[Template:Infobox medical condition](/wiki/Template:Infobox_medical_condition" \o "Template:Infobox medical condition) **Measles** is a highly contagious infection caused by the [measles virus](/wiki/Measles_virus).<ref name=MM2014>[Template:Cite web](/wiki/Template:Cite_web)</ref>[[1]](#cite_note-1) Initial signs and symptoms typically include [fever](/wiki/Fever), often greater than [Template:Convert](/wiki/Template:Convert), cough, [runny nose](/wiki/Rhinitis), and [inflamed eyes](/wiki/Conjunctivitis).<ref name=MM2014/><ref name=CDC2014SS/> Two or three days after the start of symptoms, small white spots may form inside the mouth, known as [Koplik's spots](/wiki/Koplik's_spots). A red, flat rash which usually starts on the face and then spreads to the rest of the body typically begins three to five days after the start of symptoms.<ref name=CDC2014SS>[Template:Cite web](/wiki/Template:Cite_web)</ref> Symptoms usually develop 10–12 days after exposure to an infected person and last 7–10 days.<ref name=WHO2014/><ref name=Conn2014>[Template:Cite book](/wiki/Template:Cite_book)</ref> Complications occur in about 30% and may include [diarrhea](/wiki/Diarrhea), [blindness](/wiki/Blindness), [inflammation of the brain](/wiki/Encephalitis), and [pneumonia](/wiki/Pneumonia) among others.<ref name=WHO2014/><ref name=CDC2012Pink/> [Rubella](/wiki/Rubella) (German measles) and [roseola](/wiki/Roseola) are different diseases.[[2]](#cite_note-2) Measles is an [airborne disease](/wiki/Airborne_disease) which spreads easily through the [coughs](/wiki/Cough) and [sneezes](/wiki/Sneeze) of those infected. It may also be spread through contact with saliva or nasal secretions.<ref name=WHO2014/> Nine out of ten people who are not immune and share living space with an infected person will catch it. People are infectious to others from four days before to four days after the start of the rash.<ref name=CDC2012Pink>[Template:Cite book](/wiki/Template:Cite_book)</ref> People usually do not get the disease more than once.<ref name=WHO2014/> Testing for the virus in suspected cases is important for public health efforts.<ref name=CDC2012Pink/>

The [measles vaccine](/wiki/Measles_vaccine) is effective at preventing the disease. [Vaccination](/wiki/Vaccination) has resulted in a 75% decrease in deaths from measles between 2000 and 2013 with about 85% of children globally being currently vaccinated. No specific treatment is available. Supportive care may improve outcomes.<ref name=WHO2014/> This may include giving [oral rehydration solution](/wiki/Oral_rehydration_solution) (slightly sweet and salty fluids), healthy food, and medications to control the fever.<ref name=WHO2014/><ref name=Conn2014/> [Antibiotics](/wiki/Antibiotics) may be used if a secondary bacterial infection such as pneumonia occurs. [Vitamin A](/wiki/Vitamin_A) supplementation is also recommended in the developing world.<ref name=WHO2014>[Template:Cite web](/wiki/Template:Cite_web)</ref>

Measles affects about 20 million people a year,<ref name=MM2014/> primarily in the developing areas of Africa and Asia.<ref name=WHO2014/> It causes the most vaccine-preventable deaths of any disease.<ref name=Kabra2013>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> It resulted in about 96,000 deaths in 2013, down from 545,000 deaths in 1990.<ref name=GDB2013>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> In 1980, the disease is estimated to have caused 2.6 million deaths per year.<ref name=WHO2014/> Before immunization in the United States between three and four million cases occurred each year.<ref name=CDC2012Pink/> Most of those who are infected and who die are less than five years old.<ref name=WHO2014/> The risk of death among those infected is usually 0.2%,<ref name=CDC2012Pink/> but may be up to 10% in those who have [malnutrition](/wiki/Malnutrition).<ref name=WHO2014/> It is not believed to affect other animals.<ref name=WHO2014/> [Template:TOC limit](/wiki/Template:TOC_limit)

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## Signs and symptoms[[edit](/index.php?title=(none)&action=edit&section=1)]

