

MEASLES

Case definition

CONFIRMED CASE

Laboratory confirmation of infection in the absence of recent immunization with measles-containing vaccine:

- isolation of measles virus from an appropriate clinical specimen
OR
- detection of measles virus RNA
OR
- seroconversion or a significant [e.g., fourfold or greater] rise in measles IgG titre, by any standard serologic assay, between acute and convalescent sera
OR
- positive serologic test for measles 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
- clinical illness* in a person with an epidemiologic link to a laboratory-confirmed case

PROBABLE CASE

Clinical illness*

- in the absence of appropriate laboratory tests
OR
- in the absence of an epidemiologic link to a laboratory-confirmed case
OR
- in a person who has recently travelled to an area of known measles activity

*Clinical illness is characterized by all of the following features:

- fever of 38.3°C or greater
- cough, coryza or conjunctivitis
- generalized maculopapular rash for at least 3 days

Causative agent

Measles virus

Source

Humans

Incubation

About 10 days, but may be 7-18 days from exposure to onset of fever (rarely as long as 19-21 days). Average time from exposure to onset of rash is 14 days.

Note: The incubation period may be extended in an exposed individual if Immune globulin (IG) is given for passive protection early in the incubation period.

Transmission

Airborne by aerosol or droplet spread; direct or indirect contact with nasal or throat excretions of infectious person.

Communicability

From 1 day before the onset of prodromal symptoms (or 3 to 5 days before the onset of rash) to 4 days after the appearance of the rash. Minimal after 2nd day of rash.

Symptoms

Prodromal fever, conjunctivitis, coryza, cough, Koplik spots; then red maculopapular confluent rash on 3rd to 7th day beginning on face and becoming generalized.

Diagnostic testing

- Conjunctival swab; throat washing; nasopharyngeal swab; urine for polymerase chain reaction (PCR)
- Measles serology if ACUTE DISEASE SUSPECTED: blood, clotted or serum for IgM enzyme immunoassay (EIA)

Note:

- A blood specimen should be collected between 3 and 7 days after onset of rash. [Specimens collected prior to this may be falsely negative and will require a follow up convalescent specimen.]
- If case is suspected to be infectious, inform blood collection services that he/she is being sent for testing.
- Measles serology for IMMUNE STATUS: blood, clotted or serum for IgG EIA.

In cases with a high probability of being measles, nasopharyngeal/throat swab or urine testing may be requested as these specimens are required for molecular confirmation and genetic surveillance.

- Nasopharyngeal swab or throat swab (in viral transport media) or aspirate (tubing should be flushed with viral transport media in a sterile container), within 4 days after onset of rash and/or 50 ml urine (in sterile container) within 7 days after onset of rash. Specimens transported to the lab should be maintained at 4°C.

Treatment

None

Prevention

In Nova Scotia the following groups are eligible to receive MMR vaccine as part of the publically funded immunization program.

1. Infants and Children:

- Two doses of a measles-containing vaccine are recommended for children with the first dose provided at one year of age, and the second dose at either 18 months or 4-6 years of age.
- During outbreaks or for travel to regions where measles is a concern, travel.gc.ca/travelling/health-safety/travel-health-notice/measles, the vaccine may be given as early as six months of age. Under these circumstances, the *routine* two dose series must be then restarted on or after the first birthday, for a total of three doses.

2. Adolescents and Adults:

- Adults born in or after 1970 should receive two doses of measles-containing vaccine unless they have previous documentation of receiving two valid doses of measles-containing vaccine on or after 1 year of age, documented immunity [serology] from measles disease, or a contraindication to the vaccine.
- It is generally safe to assume that Canadian residents born before 1970, regardless of place of birth, have naturally acquired immunity against measles.
- However, international travelers born before 1970 should receive one dose of measles-containing vaccine if they do not have one of the following:
 - documented evidence of receiving measles-containing vaccine on or after their first birthday;
 - laboratory evidence of immunity (e.g., through blood testing); or
 - a history of laboratory confirmed measles disease.

- Unlike the at risk traveling infants who are 6–11 months of age, international travelers born before 1970 are **not** eligible to receive MMR vaccine as part of the publically funded program.

