A Guide to Introducing a Second Dose of Measles Vaccine into Routine Immunization Schedules
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## Abbreviations

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<th>Description</th>
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<tbody>
<tr>
<td>AEFI</td>
<td>adverse event following immunization</td>
</tr>
<tr>
<td>BCC</td>
<td>behaviour change communication</td>
</tr>
<tr>
<td>cMYP</td>
<td>comprehensive multi-year plans for immunization</td>
</tr>
<tr>
<td>DTP</td>
<td>diphtheria-tetanus-pertussis [vaccine]</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunization</td>
</tr>
<tr>
<td>IEC</td>
<td>information, education and communication</td>
</tr>
<tr>
<td>GAVI</td>
<td>Global Alliance for Vaccines and Immunization</td>
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<tr>
<td>JRF</td>
<td>Joint Reporting Form</td>
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<tr>
<td>LLIN</td>
<td>Long-lasting insecticide treated bednet</td>
</tr>
<tr>
<td>ICC</td>
<td>Inter-Agency Coordinating Committee</td>
</tr>
<tr>
<td>M</td>
<td>measles [vaccine]</td>
</tr>
<tr>
<td>MCV</td>
<td>measles-containing vaccine</td>
</tr>
<tr>
<td>MCV1</td>
<td>first dose of MCV</td>
</tr>
<tr>
<td>MCV2</td>
<td>second dose of MCV</td>
</tr>
<tr>
<td>MMR</td>
<td>measles-mumps-rubella [vaccine]</td>
</tr>
<tr>
<td>MR</td>
<td>measles-rubella [vaccine]</td>
</tr>
<tr>
<td>NITAG</td>
<td>National Immunization Technical Advisory Group</td>
</tr>
<tr>
<td>PCV</td>
<td>pneumococcal conjugate vaccine</td>
</tr>
<tr>
<td>RCV</td>
<td>rubella-containing vaccine</td>
</tr>
<tr>
<td>SAGE</td>
<td>Strategic Advisory Group of Experts on immunization</td>
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<td>SIA</td>
<td>supplementary immunization activity</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>WHO</td>
<td>World Health Organization</td>
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About this guide

This document is for national immunization programme managers and immunization partners involved in operational support. Its objectives are:

• To guide the policy discussions and operational aspects of the introduction of a second dose of measles vaccine at a scheduled age into the routine immunization schedule.

• To provide up-to-date references on the global policy, the technical justification, and the strategic issues relating to the introduction and provision of a second dose of measles vaccine in the routine immunization programme.
Introduction

The vision of “a world without measles” is supported by WHO, UNICEF and other partners in the newly released Global Measles and Rubella Strategic Plan 2012–2020. The plan presents clear strategies that country immunization managers working with domestic and international partners can use as a blueprint to achieve the 2015 and 2020 measles control and elimination goals. The plan stresses the importance of strong routine immunization systems providing two doses of measles vaccine to each child, supplemented by campaigns, laboratory-backed surveillance, outbreak preparedness and case management, as well as research and development.

Strengthening routine immunization is critical as it is the foundation to achieving and sustaining high levels of population immunity to measles. For measles elimination, vaccination coverage needs to reach and remain at or exceed 95% with each of the two doses of MCV vaccines at the district and national levels. The challenge to achieve this will depend on enhanced implementation of the five components of the “Reaching Every District” (RED) approach to increase immunization coverage (see box below).

Five “RED” components to increase immunization coverage

1. **Planning and management of resources** – better management of human and financial resources.
2. **Reaching target populations** – improving access to immunization services by all.
3. **Linking services with communities** – partnering with communities to promote and deliver services.
4. **Supportive supervision** – regular on-site teaching, feedback and follow-up with health staff.
5. **Monitoring for action** – using tools and providing feedback for continuous self-assessment and improvement.

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Since 2009\(^2\) WHO has recommended that reaching all children with two doses of measles containing vaccine (MCV) should be the standard for all national immunization programmes.

When national coverage of MCV \(\geq 80\%\)\(^3\) has been achieved countries should consider introducing a second dose into their routine immunization schedule\(^4\). As routine coverage with two doses increases, campaigns will need to occur less frequently and can eventually cease altogether.

