2025

Measles: Information for Healthcare Providers
&
Case and Contact Management of Measles

Revised July 29, 2025

Revisions

Please use the most updated version of this document that can be found at the link:
Measles: Information for Healthcare Providers

Date	Revisions
March 7 2025	Page 16: Revision to advise anyone traveling outside Newfoundland and Labrador should ensure their measles immunization are up to date. Children between 12 and 18 months can receive their 2nd dose of MMRV earlier if there is a minimum 4-week interval between MMRV doses.
May 1, 2025	Revised title to reflect case and contact management in this document. Page 8: Revision to Diagnosis of Measles to reflect PHML capacity for Measles PCR and removed recommendation for Measles IgM for all suspect cases. Page 10: Removed table of routine immunizations and added link to schedule instead. Page 11: Added Table 3: Summary of Recommendations for Measles Immunization Page 15: Added WHO Global Health Observatory link to replace CDC Global Measles link. Section: Measles Post-Exposure Prophylaxis updated to align with NACI guidelines published February 13, 2025.
May 12, 2025	Page 6: Added link to PHML updated 2025 memo on testing for measles. Page 7: Added more information on treatment.
July 29, 2025	Page 1: Updated Incubation and Communicable period with new 2025 PHAC Guidelines for Public Health Management of measles cases Page 2: Case definitions now moved to section: Public Health Case Management including classification of vaccine-derived measles as AEFI. Page 2: Added Atypical or modified measles clinical presentation. Page 5: Updated Diagnosis section Page 17: Added section: Case Management. Updated 2025 national case definition for measles. Page 21: Added roles and responsibilities to section: Contact Management Page 33: Added resources to IVIG section

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REPORTING REQUIREMENTS

The Public Health Protection and Promotion Act requires any cases of measles to be reported to Communicable Disease Control by telephone as soon as measles is SUSPECTED. Following reporting via telephone, a written report is required within 24 hours.

To report to Communicable Disease Control, please see the contact information in the Notifiable-Disease-List-and-Notification-Form.pdf

MEASLES TRANSMISSION CHARACTERISTICS

Pathogen: Measles is a highly infectious disease caused by the measles (rubeola) virus, a member of the *Paramyxoviridae* family.

Modes of transmission:

Airborne precautions are required for suspect or confirmed measles cases.

- airborne by aerosol and droplet spread such as when infected person breathes, coughs, sneezes or talks. Measles can persist **in air or on surfaces for up to 2 hours after an infected person has left the space.**
- direct contact with nasal or throat secretions of infected persons
- direct contact with contaminated surfaces or articles through transfer of infectious particles from the object to mucous membranes via unclean hands. Duration of infectious measles viability on surfaces is unknown at this time[1].

Incubation Period (defined as period from infection to symptom onset) = 7 to 21 days

- Average time from exposure to first symptom = 10 days (Ranging from 7 to 18 days)
- Average time from exposure to rash onset = 14 days to 21 days[1]

Communicable Period (defined as the time when an infectious agent can be transmitted directly or indirectly from an infected person to another susceptible person):

- With rash: 4 days before rash onset to 4 days after rash onset (first day of rash is day zero)
- Without rash: 10 days after first symptom onset.
- Individuals who are immunocompromised may have prolonged excretion of measles in respiratory tract secretions and may remain contagious for the entire duration of their illness[1]

CLINICAL PRESENTATION

Prodromal symptoms of measles include:

- fever
- malaise
- cough
- coryza (runny nose)
- conjunctivitis

Koplik spots (white spots on the buccal mucosa) are a pathognomonic enanthema for measles and may appear 2 to 3 days after symptoms begin.

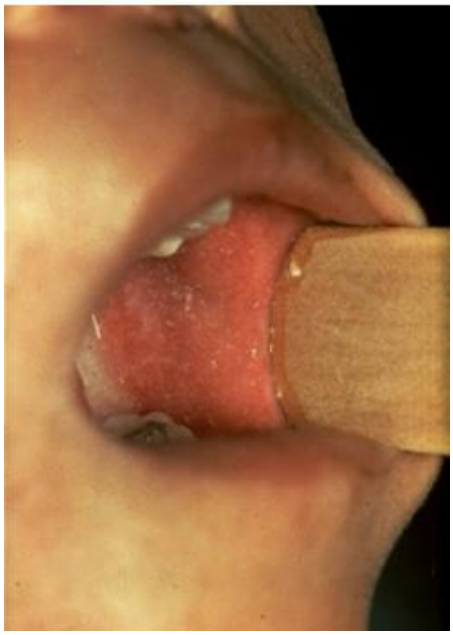

Image 1: White Koplik spots found classically in the buccal mucosa of the inner mouth.
Courtesy of the U.S. Centers for Disease Control and Prevention

Measles Rash:

- Begins on the face, advancing to the trunk of the body and then to the arms and legs
- Appears macular or maculopapular (fine, flat or slightly raised) and becomes confluent as it progresses, giving it a red, blotchy appearance at its peak. In mild cases, the rash tends not to be confluent. However, in severe cases, the rash is more confluent, and the skin may be completely covered.
- Lasts 4 to 7 days.
- A slight desquamation or peeling of the skin occurs as the rash clears[2].

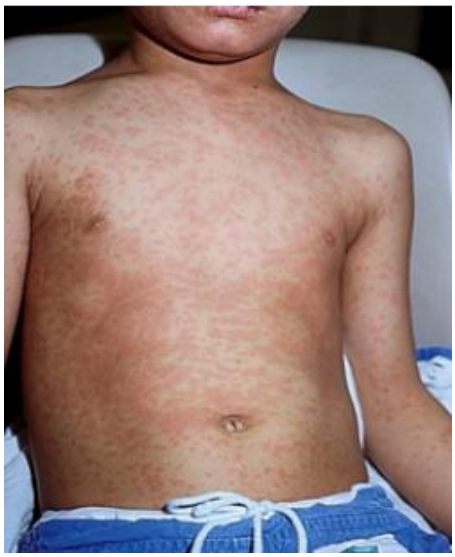

Image 2: Measles rash: a generalized maculopapular rash on the chest and abdomen of a child (Courtesy of Dr. CW Leung, Department of Paediatrics and Adolescent Medicine, Princess Margaret Hospital, Hong Kong)

Atypical or modified measles:

- Seen in breakthrough cases in person who have been fully immunized with measles-containing vaccine, which presents with milder illness with less fever, cough, coryza or conjunctivities

  OR

- Cases in people who are immunocompromised who often have more severe illness and may present without rash or with atypical rash[1]

Risk factors

All persons who have not had a previous measles infection or who are unvaccinated or under-vaccinated for measles are at risk. However, some protection can be provided to young babies because of antibody transfer during pregnancy. In Canada, adults born before 1970 are generally presumed to have acquired immunity due to infection with measles when they were younger. This is due to the high level of measles circulation before 1970. However, measles vaccination is still recommended for certain groups even if born before 1970.

Risk factors for exposure include:

- health care providers
- members of the military
- people planning travel to measles endemic regions or regions experiencing measles outbreaks.
- those who attend post-secondary educational settings.

Risk factors for complications:

- people who are pregnant
- those less than 5 years of age
- people who are immunocompromised

Complications

Common complications from measles can include:

- otitis media (1 of every 10 cases)
- bronchopneumonia (1 of every 10 cases)
- diarrhea (less than 1 of every 10 cases)

Severe complications of measles can include:

- respiratory failure
- encephalitis that may result in permanent neurologic sequelae.
    - occurs in approximately 1 of every 1,000 reported cases.
- Death mainly due to a respiratory or neurologic complication
    - estimated to occur in 1 to 10 of every 10,000 cases of measles.

Long-term sequelae of measles can include:

- blindness
- deafness
- permanent neurological sequelae
- subacute sclerosing panencephalitis (SSPE)

SSPE is a rare and fatal degenerative central nervous system disease. It is characterized by:

- behavioral and intellectual deterioration
- seizures
- these changes occur 7 to 10 years after infection with the measles virus.
- occurs at a rate of 4 to 11 in every 100,000 measles cases, with the highest rates in children infected before 5 years of age[1].

