

MEASLES

INITIATIVE



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MEASLES

Measles remains a leading cause of death among young children, despite the availability of a safe and effective vaccine for the past 40 years. An estimated 242 000 people, the majority of them children, died from measles in 2006, the latest year for which figures are available.

Measles is one of the most contagious diseases known. Almost all non-immune children contract this respiratory disease if exposed to the virus. Measles is an acute illness caused by a virus in the paramyxovirus family. Measles virus normally grows in the cells that line the back of the throat and in the cells that line the lungs. It is a human disease not known to occur in animals.

Vaccination has had a major impact on measles deaths. From 2000 to 2006, an estimated 478 million children aged nine months to 14 years received measles vaccine through supplementary immunization activities in 46 out of the 47 priority countries with the highest burden of measles. These accelerated activities have resulted in a significant reduction in estimated global measles deaths. Overall, global measles mortality decreased by 68% between 2000 and 2006. The largest gains occurred in Africa where measles cases and deaths fell by 91%.

Signs and symptoms

The first sign of infection is usually high fever, which begins approximately 10 to 12 days after exposure and lasts one to seven days. During the initial stage, the patient may develop a runny nose, cough, red and watery eyes and small white spots inside the cheeks. After several days, a rash develops, usually on the face and upper neck. Over a period of about three days, the rash spreads, eventually reaching the hands and feet. The rash lasts for five to six days, then fades. The rash occurs, on average, at day 14 after exposure to the virus, with a range of seven to 18 days.

Complications

Measles is often an unpleasant mild or moderately severe illness. Severe measles is particularly likely in poorly nourished young children, especially those who do not receive sufficient vitamin A, or whose immune systems have been weakened by HIV/AIDS or other diseases.

Children usually do not die directly of measles, but from its complications. Complications are more common in children under the age of five or adults over the age of 20.

The most serious complications include blindness, encephalitis (a dangerous infection of the brain causing inflammation), severe diarrhoea (possibly leading to dehydration), ear infections and severe respiratory infections such as pneumonia, which is the most common cause of death associated with measles. Encephalitis is estimated to occur in 1/1000 cases, while otitis media (middle ear infection) is reported in 5-15% of cases and pneumonia in 5-10% of cases. The case fatality rate in developing countries is generally in the range of 1 to 5%, but may be as high as 25% in populations with high levels of malnutrition and poor access to health care. People who recover from measles are immune for the rest of their lives.

People most at risk

Un-immunized young children are at highest risk for measles and its complications, including death. However, any person who has not been immunized with vaccine or through experiencing the disease can become infected.

Measles can be particularly deadly in countries experiencing or recovering from war, civil strife or a natural disaster. Infection rates soar because damage to infrastructure and health services interrupts routine immunization and overcrowding in camps for refugees and internally displaced people greatly increases the risk of infection.

Transmission

The highly contagious measles virus is spread by coughing and sneezing, close personal contact or direct contact with infected nasal or throat secretions., Measles tends to result in epidemics which may cause many deaths, especially among young malnourished children.

The virus remains active and contagious in the air or on infected surfaces for up to two hours. It can be transmitted by an infected individual from four days prior to the onset of the rash to four days after the onset. If one person has the disease, a high proportion of their susceptible close contacts will also become infected.

Treatment

Severe complications can be avoided. General nutritional support and the treatment of dehydration with oral rehydration solution are necessary. Antibiotics should be prescribed for treating eye and ear infections and pneumonia. To improve survival, it is important that children with measles receive adequate nutrition and fluids.

All children in developing countries diagnosed with measles should receive two doses of vitamin A supplements given 24 hours apart. This can help prevent eye damage and blindness. Moreover, vitamin A supplementation has been shown to reduce the number of deaths from measles by 50%.

