



Childhood diseases: Focus on measles

Stephani Schmidt
Amazeza Information Services

Introduction

Measles, also known as rubeola, is a highly contagious viral illness. In the pre-vaccination era, measles was a near universal childhood infection and more than 90% of children had measles before 15 years of age. It also caused approximately 2.6 million deaths annually.

While vaccination against measles has resulted in a 73% reduction in measles deaths between 2000 and 2018, measles is still common in many developing countries, especially in parts of Africa and Asia.

Measles case numbers increased to a near 10-year peak in 2018, with over 140 000 deaths globally. In 2019, the World Health Organization (WHO) reported that “many countries around the world are experiencing outbreaks” and there has been a global resurgence of measles in several countries around the world that had achieved, or were close to achieving, measles elimination. Although the causes of the outbreaks vary, the WHO stated that “failing to vaccinate people is at the root of them all”.

While measles is still circulating somewhere in the world, countries cannot prevent the importation, but they can protect their population through high vaccine coverage ($\geq 95\%$ is necessary to prevent outbreaks).

How is the measles virus spread?

A person with measles is contagious (able to spread the virus) from four days before the rash appears to four days after the rash onset.

The measles virus is spread when someone with measles sneezes, coughs or talks. The airborne virus remains active

and contagious in the air or on infected surfaces for up to two hours and can be spread even in the absence of person-to-person contact. Other people can become infected if they inhale the airborne virus or touch their eyes, nose or mouth after touching an infected surface.

Measles is considered “one of the world’s most contagious diseases” and following exposure, up to 90% of people who are susceptible (not immune) to measles will develop measles.

What are the signs and symptoms of measles?

After a person has been exposed to the virus, the virus has to first incubate. During this stage the infected person does not have any signs or symptoms of measles.

A high fever (can be as high as 40°C) is usually the first sign of measles and usually appears 10 to 12 days (ranging from 7 to 14 days) after being exposed to the virus. Other non-specific signs and symptoms include:

- conjunctivitis (red, watery eyes),
- coryza (runny nose), and
- cough.

Two to three days after symptoms begin, tiny white spots on a red background, also known as Koplik spots, may appear on the inside lining of the cheeks. They are characteristic for measles.



Figure 1: Measles. Adapted from the Centers for Disease Control and Prevention (CDC).

The rash usually appears on average 14 days (ranging from 7 to 18 days) after exposure. The measles rash:

- Starts in the face at the hairline and spreads to the rest of the body over about three days.
- Looks like small, flat red spots, but may become confluent (flow into one another) as they spread.
- Usually lasts for five to six days and then fades in the same order that it appeared.



Measles rash after three days Classic measles rash after four days

Figure 2: Measles rash. Adapted for the CDC.

Available from: <https://www.cdc.gov/measles/symptoms/photos.html>

The measles rash may be very similar to the rash of other viral infections such as German measles. It is therefore important that the diagnosis is confirmed by a blood test to make sure that it is truly measles.

Since measles virus is able to spread through communities very quickly, the National Institute for Communicable Diseases (NICD) must be notified if measles is suspected. This will allow public health officials to respond to every case in an attempt to prevent outbreaks.

Complications

Most of the measles-related deaths occur in low-income countries with weak health infrastructures. Deaths are mostly due to complications associated with measles and include severe diarrhoea and related dehydration, otitis media (ear infection), pneumonia, blindness (measles is a leading cause of blindness in African children) and encephalitis (brain infection).

Children at risk of developing severe disease or complications include:

- Young children (under five years of age)
- Malnourished children, especially those with a vitamin A deficiency
- Persons whose immune system has been weakened by HIV/AIDS or other diseases

How is measles treated?

There is no specific antiviral treatment for measles.

Treatment is aimed at improving symptoms and preventing

complications. Fever may be treated with over-the-counter medication such as paracetamol or ibuprofen. Aspirin should not be used in children under 16 years of age, due to the risk of Reye's syndrome.

Supportive care includes ensuring good nutrition, adequate fluid intake and prevention/treatment of dehydration.

Vitamin A supplementation may lessen the severity of measles, prevent eye damage and blindness. It is recommended for all children with acute measles. Kindly note that an age-appropriate dose of vitamin A should be used for the treatment of measles. It is therefore important to refer the patient to the doctor or pharmacist.

In order to prevent the spread of measles, those with measles should be advised to:

- Stay at home until they are no longer contagious (for four days after the rash developed).
- Avoid contact with people that are susceptible to measles.
- Cough or sneeze into a tissue (covering the nose and mouth), upper sleeve or elbow, but not into the hands. Used tissues should be disposed of in a dustbin.
- Frequently wash their hands with soap and water.
- Not share eating or drinking utensils.
- Disinfect surfaces that are frequently touched (i.e. tables, doorknobs, toys) with standard household disinfectants.

Who is at risk of getting measles?

Persons who had measles in the past are immune and can therefore not get measles again.