Measles during pregnancy results in a higher risk of:

- low birth weight
- premature labour
- spontaneous abortion[2]
- maternal complications such as pneumonia, hepatitis, and death[1].

DIAGNOSIS OF MEASLES

- The diagnosis of measles and evaluation of measles test results should consider an individual's clinical context and epidemiological data.

- All suspect cases of measles should be reported to the MOH on-call. A single negative measles RT-PCR may not rule out measles infection depending on the case's clinical and epidemiological factors.

Health care providers should suspect measles in a patient presenting with a:
- febrile illness and rash
- history suggesting that they are not immune to measles, and:
  - have travelled to a measles endemic region or area with measles outbreaks; OR
  - are known to have had an epidemiologic link to a suspect or confirmed measles case or outbreak.

A positive Measles RT-PCR detection by itself or positive Measles IgM in a patient with clinical signs or symptoms of measles or history of travel to area with known measles activity or with an epidemiological link to a confirmed case is diagnostic of measles.

Measles RT-PCR

Viral detection by RT-PCR is the preferred method of diagnosing measles and should be collected as soon as possible.

Nasopharyngeal/throat swabs are preferred over urine for measles RT-PCR

Specimens accepted for measles RT-PCR:
- Nasopharyngeal/throat and urine RT-PCR should be collected **as soon as possible and within 7 days of rash onset for maximum sensitivity.**
  - Nasopharyngeal/throat swab for measles RT-PCR is most sensitve if done within 3 days of rash onset.
  - Urine and nasopharyngeal/throat measles RT-PCR can detect the measles virus up to 14 days after rash onset, but with rapidly decreasing sensitivity.

- Collecting both nasopharyngeal/throat AND urine for measles RT-PCR will increase the likelihood of detecting the virus.

Viral detection is also used for genotyping to differentiate between wild-type measles or a vaccine reaction. Please see the Provincial Public Health Laboratory memo: Guidance for measles laboratory testing PHML 2025

Potential Causes of False Positive Measles RT-PCR

- Individuals with history of recent measles vaccination may have a positive measles RT-PCR results
- Genotyping at the National Microbiology Lab is required to distinguish between wild-type measles infection and a measles vaccine reaction.

Potential Causes of False Negative Measles RT-PCR

The sensitivity of RT-PCR is about 95% with detection threshold of 20 copies of measles virus RNA. Sensitivity is affected by the following factors:

- Timing of specimen collection in relation to illness onset
    - Window for detection may be shorter in cases with measles vaccination history
- Specimen type and quality
- Time for transportation of specimen to lab. Specimens should be delivered to lab within 48 hours of sample collection unless kept frozen at -70˚C or below. Avoid unnecessary freezing/thawing of specimens[1].

Measles Serology

- During periods of community transmission such as during an outbreak, measles RT-PCR specimens is recommended for diagnostic testing

- Consultation with the Medical Officer of Health on-call is recommended before ordering measles serology for suspect measles cases to determine the utility of the result.

- If an individual's immunization record is unavailable, immunization with a measles-containing vaccine is preferred rather than ordering serology to determine immune status to avoid the potential for false positive results and reduce the risk of missed opportunities for immunization.

- If serology is done for diagnostic purposes, **measles serology should be collected as soon as possible when the patient is seen and within 28 days of rash onset.**

- **If the first measles serology is negative, a second convalescent sample should be done 10 to 21 days after the first serology.**

- **Serological testing is not recommended to check:**
    - Susceptibility before measles vaccination
    - Response after receiving measles vaccination.

Measles IgM

- Measles IgM is most sensitive between 4 to 28 days from rash onset.
- A positive measles IgM indicates a primary or acute measles infection when accompanied with clinical signs consistent with measles and a history suggesting exposure to measles
- **A positive measles IgM results should be confirmed by measles RT-PCR. RT-PCR is the preferred diagnostic test for acute measles infection.**
- A single negative measles IgM may not be sufficient to rule out measles. Repeat convalescent serology is needed.

False negative measles IgM can occur:

- When the sample is taken less than 4 days or after 28 days from rash onset.
- In previously vaccinated individuals because they may not have detectable Measles IgM.

False positive measles IgM can occur in patients with:

- Recent measles-containing vaccination (up to 56 days before the test).
    - Serology cannot distinguish between immune response to vaccine or wild-type measles.
- Rheumatoid factor
- Other acute infections
- High titres of measles IgG

Measles IgG

- A positive measles IgG indicates a history of measles immunity from previous infection or through measles vaccination
- The precise protective level of measles IgG is not known but is estimated to be between 120 and 200 mIU.
- If done, it should be collected within 7 days from rash onset and repeated 10 to 21 days after the first sample.
- A conversion of measles IgG from negative to positive or a 4-fold rise in IgG titre between acute and convalescent sera (i.e. serology done 10 to 21 days after the first serology) indicates measles infection.

False negative measles IgG can occur:

- In patients who are previously vaccinated against measles who have breakthrough measles infection. These individuals may have a rapid rise in measles IgG in their acute serum and therefore, the 4-fold increase between acute and convalescent measles IgG may not occur.

Diagnosing Sub-Acute Sclerosing Panencephalitis (SSPE)

Recommended Tests for Diagnosis of SSPE:

- Total IgG and total albumin (mg/L) in serum and CSF
  AND
- Both Measles specific IgG in CSF and serum

- **Both CSF and blood (serum or plasma) specimens must be submitted**
- Detection of measles through RT-PCR of central nervous system tissue such as a brain biopsy has been reported
  - In SSPE, the measles virus cannot be detected by RT-PCR of the CSF

Diagnosing Measles in Individuals with Presumed Immunity

The best method of diagnosing breakthrough measles infections (i.e., infections that occur in people who have a history of previous measles infection or vaccination) is by measles RT-PCR.

Important considerations for diagnosing breakthrough measles infection:

- Negative measles IgM and/or RT-PCR does not on its own exclude measles infection and results should be evaluated based on the clinical and epidemiological context.
- The time from infection to detection by measles RT-PCR may be shorter.
- Urine and throat/nasopharyngeal swab for measles RT-PCR should be collected as soon as possible.
- Breakthrough measles cases may not have detectable measles IgM
- Measles IgG may rapidly rise and be elevated on the first acute serum specimen, making it difficult to detect a 4-fold rise in IgG titre.
- Measles IgG titres as measured by plaque reduction neutralization test (PRNT) at NML of ≥40 000 milli-international units or measles IgG with high avidity has been shown to be characteristic of breakthrough infection. These tests are only done at NML by special request because they require lengthy turnaround times and are only used for retrospective outbreak analysis.

TREATMENT

There is no specific antiviral treatment for measles infection. Medical management is supportive and aimed at symptom relief and management of complications. This can include rehydration and management of secondary complications of measles, such as bacterial pneumonia.

As vitamin A deficiency is linked to delayed recovery and greater complications with measles, and because measles may precipitate a vitamin A deficiency, health care providers may consider giving vitamin A as an adjunct to supportive therapy for people with measles[3,4]. Dosing information can be found in the WHO 2017 position paper.

Vitamin A to support the treatment of measles should only be used under the supervision of a healthcare provider.

Vitamin A supplements are NOT recommended as a method of preventing measles because it does NOT prevent against measles infection, and prolonged or large doses of Vitamin A can negatively impact the liver, bone, brain and skin. Vitamin A supplements in the wrong doses can also cause birth defects when taken during pregnancy[5].

Resources:

- Measles vaccines: April 2017 position paper (World Health Organization)
- Measles: For health professionals - Canada.ca (Public Health Agency of Canada)

Patient Counselling

Counsel people infected with measles to:

- Practice good hand hygiene
- Avoid sharing drinking glasses or utensils.
- Cover coughs and sneezes with tissue or forearm
- Follow public health advisories regarding exclusion policies.
    - Stay home.
    - Self-isolate from childcare facilities, schools, post-secondary educational institutions, workplaces, healthcare, and other group settings and away from non-household contacts for 4 days after appearance of rash
    - These exclusion policies apply whether the individual is vaccinated or not.