Disease and mortality burden

While measles is now rare in many industrialized countries, it remains a common illness in many developing countries. More than 20 million people are affected each year by measles. In 2006, it was estimated that there were 242 000 measles deaths globally: this translates to about 663 deaths every day; 27 people die every hour from measles. The overwhelming majority (>95%) of measles deaths occur in countries with per capita Gross National Income of less than US \$1000 and weak health infrastructure. The primary reason for continuing high childhood measles morbidity and mortality is the failure to deliver at least one dose of measles vaccine to all infants. In countries where measles has been largely eliminated, cases imported from other countries remain an important source of infection.

Table 1: Estimated number of deaths, with ranges*, by WHO region, 2006

Region	Estimated number of measles deaths	Ranges
Africa	36 000	[26 000 - 49 000]
Americas	<1 000*	[-]
Eastern Mediterranean	23 000	[16 000 - 34 000]
European	<1 000*	[-]
South East Asia	178 000	[128 000 - 234 000]
Western Pacific	5 000	[3000 - 7000]
TOTAL	242 000	[173 000 - 325 000]

* At low incidence levels the model is not precise and surveillance data indicate <1,000 deaths .

Prevention: a cost-effective, safe vaccine

Immunization prevents suffering, complications and death caused by measles. The measles vaccine is safe, effective and inexpensive. It costs less than one US dollar (for the vaccine, injection equipment and operational costs) to immunize a child against measles, making measles vaccination one of the most cost-effective public health interventions available for preventing deaths. Measles immunization carries the highest health return for the money spent, saving more lives per unit cost than any other health intervention. The vaccine, which has been available for more than 40 years, costs about US \$0.33 per bundled dose (vaccine plus safe injection equipment) if bought through UNICEF.

In many countries where the public health burden of rubella and/or mumps is considered to be important, measles vaccine is often incorporated with rubella and/or mumps vaccine as a combined, live, attenuated (weakened) measles-rubella (MR) or measles-mumps-rubella (MMR) vaccine. If bought through UNICEF, MR vaccine costs about US \$0.65 per bundled dose, and the price of MMR per bundled dose is in the range of US \$1.04-\$1.50 depending on the manufacturer. Measles vaccine is equally effective whether in the single or in the combined form.

Immunization coverage rates for measles vaccination vary significantly by region. WHO and UNICEF estimate that, in 2006, global routine measles vaccination coverage reached 80% for the first time, up from 72% in 2000.

Global measles mortality reduction goal

In May 2005, the 58th World Health Assembly adopted the WHO/UNICEF Global Immunization Vision and Strategy (GIVS)¹. GIVS calls on countries to reduce global measles deaths by 90% by

¹ World Health Assembly Resolution 58.15: Global immunization strategy:

http://www.who.int/gb/ebwha/pdf_files/WHA58/WHA58_15-en.pdf

Global Immunization Vision and Strategy web site: <http://www.who.int/immunization/givs/en>

2010 compared to 2000 estimates. The United Nations Millennium Declaration also set a child survival target: to reduce the under-five child mortality rate by two-thirds by the year 2015 compared with 1990 levels. Routine measles vaccination coverage is an indicator for this target.

WHO/UNICEF comprehensive strategy for sustainable measles mortality reduction

WHO and UNICEF have developed a comprehensive strategy to sustainably reduce measles deaths. It was endorsed by the World Health Assembly in 2003. The four components of the strategy are as follows:

1. **Strong routine immunization.** The first dose of measles vaccine is given to children at the age of nine months or shortly thereafter through routine immunization services. This is the foundation of the sustainable measles mortality reduction strategy. At least 90% of children should be reached by routine immunization services every year, in every district.
2. **A 'second opportunity' for measles immunization** is provided to all children aged nine months to 15 years. This assures measles immunity in children who failed to receive a previous dose of measles vaccine, as well as in those who were vaccinated but failed to develop immunity following vaccination (approximately 15% of those children vaccinated at nine months of age).

