

# Summary of Key Points

## WHO Position Paper on Vaccines against measles virus April 2017



World Health  
Organization

# Background

- Measles is one of the most contagious diseases of humans, and in the absence of vaccination, about 95% of individuals would be infected with measles virus by 15 years of age.
- Measles is preventable and can be eliminated by vaccination. In 2015, worldwide measles vaccination coverage with the first and second dose had reached 85% and 61%, respectively.
- In 2015, there were an estimated 134 200 measles deaths globally, representing a 79% decline since 2000.
- All 6 WHO regions have measles elimination goals before or by 2020, and the GVAP, endorsed by the WHA, has a goal to eliminate measles in 5 of the 6 WHO Regions by 2020.



# Disease

- The incubation period for measles usually lasts 10–14 days (range, 7–23 )
- Symptoms generally consist of cough, fever, malaise, conjunctivitis, and coryza. The characteristic morbilliform rash appears 2–4 days after onset of the prodrome.
- Complications occur in approximately 30% of reported cases. Most common complications are: otitis media, croup, diarrhoea & pneumonia.
- In developing countries, case-fatality rate for measles is usually 3–6%, but can be as high as 30%, particularly among displaced or isolated, immunologically naïve populations.



# Treatment

- There is no specific treatment for measles.
- Case management of measles focuses on supportive care as well as the prevention and treatment of measles complications and secondary infections.
- Vitamin A should be administered to all acute cases irrespective of the timing of previous doses of vitamin A.
  - Vitamin A oral dosage should be given immediately on diagnosis and repeated the next day;
  - 50 000 IU should be given to infants aged <6 months;
  - 100 000 IU to infants aged 6-11 months and;
  - 200 000 IU to children aged 12 months or older.
  - If the child has clinical ophthalmic signs of vitamin A deficiency such as Bitot's spots, a third dose should be given 4–6 weeks later



# Measles vaccines

- Several live attenuated measles vaccines are available, either as a monovalent vaccine or in combination with rubella, mumps, or varicella vaccines.
- Available vaccines are
  - safe
  - effective
  - provide long-lasting protection
  - inexpensive
  - may be used interchangeably in immunization programmes.



# Immunogenicity, efficacy and effectiveness

- Vaccinating infants before or at the age of 6 months often fails to induce seroconversion due to the immaturity of the immune system as well as the presence of neutralizing maternal antibodies.
- The median vaccine effectiveness of a single dose of MCV administered at 9–11 months and greater than 12 months of age is **84%** (interquartile range (IQR), 72–95%) and **92.5%** (IQR, 84.8–97%), respectively.
- Among children that do not respond to their first dose of MCV, approximately 95% develop protective immunity after the second dose.
- Evidence indicates that a single dose of correctly administered measles vaccine which results in seroconversion will afford lifelong protection for most healthy individuals.
- Although secondary failures may occur at least occasionally due to waning immunity, declining immunity does not appear to play a major role in measles virus transmission.

# Vaccine safety

- Adverse reactions following measles vaccination are generally mild and transient.
- Approximately 7–12 days after vaccination, systemic reactions occur in about 5–15% of recipients including fever of  $>39^{\circ}\text{C}$  for 1–2 days. A transient rash occurs in about 2% of recipients.
- There is very strong scientific evidence that measles vaccination is not linked to inflammatory bowel disease or to autism.
- Serious adverse events are very rare.



# WHO Position

## Immunization program standards

- Reaching all children with 2 doses of measles vaccine should be the standard for all national immunization programmes.
- In addition to the first routine dose of MCV (MCV1), all countries should include a second routine dose of MCV (MCV2) in their national vaccination schedules regardless of the level of MCV1 coverage.
- Countries aiming at measles elimination should achieve  $\geq 95\%$  coverage with both doses equitably to all children in every district.



