Measles

Frequently Asked Questions

Providers

Measles Overview

What is measles and what are the symptoms?

Measles is a viral disease that is spread through respiratory droplets when an infected person coughs or sneezes. It is not just a rash and can be dangerous, especially for babies and young children. Measles is one of the most contagious diseases. If one person has it, up to nine out of 10 people nearby will become infected if they are not immune.

Patients can contract measles by being in a room where a person with measles has been even up to two hours after the person has left the room. If someone is infected with measles, they can spread it to others starting four days before through four days after the rash starts. An infected person can spread measles to others even before knowing they have the disease.

Symptoms typically appear seven to 14 days after exposure and include:

- High fever (may spike to more than 104° Fahrenheit).
- Cough.
- Runny nose (coryza).
- Red, watery eyes (conjunctivitis).
- Tiny white spots (Koplik) spots may appear inside the mouth two to three days after symptoms begin.
- Rash that appears three to five days after the first symptoms. It usually begins as flat red spots that appear on the face then spreads downward across the body.
    - Sometimes immunocompromised patients do not develop a rash.

Uncomplicated measles, from late prodrome to resolution of fever and rash, lasts seven to 10 days.

Measles Symptoms and Complications | Measles (Rubeola) | CDC
About Measles | Measles (Rubeola) | CDC

Who is at risk for complications?

Measles can be serious for all age groups. However, there are several groups more likely to suffer from measles complications:

- Children younger than 5 years of age.
- Adults older than 20 years of age.
- Pregnant women.
- People with weakened immune systems, such as from leukemia or HIV infection.

Measles Vaccination

What is presumptive evidence of immunity?

It is recommended that people who do not have presumptive evidence of immunity to measles, mumps and rubella should get vaccinated against these diseases.

Presumptive evidence of immunity can be established in any of the following ways:

- Written documentation of adequate vaccines for measles, mumps and rubella.
- Laboratory evidence of immunity.
- Laboratory confirmation of disease.
- Birth before 1957.
    - Although considered acceptable evidence of immunity for health care personnel in routine circumstances, health care facilities should consider vaccinating personnel born before 1957 who lack laboratory evidence of immunity or laboratory confirmation of disease.
    - Health care providers should not accept verbal reports of vaccination without written documentation as presumptive evidence of immunity.

Measles Vaccine Recommendations | Measles (Rubeola) | CDC

What are routine vaccine recommendations?

Children

The U.S. Centers for Disease Control and Prevention (CDC) recommends children get two doses of the measles, mumps, rubella (MMR) vaccine or measles, mumps, rubella, varicella (MMRV) vaccine:

- **First dose** at age 12 through 15 months.
- **Second dose** at age 4 through 6 years (before school entry).

Adolescents and adults

Adolescents through age 18 years are recommended for two doses of MMR vaccine. If they do not have two doses of vaccine, catch them up as soon as possible.

- The minimum interval between two doses of MMR vaccine is at least 28 days between dose one to dose two.

Adults 19 years and older should also be up to date on MMR vaccinations with either one or two doses (depending on risk factors); unless they have other presumptive evidence of immunity to measles, mumps and rubella. Ensuring a two-dose series of MMR vaccination is especially important for specific groups including:

- Students at post-high school education institutions.
- International travelers.
- Health care personnel.
- Close contacts of immunocompromised people.
- People with HIV infection (absence of severe immunosuppression).
- Adults who got inactivated measles vaccine (1963-1967).
- Groups at increased risk during measles outbreak.

[Measles Vaccination for Specific Groups | Measles (Rubeola) | CDC]
[Recommended Adult Immunization Schedule for ages 19 years or older; 2025 U.S.]

Do adults who have already been vaccinated need a booster?

Most vaccinated adults are immune to measles and do not need further vaccines, but here is a closer look at recommendations.

