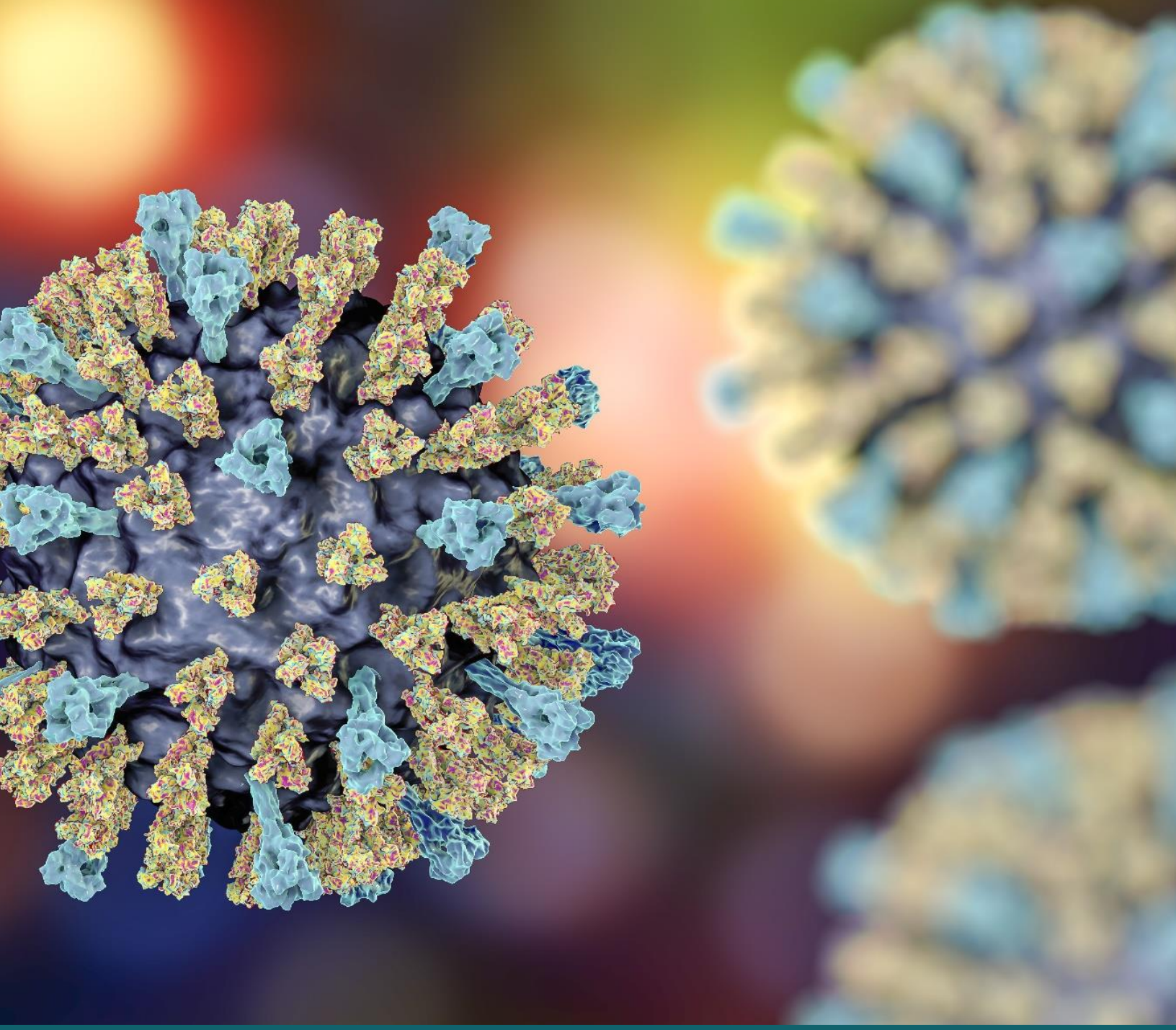

Measles Guidelines

Wisconsin Immunization Program

WISCONSIN DEPARTMENT of HEALTH SERVICES

P-00892 (06/2025)

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1. About the disease

Etiologic agent

Measles is caused by the measles virus (genus Morbillivirus, family Paramyxoviridae).

Clinical description

Measles, or rubeola, is a highly contagious, acute disease characterized by fever, cough, runny nose, conjunctivitis, erythematous maculopapular rash, and characteristic mouth lesions (Koplik spots).

The initial phase (prodrome) lasts 2–4 days (range 1–7 days) and includes a gradually rising fever, often reaching 103–105°F, followed by the onset of cough, runny nose, and/or conjunctivitis. Koplik spots may develop 1–2 days before rash onset.

The measles rash usually starts at the hairline, face and upper neck, then spreads downward to the trunk, arms, and legs, lasting 4–7 days. The maculopapular lesions are generally discrete, but may become confluent, particularly on the upper body. Initially, lesions blanch with pressure. Fine, scaly desquamation may occur over more severely involved areas.

