

## IMPORTANT NOTICE

### Measles Information for Healthcare Providers

Measles transmission is currently rising globally due to a drop in measles vaccination during the COVID-19 pandemic response, with the WHO projecting that more than half of the world's countries will be at a high risk of measles by the end of the year. In Ontario, there has been a rise in measles cases identified in the past month, mostly related to international travel and a small number with no known source of acquisition. Ontario (including the LGL region) remains at risk of local measles outbreaks seeded by travel-related cases, until measles vaccination rates reach herd immunity levels and global transmission falls.

All *suspected or confirmed* cases of measles must be reported to Leeds, Grenville and Lanark District Health Unit **immediately** by calling **1-800-660-5853**. During normal business hours (Monday - Friday, 8:30 am - 4:30 pm), dial ext. 2222. After hours and holidays, ask for the Manager on-call. DO NOT WAIT for test results before contacting us. We will also ask you to complete the [measles reporting form](#).

All patient suspected to have measles infection **must** receive measles testing (described below). This testing should be done at the primary care clinic or ER. **Do not send individuals suspected to have measles to pharmacies, labs (including private labs such as LifeLabs) or the Health Unit's offices.** If you are sending a patient to the ER for testing, you must **call the hospital ahead of time** so the ER can engage in proper airborne infection prevention and control (IPAC) procedures.

In Ontario, the most significant risk factors for transmission are a history of travel to countries or regions with active measles outbreaks, or contact with somebody with known measles infection. This is particularly the case for those who are not immunized or only partially immunized.

#### **CLINICAL ASSESSMENT**

Measles (also called 'rubeola') is one of the most infectious human pathogens; in naïve populations, one infected individual will typically infect around 17 others. Despite a very highly effective measles vaccine, due to the high infectiousness of the virus the target measles vaccination rates for herd immunity are >95%. [This article](#) provides an excellent clinical overview. Images of the measles rash, Koplik spots, and other clinical features [can be found here](#).

Symptoms of measles infection include:

- Fever and at least one of "the 3 C's": cough (dry), coryza (runny nose), and conjunctivitis.
  - This is the "prodrome phase"
- Pathognomonic Koplik spots (white spots on the buccal mucosa) appears in most cases, 2 to 3 days after prodrome symptoms begin.
- A characteristic generalized maculopapular rash, initially fine and becoming confluent, appears about 3 – 7 days after prodromal symptoms begin and lasts 4 – 7 days. The rash typically begins on the face, advances to the trunk of the body, and then to the arms and legs.
  - A **rash in the absence of prodrome symptoms is atypical of measles** and an alternative etiology should be considered.

Complications include:

- Pneumonia (~10% of cases and more common among infants less than 1 year old)
- Measles encephalitis (1 in 1,000 cases), which may lead to permanent brain damage
- Subacute sclerosing panencephalitis (SSPE), which is rare but fatal
- Immune amnesia: loss of immune memory to previous infections
- 2-3 in 1,000 reported measles cases will result in brain damage or death
- Infants, pregnant people, and the immunocompromised are at higher risk for severe outcomes

Differential diagnoses include: influenza, rubella (also called 'German measles'), roseola, mononucleosis, Kawasaki disease, Scarlet fever (group A strep), autoimmune process, and adverse drug reactions. Overview of differential diagnosis for measles [here](#); overview of differential diagnosis for generalized rash [here](#).

Treatment for measles infection is supportive. Vitamin A administration may be considered.

### **TRANSMISSION**

Measles is transmitted via the airborne route, and can remain infectious in the air or on infected surfaces for at least two hours. It can travel to other rooms sharing the same ventilation system.

- The incubation period (between exposure and the start of prodrome symptoms) is typically 10 days (range of 7 – 21 days).
- Infected individuals are typically contagious 1 day before any symptoms appear (i.e. before the prodromal period) and 4 days after the onset of rash.

Information on the case and outbreak definition can be found [here](#).

### **MEASLES VACCINE**

The measles vaccine is a live, attenuated vaccine that is available in Canada as a combined product with the mumps and rubella vaccines (MMR), as well as varicella (MMRV). Ontario's routine vaccine schedule includes 2 doses of measles: MMR at age 1 year old, MMRV at 4-6 years old. With this schedule, the measles vaccine is 85-95% effective after the first dose, and nearly 100% effective after the second dose. Protection is life-long.

Infants aged 6 months and 1 year are eligible for measles vaccine; however, they will require 2 additional doses after their 1<sup>st</sup> birthday to ensure lasting immunity.

Anybody who has not had a previous measles infection or who have not received both doses of a measles-containing vaccine is considered at risk of measles infection. Due to widespread circulation before the measles vaccine became available, in Canada adults born before 1970 are considered immune to measles ([reference](#)).

Vaccination can be used for post-exposure prophylaxis; a measles immunoglobulin also exists.

Note that serological testing to determine immunity in well individuals is not recommended (unless they are a healthcare worker; see last page of this document). If a patient's immunization records are unavailable, immunization with measles-containing vaccine is preferable to testing to determine immune status. This avoids the risk of false positive results and reduces the risk of missed opportunities for immunization. It is safe to give additional doses of MMR vaccine to those who are already immune.