# WHO Position

## Optimal timing for routine MCV1 and MCV2

- Where risk of measles mortality among infants remains high, MCV1 should be administered at 9 months of age. These countries should administer the routine dose of MCV2 at age 15–18 months. The minimum interval between MCV1 and MCV2 is 4 weeks.
- In countries with low risk of measles infection among infants (i.e. near elimination), MCV1 may be administered at 12 months
  - Higher sero-conversion rates are achieved at 12 months than 9 months
  - Before increasing age of MCV1, policy-makers should review local measles epidemiology and programmatic data on vaccination.



# WHO Position

## Optimal timing for routine MCV1 & MCV2 (cont.)

- In countries where MCV1 is administered at 12 months of age, the optimal age for delivering routine MCV2 is based on programmatic considerations that achieve the highest coverage of MCV2 and, hence, the highest population immunity.
- Every opportunity (e.g. whenever children come in contact with health services) should be taken to vaccinate all children who missed one or both MCV routine doses, particularly those <15 years of age.
- Policies prohibiting the use of the vaccine in children >1 year of age, older children and adolescents should be changed to allow them to be vaccinated as necessary.



# WHO Position

## Vaccination of infants from 6 months of age

- A supplementary dose of MCV should be given to infants from 6 m of age:
  - during a measles outbreak as part of intensified service delivery;
  - during campaigns where the risk of measles among infants < 9 m is high;
  - for internally displaced populations, refugees, and populations in conflict zones;
  - for individual infants at high risk of contracting measles;
  - for infants travelling to countries experiencing measles outbreaks;
  - for infants known to be HIV-infected or exposed.
- MCV administered before 9 m of age should be considered a supplementary dose\* and recorded as “MCV0”.
- Children who receive a MCV0 dose *should also* receive MCV1 and MCV2 at the recommended ages according to the national schedule.

\*unless the country has data showing high seroconversion when vaccination is carried out before 9 months of age.

# WHO Position

## Vaccination campaigns

- Campaigns should be conducted before the number of pre-school children susceptible to measles approaches the equivalent of one birth cohort.
  - Programmes should use good quality coverage data (i.e. vaccination coverage, surveillance, serological studies) to monitor accumulation of susceptible persons.
  - This approach has been found to be programmatically useful and sufficiently accurate to prevent large outbreaks.
- For large countries and countries which are close to measles elimination, a more extensive assessment of the accumulation of susceptible persons should be carried out at the subnational level.



# WHO Position

## Target age range of vaccination campaigns

- Countries should integrate their surveillance, demographic, survey and seroprevalence data together with vaccination coverage information, history of MCV and RCV use, and local knowledge to determine the age distribution of susceptibility (age-specific immunity gaps) and hence the target age range/s for measles and MR campaigns.
- For MR campaigns, the rubella immunity among women of child-bearing age, the epidemiology of rubella and CRS, age-specific fertility rates, and the age of mothers of CRS-affected infants should be taken into consideration.



# WHO Position

## Criteria for stopping vaccination campaigns

- Campaigns should continue until >90–95% vaccination coverage has been achieved at the national level for both MCV1 and MCV2, as determined by accurate coverage data for a period of at least 3 consecutive years.
- Before stopping campaigns, a national committee should examine:
  - historical immunization coverage data at the national and district level
  - degree of heterogeneity of routine coverage among districts
  - population immunity profile
  - predicted rate of accumulation of susceptibles in the absence of SIAs
  - detailed epidemiology of measles
  - performance of the measles surveillance system.
- In the absence of adequate data, or if data suggest that cessation of campaigns would allow population immunity to drop below the herd immunity threshold, campaigns should continue.





# WHO Position

## Choice of vaccines and their interchangeability

- All commercially available live attenuated measles vaccines, either as monovalent vaccine or in combination with rubella, mumps, or varicella vaccines can be used interchangeably to protect against measles.
- For programmatic reasons (e.g. to reduce cold storage needs and vaccine wastage), it is recommended that the same formulation is used for both routine doses of MCV.