The second opportunity prevents the accumulation of susceptible children to dangerous levels, since many older children have missed measles vaccination and have not been infected, so they are not immune. The second opportunity for measles immunization is given either through routine immunization services (if high coverage can be achieved and maintained over time) or through periodic supplementary immunization activities. These target large populations (entire nations or large regions) and aim to vaccinate all children regardless of prior vaccination history.

3. **Surveillance** Standard measles surveillance guidelines have been developed and implemented. These include collection of blood from suspected cases and testing it in an accredited laboratory. Prompt recognition and investigation of measles outbreaks provide important information about programme impact and assure the implementation of appropriate outbreak response activities.
4. Improved **clinical management of measles cases**, including vitamin A supplementation and adequate treatment of complications, if needed, with antibiotics.

Priority countries

In their joint *Global Plan for Reducing Measles Mortality, 2006-2010*², WHO and UNICEF have identified 47 priority countries to target. These countries account for more than 95% of global measles deaths; they are:

African Region: Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Eritrea, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Liberia, Madagascar, Mali, Mozambique, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, United Republic of Tanzania, Togo, Uganda and Zambia;

Eastern Mediterranean Region: Afghanistan, Djibouti, Pakistan, Somalia, Sudan and Yemen;

South-East Asia Region: Bangladesh, India, Indonesia, Myanmar, Nepal and Timor-Leste; and

² WHO/UNICEF *Global Plan for reducing measles mortality 2006-2010*:

http://www.who.int/immunization_delivery/adc/measles/Measles%20Global%20Plan_Eng.pdf

Western Pacific Region: Cambodia, Lao People's Democratic Republic, Papua New Guinea and Viet Nam.

The Measles Initiative

In addition to the affected countries themselves, the Measles Initiative partnership has been a key force in reducing measles mortality. Launched in 2001, it is spearheaded by the American Red Cross, the Centers for Disease Control and Prevention of the United States Department of Health and Human Services, the United Nations Foundation, UNICEF and WHO. Each partner has a clearly defined role. WHO and UNICEF play a leading role in strategy development, consensus building and programme monitoring. WHO provides technical leadership and strategic planning for the management, coordination, and monitoring of global measles control activities and is responsible for ensuring that all components of the WHO/UNICEF Strategy are technically sound and successfully implemented. UNICEF procures and delivers the measles vaccine and injection equipment to countries and assists with advocacy and community mobilization.

With additional resources from the GAVI Alliance and most recently from the International Finance Facility for Immunization, the Measles Initiative is expanding its support to countries affected by measles in the Eastern Mediterranean, South-East Asia and Western Pacific regions of WHO. It continues the successful child health campaigns in which health workers provide not only measles vaccine but also polio vaccine, insecticide-treated nets for malaria prevention, vitamin A and de-worming tablets.

Other key partners of the Initiative include the Canadian International Development Agency, Church of Jesus Christ of Latter-Day Saints, Japanese International Agency for Cooperation, Bill & Melinda Gates Foundation, Vodafone Group Foundation, Izumi Foundation, International Federation of Red Cross and Red Crescent Societies, Becton Dickinson and Company.

Challenges ahead

To achieve the 2010 measles mortality reduction goal of 90% from 2000 levels, several challenges have to be overcome:

1. Remaining large countries with high measles deaths such as India and Pakistan need to implement measles mortality reduction activities;
2. To sustain the gains achieved in the 47 priority countries, particularly in the African region, enhanced efforts are needed to ensure that more than 90% of infants are vaccinated against measles before their first birthday;
3. Priority countries must continue conducting follow-up vaccination campaigns every two to four years targeting children born since the last campaign until their routine immunization systems are capable of reaching all children, and
4. Field surveillance with laboratory confirmation of suspected measles outbreaks will need to be extended to all priority countries to ensure effective monitoring.

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More information about measles can also be found at: http://www.who.int/immunization_delivery/adc/measles/measles/en/index.html

All WHO Press Releases, Fact Sheets and Features as well as other information on this subject can be obtained on the WHO web site: <http://www.who.int>