Adults who would be recommended for zero doses:

- Those born before 1957, except health care personnel*.
- Those born 1957 or later who are at low risk (e.g., not an international traveler or health care worker or person attending college or other post-high school educational institution) and who have already received one or more documented doses of live measles vaccine.
- Adults with laboratory evidence of immunity or laboratory confirmation of measles.

Adults recommended for one dose of MMR vaccine:

- Those born in 1957 or later who are at low risk (e.g., not an international traveler, health care worker or person attending college or other post-high school educational institution) and have no documented vaccination with live measles vaccine and no laboratory evidence of immunity or prior measles infection.

Adults recommended for two doses of MMR vaccine:

- Those who are high-risk without any prior documented live measles vaccination and no laboratory evidence of immunity or prior measles infection, including:
  - Health care personnel*.
  - International travelers born in 1957 or later.
  - People attending colleges and other post-high school educational institutions.

People who previously received a dose of measles vaccine between 1963–1967 and are unsure which type of vaccine it was, or are sure it was inactivated measles vaccine, should be revaccinated with either one (if low-risk) or two (if high-risk) doses of MMR vaccine. If the vaccine given was the live virus vaccine, the dose is considered valid and does not need to be repeated.

**Health care personnel born before 1957 should be considered for MMR vaccination in the absence of an outbreak but are recommended for MMR vaccination during outbreaks.*

Providers have clinical discretion and can establish a policy for their office to educate and vaccinate adults born before 1957 or those who only need one dose to receive up to two MMR doses regardless of age/risk if the patient requests vaccination unless there are contraindications.

If a patient is not sure of their immunity or vaccination status, the best defense against measles is vaccination and it **is safe to get a measles vaccine**.

[Routine MMR Vaccination Recommendations: For Providers | CDC]

Who should *not* be vaccinated against measles?

Contraindications and precautions to vaccination generally dictate circumstances when vaccines will not be given. For further guidance on contraindication and precautions review these resources:
[Contraindications and Precautions | Vaccines & Immunizations | CDC.]
[Immunization Schedules | Vaccines & Immunizations | CDC.]

[Chapter 13: Measles | Pink Book | CDC.]

- **Contraindication to MMR vaccination.**
  - Severe allergic reaction after a previous dose of MMR or to any vaccine component.
  - Severe immunodeficiency.
    - Hematologic and solid tumors, receipt of chemotherapy, congenital immunodeficiency, long–term immunosuppressive therapy or patients with HIV infection who are severely immunocompromised.
  - Family history of altered immunocompetence, unless verified clinically or by laboratory testing as immunocompetent.
  - Pregnancy.

- **Precaution to MMR vaccination.**
  - Moderate or severe acute illness with or without fever.
  - Recent (≤11 months) receipt of antibody-containing blood product (specific interval depends on product).
  - History of thrombocytopenic purpura or thrombocytopenia.
  - Need for tuberculin skin testing or interferon-gamma release assay (IGRA) testing.

How long does it take for the measles vaccine to work in the body?

For the measles vaccine to work, the body needs time to produce protective antibodies. People are usually fully protected after about two or three weeks.

If the patient is traveling internationally, make sure they are up to date on measles vaccinations. The patient should plan to be fully vaccinated at least two weeks before departure. If the trip is less than two weeks away and they are not protected against measles, a dose of measles vaccine should still be given.

Measles Vaccine Safety

Where can I find more information to help address concerns about vaccine safety?

There are many websites that have information about vaccine safety, including the American Academy of Pediatrics, the CDC, Vaccinate Your Family, Immunize.org, the National Academies of Science, Engineering, and Medicine and the Vaccine Education Center of the Children's Hospital of Philadelphia.

Resources:

- Vaccinations Are Safe: Explaining Why.
- Are Vaccines Safe? - Vaccinate Your Family.

Measles Exposure and Outbreak Questions

What infection prevention steps should be taken if there is a suspected case of measles in a pediatric office?