MEASLES PREVENTION THROUGH VACCINATION

The live attenuated measles vaccine came into limited use in 1964 and public health programs adopted it in each province over the next 4 to 5 years[6]. Due to the high number of cases in Canada before 1970, people born before 1970 are presumed to be immune.

Table 1. History of Measles-containing vaccines in Newfoundland and Labrador (NL)

Measles, plain (Lirugen)	Given to all 9-month-old infants from February 1966 to September 1970. Given to all one-year-old children from September 1970 to October 1972.
Measles and Rubella (MR)	This vaccine replaced plain measles-containing vaccine. It was given from October 1972 to December 1974 for all one-year-old children. May have been given before the first birthday.
Measles, Mumps and Rubella (MMR)	This vaccine replaced MR. Program began in December 1974 and MMR may have been given to children less than one year of age, although the recommended age is one year. In 1996 a 2nd dose was added at 18 months. People born 1983 and after should have received 2 doses of MMR because of a school catch-up that started in 1999. The MMR vaccine was no longer used for childhood programs when MMRV started in 2012.
Measles, Mumps, Rubella and Varicella (MMRV)	Starting January 2012 MMRV replaced MMR and Var at the 12-month clinic visit. On July 1, 2014, MMRV replaced MMR at 18-month clinic visit. Children born 2013 and after receiving MMRV at 12 and 18 mos.

For the routine childhood immunization schedule in NL, please see: [Immunization-Schedule.pdf]

Table 2. Summary of recommendations for measles immunization

Routine immunization	• **People born in or after 1970** should receive 2 doses of MMR ○ **Children** are offered a 2-dose series of MMRV, given at 12 and 18 months of age. Children who missed these doses can be caught-up[a] • **Adults born before 1970** who are not travelers, healthcare workers, military personnel, or students in post-secondary settings are generally considered to have natural immunity to measles, though some may still be susceptible • **For people born in the United States, individuals born before 1957 are considered immune.**
Travelers[a] to destinations outside of NL or out-of-country	• People **born in or after 1970**, should have documentation of 2 doses of MMR prior to travel[b] • People **born before 1970**, should receive 1 dose of MMR prior to travel[b] • **Infants 6 to 12 months old** are eligible for one dose of MMR vaccine prior to traveling.[b,c] • **Children 12 months or older** should have two doses of MMRV vaccine prior to traveling.[b,c,d]
Health care workers	**Regardless of year of birth**, healthcare workers should have documentation of vaccination with 2 doses of MMR
Military personnel	**Regardless of year of birth**, military personnel should have documentation of vaccination with 2 doses of MMR
Students in post-secondary educational settings	• **Students born in or after 1970** should have documentation of 2 doses of MMR • **Students born before 1970** should have documentation of 1 dose of MMR

Note:

- Please refer to the NL immunization manual, Canadian Immunization Guide, and vaccine product monographs for detailed information
- Measles-containing vaccines are recommended unless there is a history of laboratory confirmed infection or laboratory evidence of immunity
- Routine testing for measles immunity prior to providing MMR is not recommended

a. MMRV may be used in healthy children aged 12 months to 13 years old.
b. Measles vaccination for travel should ideally be administered at least two weeks before travel; there are still benefits if given less than two weeks prior
c. Infants will still follow the routine schedule and receive MMRV at 12 and 18 months
d. Children younger than 18 months can receive a second dose of MMRV if they are traveling and it has been four weeks since their first dose

Recommendations for Immunization with MMR for Adults

All healthcare workers or military personnel should receive 2 doses of MMR or have lab-confirmed immunity to measles regardless of birth year.

Students in post-secondary educational settings:

- People born in or after 1970 should have documentation of 2 doses of measles vaccines or lab-confirmed immunity to measles.
- People born before 1970 should have documentation of 1 dose of measles vaccines or lab-confirmed immunity to measles.

Adults that are NOT healthcare workers, military personnel, travelers, or students in post-secondary educational settings:

- Adults 18 years or older **born in or after 1970** should have 2 doses of measles-containing vaccines or have lab-confirmed immunity to measles
- Adults 18 years or older born **before 1970 are considered immune** and do not need vaccination with a measles-containing vaccine. For people born in the United States, individuals born before 1957 are considered immune.

For individuals who are traveling, please see section: MEASLES VACCINATION FOR TRAVELERS

Measles, Mumps and Rubella (MMR) Administration

- Search product monograph on Drug Product Database online query (canada.ca) for vaccine description.
- See Canadian Immunization Guide Content of Immunizing Agents Available for Use in Canada for latex and product content information.

Administration

Dose: 0.5 ml

Route: Subcutaneously

Site: Subcutaneous tissue in the upper arm
Note: This must be a different anatomical site (at least 2.5 cm or 1 inch away) than other vaccines.

Interval: Doses of MMR should be administered at least 4 weeks apart[7].

Concurrent administration with other vaccines:

- MMR can be administered concurrently with or at any time before or after other non-live vaccines, live oral vaccines or live intranasal influenza vaccine.
- MMR vaccine can be administered concurrently with other live intramuscular or subcutaneous vaccines but if not given at the same time, a minimum interval of 4 weeks is recommended between MMR and other live intramuscular or subcutaneous vaccines[7].

Not Contraindications

- Minor illness with or without a fever
- Coagulation disorder (use appropriate gauge needle)
- Contact with a case of active tuberculosis.
- History of an allergy to eggs, chicken, feathers, or egg products
- Breastfeeding
- Recently been exposed to measles.
- Uncertain immunization history of previous MMR vaccine
- History of febrile seizures or family history of seizures[7].

Contraindications and Precautions

- Allergy to a previous dose of MMR or any component of MMR except for an egg allergy (consult MOH, controlled setting may be indicated)
- Pregnancy
- Persons who are immunocompromised including primary or secondary immunodeficiency disorders.
- Measles-containing vaccines is contraindicated in individuals with active untreated tuberculosis (TB) as a precautionary measure because TB can be exacerbated by natural measles infection. Although there is no evidence measles-containing vaccines have such an effect, anti-tuberculosis therapy for active TB disease is recommended before administering measles-containing vaccines.

Tuberculin skin testing (TST) or Interferon Gamma Release Assay (IGRA)

- Measles-containing vaccines can suppress tuberculin reactivity and cause false-negative results. If TST or IGRA is required, it should be done on the same day as immunization or delayed at least 4 weeks after measles vaccination.
- After a TST or IGRA has been performed and read, measles vaccination can occur at any time unless contraindicated[7].

Drug Interactions

- Systemic antiviral therapy such as acyclovir, valacyclovir, and famciclovir should be discontinued, if possible, at least 24 hours before MMR vaccination and should not be restarted until 14 days after vaccine administration.
- Passive immunization with human immunoglobulin or receipt of most other blood products can interfere with immune response to MMR, MMRV and univalent varicella vaccines. These vaccines should be given at least 14 days before administration of an immunoglobulin preparation or blood product or delayed until antibodies in immunoglobulin preparation or blood product have degraded. See: Blood Products, Human Immunoglobulin and Timing of Immunization in Part 1 for additional information[7].

Screening Guidelines:

See Section 1.5 of Newfoundland and Labrador Immunization Manual for additional screening information

See Appendix A: MMR Vaccination Screening Questions

Measles, Mumps and Rubella & Varicella (MMRV) Administration

Policy

The Newfoundland and Labrador provincial immunization schedule provides two doses of MMRV for children born on or after January 1st, 2013, given at age 12 and 18 months. The first dose of MMRV must be given on or after the first birthday.

Description of Vaccine

The combined measles, mumps, rubella, and varicella vaccine is a live attenuated lyophilized preparation. MMRV is not licensed for use for individuals 13 years of age and over is only available for routine childhood immunization through public health.