Taking the above mentioned policy and technical documents as its starting point, this guide “translates” the recommendations and evidence for introducing a routine second dose of measles vaccine into an easy to use “step-by-step” process.

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\(^3\) As determined by the most accurate means available, for example, a conducted population-based survey or WHO/UNICEF estimates.

\(^4\) Countries in the African region should consider introducing a second dose to their routine immunization schedule when national coverage of MCV \(\geq 80\%\) has been achieved for three consecutive years and at least one of two principal measles surveillance indicators \([1]\) Non-measles febrile rash illness rate of at least 2.0 cases per 100,000 population per year; \([2]\) At least 1.0 suspected measles case investigated with blood specimens in at least 80\% of districts per year\] has been achieved for at least two years.
Decision-making at country level
What should be the process?

It is important to have a systematic and transparent process for making a decision about introducing a second dose of measles vaccine into the national immunization programme. Ideally, the national immunization technical advisory group (NITAG\textsuperscript{5}) or an equivalent independent advisory body should be requested to undertake a rigorous review of the evidence and make an independent recommendation to the national government.

This review can include the use of WHO’s *Measles Strategic Planning (MSP) Tool* (Annex 1) which is an Excel-based computer application that estimates the impact of adjusting measles vaccination strategies (including introducing a measles second dose) on population immunity, measles incidence, mortality, costs and cost-effectiveness. The MSP tool is available at https://extranet.who.int/aim_elearning/en/measles/tool/index.html.

Subsequently the Inter-agency Coordinating Committee (ICC\textsuperscript{6}) will serve to coordinate partner activities and to fund the immunization programme. As with other decisions regarding the national immunization schedule, the national government takes the decision regarding introduction of a second routine dose of measles vaccine.

What information is needed?

The decision to introduce a routine second dose of measles vaccine needs to consider the following:

- measles transmission or incidence rates;
- age and coverage of MCV1;
- supplemental Immunization Activities (SIAs);
- overall capacity and performance of the routine immunization and surveillance systems.

\textsuperscript{5} NITAGs should consist of national experts in a broad range of disciplines — such as senior pediatricians, immunization and vaccine experts, epidemiologists, public health experts, health economists, health system experts and social scientists — who are capable of analyzing the different types of evidence and issues that should be considered in making an informed decision.

\textsuperscript{6} A committee made up of representatives of the Ministry of Health (MOH), WHO, UNICEF and other domestic and external partners to improve coordination among partners for the support of immunization programmes.
The simplified flow chart below summarizes this analytical process into four parts:

**Part 1 ➤ Optimal age of MCV1 administration**

- **Is risk of infant infection with measles virus high in your country (typically where transmission rates are high)?**
  - yes
    - Administer MCV1 at 9 months.
    - In areas with high incidences both of HIV-infection and measles, the first measles immunization can be administered at 6 months of age followed by revaccination at 9 months.
  - no
    - Administer MCV1 at 12 months.

When the risk of infant infection with measles virus drops (typically where transmission rates are low – at or near elimination), it is desirable to increase the age of the MCV1 administration to 12 months.
Part 2 ➔ Routine MCV2 introduction and optimal age of administration

Does your immunization programme offer routine MCV2?

no

Has MCV1 coverage been ≥80% for the last 3 years?*

yes

Use resources to maximize MCV1 coverage rather than to introduce routine MCV2. Continue to conduct SIAs as needed (see Part 4).

no

Review pros and cons of second dose options (see Part 3).

Is introduction of routine MCV2 a good option?

yes

Review when to conduct SIAs (see Part 4).

no

Is risk of infant infection with measles virus high in your country?

yes

Administer MCV1 at 9 months and MCV2 at 15–18 months.

no

Administer MCV1 at 12 months and administer MCV2 at 15–18 months or school-entry, depending on which age enables achievement of the highest routine MCV2 vaccination coverage.

Note: All measles-containing vaccine doses, regardless of delivery mode, should be recorded on the child’s immunization card and in the clinic or school vaccination register.