The rash will begin to fade in the same order that it appears, from head to the extremities. Other symptoms resolve at this time.

Other illnesses that may present like measles, with rash and fever, include: fifth disease, roseola, rubella, scarlet fever, adenovirus infections, influenza, certain vector-borne illnesses such as rocky mountain spotted fever or zika, multisystem inflammatory syndrome in children (MIS-C), and antibiotic reaction.

Complications

Approximately 30% of measles cases in the United States from 1987 to 2000 were reported to have one or more complications. Complications include diarrhea, otitis media, pneumonia, encephalitis, subacute sclerosing panencephalitis, and death. Complications of measles were most common among children younger than 5 years and adults.

Reservoirs

Humans are the only host for measles virus.

Modes of transmission

Measles is spread by airborne transmission. Airborne particles can remain suspended in the air for up to 2 hours after an infected person leaves the area. No minimum duration has been established for exposure, but it is presumed that exposures that are longer in duration are more likely to result in measles transmission than brief, transient exposures.

Incubation period

The typical interval between exposure to measles and the onset of prodromal symptoms is 10–12 days (range 7–21 days). The average interval from exposure to rash onset is 14 days.

Infectious period

Patients with measles are infectious from 4 days before rash onset through 4 days after rash onset (counting the day of rash onset as day 0), for a total of 9 days.

Immunocompromised patients may have prolonged excretion of virus in their secretions and can be infectious for the duration of their illness.

Treatment

No specific antiviral therapy is available for measles. Vitamin A does not prevent measles infection. Under physician supervision, vitamin A may be recommended as part of treatment for some patients.

See the Redbook Chapter on Measles for more information.

Epidemiology

Measles was declared eliminated in the United States in 2000 and in other parts of the Western Hemisphere in 2016, however, measles still occurs in other regions in the world. Most measles cases in the United States are imported from an unvaccinated individual who traveled internationally; spread may occur among their susceptible contacts.

CDC Measles Cases and Outbreaks

While all individuals may be at risk for measles, those who are un- or under-vaccinated are most likely to contract measles infection.

Prevention measures

The single best prevention against measles is vaccination. The Advisory Committee on Immunization Practices (ACIP) and the Centers for Disease Control and Prevention (CDC) recommend routine vaccination against measles virus.

CDC Pink Book Chapter 13: Measles

2. Case definitions

Measles case definitions

The Council of State and Territorial Epidemiologists (CSTE) provides standardized case definitions for measles to ensure consistent public health surveillance across the United States. These definitions categorize cases based on clinical presentation, laboratory evidence, and epidemiologic linkage.

CSTE Measles Case Definition

Clinical Description: An acute illness characterized by:

- Generalized, maculopapular rash lasting ≥3 days; **and**
- Temperature ≥101°F or 38.3°C; **and**
- Cough, coryza, or conjunctivitis.

Case Classification

Probable: In the absence of a more likely diagnosis, an illness that meets the clinical description with:

- No epidemiologic linkage to a laboratory-confirmed measles case; **and**
- Noncontributory or no measles laboratory testing.

Confirmed: An acute febrile rash illness† with:

- Isolation of measles virus‡ from a clinical specimen; **or**

- Detection of measles-virus specific nucleic acid‡ from a clinical specimen using polymerase chain reaction; **or**
- IgG seroconversion‡ or a significant rise in measles immunoglobulin G antibody‡ using any evaluated and validated method; **or**
- A positive serologic test for measles immunoglobulin M antibody‡§; **or**
- Direct epidemiologic linkage to a case confirmed by one of the methods above.

† Temperature does not need to reach ≥101°F/38.3°C and rash does not need to last ≥3 days.
‡ Not explained by MMR vaccination during the previous 6–45 days.
§ Not otherwise ruled out by other confirmatory testing or more specific measles testing in a public health laboratory.

3. Terms and definitions

Suspect case: An individual with measles-like symptoms who is being evaluated.

Isolation: The separation of people with suspected or confirmed illness from those without illness.

Quarantine: The period of home isolation recommended for non-immune contacts who have not received appropriate PEP within the specified time period.

Exclusion: The temporary restriction of individuals who have been exposed to a confirmed measles case from high-risk settings, defined in section 7, during the incubation period to prevent potential transmission. It may apply to contacts who are not otherwise quarantined.

Laboratory evidence of immunity (titer): Detectible measles IgG antibody.

Passive symptom monitoring: Self-monitoring for symptoms of measles.

Active symptom monitoring: Where a susceptible contact communicates with public health regularly to assess for symptoms consistent with measles. The self-monitoring module within a WEDSS contact investigation may be used to facilitate active monitoring.