Health care providers should familiarize themselves with the clinical features of measles to quickly identify and minimize the spread of the virus. Measles should be considered in any patient presenting with febrile rash illness, especially if unvaccinated for measles or has traveled internationally in the last

21 days. Providers should ask about recent international travel, exposure to international travelers, travel to areas with active measles or exposure to people with measles.

It is important to follow Infection prevention precautions, including immediate public health notification when treating suspected measles cases. Every office, emergency room and health system should review their policies and procedures for disease management.

Below is a quick summary of recommended infection prevention and control practices:

- Provide face masks for patients (2 years of age and older) and family before they enter the facility. Patients unable to wear a mask should be "tented" with a blanket or towel when entering the facility.
- Immediately move patient and family to an isolated location, ideally an airborne infection isolation room if available. If unavailable, use a private room with the door closed.
- No other children should accompany a child with suspected measles.
- Patients (2 years of age and older) and family should leave face masks on if feasible.
- Standard and airborne precautions should be followed, including use of N95 mask.
- Only health care providers with evidence of measles immunity should provide care.
    - Knowing your staff's immunity status ahead of time is important before an exposure situation occurs.
    - For health care provider guidance: [Measles | Infection Control | CDC.]

Where can I find information about potential measles cases in Michigan?

The Michigan Department of Health and Human Services (MDHHS) has a webpage that provides guidance on measles both nationally and in the state. [Measles Updates]

If there is an outbreak in my area, can we vaccinate children younger than 12 months?

MMR vaccine can be given to children as young as 6 months of age who are at high risk of exposure such as during international travel or a community outbreak. However, doses given BEFORE 12 months of age cannot be counted toward the two-dose series for the MMR vaccine.

Should a child traveling to a county where an outbreak is occurring receive the MMR vaccine between 6 and 11 months of age?

- MDHHS does not routinely recommend that infants under 12 months of age traveling within the United States be vaccinated, **unless** there is travel to an outbreak area and there is a chance of encountering the affected outbreak population or community.
- On a case-by-case basis, the provider should assess the risk during an outbreak and evaluate the likelihood that a child might encounter a case.
- The provider should use their clinical discretion on whether to vaccinate.
    - Note: Doses given before 12 months of age cannot be counted toward the routine two-dose series for the MMR vaccine.
    - For a child to be fully vaccinated, they need to receive two doses of MMR vaccine when they are 12 months of age and older.
    - The routine schedule for MMR vaccine is at 12-15 months and at 4-6 years.

Should a child traveling to a county where an outbreak is occurring be administered their second dose of MMR vaccine earlier than 4 through 6 years of age?

- Providers should follow the routine recommended schedule per the CDC. The second dose of MMR vaccine should be given at 4 through 6 years of age.
    - However, the minimum interval of 28 days between two doses of MMR vaccine must be maintained.
- If there is travel to an outbreak area and there is a chance of encountering the affected outbreak population or community, providers should use their clinical discretion and assess each case for their risk of exposure and need for MMR vaccine.
    - The second dose of vaccine can be given as soon as 28 days after the first dose. In this situation, the series would be considered complete.

Can Vaccines for Children (VFC) vaccine be used to vaccinate those 6 through 11 months of age or as the accelerated second dose?

- If a patient is VFC-eligible and the patient is identified as potentially encountering measles in an outbreak area or is travelling internationally, the health care provider may vaccinate and may use VFC vaccine.
- The 6- through 11-month MMR vaccine dose may be covered by VFC on a case-by-case basis and after appropriate medical assessment.
- VFC vaccine cannot be used for privately insured patients.
- Remember: Doses given before 12 months of age cannot be counted toward the routine two-dose series for the MMR vaccine.

Where do I find information about travel vaccinations and any travel warnings?

Travel warnings by destination can be found at Travelers' Health | CDC.

If a patient can't remember if they have been vaccinated and they have no documentation of any doses, what should we do?

It is not necessary or recommended to titer the patient. Vaccinate them per the recommendations.

Should people have their titer checked just to confirm they are immune?