Section-3-Routine-Immunization-Products-Sept-15.pdf (gov.nl.ca)

MEASLES VACCINATION FOR TRAVELERS

- **It is highly recommended those traveling outside Newfoundland and Labrador ensure they are fully vaccinated against measles.**
- **Protection from measles vaccination is optimal if given at least 2 weeks before departure but there are still benefits if given less than 2 weeks before traveling.**
- There has been a significant increase in measles cases globally since 2023.
- This global surge in cases combined with declined measles vaccination rates in Canada has led to an increase in imported measles cases along with community transmission in some provinces.
- It is recommended to speak to a healthcare provider at least 6 weeks prior to traveling to provide time to implement additional travel advice and vaccinations as needed.

Criteria for measles immunity in those traveling outside Newfoundland and Labrador:

1. Infants 6-12 months old should receive 1 dose of MMR and will also need MMRV at 12 and 18 months of age as per the routine immunization schedule to achieve long-term immunity.
2. Children who are between the ages of 12-18 months who have not received their 2nd dose of MMRV can receive their second dose before 18 months provided there is a minimum interval of 4 weeks between each dose.
3. People born in or after 1970 should have documentation of 2 doses of measles-containing vaccine.
4. People born before 1970 should have documentation of 1 dose of measles-containing vaccine[7].
   Note: Checking measles immunity before providing MMR to travelers is not recommended.

For more information:

- Government of Canada Global Measles Notice
- **World Health Organization Global Health Observatory:** Measles - number of reported cases
- **For reports of measles cases in Europe:** European Centre for Disease Prevention and Control - Monthly measles and rubella monitoring reports
- **Measles epidemiology in the United Kingdom:** Measles epidemiology 2023 and 2024 - GOV.UK (www.gov.uk)
- **Measles cases in the United States:** Measles Cases and Outbreaks | CDC

CASE MANAGEMENT

Health equity and psychosocial considerations

Measles may have greater impact on certain population groups based on duration or severity of illness, risk of exposure, or social drivers of health such as social, economic, health and other factors such as poverty, barriers to accessing healthcare, living in crowded or congregate residential settings.

When implementing measures, these factors and psychosocial implications of public health measures should be considered while minimizing the measles transmission. Public health messaging should be clear, concise, consistent, and consider the needs of populations with social, economic, cultural and other vulnerabilities as well as the confidentiality of individuals[1].

CASE FINDING AND CLASSIFICATION

- When measles case is detected, prompt case finding should take place to identify additional cases
- Cases and contacts are considered persons under investigation until they can be classified (see Table 3: National Case Definitions for Measles)
- Case investigation should not be delayed while laboratory results are pending.

Other definitions for the purposes of the public health investigation:

- **Primary case:** A case who is not immune to measles and has never been vaccinated

- **Breakthrough case:** A case who has a history of vaccination at least 14 days before symptom onset or previously serological evidence of immunity

- **Suspect case:** A person whom public health or a healthcare provider has suspicion is a measles case based on symptoms and/or exposure, but more information is needed to classify as a confirmed or probable case or to rule out measles.

Suspect or probable cases where measles has been ruled out by laboratory testing and/or have symptoms from a post-measles vaccine reaction should NOT be classified as a case and does not require further public health management[1].

CASE DEFINITIONS

Table 3. National Case Definitions for Measles[1,8]

CASE STATUS	CRITERIA
Laboratory-Confirmed Case	**Laboratory confirmation of infection in the absence of identification of measles vaccine strain based on genotyping or recent immunization history[a]** • isolation of measles virus from an appropriate clinical specimen or • detection of measles virus RNA by PCR from appropriate clinical specimen or • seroconversion or a 4-fold or greater rise in measles IgG titer by any standard serologic assay between acute and convalescent sera. or • positive serologic test for measles IgM antibody in a person with clinical illness[b] who is either epidemiologically linked to a laboratory-confirmed case or is epidemiologically linked to a geographic area or community with known measles activity
Clinically confirmed case	Clinical illness[b] (see **Clinical Presentation** section) in a person with an epidemiologic link to a laboratory-confirmed case
Probable Case	**Clinical illness[b]** in the absence of appropriate laboratory tests **and** in absence of epidemiologic link to a laboratory-confirmed case **and** one of the following: • in a person who is epidemiologically linked to a geographic area or community with known measles activity or • in a person with an epidemiologic link to a clinically confirmed case that is not laboratory-confirmed

Notes:

a. For individuals with suspect measles who have been immunized with a measles-containing vaccine in the last 5-42 days, measles virus genotyping is required to differentiate wild-type versus vaccine-associated measles. Genotyping requires measles PCR collection and genotyping at the National Microbiology Laboratory. **Vaccine-associated measles illness (genotype A) should be reported as an adverse event following immunization (AEFI).**

b. Clinical illness is characterized by all the following:
- Fever
- One or more of: cough, coryza or conjunctivitis
- Generalized maculopapular rash for at least 3 days[8]

Isolation of Cases

- Case management is the same for primary and breakthrough cases
- Suspect and probable cases should follow the same recommendations as confirmed cases, including isolation, while awaiting laboratory results.
- Cases should be actively monitored and compliance to isolation measures ensured through regular communication. The frequency and type of monitoring is at the discretion of NLHS CDC MOH or designate and depends on a risk assessment and available resources.

Isolation recommendations:

- Isolation approach may need to be modified depending on the location, living circumstance and need for support of the case. (e.g. housing instability, congregate living setting, limited resources)
- Decision on location of case isolation should be made in collaboration with the individual and their healthcare provider
- Local community organizations or other supports can be facilitated to support cases while they isolate if there are challenges accessing necessities such as when the case lives alone or entire household is in isolation with few supports available to get essential items.
- The financial, social and psychological impact of isolation can be considerable and may impact an individual's ability or willingness to practice recommended public health measures.
- Cases should not attend public settings such as childcare facilities, schools, post-secondary institutions, workplaces, healthcare settings except when seeking medical care, places of worship and other group settings.
- If the case leaves their isolation location to seek medical care, they should wear a mask and inform the healthcare facility about their suspect, probable, or confirmed measles diagnosis before the appointment so proper precautions can be in place to protect others.
- Generally, by the time a case of measles is identified, household members have had a high degree of exposure (see Public Health Contact Management). If any household members have not been in contact with the case, NLHS CDC should ensure they meet the criteria for measles immunity before entering the case's isolation location.
- Individuals who do not need to enter the isolation location of a measles case, should not enter the isolation location.
- Cases should be advised to practice the following public health measures:
    - Avoid contact with others including direct contact such as kissing and indirect contact such as using shared items.

- Open windows and doors or run heating, ventilation or air conditioning system fans to improve indoor ventilation[1].
- Cover coughs and sneezes with a tissue or elbow and throw any used tissues into plastic-lined waste container as soon as possible. Clean hands immediately afterwards.
- Practice proper hand hygiene by washing hands regularly with soap and water for at least 20 seconds or use a hand sanitizer with at least 60% alcohol.
- Clean and disinfect frequently touched surfaces and objects such as toys, phone, doorknobs, tables, and counters.
- Wear a mask in shared spaces that others may access if others are not present at the time. Cases should wear a well-fitting respirator, and if not available a well-fitting medical mask.
- If avoiding a shared space is not feasible, such as providing care to someone who cannot wear a mask, an individual should wear a well-fitting respiratory or medical mask.
    - People should not wear a mask if they are under 2 years of age, have trouble breathing while wearing the mask or unable to put on or remove the mask without assistance.
    - Household members should also wear a mask if they must be in a shared space with a case of measles or entering a space within 2 hours of when the case occupied the space.

*Masks can protect an individual from becoming infected and limit the spread of infectious respiratory particles to others. However, the level of protection wearing a mask prevents measles infection or spread to others is unknown.

Length of isolation:

- As soon as possible, even if symptoms are mild, until 4 days after rash onset with the first day of the rash being day zero.
- Cases without a rash should isolate for 10 days with day one being the first day of symptom onset
- People who are immunocompromised may be infectious for longer due to prolonged viral shedding and may need to isolate for the entirety of their illness duration. Consultation with treating physician is recommended because the type and level of immunosuppression may impact length of isolation.

