

Measles and Vaccinations

Lots of buzz these days in the media about a measles outbreak. And a related buzz about vaccination in general and measles vaccination in particular. The commercial media seems aligned on the “vaccines work” story and consistently dismiss all claims to the contrary as if there really is no controversy.

This is the modern party line: take the vaccinations, take the drugs, take the surgery because medical scientists have no doubt that this is the proper course of action. This is just more of the “if you say it often enough, they will believe it” theory.

Reality is different.

What about measles? Measles is an acute viral¹ infection of the respiratory system, immune system, and skin. The primary site of infection is the respiratory epithelium of the nasopharynx. Measles is considered highly contagious through airborne transmission of fluids from an infected person’s nose or mouth (via sneezing and coughing) or skin contact for about two hours. Symptoms begin 9–12 days after exposure with fever, sore eyes, coughing, runny nose, and Koplik’s spots (lesions in the mouth) which are followed by a skin rash that covers much of the body and fades gradually after a few days. The infection usually lasts about 7–10 days. There is no specific treatment for measles. Most patients with uncomplicated measles will recover with rest and supportive treatment. Sick children are clearly unwell and sometimes miserable, but *Clinical Pediatrics* describes it as “typically a benign childhood illness.”

Period of contagion: Measles virus is shed from the nasopharynx beginning with the first symptoms until 3–4 days after rash onset. Sanitation and even quarantine can be effective methods of avoiding transmission.

Complications include pneumonia, ear infections, bronchitis (either viral bronchitis or secondary bacterial bronchitis), and brain inflammation. These are often the result of malnutrition and poor immune system.

Between 1987 and 2000 0.3% of patients died of measles or its complications in the U.S.; pneumonia accounted for about 60% of those deaths. Since 1995, an average of 1 measles-related death per year has been reported.² There is far greater mortality in developing countries.

A diagnosis of measles can be considered based on a physical examination of the patient, but, as those symptoms cannot be exclusively attributed to measles, the infection must be confirmed by laboratory test. Detection of specific IgM (Immunoglobulin M) antibodies in serum can provide presumptive evidence of a current or recent measles virus infection. But no assay is 100% specific, so serological testing sometimes yields false positive results. In the U.S. most suspected cases are not measles, and rash and fever illnesses are more likely due to a number of other rash-causing illnesses such as parvovirus B19, enteroviruses, or human herpesvirus-6 (roseola). As described below, the RT-PCR technique is capable of identifying the measles genotype.

Humans are the primary host of the measles virus, but not the only one. Infection of non-human primates has been well documented in macaques (especially rhesus), baboons, African green, marmosets, tamarins, squirrel monkeys, chimps, and *Presbytis cristatus*. Measles viral infection seldom occurs in wild monkeys, but most wild-caught monkeys seroconvert within a few months of capture. Many outbreaks in primate

1. The species is the *measles virus* in the genus *Morbillivirus*.

2. Centers for Disease Control and Prevention, “The Pink Book: Course Textbook; Measles: Epidemiology and Prevention of Vaccine-Preventable Diseases.” <http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html>

colonies have been described (Potkay et al., 1966; Willy et al., 1999; Choi et al., 1999). Although the primary infective source or the mode of infection could not be determined in a number of outbreaks, it was suspected that measles virus might have been transmitted to the monkeys from human visitors while the monkeys were on exhibit.³

Benefits of measles. Childhood diseases are seen by some as having distinct benefits. The diseases prime and mature the immune system and also represent developmental milestones. Having measles not only results in life-long specific immunity to measles⁴, but also in life-long non-specific immunity to degenerative diseases of bone and cartilage, sebaceous skin diseases, immunoreactive diseases, and certain tumors as demonstrated by Dr. Tove Rønne of Statens Serum Institut, Copenhagen, Denmark.⁵ Natural measles disease has been found by one group of researchers to prevent asthma and allergies (S. O. Shaheen et al., 1996)⁶ while a second group in Finland found no such relationship.⁷ H. Carmona Mota (University of Coimbra, Portugal) described a remission of infantile Hodgkin's disease after natural measles (1973).⁸

Other childhood diseases have been found to have similar benefits. For example, having mumps protects against ovarian cancer.⁹

