1. WHAT IS MEASLES?

Measles is a self-limiting childhood viral infection.

- Measles symptoms include a prodromal (initial) phase of cough, runny nose, eye irritation and fever, followed by a generalized rash on days 4–10 of the illness.\(^1\)
- Measles is contagious during the prodromal phase and for 3-4 days after rash onset.\(^1\)
- Most measles cases are benign and not reported to public health departments.\(^2\)
- Before the measles mass vaccination program was introduced, nearly everyone contracted measles and obtained lifetime immunity by age 15.\(^1\)
- In rare situations, measles can cause brain damage and death.\(^3,4\)

2. WHAT ARE THE RISKS?

In the modern era, it is rare to suffer permanent disability or death from measles in the United States. Between 1900 and 1963, the mortality rate of measles dropped from 13.3 per 100,000 to 0.2 per 100,000 in the population, due to advancements in living conditions, nutrition, and health care—a 98% decline (Fig. 1).\(^2,5\) Malnutrition, especially vitamin A deficiency, is a primary cause of about 90,000 measles deaths annually in underdeveloped nations.\(^6\) In the U.S. and other developed countries, 75–92% of hospitalized measles cases are low in vitamin A.\(^7,8\)

Research studies and national tracking of measles have documented the following:

- 1 in 10,000 or 0.01% of measles cases are fatal.\(^3\)
- 3 to 3.5 in 10,000 or 0.03–0.035% of measles cases result in seizure.\(^9\)
- 1 in 20,000 or 0.005% of measles cases result in measles encephalitis.\(^4\)
- 1 in 80,000 or 0.00125% of cases result in permanent disability from measles encephalitis.\(^4\)
- 7 in 1,000 or 0.7% of cases are hospitalized.\(^10\)
- 6 to 22 in 1,000,000 or 0.0006–0.0022% of cases result in subacute sclerosing panencephalitis (SSPE).\(^11\)

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Centers for Disease Control and Prevention (CDC) publishes measles case-fatality rates based on reported cases. However, nearly 90% of measles cases are benign and not reported to the CDC.\(^2\) Calculating case-fatality rates based on reported cases (that constitute only 10% of all cases) results in a case-fatality rate that is 10 times higher than what it actually is in the general population. Data analysis herein is based on total measles cases (both reported and unreported).

Figure 1: Measles death declined 98% from 1900 to 1963, before the measles vaccine was introduced.

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3. WHAT TREATMENTS ARE AVAILABLE FOR MEASLES?

Because measles resolves on its own in almost all cases, usually only supportive treatment is necessary. As such, treatment options include the following:

- Rest
- Hydration
- High-dose vitamin A
- Immune globulin (available for immunocompromised patients, such as those on chemotherapy)

4. ARE THERE ANY BENEFITS FROM GETTING MEASLES?

There are studies that suggest a link between naturally acquired measles infection and a reduced risk of Hodgkin’s and non-Hodgkin’s lymphomas, as well as a reduced risk of atopic diseases such as hay fever, eczema and asthma. In addition, measles infections are associated with a lower risk of mortality from cardiovascular disease in adulthood. Moreover, infants born to mothers who have had naturally acquired measles are protected from measles via maternal immunity longer than infants born to vaccinated mothers.

5. WHAT ABOUT THE VACCINE FOR MEASLES?

The measles vaccine was introduced in the U.S. in 1963 and is now only available as a component of the measles, mumps, and rubella (MMR) vaccine. It has significantly reduced the incidence of measles; however, the vaccine is not capable of preventing all cases of measles, as failures have been reported. The manufacturer’s package insert contains information about vaccine ingredients, adverse reactions, and vaccine evaluations. For example, “M-M-R II vaccine has not been evaluated for carcinogenic or mutagenic potential, or potential to impair fertility.” Furthermore, the risk of permanent injury and death from the MMR vaccine has not been proven to be less than that of measles (Fig. 2).

Figure 2: This graph shows the measles death rate before the vaccine was introduced, when measles was a common childhood viral infection, and compares it to the leading causes of death in children under age 10 today. Hence, in the pre-vaccine era, the measles death rate per 100,000 was 0.9 for children under age 10. In 2015, the death rate per 100,000 for homicide was 1.3, followed by cancer (2.0), SIDS (3.9), unintentional injury (8.2), and congenital anomalies (13.6). The rate of death or permanent injury from the MMR vaccine is unknown because the research studies available are not able to measure it with sufficient accuracy.
MEASLES – DISEASE INFORMATION STATEMENT (DIS)

REFERENCES


2. Between 1959 and 1962, annually there were about 4 million cases, of which 440,000 (11%) were reported.

3. Between 1959 and 1962, annually there were 400 measles deaths out of 4 million cases, about 1 in 10,000 cases.
   • Same sources as reference 2.

4. Measles surveillance in the 1980s and 1990s showed that there are half as many cases of measles encephalitis as there are measles deaths, 1 in 20,000 cases (50% of 1 in 10,000 cases of death). Of these cases, 25% (1 in 80,000 cases) result in residual neurological injury.
   • Same sources as references 1 and 3.


6. The measles case-fatality rate in underdeveloped nations, where vitamin A deficiency is prevalent, is about 3–6% of reported cases, 30 to 60 times higher than in developed countries.


9. Measles surveillance in the 1980s and 1990s showed that there are 3 to 3.5 times more measles seizures than measles deaths (3 to 3.5 per 10,000 cases).
   • Same sources as references 1 and 3.

10. Measles surveillance in the 1980s and 1990s showed that there are about 70 times more measles hospitalizations than measles deaths (7 per 1,000 cases).
    • Same sources as reference 3.