# WHO Position

## Contraindications

- MCVs should not be given to individuals with a history of anaphylactic reactions or severe allergic reactions to any component of the vaccine (e.g. neomycin or gelatin) or those with any form of severe immunosuppression.
- Mild, concurrent infections are not a contraindication to vaccination.
- As a precautionary measure, MCVs should be avoided during pregnancy. No significant adverse outcomes for fetus or mother following vaccination of pregnant women have been reported.
- Inadvertent administration of MCV during pregnancy is not a reason for terminating the pregnancy.





# WHO Position

## Vaccination of health workers and travellers

- All HCWs and any staff who are in contact with patients should be immune to measles. Documentation of immunity should be required before signing an employment contract or entering into a training programme.
- Susceptible individuals travelling to measles-endemic areas are considered at risk of contracting measles. Vaccine should be offered to children from 6 months of age, adolescents and adults likely or known to be susceptible.



# WHO Position

## Measles vaccination of HIV-infected individuals

- Measles vaccine should be routinely given to potentially susceptible, asymptomatic HIV-infected children and adults.
  - May even be considered for those with symptomatic HIV infection who are not severely immunosuppressed
- In areas with high incidences both of HIV-infection and measles:
  - The first measles immunisation may be offered as early as 6 months of age (recorded as MCV0)
  - Two additional doses of measles vaccine should be administered to these children according to the national immunization schedule.



## Measles re-vaccination of HIV-infected children receiving HAART

- An additional dose of MCV should be administered to HIV-infected children receiving HAART following immune reconstitution:
  - If CD4+ T lymphocyte counts are monitored, an additional dose of MCV should be administered when immune reconstitution has been achieved, e.g. when the CD4+ T lymphocyte count reaches 20–25%.
  - Where CD4+ T lymphocyte monitoring is not available, children should receive an additional dose of MCV 6–12 months after initiation of HAART.

# WHO position

## Surveillance and outbreak response

- As countries approach elimination, they should intensify surveillance and move towards weekly reporting to the WHO regional offices.
- To determine if a country or a WHO Region has achieved elimination, the regional verification commission should consider five lines of evidence (disease epidemiology, population immunity, quality of surveillance, sustainability of the programme, and genotyping evidence)\*.
- These lines of evidence should be evaluated together to establish the case for elimination.

\*WER 2013. No.9: <http://www.who.int/wer/2013/wer8809.pdf?ua=1>



# WHO position

## Surveillance and outbreak response

- To limit impact of outbreaks, WHO recommends:
  - surveillance for early outbreak detection
  - thorough assessment of risk of spread and severe disease outcomes
  - identification of immunity gaps
  - Planning rapid responses including expanded use of MCVs.
- The nature and extent of the vaccination response should be based on an assessment of risk of spread, risk of severe outcomes, and capacity to respond. A district outbreak coordination committee with broad representation should take the decisions as to the type of vaccination response at the local level.
- To protect individuals at high risk during an outbreak, vaccination within 72 hours of exposure may be given to modify the clinical course of measles.
- In individuals for whom vaccination is contraindicated, the administration of measles immune globulin within 6 days of exposure may have a similarly beneficial effect.

# WHO Position

## Recommendations on selected research needs

- The ongoing development of microarray patches for the administration of MCVs and point-of-care diagnostic tests are of major importance in addressing programme barriers to achieving measles and rubella/CRS elimination.
- Programmatic questions that should be addressed include:
  - which populations should be targeted for special immunization efforts;
  - optimal strategies for reaching hard-to-reach populations, and adolescents and adults;
  - how to strengthen and enhance disease surveillance and reporting;
  - the best approaches to measuring vaccination coverage;
  - strategies to communicate the benefits of measles vaccination and minimize vaccine hesitancy;
  - and the economic impact of the disease.



**For more information on the WHO  
Measles vaccines position paper,  
visit the WHO website:**

**[www.who.int/immunization/documents/positionpapers](http://www.who.int/immunization/documents/positionpapers)**



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