

Preventing Measles (Rubeola) in Healthcare Settings

Measles is one of the most contagious infectious diseases; approximately 9 out of 10 susceptible persons exposed to measles will develop measles.

Clinical Presentation

Measles usually starts with:

- Fever $\geq 101^{\circ}\text{F}$ (38.3°C)
- Cough
- Runny nose (coryza)
- Red eyes (conjunctivitis)

A few days later:

- Koplik spots (tiny white/blue spots inside the mouth) may appear.
- A red blotchy (maculopapular) rash follows, typically starting on the face and spreading downward 2-4 days after symptoms begin. Rash may be harder to see or appear as purple or darker than surrounding skin on dark complexions.

People are contagious 4 days before through 4 days after rash onset. Fever and rash typically overlap in people who are not immunized.

Immunocompromised patients may not develop classic symptoms and may have a modified rash presentation, but they can still spread measles.

Although rare, breakthrough infections may occur in people who are immunized or following post-exposure prophylaxis (PEP). People with breakthrough measles disease usually have milder symptoms, with lower fever, less rash, and fewer complications, and are less likely to spread the disease.

Transmission

The virus is transmitted by direct contact with infectious droplets or by inhaling infectious airborne particles, which easily spread through the air when an infected person breathes, talks, coughs, or sneezes.

The virus can remain in the air up to 2 hours after the person leaves the area. This is why waiting rooms, shared hallways, and delayed isolation/masking are major risk factors for exposure.

Follow these steps to minimize the risk of measles transmission

- Healthcare Personnel (HCP) should have documented immunity to measles, ideally as a condition of employment. Healthcare facilities should maintain readily available documentation of immunity for those working in the facility.
- Screen incoming patients for signs or symptoms concerning for measles plus a risk factor for measles:
 - Travel outside of the United States
 - Travel to a region of the United States where ongoing measles infections are happening
 - Measles outbreak is happening in your community
- Implement screening procedures through pre-visit telephone calls (when possible) and upon arrival to the healthcare facility
- Instruct referring clinicians with suspect measles cases to provide proper instruction prior to arrival at the healthcare facility, including contacting the healthcare facility ahead of time.

Pre-Visit Telephone Screening

- For persons with signs or symptoms of measles, reschedule or use telehealth services for non-urgent services.
- For persons with suspected measles who will receive healthcare on-site, provide instructions for arrival, such as:
 - How to notify staff of their arrival: Have family remain in car upon arrival and provide a phone number for family to call for assistance with safe entry.
 - Which entry to use.
 - Wear a well-fitting facemask upon entry.
 - Who should accompany the patient. No other children should accompany a patient with measles.
 - Any additional procedures to follow.
- Schedule patient at the end of the day, if possible.

Upon-Arrival Screening

- Utilize existing triage stations for rapid identification and isolation of patients with measles.
- Post visual alerts at the entrance of facility with instructions for patients with signs and symptoms of measles to follow prior to entering facility. Ensure signs are translated into other languages spoken in your community.
- Persons with signs or symptoms of measles should be provided with a facemask to

wear and separated from other patients prior to or as soon as possible after entry into a facility. If complete separation cannot be achieved, consider having other patients wear a facemask and move high-risk patients and families away from area of entry.

If Measles is Suspected:

- Consider implementing processes to assess and/or collect specimens while the individual with suspected measles is in their vehicle or in an outdoor tent where outdoor air can maximize ventilation, preventing exposures in the health care facility.
 - Mask patient immediately. If a mask is not tolerated, utilize other means of source control if safe, e.g. tenting a blanket loosely over an infant.
 - Patients with suspected measles should not remain in waiting room or common areas.
 - Escort suspected measles patients from a separate entrance that allows them to access an exam room directly, without exposing others. The path should be cleared of patients and susceptible health care workers prior to escorting the patient to the exam room and for up to 2 hours after the patient leaves.
 - Place the patient in an Airborne Infection Isolation Room (AIIR) room. If an AIIR room is not available, utilize a negative pressure room. If neither is available, place them in a private room with the door closed and instruct them to continue to use a mask.
 - Adhere to Standard and Airborne Precautions.
 - Standard Precautions should include eye protection if the patient is coughing or sneezing, undergoing aerosol-generating procedures (AGPs) and when collecting specimens for measles testing, such as nasopharyngeal (NP) or oropharyngeal (OP) swabs.
 - For Airborne Precautions, HCP should use respiratory protection that is at least as protective as a fit-tested, NIOSH-certified disposable N95 filtering facepiece respirator, regardless of presumptive evidence of immunity.
 - Limit the number of HCP who enter the room. Only HCP with acceptable presumptive evidence of measles immunity should enter the room and must be wearing appropriate respiratory protection.
 - Limit visitors to those who are necessary for the patient's well-being and care. Visitors without presumptive evidence of immunity should not enter the room.
 - Patients with measles should remain in Airborne Precautions for 4 days after the onset of rash (with onset of rash considered to be Day 0).
 - Immunocompromised patients with measles may need to remain in Airborne Precautions for a longer period due to prolonged virus shedding.
 - Notify the [local health jurisdiction](#) (LHJ) immediately of any suspect measles patient.
 - The LHJ can help arrange for measles testing through the Washington State Department of Health (WA DOH) Public Health Laboratory.
 - Instruct the patient, and anyone with an exposure to measles, to inform all health care providers of the possibility of measles **before** entering the health care facility so
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appropriate infection control precautions can be implemented.