[thumb|Skin of a person after 3 days of measles infection](/wiki/File:Morbillivirus_measles_infection.jpg) [thumb|“Koplik's spots” on the third pre-eruptive day](/wiki/File:Koplik_spots,_measles_6111_lores.jpg) The classic signs and symptoms of measles include four-day fevers (the 4 D's) and the three C's—[cough](/wiki/Cough), [coryza](/wiki/Rhinitis) (head cold, fever, sneezing), and [conjunctivitis](/wiki/Conjunctivitis) (red eyes)—along with fever and rashes.<ref name=Biesbroeck2013>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> Fever is common and typically lasts for about one week; the fever seen with measles is often as high as [Template:Convert](/wiki/Template:Convert).<ref name=Ludlow2015/> [Koplik's spots](/wiki/Koplik's_spots) seen inside the mouth are [pathognomonic](/wiki/Pathognomonic) (diagnostic) for measles, but are temporary and therefore rarely seen.<ref name=Biesbroeck2013/> Recognizing these spots before a person reaches their maximum infectiousness can help physicians reduce the spread of the disease.<ref name=baxby>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>

The characteristic measles [rash](/wiki/Rash) is classically described as a generalized [red](/wiki/Erythema) [maculopapular](/wiki/Maculopapular_rash) rash that begins several days after the fever starts. It starts on the back of the ears and, after a few hours, spreads to the head and neck before spreading to cover most of the body, often causing [itching](/wiki/Itch). The measles rash appears two to four days after the initial symptoms and lasts for up to eight days. The rash is said to "stain", changing color from red to dark brown, before disappearing.[[3]](#cite_note-3) Overall, the disease from infection with the measles virus usually resolves after about three weeks.<ref name=Ludlow2015/> [alt=by chernet|thumb|A child with measles](/wiki/File:Measles_in_African_Child_4.JPG)

### Complications[[edit](/index.php?title=(none)&action=edit&section=2)]

Complications with measles are relatively common, ranging from mild complications such as [diarrhea](/wiki/Diarrhea) to serious complications such as [pneumonia](/wiki/Pneumonia) (either direct [viral pneumonia](/wiki/Viral_pneumonia) or secondary [bacterial pneumonia](/wiki/Bacterial_pneumonia)), [bronchitis](/wiki/Bronchitis) (either direct viral bronchitis or secondary bacterial bronchitis), [otitis media](/wiki/Otitis_media),[[4]](#cite_note-4) acute [brain inflammation](/wiki/Encephalitis)[[5]](#cite_note-5) (and very rarely SSPE—[subacute sclerosing panencephalitis](/wiki/Subacute_sclerosing_panencephalitis)),[[6]](#cite_note-6) and [corneal ulceration](/wiki/Corneal_ulcer) (leading to [corneal scarring](/wiki/Corneal_abrasion)).[[7]](#cite_note-7) Complications are usually more severe in adults who catch the virus.[[8]](#cite_note-8) The death rate in the 1920s was around 30% for measles pneumonia.[[9]](#cite_note-9) Between 1987 and 2000, the case fatality rate across the [United States](/wiki/United_States) was three measles-attributable deaths per 1000 cases, or 0.3%.[[10]](#cite_note-10) In [underdeveloped nations](/wiki/Developing_country) with high rates of [malnutrition](/wiki/Malnutrition) and poor [healthcare](/wiki/Healthcare), fatality rates have been as high as 28%.[[10]](#cite_note-10) In [immunocompromised](/wiki/Immunodeficiency) persons (e.g., people with [AIDS](/wiki/AIDS)) the fatality rate is approximately 30%.[[11]](#cite_note-11) Risk factors for severe measles and its complications include [malnutrition](/wiki/Malnutrition),[[12]](#cite_note-12) underlying immunodeficiency,[[12]](#cite_note-12) [pregnancy](/wiki/Pregnancy),[[12]](#cite_note-12) and [vitamin A deficiency](/wiki/Vitamin_A_deficiency).[[12]](#cite_note-12)[[13]](#cite_note-13)