4. Laboratory testing

Samples to collect

Testing for measles should be done promptly for all patients with febrile rash illness that meets the clinical definition and has epidemiologic risk factors for measles. Collect the following specimens:

- **Combined throat and nasopharyngeal swabs**
  - **Timing:** Ideally collected within 3 days after rash onset, up to 10 days after rash onset.
  - **Notes**: Collect a throat swab and a nasopharyngeal swab. Synthetic swabs (for example, Dacron) are required for specimen collection. Do not use cotton or calcium alginate swabs as they may be inhibitory to enzymes used in PCR. Place both swabs in a single tube of virus transport medium (VTM); any commercially available virus transport medium is acceptable. Maintain specimen at refrigerator temperature prior to and during transport.
  - **Test to order:** Measles virus RT-PCR.

- **Serum**
    - **Timing:** Collect at the same visit as the specimen for PCR.
    - **Notes:** Collect 7–10 ml of blood in a red top or serum separator tube (SST). Store specimens at refrigerator temperature. Transport at refrigerator temperatures using cool-packs. A repeat serum specimen should be collected and tested if IgM serology testing is negative for specimens collected within 72 hours of rash onset.
    - **Test to order:** IgM and IgG serology.

The following specimens may be recommended in certain circumstances.

- **Convalescent serum**
    - **Timing:** Collect 2–3 weeks after collection of the acute serum.
    - **Notes:** Paired (acute and convalescent) sera can be of value for patients with no history of vaccination or with seronegative acute specimens.
    - **Test to order:** IgM and IgG serology.

- **Urine**
    - **Timing:** Collect within 10 days of rash onset.
    - **Notes:** Collect 10–50 ml of first-voided morning urine in an empty container; do not add virus transport medium. Maintain the urine specimen at refrigerator temperature prior to and during transport. Note that urine is not a preferred specimen.
    - **Test to order**: Measles virus RT-PCR.

Additional information:

- Only symptomatic individuals with a rash should be tested for measles.
- Testing in the prodromal period (before the rash appears) can result in false negative results and necessitate testing again later in the course of illness.
- If testing an asymptomatic individual for proof of immunity, request only the IgG test.
- Isolation of measles virus by culture is not recommended.

Public health laboratories

All testing for suspect measles cases should be sent to a public health laboratory in Wisconsin.

- **Wisconsin State Lab of Hygiene (WSLH)**
  Details about specimen collection, transport, and testing can be found on the WSLH website. For additional details on WSLH testing please call customer service at 800-862-1013.

  The WSLH can perform real-time PCR for the detection of measles, real-time PCR to distinguish wild-type measles strain from vaccine-strain, and IgM and IgG serology. Specimen types for PCR at the WSLH include NP/OP swabs in VTM and urine. This testing along with fee-exempt status should be coordinated through the local or Tribal health department and the state Immunization Program (during normal business hours at 608-267-9959 and after hours at 800-943-0003).

- **Milwaukee Health Department Laboratory (MHDL)**

For entities in the Milwaukee area, real time PCR for detection of measles at City of Milwaukee Department Laboratory (MHDL) may be an option. This should be coordinated through the City of Milwaukee Health Department Communicable Disease Team, prior to specimen collection, at 414-286-6800. If testing is approved by the City of Milwaukee Health Department Communicable Disease Team, it can be performed fee-exempt at the MHDL. Specimen types for PCR at the MHDL include OP swab in VTM, NP swab in VTM, nasal swab in VTM, NP/OP combination swabs in VTM, and urine.

Additional information: If serum specimens were collected for immunity testing only, the specimen should be sent to a commercial laboratory. Only the IgG test should be requested.

Post-vaccination testing

About 5% of individuals who receive a measles-containing vaccine will develop a fever and rash.

If laboratory testing is performed, the PCR results will be positive. Further testing will be needed to differentiate measles vaccine virus from wild type infection. The WSLH can perform this test.

If a recently vaccinated individual has fever and rash but no risk factors for measles, measles is unlikely, and testing is usually unnecessary.

5. Reporting responsibilities

Purpose of surveillance and reporting:

- To identify all cases and susceptible exposed people rapidly, and to prevent further spread of this highly contagious disease.
- To identify the source of infection. Genotyping (performed at CDC) of viral isolates allows for determination of patterns of importation and transmission.
- To help in the international effort to eradicate measles.

Laboratory and health care provider reporting requirements

Measles is a Category I Reportable Disease according to Wisconsin Department of Health Services (DHS) regulations (DHS 145.04). Health care providers should immediately report to the local or Tribal health department (LTHD), by telephone, all suspect, probable, and confirmed cases of measles. Within 24 hours, health care providers should also submit a case report online through the Wisconsin Electronic Disease Surveillance System (WEDSS) or by mail or fax using an Acute and Communicable Disease Case Report (F44151).

Laboratories performing examinations on any specimens derived from Wisconsin residents that yield evidence of measles infection should report the case to the LTHD online through WEDSS or by fax using an Acute and Communicable Disease Case Report (F44151).

LTHD contact information can be found on the DHS Local Public Health web page.