Transporting Patients with Known or Suspected Measles Within and Between Healthcare Facilities

These precautions substantially reduce exposure risk during transport. However, because measles virus can remain airborne, exposure risk may not be completely eliminated in some situations.

- Conduct medically necessary procedures in the patient's room. Limit transport and movement of patient to only medically necessary procedures that cannot be done in the room.
- All staff who transport patients or enter the room the patient was in during the procedure and up to 2 hours after they vacated the room, should use respiratory protection that is at least as protective as a fit-tested, NIOSH-certified disposable N95 filtering facepiece respirator.
- If a patient must be transported to another area for a procedure, schedule the patient for the last appointment of the day, if possible. After the procedure, close the procedure room for 2 hours, or the time that corresponds to 99.9% removal efficiency of airborne contaminants.
- Identify the route before transporting patient. Clear the route of visitors and staff. Have patient wear a mask (or tent with blanket if unable to wear a face mask) during transport. Prior to transporting patient, notify HCP in the receiving area to allow proper time for preparation and implementation of isolation practices.
- When transport outside the facility is necessary, inform the receiving facility and the transporting HCP in advance about Airborne Precautions being used.

Environmental Cleaning After Care of a Patient with Known or Suspected Measles

- The room or area should remain vacant for at least 2 hours after the patient leaves, or the time that corresponds to 99.9% removal efficiency of airborne contaminants.
- Avoid dry dusting, sweeping, or vacuuming, as these activities may resuspend infectious particles into the air.
- Perform cleaning using wet methods (e.g., damp wiping, mopping) to minimize aerosolization of particles.
- Routine cleaning and disinfection procedures are sufficient for measles virus environmental control. Use U.S. Environmental Protection Agency (EPA)-registered hospital disinfectants according to manufacturer instructions.
- Remove used linens gently and place them directly into appropriate laundry bags. Avoid shaking or handling in a way that could disperse infectious particles.

Exposure Definition

For health care facilities, exposure is defined as any person who is not wearing recommended

respiratory protection* (regardless of presumptive evidence of measles immunity status) who is:

- In a shared air space with an infectious measles patient at the same time, OR
- In a shared air space vacated by an infectious measles patient within the prior 2 hours.** (See [Appendix A](#))

Air exchange rates and airflow patterns may vary depending on factors such as door opening and closing, ventilation design, and shared air circulation between rooms and hallways. These variables can influence the extent and duration of airborne contamination and should be considered when assessing potential exposure risk.

* Recommended respiratory protection is a minimum a fit-tested, NIOSH-certified N95 respirator or higher-level protection.

**Measles has been reported to remain infectious in air for up to 2 hours. For spaces with a defined rate of air changes per hour (ACH), see the following for additional considerations about estimating the time for 99.9% removal efficiency of airborne contaminants: Table B1 "Air changes/hour (ACH) and time required for airborne-contaminant removal by efficiency" from the 2003 [Guidelines for Environmental Infection Control in Health-Care Facilities](#).

Management of an Exposure to Measles

When a measles exposure occurs in a healthcare setting, the goals are to identify everyone exposed, provide post-exposure prophylaxis (PEP) when indicated, monitor for symptoms, and prevent further transmission.

Healthcare facilities should notify and work closely with the LHJ whenever measles exposures occur. LHJs can help assess the risk level of exposure and provide support with contact tracing, public notifications, and guidance on managing exposed patients, visitors, and staff.

In some situations, it may not be possible to identify or contact each exposed person individually. When that happens, facilities may need to use broader communication methods to inform people who were in specific areas of the facility (for example, the emergency department, waiting rooms, or cafeteria) during certain dates and times that they may have been exposed to measles.

Notify the LHJ immediately if an exposed person develops symptoms, is tested, is confirmed to have measles, or is admitted to the hospital.

Additional details for managing measles exposures can be found in [Steps for Responding to Measles Exposures in Healthcare Settings](#) from the CDC.