PUBLIC HEALTH MANAGEMENT & RESPONSE

Case management

This disease is a priority and must be dealt with immediately. Immediate reporting, investigation and vaccination of susceptible contacts can stop secondary cases.

Case follow up

- In discussion with the primary care provider, determine if the case meets the case definition. If the suspect case meets the case definition all appropriate control measures should be undertaken.
- Be sure to ask about potential exposures (i.e., ill friends or family members), immunization history (MMR, number of doses, dates received), travel history.
- Confirm or rule out disease. Arrange to have diagnostic testing performed (see diagnostic testing section). Ensure primary care provider orders a rash screen on the laboratory requisition.
- Arrange for a visit to the lab and notify the lab to take the case into a private room immediately upon arrival because the case may be infectious. Notify the lab that the results are required immediately.
- Determine contacts and initiate contact tracing.

Exclusion: Persons infected with measles

Individuals diagnosed with measles should be excluded from: child care settings, schools, post-secondary educational institutions, work places, healthcare and other group settings; and away from non-household contacts until the end of the fourth day after the appearance of the rash. This should apply whether the case had been previously vaccinated or not. Self-isolation will help to prevent transmission of the virus.

Education of case

- Educate the case about measles including the infectious period (from 1 day before the onset of symptoms [or 3 to 5 days before the onset of rash] to 4 days after the appearance of the rash) and the need for isolation from susceptible contacts and public places during the period of communicability.
- If the case is a health care worker, advise him/her to contact Occupational Health or Infection Control at their place of employment immediately.

Contact tracing

The single most important factor in preventing measles outbreaks is rapid separation of susceptible contacts and infected persons. Immediate reporting, investigation and vaccination of susceptible contacts can stop secondary cases.

Definition of close contact

Contacts are individuals who have spent any length of time in a room or enclosed space while the infectious measles case was present or for up to 2 hours after the case left the room/space.

Susceptibility

Within 24 hours of reporting a confirmed or probable case of measles, all possible efforts should be made to identify contacts and classify them as susceptible*, high risk**, or non-susceptible. The immunization status of community contacts of cases should be ascertained to determine susceptibility to measles.

As per N.S. policy: any contact \geq 6 months of age or born in 1970 or later is considered *susceptible to measles if they meet one or more of the following criteria:

- lack of documented evidence of two valid doses of measles-containing vaccine
- lack of laboratory evidence of prior measles infection; and
- lack of laboratory evidence of immunity

**The following susceptible contacts are at high risk of measles complications:

- Pregnant women who have never had measles disease or MMR vaccine
- Infants
- Immunocompromised children, adolescents and adults

Initiate contact tracing

When contact tracing, ask the case about:

- Travel
- Group functions/social events
- Visitors from out of province/country
- Knowledge of other suspect cases [persons with symptoms]
- Household contacts
- Medical facilities visited

- Work
- School/day care
- Apartment complex where case lives
- Transportation, public conveyances
- Immunization history
- Occupation

Prophylaxis

MMR Vaccine

MMR vaccine should be preferentially used for post-exposure prophylaxis in those ≥ 6 months of age if there are no contraindications to receipt and if vaccine can be given within 72 hours of the exposure.

Immunoglobulin (Ig)

Ig should be considered within 6 days of exposure for susceptible contacts of measles, particularly immunocompromised people, infants less than 6 months of age and pregnant women, for whom measles-containing vaccine is contraindicated.

The recommended dose of GamaSTAN® S/D [Ig] for healthy individuals exposed to measles is 0.25 mL/kg body weight. The dose for exposed individuals who have underlying malignant disease or who are otherwise immunologically deficient is 0.5 mL/kg body weight. A maximum dose of 15 mL should not be exceeded. GamaSTAN® S/D should only be given by the intramuscular route. For complete prescribing information, consult the product leaflet or information contained within the authorized product monograph available through Health Canada's Drug Product Database at: webprod5.hc-sc.gc.ca/dpd-bdpp/index-eng.jsp.