6. Case investigation

Step 1: Notification of a suspect case

When the LTHD is notified of an individual who is suspected to have measles, gather the following information:

- Clinical presentation, including onset dates.
- Measles vaccination history.
- Travel or other possible exposure within 21 days prior to symptom onset.
- Laboratory information (for example, specimens collected, tests ordered, and laboratory used).
- Differential diagnosis being considered.
- Status and results of other laboratory testing (for example, respiratory panel or strep test).

See Appendix A for a sample intake form that can be used for information gathering.

Step 2: Ensure infection prevention

- Initial management in clinical settings:
    - Screen all patients for febrile rash illness, either prior to or immediately on arrival at the intake area.
    - Immediately have the patient mask and escort to a separate waiting area or place immediately in a negative pressure room, if available.
    - Staff caring for a patient suspected/confirmed for measles should wear a fit-tested N95 respirator at all times.
    - If the patient is not admitted, maintain standard and airborne infection isolation, including while patient is exiting the facility (for example, use a separate exit). Patients should receive instructions to remain in isolation at home through 4 days after rash onset.
    - Identify areas of the facility that may be contaminated based on the patient's movements within the facility and the airflow within the facility. Measles virus can remain suspended in the air for up to 2 hours. Therefore, we recommend that susceptible patients not be placed in a room that has been occupied by a suspect case for 2 hours following the case's exit from that room.
- Isolate the suspect case:
    - Individuals who are suspected of having measles should be instructed to isolate at home until measles has been ruled out, or until their infectious period is over, whichever is sooner.

Step 3: Local and Tribal health department (LTHD) reporting responsibilities

Each LTHD must report all suspect, probable, and confirmed cases of measles to the state Immunization Program immediately by phone by calling 608-267-9959 during normal business hours and after hours at 800-943-0003. Be ready to provide the disease incident number as well as information about the case.

Step 4: Complete case investigation

- Complete interview with case, focusing on the following:
    - Possible source of infection.
    - Travel history within 21 days prior to symptoms onset, including flight or maritime information.
    - Risk factors for severe disease.
    - Assessment of individuals and places where exposure to measles may have occurred during the individual's infectious period. (Note: If the case traveled while infectious, notify the immunization program by email as soon as possible.)
- Provide education on the following topics:

    - Isolation period.
    - Steps to follow if medical care is needed.
    - Measles related information.
- Complete the WEDSS case report form and set the process status to “Sent to State” when documentation is complete.

7. Contact investigation

This section provides detailed control guidelines to protect contacts and limit or prevent the spread of disease. The LTHD will take the lead on implementing control measures, in collaboration with the state Immunization Program.

Step 1: Define the dates during which the case was infectious

Patients with measles are infectious from 4 days before rash onset through 4 days after rash onset (counting the day of rash onset as day zero), for a total of 9 days.

Step 2: Identify all individuals who were exposed to the case during their infectious period

Measles is so contagious that everyone in a location is often considered exposed. In some instances, a review of institutional floor plans and air flow patterns may be necessary to determine which individuals are considered exposed. Consider:

- Household members.
- Close contacts identified by case, such as friends or visitors.
- Health care personnel (HCP) and patients in health care settings.
- School and childcare centers.
- Coworkers, classmates, and social network.
- Passengers on same conveyance or that traveled through same terminal, or public transportation.
- Patrons of public locations, such as stores, restaurants, or place of worship.

Note: For contacts who are non-residents of Wisconsin, please notify the state Immunization Program, who will notify other states.

Step 3: For each identified contact gather information.

Taken together, these three factors will determine the management of each contact.

- First and last date of exposure to the case.
- Measles immunity status.
- Whether they are at high risk for severe measles disease and if they live or work in high-risk settings.

Evidence of immunity may include the following:

- Written documentation of vaccination.
- Laboratory evidence of immunity.
- Birth before 1957.
- Laboratory confirmation of disease.

For all identified contacts it is important to understand their risk status.

- **Low-risk contact:** A low-risk contact is a person who is not at high risk of experiencing severe measles illness.

- **High-risk contact:** A high-risk contact is a person who may experience severe illness if they become infected with measles, this includes:
    - Infants under 12 months.
    - People who are pregnant.
    - People who are immunocompromised.
- **Low-risk setting:** A low-risk setting is one in which transmission is unlikely and multiple high-risk contacts are not present.
- **High-risk setting:** A high-risk setting is one in which transmission is likely because high-risk individuals are present. For routine follow-up, this is defined as health care and childcare with infants under 12 months.

In certain situations, these definitions maybe expanded to include additional people or places. These recommendations would reflect the epidemiology of the case(s) and the community/population affected.

Step 4: Management of Contacts

All contacts need to be notified of their exposure and provided education about what to do if they develop symptoms. If symptoms consistent with measles develop, contact should be instructed to notify their LTHD and immediately isolate. Testing for measles should be arranged.

Based on the information gathered in step 3, public health can make recommendations specific to each contact.

Recommendation 1: Management of low-risk contacts with proof of immunity.