* In the African Region it is also required that one of the two principal measles surveillance performance indicators has been achieved for at least two years (see footnote 5).
## Part 3 ➤ Characteristics of different second dose delivery options when MCV1 coverage has reached ≥80% for three years

<table>
<thead>
<tr>
<th>Introduce routine MCV2</th>
<th>Advantages</th>
<th>Factors to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Decreases reliance on SIAs by slowing accumulation of susceptibles and subsequently extending the interval between SIAs.</td>
<td>• Impact on transmission takes &gt;3–4 years.</td>
</tr>
<tr>
<td></td>
<td>• SIAs can be eventually stopped when MCV1 and MCV2 coverage reach 90–95%, are sustained and high population immunity can be maintained.</td>
<td>• Logistical requirements prior to introduction:</td>
</tr>
<tr>
<td></td>
<td>• Reinforces existing services:</td>
<td>– Determine suitable age.</td>
</tr>
<tr>
<td></td>
<td>– Can establish a well-child visit in the second year of life.</td>
<td>– Ensure an accurate denominator.</td>
</tr>
<tr>
<td></td>
<td>– May coincide with administration of booster DTP dose and/or PCV vaccination if following the “2+1” schedule or with meningococcal vaccines where appropriate.</td>
<td>– Establish a two-dose recording system.</td>
</tr>
<tr>
<td></td>
<td>• May reduce commitment to SIAs though SIAs should be continued until coverage with both routine doses reaches 90–95%.</td>
<td>– Conduct training of health staff.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SIAs</th>
<th>Advantages</th>
<th>Factors to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Impact is quick and easy to measure.</td>
<td>• Logistical and financial burden can be high.</td>
</tr>
<tr>
<td></td>
<td>• SIAs can reach more children without reliable access to health facilities than routine vaccinations alone.</td>
<td>• Requires intensive preparation for at least 6 months.</td>
</tr>
<tr>
<td></td>
<td>• SIAs are commonly integrated with Vitamin A, bednets, anthelmintic treatment and/or other health services.</td>
<td>• Needs to achieve 95% or more coverage in every district.</td>
</tr>
</tbody>
</table>
Part 4 ➪ When should you conduct follow-up SIAs and when can you stop

Follow-up SIAs should be conducted whenever the number of susceptible pre-school children approaches the size of a birth cohort, regardless of whether one or two routine doses are offered. Follow-up SIAs should target children from 9–12 months up to the age of the oldest cohort that was missed by the last campaign (typically 3–5 years old, i.e. children born after the last SIA).

Follow-up SIAs should continue to be implemented until 90–95% vaccination coverage has been achieved with both MCV1 and routine MCV2 for three years*. Stopping SIAs is a serious decision, prior to which a careful review should be conducted by a national committee to evaluate the potential risks and benefits of relying solely on routine immunization. Among other things, it is suggested that the committee should consider subnational MCV1, MCV2 and SIA coverage, the expected rate of accumulation of susceptibles without SIAs, measles epidemiology and the performance of the surveillance system.

What policies must be in place?

It is a prerequisite for MCV2 introduction for health workers to have clear policy guidance and knowledge of the overall successes of measles strategy in place. As part of the decision-making process for MCV2, the existence and implementation status of the following policy issues should be reviewed:

- **First dose measles vaccination (MCV1)** should not be limited to infants less than 12 months of age. All unvaccinated children, regardless of age, should be offered MCV1 when the child comes into contact with health services. This instruction should be clearly reflected in the EPI policy and guidance documents, supervision and training of health workers, in the forecasting of vaccine needs, in vaccination monitoring tools (e.g. a column for recording doses given to children >12 month), etc.

- Irrespective of the strategy or age given, **both MCV1 and MCV2 should be recorded** on a child’s immunization card and in the health facility register.

- Children should be screened for their vaccination history at the time of **school entry**, and those lacking evidence of receipt of two doses of measles vaccine should be vaccinated (other missed antigens should also be administered).

* As determined by the most accurate means available, for example, a conducted population-based survey or WHO/UNICEF estimates.
• In areas where there is a high incidence of both HIV and measles, the first dose of MCV may be given as early as 6 months of age. Two additional doses of measles should be administered to these children according to the national immunization schedule.

• Surveillance for measles should include individual reporting of cases with collection of samples for laboratory confirmation together with outbreak confirmation and investigation.