## Cause[[edit](/index.php?title=(none)&action=edit&section=3)]

[thumb|An electron micrograph of the measles virus.](/wiki/File:Measles_virus.JPG) Measles is caused by the [measles virus](/wiki/Measles_virus), a single-stranded, [negative-sense](/wiki/Sense_(molecular_biology)#RNA_sense_in_viruses), enveloped [RNA virus](/wiki/RNA_virus) of the genus [*Morbillivirus*](/wiki/Morbillivirus) within the family [*Paramyxoviridae*](/wiki/Paramyxoviridae).<ref name=Cohen2014/> The virus was first isolated in 1954 by [Nobel Laureate](/wiki/Nobel_Laureate) [John F. Enders](/wiki/John_F._Enders) and Thomas Peebles, who were careful to point out that the isolations were made from patients who had Koplik's spots.[[14]](#cite_note-14) Humans are the only natural hosts of the virus, and no other animal reservoirs are known to exist. This highly contagious virus is spread by coughing and sneezing via close personal contact or direct contact with secretions. Risk factors for measles virus infection include [immunodeficiency](/wiki/Immunodeficiency) caused by [HIV](/wiki/HIV) or AIDS,[[15]](#cite_note-15) [immunosuppression](/wiki/Immunosuppression) following receipt of an [organ](/wiki/Organ_transplantation) or a [stem cell transplant](/wiki/Hematopoietic_stem_cell_transplantation),[[16]](#cite_note-16) [alkylating agents](/wiki/Alkylation#Alkylating_agents), or [corticosteroid therapy](/wiki/Corticosteroid#Uses_of_corticosteroids), regardless of immunization status;[[12]](#cite_note-12) travel to areas where measles is endemic or contact with travelers to endemic areas;[[12]](#cite_note-12) and the loss of passive, inherited antibodies before the age of routine immunization.<ref name=Leuridan2012/>

## Diagnosis[[edit](/index.php?title=(none)&action=edit&section=4)]

Clinical [diagnosis](/wiki/Diagnosis) of measles requires a history of fever of at least three days, with at least one of the three C's (cough, [coryza](/wiki/Coryza), conjunctivitis). Observation of [Koplik's spots](/wiki/Koplik's_spots) is also diagnostic of measles.[[17]](#cite_note-17)[[18]](#cite_note-18)

### Laboratory testing[[edit](/index.php?title=(none)&action=edit&section=5)]

Alternatively, laboratory diagnosis of measles can be done with confirmation of positive measles [IgM](/wiki/IgM) antibodies or isolation of measles virus RNA from respiratory specimens.[[19]](#cite_note-19) For people unable to have their [blood drawn](/wiki/Phlebotomy), saliva can be collected for salivary measles-specific [IgA](/wiki/IgA) testing.[[20]](#cite_note-20) Positive contact with other patients known to have measles adds strong [epidemiological](/wiki/Epidemiology) evidence to the diagnosis. Any contact with an infected person, including semen through sex, saliva, or mucus, can cause infection.[[18]](#cite_note-18)

## Prevention[[edit](/index.php?title=(none)&action=edit&section=6)]

[Template:Further2](/wiki/Template:Further2) [left|thumb|Rates of measles vaccination worldwide](/wiki/File:Measles_vaccination_coverage_world.svg) In developed countries, children are immunized against measles at 12 months, generally as part of a three-part [MMR vaccine](/wiki/MMR_vaccine) (measles, [mumps](/wiki/Mumps), and [rubella](/wiki/Rubella)). The vaccination is generally not given before this age because such infants respond inadequately to the vaccine due to an immature immune system.[[21]](#cite_note-21) Anti-measles antibodies are transferred from mothers who have been vaccinated against measles or have been previously infected with measles to their newborn children.[[21]](#cite_note-21) However, such antibodies are transferred in low amounts and usually last six months or less.[[21]](#cite_note-21) Infants under one year of age whose maternal anti-measles antibodies have disappeared become susceptible to infection with the measles virus.[[21]](#cite_note-21) A second dose of the vaccine is usually given to children between the ages of four and five, to increase rates of immunity. Vaccination rates have been high enough to make measles relatively uncommon. Adverse reactions to vaccination are rare, with fever and pain at the injection site being the most common. Life-threatening adverse reactions occur in less than one per million vaccinations (<0.0001%).[[22]](#cite_note-22) In developing countries where measles is highly [endemic](/wiki/Endemic_(epidemiology)), [WHO](/wiki/World_Health_Organization) doctors recommend two doses of [vaccine](/wiki/Vaccine) be given at six and nine months of age. The vaccine should be given whether the child is HIV-infected or not.[[23]](#cite_note-23) The vaccine is less effective in HIV-infected infants than in the general population, but early treatment with antiretroviral drugs can increase its effectiveness.[[24]](#cite_note-24) Measles vaccination programs are often used to deliver other child health interventions, as well, such as bed nets to protect against [malaria](/wiki/Malaria), antiparasite medicine and vitamin A supplements, and so contribute to the reduction of child deaths from other causes.[[25]](#cite_note-25)

## Treatment[[edit](/index.php?title=(none)&action=edit&section=7)]

There is no specific treatment for measles. Most people with uncomplicated measles will recover with rest and [supportive treatment](/wiki/Supportive_treatment).