The following require only notification, education, and self-monitoring:

- Individuals with 2 documented doses of MMR.
- Individuals with laboratory evidence of immunity.
- Individuals with evidence of laboratory confirmed disease.
- Most individuals born before 1957 (see Table 3 for exceptions).

Recommendation 2: Provide protection for susceptible contacts, assess eligibility for post-exposure prophylaxis (PEP).

PEP with MMR vaccine: All contacts who are within 72 hours of their first exposure and are not up-to-date with MMR vaccine should be offered MMR vaccine. Contacts who work in a high-risk setting may also be eligible to receive MMR as PEP.

Additional Information:

- MMR given within 72 hours may prevent measles disease.
- Vaccinating an exposed individual who may be incubating measles virus is not harmful.
- MMR vaccination beyond 72 hours is not considered PEP for this exposure but will provide protection in the event of future exposures.
- For infants aged 6 through 11 months, MMR vaccine can be administered in place of IG if administered within 72 hours of exposure. If beyond the 72 hours of exposure, IG should be administered within 6 days of exposure.
- For more information on spacing of MMR vaccination, see ACIP Timing and Spacing Guidelines for Immunization.

PEP with measles immune globulin (IG): IG may be given within 6 days of first exposure to eligible contacts.

Additional Information:

- Giving IG PEP can extend the incubation period; therefore, exclusion is extended to 28 days after last exposure for individuals who have received IG PEP.
- People who receive IG more than 6 days after the first exposure to the case while the case is infectious should be placed in quarantine.
- See Measles IG PEP Guidance (Appendix B) for additional information.

Recommendations 3: Assess and implement quarantine and exclusion.

Quarantine and exclusion are tools used to reduce the likelihood that a susceptible contact will spread measles. Imposing quarantine measures can be disruptive and should be used strategically but may be necessary. Exclusion is less restrictive and less disruptive. A person may be excluded from high-risk settings but not quarantined at home. Use the tables below to determine quarantine and/or exclusion for each contact.

Each contact will have a date range during which they may develop symptoms based on their date(s) of exposure to the index case. That date range is used for quarantine and exclusion.

- **If there was a discrete (one-time) exposure**: Calculate days 7–21 from that exposure using date of exposure as day zero. The susceptible contact may return to normal activities on the 22nd day after the one-time exposure.
- **If there were continuous or multiple dates of exposure**: Calculate day 7 from the first date of exposure using the first date of exposure as day zero. To calculate day 21 from the last date of exposure, use the last day of exposure as day zero. This will be longer than 14 days. The susceptible contact may return to normal activities on the 22nd day after the last date of exposure.
- **Exception**: Exclusion from health care settings **start on day 5** after first exposure.

Additional Information:

- If an individual is unable to provide proof of immunity and is outside the 72-hour window for MMR PEP, IgG (titer) testing may be considered. The individual should quarantine starting on day 7 after first exposure while awaiting results. If IgG is negative the individual will need to finish quarantine, which is 21 days after last exposure. If the IgG is positive, indicating immunity, the contact may be released from quarantine in nearly all cases.
- Individuals who are able to provide acceptable proof of immunity after the start of quarantine and/or exclusion may be released. For example, an individual had a titer drawn on day 6 following their first exposure. The results were not available until day 10. This individual would need to quarantine at home on day 7, 8, 9, and 10, but quarantine should be discontinued on day 11, assuming the IgG was positive.

Table 1: Management of contacts aged 1–4-years-old

Number of Pre-Exposure Doses of MMR	MMR Received Within 72 Hours	Quarantine at home	Exclusion from high-risk setting	Active Monitoring Recommended
0	0	Yes	Yes	Yes
0	1	No	No	Consider
1	0	No	No	Consider
1	1	No	No	No

Table 2: Management of contacts aged 5–18-years-old					
Number of Pre-Exposure Doses of MMR	**MMR Received Within 72 Hours**	**Quarantine at home**	**Exclusion from school and school activities**	**Exclusion from high-risk setting**	**Active Monitoring Recommended**
0	0	Yes	Yes	Yes	Yes
0	1	No	No	Yes	Yes
1	0	No	Yes, until 2nd dose received	Yes	Yes
1	1	No	No	No	No
2	0	No	No	No	No

Addition Information for School Settings:

Students whose first and only MMR dose is PEP are recommended to receive the second dose 28 days later. If there is a subsequent exposure, they will need to be excluded from school until the second dose is received.

Schools are generally not high-risk settings, however students with only one dose are not up-to date for age and are not in compliance with school law, DHS 144. Therefore, students with one dose who do not receive MMR PEP within 72 hours will need to be excluded from school until the second dose is received or 21 days after last exposure. The student may return to school as soon as the second dose is received even if it is after 72 hours of first exposure.

