Measles History:

Pre-vaccine Era

In the 9th century, a Persian doctor published one of the first written accounts of measles disease.

Francis Home, a Scottish physician, demonstrated in 1757 that measles is caused by an infectious agent in the blood of patients.

In 1912, measles became a nationally notifiable disease in the United States, requiring U.S. healthcare providers and laboratories to report all diagnosed cases. In the first decade of reporting, an average of 6,000 measles-related deaths were reported each year.

In the decade before 1963 when a vaccine became available, nearly all children got measles by the time they were 15 years of age. It is estimated 3 to 4 million people in the United States were infected each year. Also each year an estimated 400 to 500 people died, 48,000 were hospitalized, and 4,000 suffered encephalitis (swelling of the brain) from measles.

Vaccine Development

In 1954, John F. Enders and Dr. Thomas C. Peebles collected blood samples from several ill students during a measles outbreak in Boston, Massachusetts. They wanted to isolate the measles virus in the student’s blood and create a measles vaccine. They succeeded in isolating measles in 13-year-old David Edmonston’s blood.

In 1963, John Enders and colleagues transformed their Edmonston-B strain of measles virus into a vaccine and licensed it in the United States. In 1968, an improved and even weaker measles vaccine, developed by Maurice Hilleman and colleagues, began to be distributed. This vaccine, called the Edmonston-Enders (formerly “Moraten”) strain has been the only measles vaccine used in the United States since 1968. Measles vaccine is usually combined with mumps and rubella (MMR), or combined with mumps, rubella and varicella (MMRV). Learn more about measles vaccine.[http://www.cdc.gov/measles/vaccination.html](http://www.cdc.gov/measles/vaccination.html).

Signs and Symptoms

Koplik Spots

Mouth of a patient with Koplik spots, an early sign of measles infection.
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), and
- red, watery eyes (conjunctivitis).

*Measles Rash*

Skin of a patient after 3 days of measles infection.

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°F Fahrenheit.

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

*Transmission of Measles*

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.

**Measles Vaccination**

Measles can be prevented with the MMR (measles, mumps, and rubella) vaccine. In the United States, widespread use of measles vaccine has led to a greater than 99% reduction in measles cases compared with the pre-vaccine era. From 2000 to 2013, a range of 37 to 220 measles cases per year were reported in the United States, and most of these originated outside the country.

Measles is still common in other countries. The virus is highly contagious and can spread rapidly in areas where people are not vaccinated. Worldwide, an estimated 20 million people get measles and 122,000 people die from the disease each year—that equals about 330 deaths every day or about 14 deaths every hour.

**Vaccine Recommendations**

**Children**

CDC recommends all children get two doses of MMR vaccine, starting with the first dose at 12 through 15 months of age, and the second dose at 4 through 6 years of age. Children can receive the second dose earlier as long as it is at least 28 days after the first dose.

**Students at post-high school educational institutions**

Students at post-high school educational institutions who do not have evidence of immunity against measles need two doses of MMR vaccine, separated by at least 28 days.
Adults

Adults who do not have evidence of immunity against measles should get at least one dose of MMR vaccine.

International travelers

People 6 months of age and older who will be traveling internationally should be protected against measles. Before any international travel—

- Infants 6 through 11 months of age should receive one dose of MMR vaccine. Infants who get one dose of MMR vaccine before their first birthday should get two more doses (one dose at 12 through 15 months of age and another dose at least 28 days later).
- Children 12 months of age and older should receive two doses of MMR vaccine, separated by at least 28 days.
- Teenagers and adults who do not have evidence of immunity against measles should get two doses of MMR vaccine separated by at least 28 days.