Discontinue isolation when:

- Measles PCR from appropriate clinical specimen is negative.
- Length of isolation is completed

Repeat measles PCR for the purpose of discontinuing isolation is not recommended[1].

CONTACT MANAGEMENT

Healthcare providers working for NLHS should contact their occupational health department for direction if they have been exposed to a suspect, probable or confirmed case of measles.

NLHS CDC will assess the risk and determine prioritization of contacts for contact tracing and contact management in community settings including, but not limited to schools, childcare centres, shelters, or workplaces.

Infection Prevention and Control (IPAC) practitioners (or designate after hours) will assess the risk and determine prioritization of contacts for contact tracing and contact management in healthcare facilities including long-term care, personal care home, and community care homes (this may vary by health zone).

Prioritization of contacts is particularly important for exposure events with large numbers of contacts.

Once identified, contacts should be assessed for measles immunity and eligibility for post-exposure prophylaxis.

A contact is defined as an individual who has either:

- Spent any length of time in a shared space with a probable or confirmed measles case during the case's period of communicability
- Spent any length of time in an enclosed indoor space within **2 hours after** a probable or confirmed measles case left the space during that case's communicable period.

Contact Tracing Risk Assessment and Prioritization

Risk assessment factors

- Proximity and duration of exposure to infectious case
- Exposure in high-risk setting where there are many people at risk of complications from measles (e.g., daycare, school, healthcare facilities)
- Characteristics of exposure setting (e.g., ventilation quality, size, indoors versus outdoors)
- If contact wore a respirator during exposure
- Whether the contact meets criteria for expected measles immunity
- Number of days since exposure
- Whether the case was a primary or breakthrough measles infection

Consider prioritization of following people based on intensity of exposure

- Household members living with case
- People with face-to-face contact with case regardless of exposure duration
- People in enclosed space and within close proximity to case:
    - Healthcare facilities
    - Childcare, school, recreational settings
    - Congregate living settings
    - Workplace settings
    -

Contacts may be de-prioritized for contact tracing if the exposure is deemed lower risk such as when exposure occurred outdoors, for transient exposure, or the contact wore a respirator at during exposure[1].

Once the contact list is gathered and prioritized based on type of exposure, consider prioritizing contacts who do not meet criteria for expected measles immunity in the following groups in the order presented:

1. People at increased risk of complications from measles including:
    - Individuals who are immunocompromised
    - Infants and children under 5 years old
    - Pregnant individuals
2. Healthcare workers
3. People from communities that are known to be un- or under-immunized
4. Other healthy contacts

Contacts exposed to breakthrough case

Evidence suggests breakthrough cases of measles who have received at least one dose of measles-containing vaccine are less infectious than unimmunized measles cases. However, transmission is still possible.

Contact tracing and management for contacts of breakthrough cases should proceed as usual, but a breakthrough infection in the case should be considered as part of the contact's risk assessment and inform prioritization particularly when there are a large number of contacts[1].

Recommended Management of Contacts

Regardless of whether the contact meets criteria for expected measles immunity, ALL identified contacts should be provided with:

- Information on the signs and symptoms of measles and how it is transmitted
- Advice on self-monitoring for signs and symptoms of measles from 5 days after the first exposure to 21 days after the last exposure regardless of PEP administration.
    - When feasible, active monitoring of contacts may be considered to help identify symptoms early and to provide supports
- Advice to self-isolate immediately if signs and symptoms of measles appear and seek a healthcare provider for assessment

Contacts that do not meet criteria for expected measles immunity may be advised to:

- Avoid contact with others particularly those who do not meet the criteria for expected measles immunity or those at high-risk of complications from measles even if they are vaccinated
- Wear a well-fitting mask if in a shared indoor space with household member or going to public spaces for essential reasons such as seeking medical care or grocery shopping

Exclusion of Contacts from Public Settings

Exclusion of contacts that do not meet the criteria for expected measles immunity from public settings is at the discretion of the NLHS MOH or designate. Examples of Public settings include:

- Childcare facilities
- Schools or post-secondary educational institutions
- Workplaces
- Travel or gatherings

Exclusion period:

- 5 days after first exposure to up to 21 days from last exposure
  OR
- until 4 days after rash onset if the contact develops measles and therefore, becomes a case

Factors to consider when deciding whether to exclude a contact from public settings

- Administration of PEP to contact including timing and protocol used
- Resources available to NLHS CDC
- Number of people in setting that are expected to be immune to measles
- Presence of people at increased risk of complications from measles
- Intensity of exposure that contact experienced from case
- Contact's previous vaccination history
- Contact's ability to adhere to public health measures
- Reliability of contact to comply with early recognition of symptoms of measles and to start self-isolation

Identifying contacts through mass communication

In situations where a large group of people may have been exposed to an infectious measles case, contract tracing may not be feasible due to resource constraints. Through coordination between DHCS and NLHS Public Health divisions, mass communication may be conducted through various media such as news release, social media, radio or television announcements. The purpose of the mass communication is to educate the public on the signs and symptoms of measles and to inform individuals who may have been exposed to:

- Self-identify to a healthcare provider, 811 or their local NLHS Public Health unit that they may have been exposed to measles to expedite public health investigation to assess their risk, measles immunity, and eligibility for post-exposure prophylaxis.
- Complete a self-assessment to determine if they are immune (e.g., checking vaccination records).
- Notify the healthcare facility of their potential exposure before presenting to an in-person appointment so proper precautions can be taken at the healthcare site[1].

Contact tracing for measles cases communicable during air travel

Previous guidance for contact tracing for people exposed to an infectious measles case during air travel recommended requesting the flight manifest to directly notify passengers of their potential exposure. However, based on Canadian experience, the flight manifest may lack accurate contact information for all passengers. In addition, contacting each passenger takes considerable time and rarely results in notifications within the post-exposure prophylaxis timelines.

The Public Health Agency of Canada now recommends issuing a public advisory in all instances where the case was infectious during air travel and the flight was within the past 21 days. Flights that occurred over 21 days ago do not require an action because this is the maximum incubation period when secondary cases may occur[9].

The province or territory that leads the public health investigation is the province or territory where the measles case was diagnosed[9]. For more detail on the process at international ports of entry, please see the Quarantine Act, A list of communicable disease of concern is found in the Schedule of the Quarantine Act.

Table 4. Roles and responsibilities for DHCS Public Health, NLHS Public Health, Public Health Agency of Canada and Airline[9]
NLHS Public Health

• Assess available information and communicate information to DHCS Public Health
• Issue CNPHI alert
• In collaboration with DHCS Public Health, identify the next steps for contact tracing
• Develop and disseminate direct messaging to exposed passengers as needed, which should contain:
  ○ Instructions to monitor for symptoms of measles
  ○ Guidance to seek post-exposure prophylaxis, if applicable
• Coordinate administration of post-exposure prophylaxis to susceptible contacts as required
• Report confirmed or probable measles cases to DHCS Public Health

DHCS Public Health

• Issue public advisory, which should contain,
  ○ Flight details
  ○ Date of exposure
  ○ Additional community exposure
  ○ Instruction for monitoring for symptoms and seeking care
• Notify Public Health Agency of Canada for awareness and provide necessary information for interjurisdictional notifications
• Notify all airlines involved in the passenger's journey for Occupational Health & Safety follow-up
• If needed, request flight manifest from airline and share information with NLHS Public Health.
• Report confirmed cases to the Canadian Measles and Rubella Surveillance System

Public Health Agency of Canada
• Maintain contact info list for airlines and provide contact info to provinces and territories as needed • Maintain tools and templates for notifications • Issue interjurisdictional notifications to other countries to inform them of the exposure and/or cases in their jurisdiction
Airline
• Occupational health and Safety follow-up of flight crew • Provide flight manifest to appropriate provincial or territorial public health authority as soon as possible upon request
See the following templates in PHAC guideline: Process for contact management for measles cases communicable during air travel Appendix A: Email template to contact airline Appendix B: Template for public advisory Appendix C: Template for direct messaging to passengers

MEASLES POST-EXPOSURE PROPHYLAXIS (PEP)

Measles PEP Eligibility

Previous measles infection, birth year, vaccination history and immune function of individuals should be considered when determining measles PEP eligibility.