Patients who become sicker may be developing [medical complications](/wiki/Medical_complication). Some people will develop [pneumonia](/wiki/Pneumonia) as a [consequence](/wiki/Sequela) of infection with the measles virus. Other complications include ear infections, [bronchitis](/wiki/Bronchitis) (either viral bronchitis or secondary bacterial bronchitis), and [brain inflammation](/wiki/Encephalitis).[[26]](#cite_note-26) Brain inflammation from measles has a mortality rate of 15%. While there is no specific treatment for brain inflammation from measles, [antibiotics](/wiki/Antibiotics) are required for [bacterial pneumonia](/wiki/Bacterial_pneumonia), [sinusitis](/wiki/Sinusitis), and [bronchitis](/wiki/Bronchitis) that can follow measles.

All other treatment addresses symptoms, with [ibuprofen](/wiki/Ibuprofen) or [paracetamol](/wiki/Paracetamol) to reduce fever and pain and, if required, a fast-acting [medication to dilate the airways](/wiki/Bronchodilator) for cough. As for [aspirin](/wiki/Aspirin), some research has suggested a correlation between children who take aspirin and the development of [Reye syndrome](/wiki/Reye_syndrome).[[27]](#cite_note-27) Some research has shown aspirin may not be the only medication associated with Reye, and even [antiemetics](/wiki/Antiemetics) have been implicated.[[28]](#cite_note-28) The link between aspirin use in children and Reye syndrome development is weak at best, if not actually nonexistent.[[29]](#cite_note-29) Nevertheless, most health authorities still caution against the use of aspirin for any fevers in children under 16.[[30]](#cite_note-30)[[31]](#cite_note-31)[[32]](#cite_note-32)[[33]](#cite_note-33) The use of [vitamin A](/wiki/Vitamin_A) during treatment is recommended by the World Health Organization to decrease the risk of blindness.<ref name=WHO2009Vac>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> A [systematic review](/wiki/Systematic_review) of trials into its use found no significant reduction in overall mortality, but it did reduce mortality in children aged under two years.[[34]](#cite_note-34)[[35]](#cite_note-35)[[36]](#cite_note-36) It is unclear if [zinc](/wiki/Zinc) supplementation in children with measles affects outcomes.[[37]](#cite_note-37)

## Prognosis[[edit](/index.php?title=(none)&action=edit&section=8)]

The majority of people survive measles, though in some cases, complications may occur. Possible consequences of measles virus infection include [bronchitis](/wiki/Bronchitis), [sensorineural hearing loss](/wiki/Sensorineural_hearing_loss),<ref name=Cohen2014>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> and—in about 1 in 10,000 to 1 in 300,000 cases<ref name=Noyce2012>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>—[panencephalitis](/wiki/Subacute_sclerosing_panencephalitis), which is usually fatal.[[38]](#cite_note-38) Acute measles encephalitis is another serious risk of measles virus infection. It typically occurs two days to one week after the breakout of the measles [rash](/wiki/Exanthem) and begins with very high fever, severe headache, convulsions and altered mentation. A person with measles encephalitis may become comatose, and death or brain injury may occur.[[39]](#cite_note-39)

## Epidemiology[[edit](/index.php?title=(none)&action=edit&section=9)]

[Template:Main](/wiki/Template:Main) [thumb|](/wiki/File:Measles_world_map_-_DALY_-_WHO2002.svg)[Disability-adjusted life year](/wiki/Disability-adjusted_life_year) for measles per 100,000 inhabitants in 2002.[Template:Refbegin](/wiki/Template:Refbegin) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Legend](/wiki/Template:Legend) [Template:Refend](/wiki/Template:Refend)

Measles is extremely infectious and its continued circulation in a community depends on the generation of susceptible hosts by birth of children. In communities which generate insufficient new hosts the disease will die out. This concept was first recognized in measles by Bartlett in 1957, who referred to the minimum number supporting measles as the [critical community size](/wiki/Critical_community_size) (CCS).[[40]](#cite_note-40) Analysis of outbreaks in island communities suggested that the CCS for measles is c. 250,000.[[41]](#cite_note-41) To achieve [herd immunity](/wiki/Herd_immunity), more than 95% of the community must be vaccinated due to the ease with which measles is transmitted from person to person.<ref name=Ludlow2015/>

