will increase the sensitivity for molecular (PCR) testing.
- Measles diagnostic serology. Testing acute and convalescent whole blood or serum specimens collected as outlined in Table 2 may support and augment the molecular test results.

Due to higher sensitivity and specificity, molecular (PCR) is the preferred testing methodology. Measles serology testing may provide supplemental diagnostic and epidemiological value. However, blood collection may necessitate additional health care visits and increase the risk of community exposures. As such, serology testing should be considered at the discretion of the HCP.[18]

If referring patient for diagnostic testing, the receiving HCP (e.g. hospital or other healthcare facility) must be notified ahead of the patient's arrival to allow IPAC measures to be implemented to prevent exposures. In addition, contact your local PHU immediately to report a suspect measles case.

Public Health Ontario (PHO) will notify the submitter and the patient's local PHU of all measles positive results. For the most up-to-date testing information, refer to PHO's Laboratory Test information Index, which provides a summary of diagnostic tests for measles detection.

Table 2: Diagnostic Laboratory Tests for Detection of Measles[18,19]

Test	Specimen type/volume	Collection Kit	Timing of collection
Measles virus detection (PCR)*	Nasopharyngeal swab	Virus respiratory kit	Within 7 days of rash onset**
Measles virus detection (PCR)*	Throat swab	Virus culture kit	Within 7 days of rash onset**
Measles virus detection (PCR)*	Urine/10.0 mL	Sterile container	Within 14 days of rash onset**
Measles serology (diagnosis)***	Whole blood (5.0 mL) or serum (1.0 mL)	Blood, clotted-vacutainer tubes (SST)	Acute: Within 7 days of rash onset Convalescent: 7–10 days after the acute; preferably 10 to 30 days after acute

*Molecular assays for measles (PCR) is the preferred diagnostic test during acute stage of illness due to higher sensitivity and specificity compared to measles serology.
**For suspect cases with a high index of suspicion, it may be warranted to test beyond the time periods noted above after discussion with PHO.
*** IgM serology should not be the only diagnostic test relied upon for the diagnosis of measles. Diagnosis for a symptomatic patient requires additional samples (e.g., throat swab and urine) for testing by PCR.

Specimen Documentation and Transport

Clearly mark "Suspect case of measles" in the Testing Indications(s)/Criteria section of the general test requisition for both measles virus detection (PCR) and diagnostic serology. All requisitions should contain the following information: patient's symptoms and onset date (for diagnostic serology, failure to include clinical information may result in only measles IgG testing being performed), exposure history, travel history (if applicable), outbreak or investigation number (if applicable) and vaccination history. The "diagnosis" box should also be checked. Specimens should be stored at 2–8°C following collection and shipped to PHO on ice packs. Measles specimen requests should be sent separately from other routine lab requests.

Contact PHO's Laboratory Customer Service at 416-235-6556 or 1-877-604-4567, or the After-Hours Duty Officer at 416-605-3113 if you have questions about specimen collection, specimen submission, or to request expedited testing.

Patient Counselling

Individuals with suspected measles should be advised to isolate while laboratory results are pending.[20] Individuals with confirmed measles should be provided with the following advice to follow until the end of the infectious period. Individuals with measles are considered infectious from 4 days prior to rash onset through to 4 days after rash onset (9 days total). Immunocompromised individuals may be infectious for longer and should be advised to isolate for the duration of illness.[21]

- Self-isolate from all public places such as child care settings, schools, post-secondary educational institutions, workplaces, places of worship, sporting events, health care and other group settings;
- Avoid contact with non-household contacts;
- Avoid contact with high-risk individuals (pregnant individuals, infants < 12 months of age and immunocompromised individuals);
- Contact HCPs, hospitals, specimen collection centres, or other healthcare facilities prior to arrival so appropriate IPAC precautions can be implemented to avoid exposures (i.e., mask upon arrival, arrange for patient to be placed immediately in an appropriate isolation room);
- If urgent assessment is required such that they cannot call ahead, alert triage immediately of the suspect or confirmed measles diagnosis so that immediate IPAC measures can be put in place.

Contact Management and Post-exposure Prophylaxis

The local PHU is responsible for the follow-up of any measles case, including contact identification and management, which may include recommendations for measles PEP and/or exclusion from work, school, or other high-risk settings for susceptible contacts. The local PHU may contact HCPs to request assistance in determining a patient's susceptibility to measles and providing measles vaccine as PEP to known contacts who are patients in their practices. Hospitals are responsible for administering Ig PEP to eligible contacts, as indicated by the local PHU.