Anyone who is not immune to measles (those who have not had measles disease or who have not been vaccinated against measles in the past), are at risk of getting measles.

The role of the measles vaccine

For those at risk of getting measles, there is an effective and well-tolerated measles vaccine available.

Routine vaccination

In South Africa, the monovalent measles vaccine (only protects against measles) is included in the Expanded Programme on Immunisation (EPI). The first dose is administered at six months of age and the second at twelve months of age.

A combination vaccine, known as the measles-mumps-rubella (MMR) vaccine, is available in the private sector in South Africa. According to the vaccination schedule drawn up by the Paediatric Management Group, the first dose of the MMR vaccine can be given at 12 months of age instead of the monovalent measles vaccine. The second MMR is recommended at six years of age.

Older children, adolescents and adults can still be vaccinated; it is never too late to catch up a measles vaccine dose that has been missed.

Use in adults

A measles-containing vaccine (if not contraindicated) should be offered to susceptible persons. Special consideration for vaccination should be given to those at risk of infection and transmission of the virus, for example, international travellers, healthcare workers, people working in tourism and those attending colleges or universities.

A two-dose MMR schedule is recommended by the WHO to ensure measles immunity and to prevent outbreaks. The minimum interval between the two doses of MMR, for individuals over one year of age, is four weeks (28 days).

After being exposed to someone with measles

The measles-containing vaccine may prevent disease if given within 72 hours of exposure.

In a nutshell

- Measles remains an important cause of global illness and death, despite the availability of a well-tolerated and effective vaccine.
- Measles is highly contagious and the virus is able to spread through communities very quickly.
- Susceptible individuals of all ages can get measles.
- Measles is vaccine-preventable.
- Communities where more than 5% of the people are not vaccinated against measles are vulnerable to outbreaks. It is therefore important to maintain high levels of vaccination coverage ($\geq 95\%$).

Bibliography

1. World Health Organization (WHO). Measles key facts. [Accessed 20 Jan 2020]. Available from: <https://www.who.int/news-room/fact-sheets/detail/measles>.
2. National Institute for Communicable Diseases (NICD). Measles FAQ document. [Accessed 20 Jan 2020]. Available from: http://www.nicd.ac.za/assets/files/Document_FAQ_measles_20170111.pdf.
3. Centers for Disease Control and Prevention (CDC). Measles. The Pink Book. [Accessed 20 Jan 2020]. Available from: <https://www.cdc.gov/vaccines/pubs/pinkbook/meas.html>.
4. World Health Organization (WHO). Measles fighting a global resurgence. [Accessed 22 January 2019]. Available from: <https://www.who.int/news-room/feature-stories/detail/measles-fighting-a-global-resurgence>.
5. World Health Organization (WHO). Emergencies preparedness, response. Measles-global situation. [Accessed 21 Jan 2020]. Available from: https://www.who.int/csr/don/26-november-2019-measles-global_situation/en/.
6. Mayo clinic. Measles: symptoms and causes. [Accessed 22 January 2019]. Available from: <https://www.mayoclinic.org/diseases-conditions/measles/symptoms-causes/syc-20374857>.
7. Gans H, Maldonado YA. Measles: clinical manifestation, diagnosis, treatment and prevention. UpToDate Post TW, ed. UpToDate. Waltham, MA: UpToDate Inc. <https://www.uptodate.com> [Accessed 22 January 2019].
8. Centers for Disease Control and Prevention (CDC). Measles (Rubeola). [Accessed 20 Jan 2020]. Available from: https://www.cdc.gov/measles/symptoms/signs-symptoms.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fmeasles%2Fabout%2Fsigns-symptoms.html.
9. Centers for Disease Control and Prevention (CDC). Measles rash pictures. Available from: <https://www.cdc.gov/measles/symptoms/photos.html>.
10. National Institute for Communicable Diseases (NICD). Vaccine information for parents and caregivers. First edition Nov 2016. [Accessed 20 Jan 2020]. Available from: http://www.nicd.ac.za/assets/files/NICD_Vaccine_Booklet_D132_FINAL.pdf.
11. Mayo clinic. Measles: diagnosis and treatment. [Accessed 22 January 2019]. Available from: <https://www.mayoclinic.org/diseases-conditions/measles/diagnosis-treatment/drc-20374862>.
12. Paediatric Management Group. Vaccination Schedule 2019. [Accessed 20 Jan 2020]. Available from: <https://www.mm3admin.co.za/documents/docmanager/editor/9299/UserFiles/PMG/Vaccination%20Chart/vaccination-chart-2019-final.pdf>.
13. Royal Pharmaceutical Society of Great Britain. British National Formulary 59. Royal Pharmaceutical Society; 2010:252.
14. Centers for Disease Control and Prevention (CDC). Questions about measles. [Accessed 22 January 2019]. Available from: <https://www.cdc.gov/measles/about/faqs.html>.