In 2011, the WHO estimated that 158,000 deaths were caused by measles. This is down from 630,000 deaths in 1990.<ref name=Loz2012>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> As of 2013, measles remains the leading cause of vaccine-preventable deaths in the world.<ref name=Kabra2013/> In developed countries, death occurs in 1 to 2 cases out of every 1,000 (0.1% - 0.2%).[[42]](#cite_note-42) In populations with high levels of malnutrition and a lack of adequate healthcare, mortality can be as high as 10%. In cases with complications, the rate may rise to 20–30%.[[43]](#cite_note-43) In 2012, the number of deaths due to measles was 78% lower than in 2000 due to increased rates of immunization among [UN member states](/wiki/UN_member_states).<ref name=Ludlow2015/>

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Reported cases[[44]](#cite_note-44)[[45]](#cite_note-45)[[46]](#cite_note-46)[[47]](#cite_note-47)[[48]](#cite_note-48)[[49]](#cite_note-49) | | | | | |
| **WHO-Region** | **1980** | **1990** | **2000** | **2005** | **2014** |
| African Region | 1,240,993 | 481,204 | 520,102 | 316,224 | 71,574 |
| Region of the Americas | 257,790 | 218,579 | 1,755 | 66 | 19,898 |
| Eastern Mediterranean Region | 341,624 | 59,058 | 38,592 | 15,069 | 28,031 |
| European Region | 851,849 | 234,827 | 37,421 | 37,332 | 16,899 |
| South-East Asia Region | 199,535 | 224,925 | 61,975 | 83,627 | 112,418 |
| Western Pacific Region | 1,319,640 | 155,490 | 176,493 | 128,016 | 213,366 |
| Worldwide | 4,211,431 | 1,374,083 | 836,338 | 580,287 | 462,186 |

Even in countries where vaccination has been introduced, rates may remain high. Measles is a leading cause of vaccine-preventable childhood mortality. Worldwide, the fatality rate has been significantly reduced by a vaccination campaign led by partners in the [Measles Initiative](/wiki/Measles_Initiative): the [American Red Cross](/wiki/American_Red_Cross), the United States' [Centers for Disease Control and Prevention](/wiki/Centers_for_Disease_Control_and_Prevention) (CDC), the United Nations Foundation, UNICEF and the WHO. Globally, measles fell 60% from an estimated 873,000 deaths in 1999 to 345,000 in 2005.[[50]](#cite_note-50) Estimates for 2008 indicate deaths fell further to 164,000 globally, with 77% of the remaining measles deaths in 2008 occurring within the Southeast Asian region.[[51]](#cite_note-51) In 2013–14 there were almost 10,000 cases in 30 European countries. Most cases occurred in unvaccinated individuals and over 90% of cases occurred in the five European nations: [Germany](/wiki/Germany), [Italy](/wiki/Italy), the [Netherlands](/wiki/Netherlands), [Romania](/wiki/Romania), and the [United Kingdom](/wiki/United_Kingdom).<ref name=Ludlow2015/> In the Vietnamese measles epidemic in spring of 2014, an estimated 8,500 measles cases were reported as of April 19, with 114 fatalities;[[52]](#cite_note-52) as of May 30, 21,639 suspected measles cases had been reported, with 142 measles-related fatalities.[[53]](#cite_note-53) Five out of six WHO regions have set goals to eliminate measles, and at the 63rd World Health Assembly in May 2010, delegates agreed on a global target of a 95% reduction in measles mortality by 2015 from the level seen in 2000, as well as to move towards eventual [eradication](/wiki/Eradication_of_infectious_diseases). However, no specific global target date for eradication has yet been agreed to as of May 2010.[[54]](#cite_note-54)[[55]](#cite_note-55) In 2014, a review by the Centers for Disease Control reported a total of 911 cases of measles from 2001 to 2011, with an annual median number of 61 cases and concluded that "the elimination of endemic measles, rubella, and CRS has been sustained in the United States."[[56]](#cite_note-56) However, in 2015, a measles outbreak occurred in the U.S. and spread rather farther than it should have, because [misguided ideas about anti-vaccination and vaccination delaying](/wiki/Vaccine_controversies) have decreased the [community immunity](/wiki/Herd_immunity) afforded by proper [public health](/wiki/Public_health) programs. In 2015, a U.S. woman died of pneumonia, as a result of measles. She was the first fatality in the USA from measles since 2003.[[57]](#cite_note-57) The woman had been vaccinated for measles and was taking immune suppression drugs for another condition. The drugs suppressed the measles immunity, the woman became infected with measles, did not develop a rash, and contracted pneumonia which caused her death.[[58]](#cite_note-58) Between October 2014 and March 2015, a measles outbreak in the German capital of [Berlin](/wiki/Berlin) resulted in at least 782 cases.[[59]](#cite_note-59) From January 4 - April 2, 2015, there were 159 reported cases of measles to the CDC. Of those 159 cases, 111 (70%) were determined to have come from an earlier exposure in late December 2014. This outbreak was believed to have originated from the Disney theme parks in California. The initial exposure to the virus was never found. There have been cases associated with this outbreak in seven states, Mexico, and Canada. Of the cases 48% were unvaccinated and 38% were unsure of their vaccination status.[[60]](#cite_note-60)