## MEASLES TESTING AND SPECIMEN COLLECTION

To ensure prioritized test processing, **please call [PHOL Customer Service](#) prior to all measles diagnostic sample submission** to provide the following information:

- Patient demographics (so the lab can keep an eye out for the sample incoming)
- Clinical information (help microbiologist to assess the urgency of testing in case the sample comes in afterhours, such as weekend)
- Expected arrival time of the package to PHO's laboratory and possible routing (e.g. directly from submitter or via a private lab). Please note PHO's laboratory does not provide logistics support for sample pick up. Please contact the Health Unit if you require shipment or logistics support.
  - If your facility uses a private laboratory courier (i.e. LifeLabs or Dynacare), you must ask them to deliver to Public Health Lab, instead of the sorting facility of private lab.
  - If there is high suspicion of Measles, it may be required to privately courier the sample directly to the Public Health Lab either in Kingston or Toronto. Please call the Public Health Unit if this is the case.

### Ordering the Right Tests and Collecting the Right Specimens

All diagnostic measles testing should include **as many of the following 3 tests** as appropriate below:

1. Urine for PCR: up to 14 days after rash onset
  - At least 50 mL of clean catch urine in a screw top sterile container
2. Throat or nasopharyngeal swab for PCR: up to 7 days after rash onset
  - Throat specimen: viral swab ([Virus Culture Kit order #390081](#)) containing pink universal transport media (i.e. the same swab used to test for HSV)
  - Nasopharyngeal specimen: nasopharyngeal swab ([Virus Respiratory Kit order #390082](#)) with pink universal transport media (i.e. same swab used to test for influenza or RSV)
  - **NOTE: 'Traditional' red top throat swabs (e.g., Amies with or without charcoal, eswabs or others that do not use universal viral transport media) are not acceptable for measles PCR testing and will be rejected**
3. Serology – only if you are not able to draw blood on site; individuals should not be sent to a lab to get this test:
  - Acute serology: up to 7 days after rash onset
    - Requisitions should be clearly marked "acute measles serology IgG and IgM"
  - Convalescent serology: should be collected 7-10 days *after the initial acute serology*
    - Requisition should be clearly marked "convalescent measles serology"
    - Recommended if acute serology and virus detection are negative or indeterminate



In recent Ontario experience, some measles samples have been negative for measles and positive for influenza. Consider influenza testing if this is part of your differential diagnosis—PHO laboratory has indicated that they will temporarily extend the influenza testing eligibility to those who are also being tested for measles infection.

### Laboratory Requisition Form Requirements

- Ordering physician or health care professional's name and telephone number
- Immunization history, exposure history and travel history for 21 days prior to start of symptoms
- Relevant signs, symptoms, and/or clinical history, and onset date
- Reason for testing (diagnostic)

### **Storage and Transport Requirements**

- Place specimen in biohazard bag and seal.
- Specimens should be stored in a refrigerator at 2-8°C following collection and shipped to the Public Health Ontario laboratory on ice packs.

For more information about lab testing, refer to:

- [Measles Test Information Sheet: Diagnostic – PCR](#)
- [Measles Test Information Sheet: Serology](#)
- If measles encephalitis or subacute sclerosing panencephalitis (SSPE) is suspected, submit a CSF specimen and follow instructions as per the [Public Health Ontario Laboratory website](#)

### **INFECTION PREVENTION AND CONTROL CONSIDERATIONS IN HEALTHCARE SETTINGS ([reference](#))**

#### **For Patients**

- Patients with suspected measles should mask immediately and be placed in an airborne infection isolation room (if available). If not available, they should be placed in an examining room with the door closed, and the room should not be used for 2 hours.
  - Check that negative your pressure rooms are functioning properly and ensure staff are trained their use.
- Schedule patients with suspected measles for the end of day where possible. Consider completing the clinical interview virtually or over the phone, and conducting testing outdoors.
- Contact your local Health Unit right way to initiate contact tracing. Tell patients with suspected or confirmed measles to self-isolate at home until 4 days after the onset of rash. Children may not attend school or childcare. Adults may not attend work.
- A system should be developed to identify all patients with known or suspected infection that warrant airborne precautions (i.e., infectious tuberculosis, measles, varicella and disseminated zoster), and staff should be trained to use this system routinely.
  - Consider placing a sign on doors outside your building(s) asking individuals with measles to call you with this information before entering the building.

#### **For Health Care Workers (HCWs)**

- Determine the immunization status of all your staff, including housekeeping, support staff, nursing, physicians etc. who may be exposed to a suspect case of measles. All HCWs, regardless of year of birth, should be immune to measles to prevent acquisition and transmission of the infection to others. Only the following are accepted as proof of measles immunity:
  - 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); OR
  - Laboratory evidence of immunity.
- Ensure that all applicable staff are fit-tested for a respirator appropriate for airborne precautions.

#### **Identification of Contacts/Exposures**

A measles contact is any [susceptible person](#) who has shared the same air space for any length of time during the patient's period of communicability, for 2 hours after the case left the air space.