People considered immune to measles:

- Previous measles infection
- People who have completed measles immunization (see Table 3. Summary of recommendations for measles immunization in Newfoundland and Labrador)
    - **Note:** Immunocompetent individuals with 2 doses of measles-containing vaccine after 12 months of age given at least 4 weeks apart are expected to have long-term protection against measles. However, breakthrough infections uncommonly occur and are milder and considered less contagious.
- Adults born before 1970 who are not travelers, healthcare workers, military personnel, or students in post-secondary settings, **except for people born in the United States where people born before 1957 are considered immune to measles[10].**
    - **Note:** Healthcare workers and military personnel require 2 measles-containing vaccines to be considered immune to measles through vaccination **regardless of birth year**.

Measles serology can be used in certain circumstances and under the discretion of a Medical Officer of Health to determine if an individual should get measles PEP[10].

PEP for Populations at Higher Risk of Severe Measles

Infants and Children less than 5 years old

Complications from measles infection are more common in children less than 5 years old due to their immature immune system, children with weak immune systems and children who are malnourished. A measles infection further weakens the immune system and makes children more vulnerable to other infections[11].

A single dose of MMR between 6 to 12 months of age is thought to provide some protection against measles but does not lead to long-term protection. **For infants between 6 to 12 months old, measles PEP with MMR within 72 hours or IMIg within 6 days is recommended even if they have received one dose of MMR** because of limited evidence on the level of vaccine effectiveness after a single dose of MMR and the risk of severe measles in this age group[10].

Table 5. Updated measles PEP recommendations for infants and immunocompetent contacts[10]

Populations	Time since measles exposure	
	72 hours or less	73 hours to 6 days
Infants < 6 months old	IMIg 0.5mL/kg[a,b] as soon as possible	
Immunocompetent, unvaccinated infants 6 to 12 months old regardless of whether they received a dose of MMR	MMR vaccine within 72 hours[c]	IMIg 0.5mL/kg as soon as possible within 6 days[a,b,c]
Immunocompetent 12 months old and older	Consider criteria for expected measles immunity: • Birth year before 1970, except for people born in United States before 1957, are considered immune • History of laboratory-confirmed measles infection • Receipt of 2 doses of measles-containing vaccine given at least 4 weeks part • Laboratory confirmation of measles immunity[d] **If none of the criteria above is met or measles vaccination history is unknown, administer measles-containing vaccine as soon as possible[e].** If any of the criteria above is met, measles PEP is not recommended.	

a. Unless contraindicated, individuals who receive Ig should get routine immunization with measles-containing vaccine after the specified intervals described here: Blood products, human immunoglobulin and timing of immunization: Canadian Immunization Guide

b. IMIg should be administered at concentration of 0.5mL/kg to maximum of 15mL administered over multiple injection sites. If individuals weigh >30kg or IVIg is more feasible than access to IMIg, IVIg can be administered at 400mg/kg.

c. Immunocompetent children 6 months to 12 months old should still receive MMRV given at least 4 weeks apart after 12 months of age for long-term protection. Only MMR is recommended for PEP. Use of MMRV as PEP has not been reviewed by NACI.

d. Routine testing for measles immunity is not recommended for the general population.

e. Measles-containing vaccine is not known to provide protection after 72 hours of exposure. Starting or completing a 2-dose series of measles-containing vaccines should not be delayed to provide long-term protection.

Immunocompromised individuals

People with immunocompromising medical conditions or receiving immunosuppressive therapy have a variable risk of being infected or developing severe measles after exposure because there is a wide range in level of immune suppression[10].

Table 6. Recommendations for measles PEP by level of immunosuppression for individuals 6 months or older who are immunocompromised[10]

Group 1: Individuals with absent/near absent immune system and have high risk of severe measles
1. Transplant • Within 12 months of receiving autologous hematopoietic stem cell transplant (HSCT) or 24 months of allogeneic HSCT, and HSCT recipients with chronic graft versus host disease (GVHD)[a] • Within 12 months of solid organ transplant[a]
2. Within 12 months of receiving chimeric antigen receptor T-cell (CAR-T) therapy for malignancy[a]
3. Acute lymphoblastic leukemia • Within and up to 3 months after completing therapy[a] OR • Withing 6 months of completing B cell-depleting therapy[a]
4. Human immunodeficiency virus infection with current CD4 T-cell count <200 cells/mm^3 if 14 years or older OR <15% CD4 for children 1 to 13 years old
5. Primary immunodeficiency or inborn error of immunity (e.g., X-linked agammagobulinemia, severe combined immunodeficiency) for which live vaccines are contraindicated[a,b].
6. Receiving the following therapies or medications[a]: • Cyclophosphamide • Anti-thymocyte globulin • Receiving or completed alemtuzumab or B-cell depleting treatment (e.g., anti-CD20 etc.) in past 12 months.
Recommendations: • MMR is contraindicated for individuals in Group 1 • Offer IMIg or IVIG as PEP as soon as possible within 6 days of exposure regardless of vaccination history or serological testing.

Group 2: Individuals who are immunocompromised and may have measles antibody-mediated protection from previous vaccination or infection

1. **Transplant**
- More than 12 months and less than 24 months post autologous HSCT without evidence of GVHD requiring ongoing immunosuppression.
  AND received MMR after transplant[a]
- More than 12 months post solid organ transplant without evidence of rejection requiring ongoing immunosuppression[a]

2. **More than 12 months after CAR-T[a]**

3. **Malignancy**
- Lymphoproliferative diseases including hematologic cancers (e.g. indolent lymphoma, lymphocytic leukemia, plasma cell lymphoma) not receiving B-cell targeting therapy.
- Immunotherapy or chemotherapy or radiotherapy for malignancy other than acute lymphoblastic leukemia (e.g., solid tumour or hematologic) ongoing or completed within the last 3 months[a]

4. **Secondary hypogammaglobulinemia due to disease or therapy[b]**

5. **Therapies or medications described below[a]:**

- Targeted immunosuppressive biologic and small molecule therapies not mentioned above (e.g., tumour necrosis factor inhibitors, costimulation modulators, cytokine inhibitors, tyrosine kinase inhibitors) that are ongoing or received less than 6 months before measles exposure alone or with steroids or disease-modifying antirheumatic drugs (DMARDs)
- Ongoing or less than 4 weeks since completing daily corticosteroid therapy with prednisone or equivalent dose of ≥20mg/day for adults or ≥1mg/kg/day for children for ≥14 days[c]
- Undergoing dose tapering following treatment with prednisone or equivalent dose of ≥20mg/day for adults or ≥1mg/kg/day for children for ≥14 days[c]
- Ongoing or within 3 months of completing treatment with immunosuppressive drugs for immune-mediated disease (e.g., methotrexate >0.4mg/kg/week (children >10mg/m^2/week, adults >15mg/m^2/week), azathioprine >3mg/kg/day, 6-mercaptopurine >1.5mg/kg/day, cyclosporine, tacrolimus, sirolimus, mycophenolate mofetil, small molecule inhibitors)

Recommendations:
- Consider consultation with specialist responsible for the individual's clinical care (e.g., hematology-oncologist, infectious disease consultant or immunologist)
- Consider rapid measles serology. If measles serology negative or not available within 24 hours, administer IMIg or IVIG as soon as possible and within 6 days

Group 3: Individuals who have low-level immunocompromise who are expected to have measles antibody-mediated protection from known previous infection or vaccination, and where measles-containing vaccine is NOT contraindicated

1. **Transplant: >** 24 months after HSCT with no chronic GVHD and received measles-containing vaccine after transplant[a]
2. **Individuals who are asymptomatic and living with HIV with CD4 T- cell counts of >200 cells/mm3 (age ≥ 14 years) or >15% for children 1 to 13 years old**
3. **Primary immunodeficiencies**:
   - Minor B-cell deficiency with intact T-cell function not requiring Ig therapy or partial T-cell defects[a]
4. **Other primary immunodeficiencies or inborn errors of immunity[a]**
5. **Therapies or medications described below[a]:**