## History[[edit](/index.php?title=(none)&action=edit&section=10)]

[left|thumb|16th-century](/wiki/File:Measles_Aztec_drawing.jpg) [Aztec](/wiki/Aztec) drawing of someone with measles Estimates based on modern molecular biology place the emergence of measles as a human disease sometime after 500 AD.[[61]](#cite_note-61) (The former speculation that the [Antonine Plague](/wiki/Antonine_Plague) of 165–180 AD was caused by measles is now discounted.) The first systematic description of measles, and its distinction from smallpox and [chickenpox](/wiki/Chickenpox), is credited to the [Persian](/wiki/Medicine_in_medieval_Islam) physician [Rhazes](/wiki/Rhazes) (860–932), who published *The Book of Smallpox and Measles*.[[62]](#cite_note-62) Given what is now known about the evolution of measles, Rhazes' account is remarkably timely, as recent work that examined the mutation rate of the virus indicates the measles virus emerged from [rinderpest](/wiki/Rinderpest) (Cattle Plague) as a [zoonotic disease](/wiki/Zoonosis) between 1100 and 1200 AD, a period that may have been preceded by limited outbreaks involving a virus not yet fully acclimated to humans.<ref name = Furuse2010>[Template:Cite journal](/wiki/Template:Cite_journal)</ref> This agrees with the observation that measles requires a susceptible population of >500,000 to sustain an epidemic, a situation that occurred in historic times following the growth of medieval European cities.<ref name = Black1966>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>

[thumb|120px|](/wiki/File:Hilleman-Walter-Reed.jpeg)[Maurice Hilleman's](/wiki/Maurice_Hilleman) measles vaccine is estimated to prevent 1 million deaths per year.[[63]](#cite_note-63) Measles is an [endemic disease](/wiki/Endemic_disease), meaning it has been continually present in a community, and many people develop resistance. In populations not exposed to measles, exposure to the new disease can be devastating. In 1529, a measles outbreak in [Cuba](/wiki/Cuba) killed two-thirds of those natives who had previously survived smallpox. Two years later, measles was responsible for the deaths of half the population of [Honduras](/wiki/Honduras), and it had ravaged [Mexico](/wiki/Mexico), [Central America](/wiki/Central_America), and the [Inca](/wiki/Inca) civilization.[[64]](#cite_note-64) Between roughly 1855 and 2005, measles has been estimated to have killed about 200 million people worldwide.[[65]](#cite_note-65) Measles killed 20 percent of [Hawaii's](/wiki/Hawaii) population in the 1850s.[[66]](#cite_note-66) In 1875, measles killed over 40,000 [Fijians](/wiki/Fiji), approximately one-third of the population.[[67]](#cite_note-67) In the 19th century, the disease killed 50% of the [Andamanese](/wiki/Andamanese) population.[[68]](#cite_note-68) Seven to eight million children are thought to have died from measles each year before the vaccine was introduced.<ref name=Ludlow2015>[Template:Cite journal](/wiki/Template:Cite_journal)</ref>

In 1954, the virus causing the disease was isolated from a 13-year-old boy from the United States, David Edmonston, and adapted and propagated on [chick](/wiki/Chicken) [embryo](/wiki/Embryo) [tissue culture](/wiki/Tissue_culture).[[69]](#cite_note-69) To date, 21 strains of the measles virus have been identified.[[70]](#cite_note-70) While at [Merck](/wiki/Merck_&_Co.), [Maurice Hilleman](/wiki/Maurice_Hilleman) developed the first successful vaccine.[[71]](#cite_note-71) Licensed [vaccines](/wiki/Vaccine) to prevent the disease became available in 1963.[[72]](#cite_note-72) An improved measles vaccine became available in 1968.[[73]](#cite_note-73) Measles as an endemic disease was [eliminated from the United States](/wiki/List_of_diseases_eliminated_from_the_United_States) in 2000, but continues to be reintroduced by international travelers.