Table 3: Management of contacts aged 19 years and older.				
Number of Pre-Exposure Doses of MMR	**MMR Received Within 72 Hours**	**Quarantine at home**	**Exclusion from high-risk setting**	**Active Monitoring Recommended**
0	0	Yes	Yes	Yes
0	1	No	Yes	Consider
1	0	No	Yes	No
1	1	No	No	No
2	0	No	No	No
Adults born before 1957				
0	0	No	Yes	No
0	1	No	Yes	No
1	0	No	Yes	No
1	1	No	No	No
2	0	No	No	No

Table 4: Management of high-risk infants under 12 months of age
Refer all infants to their provider

Number of Pre-Exposure Doses of MMR	MMR Received Within 72 Hours	IG within 6 days	Quarantine at home	Exclusion from high-risk setting	Active Monitoring Recommended
Infants under 6 months					
MMR is not indicated. IG is the only PEP available. Refer these infants to their provider.		No	Yes	Yes, through day 21	Yes
		Yes	No	Yes, through day 28	Yes
Infants between 6–12 months					
0	0	No	Yes	Yes, through day 21	Yes
0	Not indicated	Yes	No	Yes, through day 28	Yes
0	1	Not indicated	No	Yes, through day 21	Yes
1*	Not indicated	Consult with DHS			

*Per ACIP recommendation for infants traveling internationally

Table 5: Management of pregnant individuals
Refer pregnant individuals to their provider, see table below for public health management. If a pregnant individual is unable to find documentation of presumptive evidence of immunity but it is likely that they had received vaccine or had measles disease, it is recommended that pregnant individuals be tested for measles IgG prior to administering IG.

Number of Pre-Exposure Doses of MMR	MMR Received Within 72 Hours	IG within 6 days	Quarantine at home	Exclusion from high-risk setting	Active Monitoring Recommended
0	Not indicated	No	Yes	Yes, through day 21	Yes
0	Not indicated	Yes	No	Yes, through day 28	Yes
1	Not indicated	No	No	Yes, through day 21	Yes
1	Not indicated	Yes	No	Yes, through day 28	No
2	Not indicated	Not indicated	No	No	No

Table 6: Management of severely immunocompromised individuals
Refer all severely immunocompromised individuals to their provider

Number of Pre-Exposure Doses of MMR	MMR Received Within 72 Hours	IG within 6 days	Quarantine at home	Exclusion from high-risk setting	Active Monitoring Recommended
Not taken into consideration	Not indicated	No	Yes	Yes, through day 21	Yes
		Yes	No	Yes, through day 28	Yes

Step 5: Public Notifications

If transmission may have occurred in a public place where potentially exposed individuals cannot be identified, a news release may be the best way to inform the public. Coordinate public notifications with the state Immunization Program.

8. Special considerations in the health care setting

Infection Prevention

For detailed recommendations on infection prevention measures in the health care setting, see the CDC Interim Infection Prevention and Control Recommendations for Measles in Healthcare Settings guidance.

Management of contacts who work in a health care setting

For the purpose of this guidance, a health care setting is defined as "all inpatient and outpatient health care facilities and long-term care facilities" (for example, nursing homes and assisted living facilities).

All staff working in health care facilities, regardless of year of birth, should have proof of 2 doses of measles vaccine or serologic proof of immunity.

Follow-up should be coordinated with the health care institution, in collaboration with their policies. Public health should refer to the tables above for management of these individuals outside of the health care setting.

Number of Pre-Exposure Doses of MMR	MMR Received Within 72 Hours	Exclusion from the health care setting beginning on day 5 after first exposure through day 21 after last exposure
0	0	Yes
0	1	Yes
1	0	Yes
1	1	No
2	0	No

Management of exposed individuals who are now seeking health care

Asymptomatic individuals with proof of immunity:

- No additional precautions needed.
- Titers are not recommended in individuals with valid, documented doses of MMR.

Individuals experiencing symptoms, regardless of vaccination history:

- Notify health care facility prior to arrival.
- Facility should place individual in airborne isolation and take steps to ensure they can safely be evaluated.
- See sections 4 through 6 for guidance.

Asymptomatic patients without proof of immunity:

- Elective appointments should be deferred or conducted via telehealth.
- If it is not possible to defer, use airborne precautions.
- If this is not available, take precautions to minimize the risk of exposure. This includes masking the patient, staff use of fit-tested N95 respirators, using exam room with a door, scheduling the patient visit at the end of the day when no other patients are present, not having them wait in the waiting room.

- In the inpatient setting use airborne isolation from day 5 after the earliest exposure through day 21 after the last exposure to the case during their infectious period.

9. Outbreaks

Considerations in an outbreak setting

- DHS, in coordination with the LTHD, will determine an outbreak. For reporting purposes, the CDC defines an outbreak as 3 or more related cases.
- In general, 3 related cases of measles will not trigger a change in recommendations.
- Any changes to specific recommendations will depend on the epidemiology of the cases and the community/population affected and will be made in collaboration with the state epidemiologist and CDC subject matter experts.
- An outbreak may be regional; recommendations implemented in one part of the state may not apply state-wide.