In addition, PHUs may issue media advisories to communicate with the public about community locations where unidentified individuals may have been exposed to measles. These individuals may present to HCPs to receive advice and may be eligible for measles PEP.

Please see PHO's Measles Exposures in Ontario webpage for information on places and dates of exposure to a case a measles. For more information on measles PEP, please see PHO's At a Glance: Measles: Post-exposure Prophylaxis for Contacts.

Infection Prevention and Control (IPAC) Practices

The measles virus is spread by contact with respiratory particles (through inhalation or direct deposition onto mucous membranes) at short and long range (e.g., airborne). These particles can remain suspended and contagious in the air for up to two hours, depending on the number of air changes.[13] In addition, transmission can occur through indirect contact when a person touches a contaminated surface, then touches their eyes, nose, or mouth.[22]

Patients with suspect/confirmed measles should be managed under Airborne, Droplet and Contact Precautions, in addition to Routine Practices.[5] The following may help minimize the risk of transmission:

- Only health care workers (HCWs) with presumptive immunity to measles should provide care to patients with suspect/confirmed measles due to increased risk of transmission of measles to susceptible individuals.[2-4]
- Presumptive evidence of immunity for HCWs includes at least two doses of measles-containing vaccine received on or after their first birthday or laboratory evidence of immunity, regardless of year of birth.
- Non-immune, susceptible staff may only enter the room in exceptional circumstances (i.e., no immune staff are available, and patient safety would be compromised otherwise).[23]
- All HCWs regardless of presumptive immunity to measles are to wear a fit-tested, seal-checked N95 respirator,[3,4,24,25] eye protection, gown and gloves.[22]
- Schedule the patient visit to minimize exposure of others (e.g., at the end of the day), and ensure the patient arrives wearing a medical mask and an appropriate room (see below) is available to place the patient in immediately upon arrival.
- If upon arrival the patient is not wearing a medical mask, instruct the patient to perform hand hygiene with alcohol-based hand sanitizer or soap and water and put on a medical mask if tolerated and there are no contraindications (e.g., under two years old, unable to remove the mask themselves).
- Immediately, place the patient in a single room with negative air flow (*airborne infection isolation* room [AIIR]) with the door closed. If an AIIR/AIR is not available, the patient should be immediately placed in a single room with the door closed.[23]
- Patient movement should be curtailed unless absolutely necessary. Where possible patient investigations/procedures should be conducted in the patient room with the patient wearing a medical mask, if tolerated. Should patient transport be required, use transport routes that minimize contacts and clear all hallways and elevators along the route. The patient should wear a medical mask, if tolerated, and HCWs assisting with transport should be wearing a fit-tested, seal-checked N95 respirator, gloves, gown, and eye protection.[22]
- After the patient leaves, the door to the room where the patient was examined must remain closed. Signage is posted to indicate that the room is not to be used. Allow sufficient time for the air to change in the room and be free of respiratory particles before re-entering the room (two hours is a conservative estimate if air changes are not known).[26] For institutional settings, this time period can be reduced depending on the number of room air changes per hour. Consult with facility plant engineers to determine the air changes per hour for each AIIR (refer to Appendix D, Time Required for Airborne Infection Isolation Room to Clear *M. tuberculosis* in Provincial Infectious Diseases Advisory Committee's (PIDAC) Routine Practices and Additional Precautions in All Health Care Settings, 3rd edition, November 2012).[5]
- Conduct routine cleaning of the room and equipment once sufficient time has elapsed to ensure adequate air exchange has occurred in the room as described above.[26,27]

Resources

For additional information about measles including immunization, surveillance, and laboratory testing please refer to the following resources:

Ministry of Health

- Publicly Funded Immunization Schedules for Ontario
- Ontario Public Health Standards, Infectious Diseases Protocol: Appendix 1

Public Health Ontario

- Measles
- How to Recognize and Respond to Measles
- Measles: Post-exposure Prophylaxis for Contacts
- Measles Diagnostic Serology Test Information
- Measles Diagnostic PCR Test Information
- Measles IPAC Checklist for Clinics and Specimen Collection Centres
- Routine Practices and Additional Precautions in All Health Care Settings, 3rd edition, November 2012

Government of Canada

- Measles: For health professionals
- Measles vaccine: Canadian Immunization Guide
- Travel health notices
- Guidance for the public health management of measles cases, contacts, and outbreaks in Canada
- NACI Updated Recommendations on measles post-exposure prophylaxis

Centers for Disease Control and Prevention

- Measles Clinical Features and Diagnosis (Video)

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