Management of patient exposure

1. Create a list of all potentially exposed patients.
 - Include anyone who was present in measles-contaminated air spaces for up to 2 hours after the person with measles vacated the airspace.
 - In outpatient clinics, emergency departments, and procedure areas, this usually requires reviewing:
 - Scheduling records

- Arrival and discharge times
 - Mode and pathway of arrival
 - Room and location movement
- 2. Determine measles immunity and risk status. This can be verified through documentation such as:
 - Medical records
 - [Washington State Immunization Information System](#) (WAIS)
- 3. Document exposure details.
 - Date of first and last exposure
 - Type of exposure (for example):
 - Shared waiting room
 - Same exam room
 - Prolonged close contact vs brief exposure
- 4. Determine and provide PEP to exposed patients who are eligible to receive PEP. Use [Measles PEP for Non-Symptomatic Susceptible Contacts](#) to determine eligibility.
- 5. If exposed to measles, hospitalized patients who are severely immunocompromised and/or do not have presumptive immunity to measles should be moved to an AIIR room with Standard and Airborne Precautions from day 5 after first exposure to 21 days after last exposure. If patient received Immunoglobulin (IG), extend isolation to 28 days after last exposure.
- 6. Monitor all exposed patients for signs and symptoms of measles from day 5 after first exposure to 21 days after last exposure. If the patient received IG, extend the monitoring period to 28 days after last exposure.
 - Best practice is to flag the patient's chart of a measles exposure.

Management of visitor exposure

1. Create a list of exposed visitors
 - Use visitor sign-in logs if available.
 - Ask the measles patient whether anyone accompanied them while in the facility.
2. Assess visitor immunity status and risk status, if possible. This can be verified through documentation such as:
 - Medical records
 - [Washington State Immunization Information System](#) (WAIS)
 - Asking individual directly for proof of immunity

Factors resulting in high risk for measles complications include children < 5, pregnant women and people with immunocompromising conditions. These are individuals that could be prioritized for PEP.

If a facility is unable to verify a visitor's immunity or risk status, coordinate with the LHJ to determine appropriate next steps. This may include follow-up with the visitor's primary care provider or alternative methods of notification and contact.

3. Document exposure details
 - Date of first and last exposure
 - Type and duration of exposure

4. Determine and provide PEP (MMR vaccine or IVIG/IMIG) to exposed individuals who are eligible to receive PEP. Use [Measles PEP for Non-Symptomatic Susceptible Contacts](#) to determine eligibility.
5. LHJ will determine the type of, and may coordinate, monitoring for exposed visitors.
6. In some circumstances, visitors may be referred to their primary care provider (PCP) for follow-up on quarantine, PEP, or symptom monitoring.

Management of HCP exposure

Determine if exposed HCP has presumptive evidence of immunity. [Acceptable evidence of immunity for HCP includes:](#)

- Documented administration of 2 doses of live measles virus vaccine given on or after the first birthday
- Laboratory evidence of immunity
- Documentation of health care provider-diagnosed measles
- Birth before 1957 is not sufficient evidence of immunity for HCW during an active outbreak. For HCP born before 1957 without laboratory evidence of immunity, healthcare facilities should consider requiring measles-containing vaccination.

Asymptomatic HCP with presumptive evidence of immunity

- Monitor daily for signs and symptoms of measles from the 5th day after their first exposure to a patient with measles through the 21st day after their last exposure.
- PEP is not necessary.
- Work restrictions are not necessary.

Asymptomatic HCP without presumptive evidence of immunity

- Administer PEP as soon as possible. Use [Measles PEP for Non-Symptomatic Susceptible Contacts](#) to determine eligibility.
- Exclude from work from the 5th day after their first exposure through the 21st day after their last exposure. Consider extending exclusion from work through the 28th day after their last exposure if IG was administered.
- Monitor daily for signs and symptoms of measles from the 5th day after their first exposure through the 21st day after their last exposure. Extend daily monitoring through the 28th day after their last exposure if IG was administered as postexposure prophylaxis.

Symptomatic HCP

- If an HCP develops symptoms of measles, immediately report the suspected case of measles to the person's LHJ.
- Coordinate specimen collection and laboratory testing to confirm measles infection through the WA DOH Public Health Laboratory.

- For HCP with suspected or confirmed measles, exclude from work for 4 days after the rash appears.
- For immunocompromised HCP with known or suspected measles, exclude from work for the duration of their illness.

Additional Resources

WA DOH [Measles](#) webpage, for general information about measles

WA DOH [Notifiable Conditions: Measles](#) webpage, for information on reporting to public health

WA DOH [Measles Cases in Washington State](#), for the latest information about measles cases

WA DOH [Measles Public Exposure Locations in WA State](#), for a list of recent public exposures

WA DOH [Measles PEP for Non-Symptomatic Susceptible Contacts](#) (PDF)

WA DOH [Suspect Measles Provider Evaluation Worksheet](#) (PDF)

WA DOH [Standard Precautions and Transmission-Based Precautions](#)

CDC [Measles Assessment Tool \(MAT\) for Infection Control in Healthcare Settings: Measles Preparedness and Response During Community Outbreaks](#) (PDF)

CDC [Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings](#)

CDC [Infection Control: Measles](#), for epidemiology and control of measles among HCP and patients

CDC [Measles Preparedness and Response in Healthcare Settings](#)

CDC [Preparing And Responding To Measles: Checklist For Healthcare Workers](#) (PDF)

CDC [Steps for Responding to Measles Exposures in Healthcare Settings](#) (PDF)

[APIC Measles Playbook](#) , for infection preventionists to rapidly activate measles response measures in their facility.

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