Recommendations that will likely not change

- Isolation of suspect, probable and confirmed cases.
- PEP to exposed, susceptible individuals.
- General process of contact tracing.

Recommendations that may change in an outbreak setting

- **Case definition criteria:** For example, residence within a certain county may be added for a probable case or the definition of an epi-linkage may be expanded.
- **Vaccination recommendations:** For example, a second dose recommended for all children 1 to 4 years.
- **Acceptable evidence of immunity:** For example, one MMR or birth before 1957 may not be sufficient.
- **Level of suspicion for testing:** For example, screening may include local travel or attendance at specific venues.
- **Definition of high-risk settings and high-risk individuals:** For example, a certain school could be determined to be a high-risk setting. In which case, exclusion from that school would apply for some individuals, who would not otherwise be quarantined.
- **Timelines used to calculate quarantine and exclusion:** For example, exclusion of susceptible individuals would be 21 days from the date of rash onset in the last case if there are multiple cases within a defined setting.

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Appendix A: Measles Intake Form

Last name	First name	DOB
Address		
Phone		

Symptom	**Yes / No**	**Other details**	
Rash		Date of onset: Description and spread:	
Fever		Highest temp:	
Cough			**Infectious period:**
Coryza			
Conjunctivitis			
Koplik spots			
Other			Using date of rash onset as day zero, first day of infectious period is day -4, last day of infectious period is day +4 (9 total days).

Lab test	**Source (NP, throat)**	**Date collected**
PCR		
Serology (IgM)		

Ordering provider _____

What other testing was done (and results)?_____

Ensure all samples are sent to the Wisconsin State Lab of Hygiene

Risk	**Yes / No**	**Other details**
MMR vaccination		Date MMR1: MMR2:
Travel in past 21 days		Destination: Dates:
Exposure to other with similar symptoms		

Calendar

Use the calendar below to track the infectious period.

Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**

Appendix B: Immune Globulin (IG) Measles Post-Exposure Prophylaxis (PEP) Susceptible Contacts

Risk Factor	Time from first exposure	
	Less than 72 hours	**72 hours through day 6**
Infant less than 6 months old	Give intramuscular IG (IGIM): 0.5 mL/kg	Give IGIM: 0.5 mL/kg[3]
Infant age 6 through 11 months	Give IGIM: 0.5 mL/kg or Give MMR vaccine	Give IGIM: 0.5 mL/kg[3]
Susceptible pregnant people	Give intravenous IG (IGIV): 400 mg/kg	Give IGIV: 400 mg/kg
Severely immunocompromised	Give IGIV: 400 mg/kg	Give IGIV: 400 mg/kg[3]

Reminders

- People at high risk for severe illness and complications from measles should be prioritized to receive IG. These include:
    - Infants less than 12 months.
    - Susceptible pregnant people.
    - Severely immunocompromised individuals (regardless of previous measles vaccination status).
- IG is not indicated for people who have received one or more doses of measles-containing vaccine at age 12 months or older, unless they are severely immunocompromised.
- People do not need IGIV if:
    - They have already received or are currently receiving IGIV therapy at a dose of 400 mg/kg within three weeks before measles exposure.
    - They received subcutaneous IG (IGSC) at a dose of at least 200 mg/kg for two consecutive weeks up to or through their measles exposure.

Contraindications

- IG should not be given to people with immunoglobulin A (IgA) deficiency. People with IgA deficiencies have the potential for developing antibodies to IgA and therefore could experience an anaphylactic reaction when IG is administered.
- IGIM should not be administered to people with severe thrombocytopenia or any coagulating disorder that would contraindicate intramuscular injections.
- History of anaphylactic reaction to a previous dose of IG.

Precautions

- Pregnancy: It is unknown whether IG can cause fetal harm when administered to a pregnant person or if it could affect reproduction.
- Careful administration in people reporting a history of systemic allergic reaction following the administration of IG.