• Vitamin A should be administered to all acute measles cases. A high dose of vitamin A is given immediately on diagnosis and repeated the next day. The recommended age-specific daily doses are 50,000 IU for infants <6 months, 100,000 for infants aged 6–11 months and 200,000 IU for children aged >12 months. If the child has clinical signs of vitamin A deficiency (such as Bitot’s spots), a third dose of vitamin A should be given 4–6 weeks later.

What opportunities are there to link with other programmes?

Inclusion of MCV2 in the immunization schedule establishes an older contact beyond the traditional target age group of infants under 1 year. This presents both challenges and opportunities. The challenge is how to reach and ensure high vaccination coverage of this new age group – what strategies, resources and mobilization approaches will be necessary? The opportunity is that the new MCV2 contact, if planned properly, may be linked to other child health programmes and the delivery of interventions such as vitamin A supplementation, deworming, growth monitoring, etc. Moreover, MCV2 can and should be used to review the child’s immunization record and “catch-up” any missed doses of other antigens according to the national schedule. Collaboration with the Ministry of Education will be essential for screening the vaccination history of children at school entry and administering any missed doses.

In countries where a large proportion of young children are looked after in day-care centres, consideration may be given to mandating that all children must demonstrate proof of measles vaccination according to their age and the national immunization schedule before entering the day-care centre.

What impact (positive and negative) might MCV2 have on the national immunization schedule?

Establishing a MCV2 contact offers the chance to review and revise the entire national immunization schedule. For example:

• Providing booster doses of other EPI vaccines, such as DTP, to these children at the same time.
• Providing the opportunity to streamline the schedule by reducing the number of visits required.

• Making use of a suitable existing health contact, even if it is a visit of another programme/intervention, is desirable since limiting the number of visits will increase the likelihood of a child becoming fully immunized. On the other hand, parents and health workers may object to multiple injections being given during the same visit. The immunization programme should therefore consider the acceptability of the change among both health workers and parents, and address these concerns in the training for health workers and in communications with the public.

What can be learned from the introduction of new vaccines?

Although measles vaccine is already part of immunization programmes worldwide, adding a second dose is much like introducing a “new vaccine” into the immunization system. A new contact must be established, forms and materials revised, training organized, new communication messages developed, supplies procured and financial resources secured. WHO has recently revised its guidance on new vaccine introduction entitled “Principles and considerations for adding a vaccine into a national immunization programme”. This document serves as a useful complementary resource for those considering adding a measles second dose, particularly with respect to health systems strengthening aspects of vaccine introduction.

\[\text{WHO Principles and considerations for adding a vaccine into a national immunization programme: From decision to implementation and monitoring (forthcoming July 2013).}\]
Planning
What is the best age to administer MCV2?

Both the chosen age of administration and measles epidemiology can have a major influence on the effectiveness of MCV2.

Countries with on-going measles transmission and MCV1 delivered at age 9 months should administer the routine dose of MCV2 at age 15–18 months. The minimum interval between MCV1 and MCV2 is one month. Providing routine MCV2 to children in their second year of life reduces the rate of accumulation of susceptible children and the risk of an outbreak. Administration of MCV2 at age 15–18 months ensures early protection of the individual, slows accumulation of susceptible young children and may correspond to other routine immunizations (for example, a DTP booster). However, when MCV2 is given in the second year of life it is recommended that countries develop and put in place a policy to screen children at school entry to verify that they have received two doses of measles vaccine and vaccinate any child missing any dose(s).

In countries with low measles transmission (that is, those that are near elimination) and where MCV1 is administered at age 12 months, 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. If MCV1 coverage is high (>90%) and school enrolment is high (95%), administration of routine MCV2 at school entry may prove to be an effective strategy for achieving high coverage and preventing measles outbreaks in schools.

What is the estimated number of children targeted for MCV2?