• Prednisone or equivalent doses <20mg/day for adults or <1mg/kg/day for children taken for ≥14 days or on alternate day corticosteroid[a,c] • ≥4 weeks after stopping long-term (≥14 days) high-dose systemic steroids or immediately after stopping high-dose steroids taken for <14 days[c] • Therapies targeting the immune system and are unlikely to have significant effects on humoral immunity (e.g., IgE blockers, IL-5 blockers, IL-4 inhibitors, IL-13 inhibitors, other cytokine inhibitors)	• Methotrexate ≤0.4mg/kg/week (children ≤10mg/m2/week and adults ≤15mg/m2/week) • Azathioprine ≤3 mg/kg/day[g] • 6-mercaptopurine ≤1.5 mg/kg/day • Hydroxychloroquine (any dose)

Recommendations:

- For people post-transplant, provide MMR if no documented positive measles IgG post-transplant
- For other individuals meeting the above criteria, consider criteria for measles immunity in Table 4. If they meet measles immunity criteria, measles PEP is recommended as per Table 4

NOTE:

a. There may be other immunodeficiencies or new immunomodulating drugs not mentioned in this table. Also, the period an individual remains immunosuppressed after stopping immune modulating therapy varies. Consultation with the specialist responsible for the individual's clinical care is recommended.

b. Individuals receiving Ig replacement therapy before measles exposure are considered immune and measles PEP is not required if IVIg (at least 400mg/kg) was given 3 weeks or if subcutaneous Ig (at least 200 mg/kg) was given 2 consecutive weeks prior to measles exposure. If outside of these parameters, administer the patient's usual dose as soon as possible.

c. For children, a dose of 20 mg/day is often similar to doses <2 mg/kg/day. There is no consensus regarding the lowest prednisone dose that would be considered immunosuppressive in children; thresholds vary across various guidelines from ≥0.5 mg/kg/day to ≥2 mg/kg/day

d. Interval may vary with type and intensity of treatment. Period may be shortened for biologics/treatments with a shorter duration of effect.

e. Individuals on azathioprine exhibiting signs of myelosuppression/myelotoxicity should be assessed for susceptibility and need for Ig PEP. **Please refer to** Group 2

Pregnancy

Pregnancy is a risk factor for serious complications from measles. PEP should be considered for pregnant people who are not immune to measles. Measles and rubella-containing vaccines are **contraindicated during pregnancy** due to a theoretical risk of transmission of vaccine-derived measles and rubella to the fetus. However, termination should not be recommended just on the basis of inadvertent administration of measles-containing vaccine during pregnancy[10].

Table 7. Recommendations for measles PEP for pregnant individuals by risk level[10]

Immune Status	Recommended measles PEP for pregnant individuals
Unvaccinated or known measles IgG negative	IVIG (400mg/kg)[1] as soon as possible within 6 days of exposure. Administer measles-containing vaccine postpartum for future protection
One previous dose of measles-containing vaccine or unknown vaccination status	Consider serology testing if results can return within 24 hours of sampling. IVIg 4oomg/kg[1] as soon as possible and within 6 days if serology non-reactive or measles serology results not attainable within 24 hours of sampling
Meets criteria for expected measles immunity (Table 4, row 3)	Measles PEP not recommended

[1] IMIg not recommended for individuals weighing more than 30kg due to lack of evidence for effectiveness at dosages below 0.5mL/kg. In remote communities where IMIg may be preferred due to difficulty accessing IVIg in a healthcare facility, more than 15mL of IMIg can be given as per clinical discretion of a MOH[10]

Measles PEP products available in NL

There are 3 types of measles post-exposure prophylaxis: MMR vaccination, intramuscular immunoglobulin (IMIg, GammaSTAN®), and intravenous immunoglobulin (IVIG)[10].

Measles PEP recommendations will be made by the Medical Officer of Health and healthcare providers are expected to follow these recommendations. If you have concerns or questions, please direct them to the Medical Officer of Health on-call.

For more information on measles PEP, see the following resources:

- Updated NACI recommendations on measles post-exposure prophylaxis - Canada.ca (2025)
- Measles vaccines: Canadian immunization guide - Canada.ca

IMIg

GammaSTAN is the only IMIg formulation stocked in NL. It is stocked at the Canadian Blood Services in St. John's, NL and can be ordered by any physician. Please contact your hospital's blood bank for questions on how to access GammaSTAN. If ordered STAT, GammaSTAN may take 1 to 24 hours to be dispensed depending on health zone and flights presuming Canadian Blood Services have GammaSTAN in stock.

IMIg is the only measles PEP available to infants <6 months old[10]

Dose: 0.5ml/kg IM x1 dose (maximum volume 15mL)

Notes on administration:

- IVIG is a blood product and requires informed consent: See Consent or refusal to administration of blood components and plasma protein and related products policy: bloodservices-pdf-informed-consent-blood-comp.pdf (gov.nl.ca)
- IMIg is no longer recommended for people weighing ≥ 30kg because they will not get an effective dose if given the maximum dose of 15mL.
- In some circumstances, such as in remote locations, there may be a preference to give IMIg instead of IVIg because IVIg usually requires administration in a healthcare facility. More than 15mL IMIg can be administered at the clinical discretion of a MOH.[10]
- Volumes >2mL for children or 3-5mL for adults should be divided and injected at 2 or more sites.
- Anyone receiving 15mL will require multiple injections, which may not be acceptable for the patient. Injection volumes up to 3mL for children can be considered to reduce the number of injections using clinical judgement. For higher volume injections, the anterolateral thigh is preferred because of the muscle's greater mass.

IVIG

All hospitals with a blood bank stock IVIG and more are available from the Canadian Blood Services from St. John's if required. Any hospital that does not have a blood bank can request IVIG from the Canadian Blood Services STAT. Given IVIG is administered intravenously, infusions occur in a health care facility where appropriate monitoring can be conducted. All IVIG orders complete a review process once the pre-printed order (Appendix B) is received. If a request is received outside of regular hours (8am-4pm), the review may take 30 to 60 minutes from receipt of pre-printed order.

IVIG Dose: 400mg/kg

Administration of IVIG requires the use of ideal body weight, appropriate infusion rates and monitoring for adverse effects. Please see the following for more information on dosing and appropriate administration:

- **Atlantic Clinical Indications and Criteria for Intravenous and subcutaneous immunoglobulin (IVIG/SCIG)**
- **Administration of IVIG - Government of NL, Provincial Blood Coordinating Program**
- **National Advisory Committee on Immunization: Updated recommendations on measles post-exposure prophylaxis - Canada.ca**

Resources:

- IVIG is a blood product and requires informed consent: See Consent or refusal to administration of blood components and plasma protein and related products policy: Consent or Refusal to Administration of Blood Components and Plasma Protein and Related Products - Government of NL, Provincial Blood Coordinating Program
- Pre-printed order form for IVIG Infectious Disease for Adult and Pediatrics must be completed to order IVIG for Measles PEP. A fillable pdf form should be located where NLHS forms are located at your healthcare facility (See Appendix B)
- Ideal Body Weight Calculator with IVIG Dosing
- IVIG Infusion Rate Tables
- Orders for IVIG must meet indications for its use to be dispensed. Measles PEP is one of the indications.
    - Review and Approval of Requests for IVIG for Adults Policy
- IVIG Information for Patients – Provincial Blood Coordinating Program

INFECTION PREVENTION AND CONTROL (IPAC) PRACTICES IN HEALTHCARE FACILITIES

Any suspect or confirmed measles case requires routine and airborne precautions.

The measles virus particles can remain suspended and contagious in the air for **up to two hours after the case has left a room**, depending on the number of air exchanges. The following recommendations should apply to all healthcare facilities including long-term care, personal care home, and community care homes.