Vaccines are the most effective way to ensure immunity to measles. After vaccination, it is not necessary or recommended to test patients for antibodies to confirm immunity, and antibody levels are not always an accurate measure of our long-term immunity. This is why documented age-appropriate vaccination supersedes the results of subsequent serologic testing. According to CDC, if you were born after 1957 one dose of measles vaccine is sufficient to be considered protected from measles. Adults who are in a setting that poses a high risk for measles transmission should make sure they have had two vaccine doses. People who are unsure of their vaccine status should talk to their health care provider.

Measles Post-Exposure Prophylaxis

Who should be offered post-exposure prophylaxis (PEP)?

People exposed to measles who cannot readily show that they have adequate presumptive evidence of immunity against measles should be offered PEP. Public health officials can help identify eligible persons, assess any contraindications and weigh benefits.

There are two types of PEP for measles. To potentially provide protection or modify the clinical course of disease among susceptible persons, administer one of these:

- MMR vaccine, if administered within 72 hours of initial measles exposure.
- Immunoglobulin (IG), if administered within six days of exposure, may provide some protection or modify the clinical course of disease.

Don't administer MMR vaccine and IG simultaneously. This practice invalidates the vaccine.

Why is MMR vaccine recommended as PEP within three days of exposure to measles?

- Several published studies have compared attack rates among persons who received the MMR vaccine or single antigen measles vaccine (without gamma globulin) as PEP with those who remained unvaccinated after exposure to measles.
- MMR vaccine given within 72 hours of initial measles exposure can reduce the risk of getting sick or reduce the severity of symptoms.
- Effectiveness might depend on timing of vaccination and the nature of the exposure.
- PEP with MMR vaccine appears to be effective if the vaccine is administered within three days of exposure to measles in "limited" contact settings (e.g., schools, childcare and medical offices).
- Revaccination within 72 hours of exposure of those who have received one dose before exposure also might prevent measles disease.
- PEP with MMR vaccine does not prevent or alter the clinical severity of mumps or rubella. However, if the exposed person does not have evidence of mumps or rubella immunity, they should be vaccinated since not all exposures result in infection.
- Another option is giving exposed measles-susceptible people IG within six days of exposure.

Measles—Measles Vaccine-Preventable Disease Investigation Guideline

Where can we find IG?

It is important for each local health department, office and health system to have a plan in place and to know where to obtain IG for pPEP. MDHHS does not supply IG.

Work with your local health system and the IG manufacturers to have a process in place to ensure IG is readily available during times when post-exposure management is occurring.

If there is difficulty procuring IG, work with your local health care coalition, local health department and they can work with the state.

Measles Treatment

What is the treatment for measles?

Treatment includes bed rest, fluids and medicine for fever and headache. Antibiotics do not help and will not cure measles or prevent the disease. There are no antiviral drugs for treating measles

Should a person with measles stay home?
Measles is very contagious. Someone with measles is contagious from four days before the onset date of the rash through the end of the fourth day after the onset of the rash (the onset date of the rash is day zero). During this time, those infected should stay home and not attend work, school or social activities unless they are seeking medical care. If seeking medical care, patients should call ahead to the medical facility and local health department to make arrangements to minimize exposures.

Does Vitamin A prevent measles?
Vitamin A does not prevent measles; only the MMR vaccine can prevent measles. The best way to prevent measles is to be vaccinated with the recommended two doses of measles vaccine. Vitamin A should not be used to try to prevent measles nor should it be used in high dosages as it can lead to toxicity (e.g. nausea, vomiting, headache, fatigue, joint and bone pain, blurry vision, skin/hair problems, increased intracranial pressure, liver damage, confusion, coma, etc.). Vitamin A may be useful as a supplemental treatment once someone has a measles infection, especially if they have a severe case of measles or low vitamin A levels.

Most people get enough vitamin A in their diet from foods like carrots, bell peppers, fish, broccoli, yogurt and chicken. However, some people may need a supplement. Because vitamin A builds up in the body over time, there is a risk of vitamin toxicity with taking too much supplemental vitamin A. For example, during pregnancy vitamin A toxicity can cause birth defects.