The number of target children for MCV2 can be estimated as the number of children who survive to the lowest full year of the recommended age range. For example, if the target for MCV2 is children 15–18 months of age, the number of children surviving until 1 year (12 months) of age should be used. If the target population is children at school entry and most children enter school at 5–6 years of age, then the target population should be estimated as the number of children surviving until 5 years (60 months) of age\(^8\).

\[\text{Estimated MCV2 target population (15–18 months)} = \text{Children surviving until 1 year (12 months) of age}\]
\[\text{Estimated MCV2 target population (5–6 years)} = \text{Children surviving until 5 years (60 months) of age}\]

\(^8\) This method will slightly overestimate the actual number of children. If more precise numbers are required, please consult a demographer or a statistician.
In practice, estimates of population by single year of age are frequently difficult to obtain. The number of live births can be used to approximate the number of children in annual cohorts under 5 years of age. For annual cohorts between 5–10 years of age, the number can be estimated by using the number of children surviving until 5 years of age, which is often available from the national statistical office or the United Nations Population Division (http://esa.un.org/unpd/wpp/Excel-Data/EXCEL_FILES/1_Population/WPP2012_POP_F07_1_POPULATION_BY_AGE_BOTH_SEXES.XLS).

What plans need to be made or revised?

Once a decision has been taken to introduce MCV2, the timeline, strategies and activities for introduction need to be identified and integrated into the national comprehensive multi-year plan for immunization (cMYP). Guidelines have been developed to assist country programme managers to prepare or update cMYPs and may be downloaded from http://whqlibdoc.who.int/hq/2005/WHO_IVB_05.20_eng.pdf.

In addition to updating the cMYP to include MCV2, immunization programmes should develop a detailed introduction plan. The plan should outline all activities and steps required for a successful MCV2 introduction by programme component, stipulate what institutions and government departments are responsible for each activity and include a timeline and detailed budget.

To assist in the detailed planning needed for any vaccine introduction, WHO has developed and field-tested a pre-implementation checklist (FinalPreIntroChronoENG&FR.xls) as a useful aid in determining what changes and activities are needed. It prompts countries to list actions, to prioritize these actions, set deadlines for each one and work backwards from the deadline to develop a timeline.

Based on country experiences with recent vaccine introductions, it is critical that enough time is allowed to plan and implement all of the many activities involved in introducing MCV2 and that the introduction not be rushed. For instance, if staff training is estimated to take four months to complete throughout the country, and it will take three more months to plan the training and develop and revise training materials, then the process needs to begin at least seven months before the planned launch of MCV2.

In terms of timing, whenever possible it is best to plan the introduction of the measles second dose to be synchronized to begin immediately after a measles “catch-up” or “follow-up” vaccination campaign. A well conducted campaign with high coverage ensures that nearly all the susceptible children are vaccinated.

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9 Available on demand from the EPI team at WHO, Geneva, please send an e-mail to gaudink@who.int to request a copy.
and this allows the routine measles second dose to prevent or slow down the further accumulation of susceptibles (provided MCV2 coverage rates are high).

How much will it cost to introduce MCV2?

Adding MCV2 will have cost implications (see box below). Hence, the immunization programme budget and financing plan also needs to be updated using WHO’s “Immunization costing and financing: A tool and user guide for comprehensive Multi-Year Planning (cMYP)”. This tool\(^{10}\) enables countries to estimate the costs, the amount of financing needed and the funding gap of their immunization programme to meet their goals for the next several years, including the addition of MCV2 and other activities. GAVI requires that all recipient countries prepare a cMYP and update it whenever applying for funding support. However, any country can greatly benefit from preparing and actively using this detailed budget. The tool and user guide can also be found at: http://www.who.int/immunization_financing/tools/cMYP/en/index.html.

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**Possible costs to include when estimating the funding needs for MCV2 introduction**

- Procurement of additional measles vaccine and injection materials and safety boxes.
- Training of all relevant health workers at all levels, including refresher training.
- An increase in the duration or number of EPI sessions due to the extra time needed to administer MCV2 vaccine to more children.
- Expansion of the cold chain, dry storage and vaccine transport systems.
- Extra fuel to operate additional cold chain equipment and vehicles required to accommodate more measles vaccine.
- Possible additional personnel costs for more frequent vaccine deliveries (e.g., drivers).
- Repairs, expansion or addition of waste management facilities to handle the additional waste generated by MCV2.
- Development of an effective communication strategy and social mobilization activities/materials for MCV2.
- New delivery strategies, such as school-based vaccination.
- Revision and printing of child health cards, immunization tally sheets, registers, forms, guidelines and procedures.
- Strengthening AEFI surveillance, reporting and management for MCV2 and all EPI vaccines.