- **All health care workers (HCW) and staff regardless of immunity to measles should wear a fit-tested, seal-checked N95 respirator when providing care to a patient with suspect or confirmed measles.**
- Only HCWs immune to measles should be assigned to care for patients with confirmed/suspected measles. Evidence of immunity in HCWs is two documented doses of measles-containing vaccine on or after the first birthday (regardless of year of birth) or laboratory evidence of immunity.
- Non-immune, susceptible staff should only enter the room in exceptional circumstances.
- Schedule the patient visit to minimize exposure of others (e.g., at the end of the day).
- Upon arrival at the entry to the facility, instruct the patient to perform hand hygiene and put on a surgical mask if it can be tolerated and there are no contraindications.
- Immediately, place the patient in a single room with negative air flow (airborne infection isolation room or AIIR) with the door closed. If an AIIR is not available, the patient should be immediately placed in a single room with the door closed.
- Patient movement should be curtailed unless necessary and then only conducted with the patient wearing a surgical mask (e.g., arrange for investigations to be done in patient room where possible).
- Following the patient's visit, the exam room door must remain closed with signage 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 using the room for non-immune individuals (two hours is a conservative estimate if air exchanges are not known). The time required may be minimized if the patient has worn a surgical mask consistently. For institutional settings, this time can be reduced depending on the number of room air changes per hour.
- 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.

For more information:

- **Department of Health and Community Services: Routine Practices and Additional Precautions,** page 35 "Airborne Precautions Elements" publichealth-cdc-routine-practices-and-additional-precautions.pdf (gov.nl.ca)

APPENDIX A: MMR VACCINATION SCREENING QUESTIONS

Screening Questions

Is the child between 12 months of age to <13 years old?

- **Yes:** Give MMRV at 12 and 18 months of age. Please advise the caregiver and child to contact their local public health unit for MMRV immunization.
- **No:** Give MMR for persons ≥ 13 years old.

Is the child between 6 – 12 months old and travelling abroad to a high-risk area of measles transmission?

- **Yes:** Give one dose of MMR and then MMRV at 12 and 18 months of age
- **No:** immunization with MMR is not recommended for infants 6-12 months of age that are not traveling to endemic areas.

Was the person born prior to January 1, 2013?

- **Yes:** Give MMR as per age & eligibility.
- **No:** Give MMRV if <13 years old.

Is the person allergic to any component of the vaccine, as listed in the product monograph?

- Defer immunization and consult with the MOH/designate. It may be necessary to immunize in a controlled setting.

Did the person have an anaphylactic reaction to a previous dose of MMR vaccine?

- Determine the nature and severity of the reaction. If required defer immunization and complete an AEFI for MOH/designate consult.

Did the person have a moderate to severe acute illness with or without a fever?

- Defer MMR until person is well.

Is the person immunocompromised?

- MMR should not be given to any person who has severe immunodeficiency. See Canadian Immunization Guide and defer MMR and consult with the MOH/designate as required.

Did the patient's birthing parent take immunosuppressant therapy during pregnancy?

- Administer MMR vaccine to the child when indicated and age appropriate. Immune responses to live vaccines that are administered at or after one year of age (e.g., MMR or MMRV vaccine) are not considered to be affected by exposure to monoclonal antibodies in the womb. Infants who receive measles-containing vaccine before 12 months of age still require MMRV at 12 months and 18 months as per the routine immunization to achieve long-term immunity.

Is the person is taking steroids or corticosteroid therapy?

- Defer MMR and consult with the MOH/designate as required. Depending on the route, dose, and duration of therapy, there may be no need to delay administration of MMR. Low to moderate doses of steroid therapy has not been associated with compromised immunity. See the Canadian Immunization Guide for further information.

Does the person have a recent history of blood transfusion or immunoglobulin therapy?

- Defer MMR. There is a requirement for an interval of at least 3 months between the administration of immune globulins or blood and live measles vaccination. See the Canadian Immunization Guide for additional information.

Does the person have a febrile respiratory or active febrile illness (including TB)?

- Defer MMR until person is well.

Is there is a possibility that the person may be pregnant?

- Defer MMR until the postpartum. Advise that pregnancy should be avoided for **one** month following immunization. See The Canadian Immunization Guide for further information.

If the child received a dose of MMR prior to the first birthday, should they still be given MMRV at 12 and 18 months of age?

- **Yes:** Give MMRV at 12 and 18 months of age. A dose given prior to the first birthday may not provide long lasting immunity, therefore must be given to the child on or after their first birthday.

The person requires a tuberculosis skin test, can they receive MMR?

- **Yes:** Can be done on the same day as the administration of the TST. MMR can suppress a positive TB skin test, therefore if TB testing is required it should be done the same day or delayed for 4 weeks after the MMR is given. Refer to the Canadian Immunization Guide or Section 3 of the Newfoundland and Labrador Tuberculosis Guideline for more information.

APPENDIX B: EXAMPLE OF IVIG NL INFECTIOUS DISEASES PRE-PRINTED ORDER FORM

Newfoundland Labrador

PRE-PRINTED ORDER
Intravenous Immunoglobulin (IVIG)
INFECTIOUS DISEASE - Adult and Pediatric

HCN:
Province/Territory: Expiry:
Name:
Date of Birth: Sex: ☐ M ☐ F ☐ UN
Mailing Address:
City:
Province/Territory: Postal Code:
Telephone: (Indicate Preferred) ☐ Home
☐ Cell ☐ Work

Items preceded by a checkbox (☐) are only to be carried out if checked.
Any change to indication, dose, duration or frequency requires a new order
Note: IVIG dose is calculated using the patient's DOSING BODY WEIGHT (DBW) for all indications. To obtain the DBW calculator, refer to http://www.health.gov.nl.ca/health/bloodservices/resources/dosage_calculator.html

Allergies:	Has titration of dose been attempted? (for renewals only) ☐ Yes ☐ No
Frequency (number of weeks between treatments): Duration (number of days per treatment): Intended treatment start date: PPO expiry (completed by Lab):	Height (cm): Weight (kg): Sex: ☐ Male ☐ Female DBW (kg): Daily Infusion : g/kg **Calculated Dose (rounded down):** g (For Pediatrics: down to the nearest 2.5g)
g X day(s). If indicated, repeat this regimen every week(s) for a total of treatments.	

Indicated Conditions	Prerequisites – Checkboxes must be checked/completed as appropriate. Missing information will result in delays or denial of product PATIENT MUST MEET THE FOLLOWING:	Dose
☐ **Group A Streptococcus (GAS) Necrotizing Fasciitis or Toxic Shock Syndrome***	☐ Must be treated with a combination therapy of antibiotics in addition to IVIG	1 g/kg on day 1 and 0.5 g/kg/day on days 2 and 3 **OR** 0.15 g/kg /day for 5 days
☐ **Staphylococcus Aureus Toxic Shock Syndrome (TSS)***	☐ Must be treated with a combination therapy of antibiotics in addition to IVIG	1 g/kg on day 1 and 0.5 g/kg/day on days 2 and 3 **OR** 0.15 g/kg /day for 5 days

*May be considered URGENT if notified by ordering physician

Possibly Indicated Conditions are approved for a 3 month period only at which time a clinical outcome questionnaire must be provided for the patient to continue treatment.

Please provide fax or e-mail for Outcome Questionnaire to be sent for completion.
Email: Fax:

Possibly Indicated Conditions	Prerequisites - Checkboxes must be completed PATIENT MUST MEET THE FOLLOWING:	Dose
☐ **Chronic Parvovirus Infection with Anemia**	☐ Immunocompromised patient with parovirus B19 causing Pure Red Cell Aplasia	**Initial:** 0.4 to 1 g/kg for 5 to10 days **Maintenance:** 0.4 g/kg every 4 weeks
☐ **Measles Post-Exposure Prophylaxis**	☐ Susceptible pregnant OR immunocompromised individuals 6 months of age or older AND ☐ IVIG should only be provided within 6 days of measles exposure	0.4 g/kg given once

Authorized Prescriber (Print): **Date(YYYY/MMM/DD):**
Authorized Prescriber's Signature:

Reset Form Print Form D0016FEB23

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