Herd immunity. Humans are the natural hosts of the measles virus; no other animal reservoirs are known to exist. It is believed that in communities which generate insufficient new hosts the disease will die out. But there is no evidence to support this belief. Some claim there is a herd immunity threshold¹⁰, a percentage of people who need to be vaccinated in order to interrupt sustained spread of the measles virus, but vaccine expert Dr. Walter Orenstein of Emory University School of Medicine's division of infectious diseases notes that even populations with higher immunity rates have experienced outbreaks. The thresholds for various infections range from 83% to 94%, with the threshold for measles set at 90% (that is, herd immunity can be established when 90% of the population is vaccinated). The theory of herd immunity says that as long as vaccinated populations are below the threshold, the disease will persist; the contrapositive is that the disease will not persist when vaccinated populations exceed the threshold. The problems with this notion are several: (1) the calculation of such a threshold, (2) many populations are in fairly frequent contact with those of different geographical areas, so carriers are commonly brought into contact with susceptible people, (3) the vaccine itself does not always grant immunity, and (4) even vaccinated people can transmit the infection to others.

A brief look at vaccines. Vaccines for viral infections are made with the actual virus in either live or dead (killed) form. A "live virus vaccine" is a vaccine made with the live virus. Chemicals commonly used in the production of vaccines include a suspending fluid (sterile water, saline, or fluids containing protein); preservatives and stabilizers (for example, albumin, phenols, glycine, and monosodium glutamate); and adjuvants or enhancers that help improve the vaccine's effectiveness. Vaccines also may contain very small amounts of the culture material used to grow the virus or bacteria used in the vaccine, such as chicken egg

3. <http://www.zoologix.com/primate/Datasheets/Measles.htm> "Primate Assay Data Sheet: Measles (Rubeola) by PCR."

4. Before a vaccine was available, infection with measles virus was nearly universal during childhood, and more than 90% of persons were immune by age 15 years.

5. "Measles Virus Infection Without Rash in Childhood is Related to Diseases in Adult Life," *Lancet* 325, 8419 (1985) 1-5.

6. S.O. Shaheen, D.J.P. Barker, C.B. Heyes, A.W. Shiell, P. Aaby, A.J. Hall, A. Goudiaby, "Measles and Atopy in Guinea-Bissau." *Lancet* 347, 9018 (1996): 1792-1796.

7. Mikko Paunio, Olli P. Heinonen, Martti Virtanen, Pauli Leinikki, Annamari Patja, Heikki Peltola, "Measles History and Atopic Diseases: A Population-Based Cross-sectional Study," *JAMA* 283, 3 (2000): 343-346.

8. "Infantile Hodgkin's Disease: Remission after Measles," *British Medical Journal* 2, 5863 (1973): 421.

9. Dr. Raymond O. West, "Epidemiologic Studies of Malignancies of the Ovaries." *Cancer* 19, 7 (1966): 1001-1007.

10. According to the CDC, a population has reached herd immunity when a sufficient proportion is immune to a particular infectious disease.

protein. A number of ingredients have been used as preservatives, including thimerosal, a form of mercury, antibiotics exclusive of penicillin, aluminum salts, and formaldehyde.

Not all people are candidates for vaccines. Typically, candidates must be in good health, of a particular age (this is specific to the vaccine), not known to be sensitive to any ingredient in the vaccine, not pregnant, and not having an immunodeficient condition.

Measles vaccine administration. There is one dose regardless of age of the recipient, 0.5 mL; this means babies get the same dose as adults. It is injected subcutaneously, the injection site varies by age of the recipient while the needle length is the same for all ages. Two doses of the MMR vaccine are usually given, one dose at 15 months of age and a second at 4 years of age.

A history of measles and its vaccines. Measles was first described in the 7th century. In the 10th century it was described by the Persian physician Rhazes as “more dreaded than smallpox.” Before a vaccine was first available in 1963, infection with measles virus was nearly universal during childhood, and more than 90% of persons were immune by age 15 years. Measles is still a common disease in developing countries.