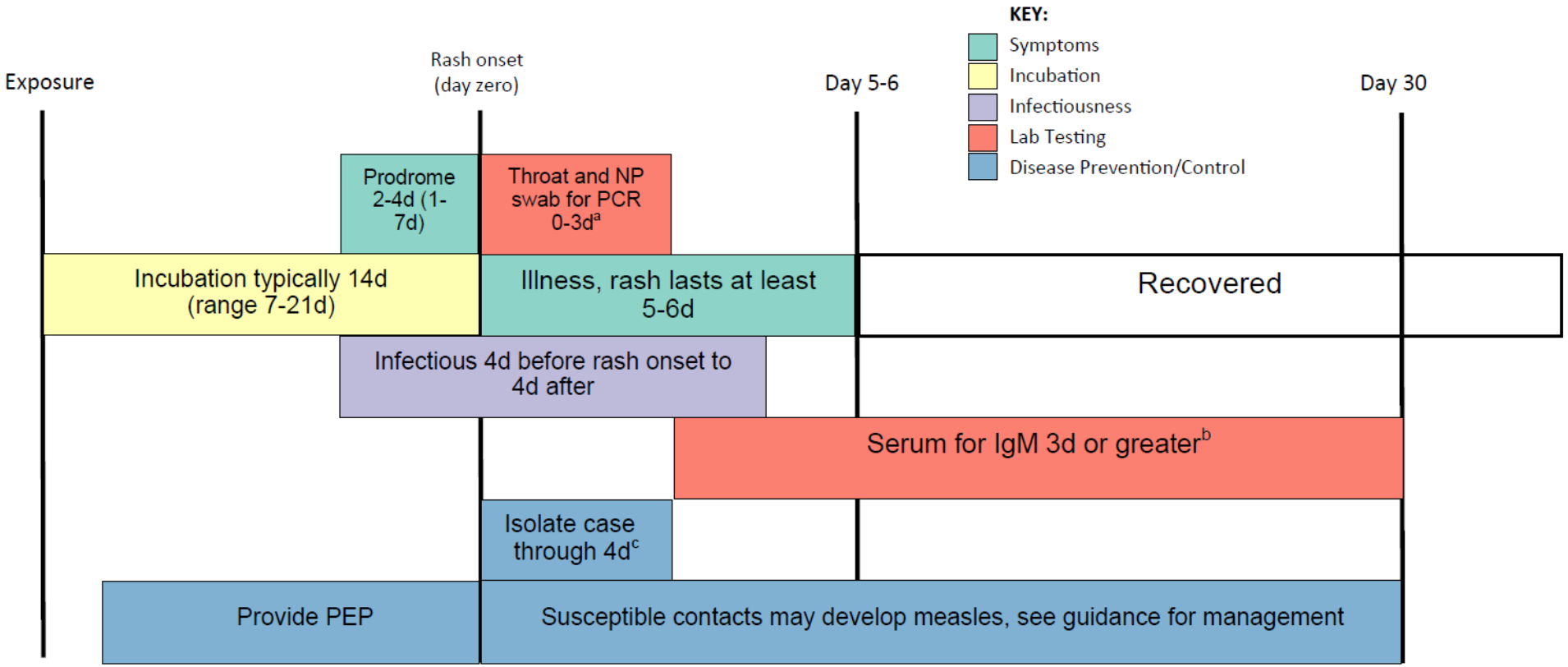
Additional Information:

- **Receipt of MMR after IG or IG after MMR:**
    - **MMR after IG:** Any susceptible person exposed to measles who received IG should subsequently receive MMR vaccine provided the person is 12 months of age or older and the vaccine is not otherwise contraindicated. MMR vaccine should be administered:
        - No earlier than six months after IGIM administration.
        - No earlier than eight months after IGIV administration.
    - **IG after MMR:** If IG is administered within two weeks following the administration of MMR or varicella vaccine, the individual should be revaccinated. MMR vaccine should be administered:
        - No earlier than six months after IGIM administration.
        - No earlier than eight months after IGIV administration.

- **IGIM dosing:** Intended for use in people weighing less than 30 kg (66 lbs).
    - Administer 0.5 mL/kg of intramuscular IG (IGIM) in the anterolateral aspect of the upper thigh(s). Do not follow package inserts that indicate a 0.25 mL/kg dose as this lower dose does not reflect current ACIP recommendations.
    - Do not administer more than 3mL of IGIM per injection site; for infants and children weighing less than 6 kg, multiple injections are required.
    - The maximum **total** dose per IGIM administration is 15 mL.

- **Severely immunocompromised measles contacts include:**
    - People with severe primary immunodeficiency (regardless of age, vaccination status, or type of exposure).
    - Bone marrow or stem cell transplant recipients who are receiving immunosuppressive treatment or completed treatment within past 12 months (or longer if developed graft-versus-host disease).
    - People currently receiving treatment for acute lymphocytic leukemia (ALL) or who completed chemotherapy for ALL within previous 6 months.
    - People with human immunodeficiency virus (HIV) infection with a CD4 T-lymphocyte count less than 200 cells/mm3 (under 5 years old) and percentage less than 15 (all ages) (some experts include HIV-infected persons who lack recent confirmation of immunologic status or measles immunity).
    - People receiving daily corticosteroid therapy with a dose at least 20 mg (or greater than2 mg/kg/day for patients who weigh less than 10 kg) of prednisone or equivalent for 14 days or more.
    - People receiving certain immunomodulatory medications (for example, tumor necrosis factor-alpha (TNF-α) blockers).

Appendix C: Measles Timeline Graphic



Footnotes:

a. Preferred timing for collecting throat and np swab is 0-3 days after rash onset but no later than 10 days. Urine can also be collected for PCR.
b. IgM collected prior to day 3 may result in a false negative. Serum for IgG can be obtained ASAP after onset but is not helpful if a convalescent is not obtained 10-30 days after the initial.
c. Count the day of rash onset as day zero. May return to normal activities on day 5.