Please see table 1 for further details regarding immunoprophylaxis

TABLE 1: IMMUNOPROPHYLAXIS OF SUSCEPTIBLE CONTACTS

Offer the following to prevent or modify measles in susceptible contacts:

Time Since First Exposure to Case	6-11 months of age ¹	≥12 months of age and MMR is safely indicated ⁴		≥6 months of age with a contraindication to MMR vaccine
		Persons who have never received live measles-containing vaccine	Persons who are known or likely to have received one dose of live measles vaccine ≥ 4 weeks earlier	
≤ 3 days	MMR ²	1st dose MMR vaccine	2nd dose MMR vaccine	Ig
4–6 days (inclusive)	Ig ³	Ig ³	2nd dose MMR vaccine	Ig
≥ 7 days	0	Offer 1st or 2nd dose of MMR vaccine for protection against future exposures		0

1 Infants under 6 months of age are usually considered immune due to antibodies transferred in utero from the mother. If, however, the mother contracts measles or is known to be non-immune, the infant should get Ig.

2 MMR vaccine may also be recommended for children between 6 months and 12 months of age for post-exposure management if it is given within 72 hours of exposure; however, two additional doses of measles-containing vaccine must be administered after the child is 12 months old (and at least 28 days from the previous dose) to ensure long lasting immunity to measles.

3 Ig should be considered for susceptible immunocompetent contacts of measles who are 6 months of age and older and who present more than 72 hours after exposure (when MMR vaccine no longer provides post-exposure protection) but less than 6 days after exposure (when Ig may still provide post-exposure protection).

4 Susceptible, immunocompetent individuals 12 months of age and older who are exposed to measles may be protected from measles disease if MMR vaccine is given within 72 hours of the exposure.

Exposed individuals who are age eligible to receive 2 doses of MMR vaccine and who have not received their 2nd dose would typically be offered the 2nd dose immediately post exposure, as the likelihood of immunity after 1st dose is high (≥90%)

Immunization of contacts

In contacts that are given a dose of Ig for prevention of measles, measles-containing vaccine should be provided if the contact does not develop clinical measles and the vaccine is not contraindicated. Measles-containing vaccine can be given once the measles antibodies administered from the Ig have degraded (Please see the Canadian Immunization Guide to determine guidelines for the interval between administration of IG and MMR).

Exclusion: Contacts who refuse vaccination and IG

Susceptible contacts that refuse or cannot receive MMR vaccine or immune globulin may be excluded from child care settings, schools, and post-secondary educational institutions at the discretion of the Medical Officer of Health; and may be required to self-isolate from work places, or other group settings, including travel. If exclusions occur, the period of exclusion should extend from 5 days after the first exposure and up to 21 days after the last exposure, or until the individual:

- is adequately immunized (having had documentation of at least one recent dose of a measles-containing vaccine), or
- demonstrates serological confirmation of immunity or
- has received immunoglobulin (Ig), if eligible

Consideration should be given to: the number of susceptible individuals in that setting; the presence of high risk individuals, susceptible infants, or immunocompromised individuals; and the reliability of the incubating individual to comply with early recognition and self-isolation.

Absent school/childcare attendees should be reached in order to determine if they are cases.

PH will inform school/childcare setting when it is permissible for the contact to return.

Educating contacts

Educate contacts about the signs and symptoms of measles, how it is transmitted, and what to do if they develop symptoms (isolate themselves, notify PH and their health care provider).

Advise them to call ahead before going to any health care facility, including laboratories, to inform the staff of measles symptoms so that they can be isolated on arrival to avoid exposing any susceptible persons.

Students at school who are suspect measles cases should be sent home but not on public transportation or the school bus.

Ask the contact to keep a diary of activities for the timeframe after exposure until they are cleared by PH.

Following up contacts

Follow up with contacts within 1 week to confirm that they received appropriate vaccination and to determine if they have or have not become cases.

Follow up in a Health Care Facility

Refer to the Guidelines for the Prevention and Control of Measles Outbreaks in Canada

Surveillance forms

Surveillance Case Report Form

Measles/Mumps/Rubella Case Report Form

novascotia.ca/dhw/populationhealth/surveillanceguidelines/Surveillance_Forms.pdf

General Information Sheet

Sample letter

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