Additional information can be found in the Measles Chapter of Red Book Online. Information to share with families can be found **here**.

Clinical Overview of Measles | Measles (Rubeola) | CDC

Measles Testing and Lab

What should we do if a patient has two valid doses of MMR in MCIR and their measles, mumps or rubella titer is negative, equivocal or shows a low level?

- The provider who ordered the titer should be the one to review and interpret the titer.
- If someone with two documented appropriately timed doses of MMR vaccine is tested serologically and is determined to have negative, equivocal or low-level results for measles, it is not recommended that the person receive an additional dose of MMR vaccine.
    - Exception: Women of childbearing age who have a negative rubella titer after two doses of a rubella-containing vaccine should receive a third and final dose of MMR vaccine (not during pregnancy).
- If there are two documented doses of MMR vaccine and both of those doses are valid, then a titer is not recommended under any circumstances.

What specimen should be collected for measles testing?

Laboratory confirmation is essential for all outbreaks and sporadic measles cases and should be attempted for all cases when measles is a suspected diagnosis. For more information, see Measles

Investigation Guidelines and the MDHHS Bureau of Laboratory's (BOL) Measles Specimen Collection Instructions.

- PCR is the preferred method of testing and PCR testing is offered at MDHHS BOL. Please call ahead to the Division of Immunization at 517-335-8159 or call your local health department to facilitate testing.
    - Collect a nasopharyngeal swab (NP) or throat swab as soon after rash onset as possible, ideally within three days, but no later than 10 days post-rash onset.
    - PCR specimen should be sent to BOL. Turnaround-time is expected to be 48 hours or less. Please refer to Instructions for Specimen Collection.
- IgM (serology) should additionally be collected between the third and 30th day post-rash onset. NOTE: Measles IgM tests that are negative and were collected less than 72 hours after the rash onset should be repeated using sera collected 72 or more hours after rash onset. **IgM can be sent to a commercial lab for testing.**
- Collection of urine may enhance the likelihood of successful measles viral isolation and may be advisable in some situations such as when more than five days, but no more than nine days, have passed since rash onset. It is not advisable to only collect urine; it should be collected in conjunction with a NP or throat swab and serology.

Dispelling Misinformation Around Vaccination

Does the MMR vaccine cause autism?
There is no scientific evidence that any vaccine, including MMR, causes autism. View information on Autism Spectrum Disorder from the American Academy of Pediatrics.

In 1998, a British researcher named Andrew Wakefield raised the notion that the MMR vaccine might cause autism. In the medical journal The Lancet, he reported the stories of eight children who developed autism and intestinal problems soon after receiving the MMR vaccine. To determine whether Wakefield's suspicion was correct, researchers performed a series of studies comparing hundreds of thousands of children who had received the MMR vaccine with hundreds of thousands who had never received the vaccine. They found that the risk of autism was the same in both groups. The MMR vaccine didn't cause autism. Some parents wary of the safety of the MMR vaccine stopped getting their children immunized. As immunization rates dropped, outbreaks of measles and mumps led to hospitalizations and deaths that could have been prevented.

Then What Does Cause Autism? - by Thomas Farley

Vaccine Resources

Measles

- Measles Updates.
- Recognizing and Addressing Measles in a Pediatric Practice.
    - Think Measles: Recognizing and Addressing Measles in Pediatric Practice.

- Measles Vaccination for Specific Groups | Measles (Rubeola) | CDC.
- Ask The Experts About Vaccines: MMR (Measles, Mumps, and Rubella) | Immunize.org.
- Clinical Guidance on Measles | Free Clinical Guidance | Healio.

How can I talk to others about getting vaccinated?

- Voicesforvaccines.org/course/becoming-trusted-messengers/.

Where can I find information about vaccines and vaccine safety?

- Vaccineinformation.org/.
- Vaccinesafety.edu/.