



# Measles (Rubeola)

## SIGNS AND SYMPTOMS

The symptoms of measles generally appear about seven to 14 days after a person is infected.

### Measles typically begins with

- ▶ High fever
- ▶ Cough
- ▶ Runny nose (coryza)
- ▶ Red, watery eyes (conjunctivitis).

Two or three days after symptoms begin, tiny white spots (Koplik spots) may appear inside the mouth.

Three to five days after symptoms begin, a rash breaks out. It usually begins as flat red spots that appear on the face at the hairline and spread downward to the neck, trunk, arms, legs, and feet. Small raised bumps may also appear on top of the flat red spots. The spots may become joined together as they spread from the head to the rest of the body. When the rash appears, a person's fever may spike to more than 104° Fahrenheit.

After a few days, the fever subsides and the rash fades.

## TRANSMISSION

Measles is a highly contagious virus that lives in the nose and throat mucus of an infected person. It can spread to others through coughing and sneezing. Also, measles virus can live for up to two hours on a surface or in an airspace where the infected person coughed or sneezed. If other people breathe the contaminated air or touch the infected surface, then touch their eyes, noses, or mouths, they can become infected. Measles is so contagious that if one person has it, 90% of the people close to that person who are not immune will also become infected.

Infected people can spread measles to others from four days before to four days after the rash appears.

Measles is a disease of humans; measles virus is not spread by any other animal species.

For more information, visit [www.cdc.gov](http://www.cdc.gov)  
or call 800-CDC-INFO

## COMPLICATIONS OF MEASLES

### Complications

Measles can be a serious in all age groups. However, children younger than 5 years of age and adults older than 20 years of age are more likely to suffer from measles complications.

### Common Complications

Common measles complications include ear infections and diarrhea.

Ear infections occur in about one out of every 10 children with measles and can result in permanent hearing loss.

Diarrhea is reported in less than one out of 10 people with measles.

### Severe Complications

Some people may suffer from severe complications, such as pneumonia (infection of the lungs) and encephalitis (swelling of the brain). They may need to be hospitalized and could die.

As many as one out of every 20 children with measles gets pneumonia, the most common cause of death from measles in young children.

About one child out of every 1,000 who get measles will develop encephalitis (swelling of the brain) that can lead to convulsions and can leave the child deaf or mentally retarded.

For every 1,000 children who get measles, one or two will die from it. Measles may cause pregnant woman to give birth prematurely, or have a low-birth-weight baby.

The Measles chapter of the Epidemiology and Prevention of Vaccine Preventable Diseases (Pink Book) describes measles complications in more depth.



### Measles Rash

Skin of a patient after 3 days of measles infection.



U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention



## Measles Frequently Asked Questions

**Q:** How effective is the measles vaccine?

**A:** The measles vaccine is very effective. Two doses of measles vaccine are about 97% effective at preventing measles if exposed to the virus. One dose is about 93% effective.

**Q:** How does the measles vaccine work?

**A:** When you get measles vaccine, your immune system makes protective virus-fighting antibodies against the harmless vaccine virus. Measles vaccine protects you from wild-type measles because if you have been vaccinated and then are exposed to someone with measles, your body remembers how to fight off the wild-type virus. That's because the vaccine trained your immune system.

**Q:** Can I still get measles if I am fully vaccinated?

**A:** Very few people—about three out of 100—who get two doses of measles vaccine will still get measles if exposed to the virus. Experts aren't sure why. It could be that their immune systems didn't respond as well as they should have to the vaccine. But the good news is, fully vaccinated people who get measles are much more likely to have a milder illness. And fully vaccinated people are also less likely to spread the disease to other people, including people who can't get vaccinated because they are too young or have weakened immune systems.

**Q:** How common was measles in the United States before the vaccine?

**A:** Before the measles vaccination program started in 1963, an estimated 3 to 4 million people got measles each year in the United States, of which 500,000 were reported. Among reported cases, 400 to 500 died, 48,000 were hospitalized, and 1,000 developed encephalitis (brain swelling) from measles.

**Q:** Why do people still get measles in the United States?

**A:** Measles is brought into the United States. This happens when unvaccinated Americans or foreign visitors get measles while they're abroad, then bring the disease into the United States. They can spread measles to other people who are not vaccinated, which sometimes leads to outbreaks. This can occur in communities with unvaccinated people.

**Q:** Where do cases of measles that are brought into the United States come from?

**A:** Measles can be brought into the United States from any country where the disease still occurs or where outbreaks are occurring including Europe, Africa, Asia, and the Pacific.

**Q:** Has measles been eliminated from the United States?

**A:** Yes. In 2000, the United States declared that measles was eliminated from this country. The U.S. eliminated measles because it has a highly effective measles vaccine, a strong vaccination program that achieves high vaccine coverage in children, and a strong public health system for detecting and responding to measles cases and outbreaks.

**Q:** What does "eliminated" mean?

**A:** CDC defines measles elimination as the absence of continuous disease transmission for 12 months or more in a specific geographic area. Measles is no longer endemic (constantly present) in the United States.

**Q:** If measles is eliminated, why do people still get it in the United State?

**A:** Every year, unvaccinated travelers (Americans or foreign visitors) get measles while they are in other countries and bring it into the United States. Typically 2 out of 3 of these unvaccinated travelers are Americans. They can spread measles to other people who are not protected against measles, which sometimes leads to outbreaks. This can occur in communities with unvaccinated people.

Most people in the United States are protected against measles through vaccination. So measles cases in the U.S. are uncommon compared to the number of cases before a vaccine was available. Since 2000, when public health officials declared measles eliminated from the U.S., the annual number of people reported to have measles ranged from a low of 37 people in 2004 to a high of 667 people in 2014.

**Q:** Is measles a concern for the United State?

**A:** Yes. Since measles is still common in many countries, travelers will continue to bring this disease into the United States. Measles is highly contagious, so anyone who is not protected against measles is at risk of getting the disease. People who are unvaccinated for any reason, including those who delay or refuse vaccination, risk getting infected with measles and spreading it to others. And they may spread measles to people who cannot get vaccinated because they are too young or have specific health conditions.

**Q:** Could measles ever re-establish itself in the United State?

**A:** Yes, measles could become endemic (constant presence of a disease in an area) in the United States again, especially if vaccine coverage levels drop. This can happen when people

- Don't get vaccinated on time,
- Think they're immune when they're not, and can't find documentation of their vaccine status (this is most common among adults), or
- Delay or refuse vaccines for religious, philosophical or personal reasons.

Research shows that there is clustering of people who delay or refuse vaccines in certain communities. When measles gets into communities with pockets of unvaccinated people, outbreaks are more likely to occur. These communities make it difficult to control the spread of the disease. And these communities make us vulnerable to having the virus re-establish itself in our country.

High sustained measles vaccine coverage and rapid public health response are critical for preventing and controlling measles cases and outbreaks.