In the U.S. before 1963, approximately 500,000 cases and 500 deaths were *reported* annually, with epidemic cycles every 2–3 years. However, the actual number of cases was *estimated* at 3–4 million annually. More than 50% of persons had measles by age 6, and more than 90% had measles by age 15. The highest incidence was among 5–9-year-olds, who generally accounted for more than 50% of reported cases.

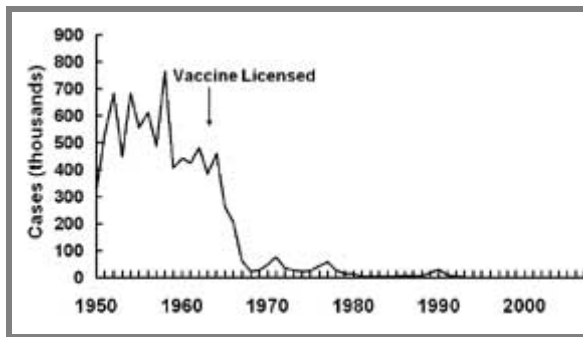


Fig. 1: Measles cases in the U.S. 1950–2009 (per CDC)

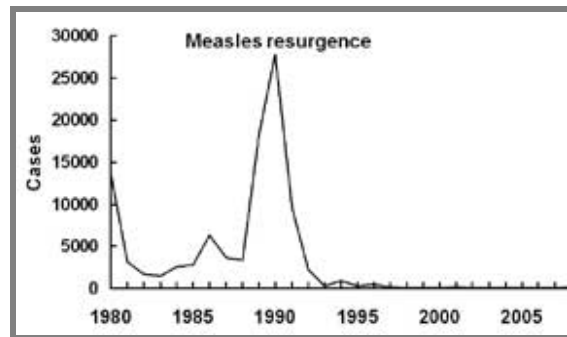


Fig. 2: Measles cases in the U.S. 1980–2009 (per CDC)

<http://business.financialpost.com/2014/04/16/lawrence-solomon-the-untold-story-of-measles/> “The Untold Story of Measles” by Lawrence Solomon, 4-16-2014, begins with a chart of measles deaths in the U.S. since 1900. They peaked at about 14 per 100,000 in 1917. In 1963, just before the measles vaccine was introduced in the U.S., the rate was less than 1 per 100,000. The rate continued to decline into the 1970s.

“The credit for the century-long decline, scientists generally agree, goes to improved nutrition and improved health care, side effects of the West’s growing affluence. In the U.S., the death rate dropped by about 98%, from about 10 per 100,000 population a century ago to one fifth of one person by 1963, the year measles vaccines made their American debut. Both before and after vaccination started, victims tended to be poor.”

Getting measles gave its “victim” lifetime immunity. The vaccination, however, does not. “In today’s vaccine era, adults have accounted for one quarter to one half of measles cases; most of them involve

pneumonia, one-quarter of them hospitalization. . . . Measles during pregnancies have risen dangerously because expectant mothers no longer have lifetime immunity.” Factors such as these increased the death rate for adults and the very young, helping to reverse the decline in deaths seen in previous decades.

And what about the measles vaccine? From the beginning, the measles vaccine has caused deaths. The first measles virus was isolated from an 11-year-old boy, David Edmonston, in 1954 by John F. Enders and Thomas Peebles. That became the basis for the subsequent measles vaccines. The first two measles vaccines were licensed for use in the U.S. in 1963, one was a live vaccine (by Merck), the other a killed vaccine (Edmonston B strain, by Pfizer). The killed vaccine was withdrawn in 1967 because it did not protect against measles virus infection and recipients frequently developed atypical measles syndrome, which triggered high rates of pneumonia. The live vaccine was withdrawn in 1975 because of a relatively high frequency of fever and rash in recipients.

A second live vaccine (Schwarz strain), introduced in 1965, is no longer used. A third live vaccine, the Edmonston-Enders strain, was licensed in 1968. It was quickly replaced by a combined measles-mumps-rubella¹¹ vaccine, called MMR, which was licensed in 1971 (by Merck), it was based on the Edmonston-Enders strain. That MMR vaccine was withdrawn in 1990 in the face of adverse reactions. A second version of this vaccine, the M-M-R II,¹² was introduced in 1978 and is now in widespread use and believed to be safe by government officials. But that belief is more of a convenience than a proven reality.