## Society and culture[[edit](/index.php?title=(none)&action=edit&section=11)]

German anti-vaccination campaigner and [HIV/AIDS denialist](/wiki/HIV/AIDS_denialism)[[74]](#cite_note-74) [Stefan Lanka](/wiki/De:Stefan_Lanka) posed a challenge on his website in 2011, offering a sum of €100,000 for anyone who could scientifically prove that measles is caused by a virus and determine the diameter of the virus.[[75]](#cite_note-75) He posits that the illness is [psychosomatic](/wiki/Psychosomatic_illness) and that the measles virus does not exist. When provided with overwhelming scientific evidence from various medical studies by German physician David Barden, Lanka did not accept the findings, forcing Barden to appeal in court. The legal case ended with the ruling that Lanka was to pay the prize.[[59]](#cite_note-59)[[76]](#cite_note-76) The case received wide international coverage that prompted many to comment on it, including [clinical neurologist](/wiki/Neurology), well-known [skeptic](/wiki/Skeptic) and [science-based medicine](/wiki/Science-based_medicine) advocate Dr. [Steven Novella](/wiki/Steven_Novella), who called Lanka "a crank".[[77]](#cite_note-77)

## Research[[edit](/index.php?title=(none)&action=edit&section=12)]

In May 2015, the journal [*Science*](/wiki/Science_(journal)), published a report in which researchers found that the measles infection can leave a population at increased risk for mortality from other diseases for 2 to 3 years.[[78]](#cite_note-78)[[79]](#cite_note-79) A specific drug treatment for measles [ERDRP-0519](/wiki/ERDRP-0519) has shown promising results in animal studies, but has not yet been tested in humans.[[80]](#cite_note-80)[[81]](#cite_note-81)[[82]](#cite_note-82)

## See also[[edit](/index.php?title=(none)&action=edit&section=13)]

* [Critical community size](/wiki/Critical_community_size)
* [Pulse vaccination strategy](/wiki/Pulse_vaccination_strategy)
* [Vaccine-naive](/wiki/Vaccine-naive)

## References[[edit](/index.php?title=(none)&action=edit&section=14)]

[Template:Reflist](/wiki/Template:Reflist)

## External links[[edit](/index.php?title=(none)&action=edit&section=15)]

[Template:Commons category](/wiki/Template:Commons_category)

* [Initiative for Vaccine Research (IVR): Measles](http://www.who.int/vaccine_research/diseases/measles/en/), [World Health Organization](/wiki/World_Health_Organization) (WHO)
* [Measles FAQ](http://www.cdc.gov/vaccines/vpd-vac/measles/faqs-dis-vac-risks.htm) from [Centers for Disease Control and Prevention](/wiki/Centers_for_Disease_Control_and_Prevention) in the United States
* [Case of an adult male with measles (facial photo)](http://news.bbc.co.uk/1/hi/health/7385020.stm)
* [Clinical pictures of measles](http://www.skinsight.com/child/rubeolaMeasles.htm)
* [Virus Pathogen Database and Analysis Resource (ViPR): Paramyxoviridae](http://www.viprbrc.org/brc/home.do?decorator=paramyxo)

[Template:Viral cutaneous conditions](/wiki/Template:Viral_cutaneous_conditions) [Template:Diseases of Poverty](/wiki/Template:Diseases_of_Poverty) [Template:Numbered Diseases of Childhood](/wiki/Template:Numbered_Diseases_of_Childhood) [Template:Authority control](/wiki/Template:Authority_control)

[Category:Measles](/wiki/Category:Measles) [Category:Pediatrics](/wiki/Category:Pediatrics) [Category:Virus-related cutaneous conditions](/wiki/Category:Virus-related_cutaneous_conditions) [Category:Infectious diseases with eradication efforts](/wiki/Category:Infectious_diseases_with_eradication_efforts) [Category:RTT](/wiki/Category:RTT)