Safety aside, vaccines repeatedly failed worldwide in the 1980s and 1990s. “Measles Elimination in Canada,” a 2004 report authored by Canadian government officials and academics, stated “despite virtually 100% documented one-dose coverage in some regions, large outbreaks of measles involving thousands of cases persisted . . . Clearly, because of primary vaccine failure, Canada’s one-dose program was insufficient.” The response to this, to add a second dose for children, had initial beneficial effects on outbreaks but those have since waned.

No studies have shown that vaccinated children are healthier than the unvaccinated. Furthermore, there have been no adequate studies to determine the long-term effects of vaccines on our children and future generations.

In 1995 scientists working at the CDC's National Center for Infectious Diseases, funded by the World Health Organization (WHO) and the National Vaccine Program, published an article in the *Journal of Clinical Microbiology* “Detection of measles virus RNA in urine specimens from vaccine recipients.” <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC228449/> They found that people who had received the measles vaccine had measles virus RNA in their urine (this would be caused by the virus shedding). The authors of the study used a technology that was relatively new at that time called reverse transcriptase polymerase chain reaction (RT-PCR) to assay the virus in its hosts.

Twenty years later, PCR testing is widely acknowledged as highly sensitive and specific, and the only efficient way to distinguish vaccine-strain and wild-type measles infection, as their clinical presentation are indistinguishable.

The recent (January 2015) outbreak traced to Disneyland has been assumed to be carried by non-vaccinated hosts. PCR testing has, so far, not been used to prove or disprove this assumption. The almost rabid criticism of parents who refuse to vaccinate their children handily ignores the reality that, because

11. Mumps is a disease caused by the *mumps virus* in the genus *Rubulavirus*. Rubella, also known casually as German measles, is a disease caused by the *rubella virus* in the genus *Rubivirus*.

12. Apparently the problem with the first MMR vaccine was the mumps component, This was changed in the MMR II vaccine.

vaccine-strain measles has almost entirely supplanted the wild-type, communally acquired measles, the host most likely carried the vaccine-strain. One commentator asked if any of the sick people have been proven via laboratory tests to actually have the measles virus.

The National Vaccine Information Center published a report in November 2014 “The Emerging Risks of Live Virus & Virus Vected Vaccines: Vaccine Strain Virus Infection, Shedding & Transmission.”

<http://www.nvic.org/CMSTemplates/NVIC/pdf/Live-Virus-Vaccines-and-Vaccine-Shedding.pdf>

This report begins with the question “Can people receiving live virus vaccines transmit vaccine strain virus to others?” The short answer is “yes.” Not only can the virus shed by infected people be transmitted to others, but the vaccine strain live virus introduced by vaccination can be shed and transmitted to others. The measles component of the MMR vaccine is a live virus.

I want to point out that in all of this history of the vaccine, the evidence that it actually prevents infection is conflicting. Certainly the infection rates dropped after the vaccines were introduced, but they have since begun increasing and some people get the infection even after being vaccinated. On the other hand the mortality rates were down before the vaccines were introduced.

In the year 2000 there was no continuous measles transmission for more than 12 months in the U.S., which the CDC interpreted to mean that measles had been eliminated here. But cases reappeared in the years that followed, increasing every year. Other countries also are experiencing outbreaks in almost universally-vaccinated populations, in particular China and France. Around the world there are about 20 million cases every year.

Vaccination was introduced by Frenchman Louis Pasteur in 1879, it was for chicken cholera; in 1881 he developed and administered an anthrax vaccine for sheep; in 1884 he introduced a rabies vaccine. The tireless self-promoter persuaded many that his theory of drug-induced immunity was valid and effective. But even in his lifetime some of his scientific peers believed otherwise.

Now what? Yes, we would like to save our children the misery of a measles infection. And we would like to prevent the possibility of a complication that becomes fatal. But is it even possible to do this 100% of the time? In other words, can measles be eradicated? If it could, should it be?

Is disease avoidable? No.

We seem to face a quandary where on the one hand our children may sicken with a contagious infection and on the other hand we believe in technological fixes such as vaccinations that do not completely keep populations free of infection and may even increase infection. It may well be that future research into viruses will suggest other explanations and possibilities.