\(^{10}\) [http://www.who.int/immunization_financing/tools/cMYP_Costing_Tool_En.xls](http://www.who.int/immunization_financing/tools/cMYP_Costing_Tool_En.xls)
There may also be “hidden costs” that countries need to consider ahead of time. For instance, if a country cannot sufficiently expand the cold chain system at all levels in time before introducing the measles second dose, it may have to increase the frequency of vaccine supply deliveries to provinces and districts. These extra deliveries mean more fuel, more vehicle repairs and maintenance and additional salary costs and per diems for the drivers.

How can MCV2 be integrated with other vaccinations and/or child health interventions?

To improve efficiency and effectiveness of the health system it is practical to consider if the administration of MCV2 can be combined with other vaccinations or child health interventions. This can be very attractive to parents as it reduces the number of visits they need to make to the health centre.

**Some of the possible interventions that MCV2 can be “packaged” with include:**

- DTP booster that is recommended to be given between 1–6 years of age;
- pneumococcal conjugate vaccine (PCV) if following the “2+1” schedule that provides two doses before 6 months of age, and a booster at 9–15 months of age;
- vitamin A supplementation recommended in areas where vitamin A deficiency is a public health problem every 6 months for children 6–59 months;
- deworming every year for children 12–59 months;
- malaria long-lasting insecticide treated net (LLIN) distribution;
- other health education.
Micro-planning for measles second dose vaccination
Vaccine management issues

How to forecast and calculate vaccine supply needed for MCV2?
The introduction of MCV2 means that more measles vaccine will need to be available. Instead of one dose, now two doses of measles vaccine are required. However, as measles vaccine is already used in the national immunization programme (e.g. MCV1), and because there is usually a high wastage rate\(^\text{11}\) with measles vaccine (ranging from 45–60%) due to the multi-dose vial policy (MDVP)\(^\text{12}\), the introduction of MCV2 will actually reduce wastage rates. That is, some of the MCV2 doses will be administered using vaccine that would have been previously “wasted” using a 1-dose schedule.

It is estimated that the introduction of MCV2 (switching from a 1-dose to a 2-dose schedule) may reduce current measles vaccine wastage rates by almost 40%. However, vaccine wastage should be monitored at all levels and data used for forecasting future needs. This includes monitoring the needs for diluent and injection supplies (bundling).

The estimated wastage rates for 1 and 2-dose measles schedules and different vaccine vial presentations are provided in Table 1 as a rough guide:

<table>
<thead>
<tr>
<th>Vial size</th>
<th>For 1 dose schedule</th>
<th>For 2 dose schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimated wastage rate</td>
<td>Estimated wastage factor</td>
</tr>
<tr>
<td>Single dose</td>
<td>&lt;5%</td>
<td>1.05</td>
</tr>
<tr>
<td>5 doses/vial</td>
<td>30–40%</td>
<td>1.43–1.67</td>
</tr>
<tr>
<td>10 doses/vial</td>
<td>45–60%</td>
<td>1.82–2.50</td>
</tr>
</tbody>
</table>

\(^{11}\) There are generally two forms of vaccine wastage:
- Doses wasted for unopened vials due to expiry date, heat exposure/VVM change, freezing or improper handling, breakage, missing, etc.
- Doses wasted for opened vials due to the characteristics of vaccine like discarded after 8 hours after reconstitution or at the end of the session, vaccine given outside the target group, etc.

\(^{12}\) Multi-dose vial policy: Once measles vaccine has been reconstituted, the vial must be discarded at the end of each immunization session or at the end of six hours, whichever comes first.
The simplest method for calculating the measles vaccine supply needs for a 2-dose schedule over a period of one-calendar year is:

\[
\text{Measles vaccine doses required} = \frac{\text{Target population size}}{\text{Estimated MCV1 coverage}} \times 2 \times \text{Wastage factor}
\]

Target population size = surviving infants\(^{13}\)
Estimated MCV1 coverage = Assumes no drop out between MCV1 and MCV2
Number of doses = 2 (MCV1 and MCV2)
Wastage Factor = Use national data or see Table 1 for 2-dose schedule

**What cold chain capacity will be required for MCV2?**

To estimate the cold chain storage capacity needed, the manager must know the packed volume per dose of the vaccine presentation that will be used. The storage volumes of measles vaccine in different presentation is in Table 2:

<table>
<thead>
<tr>
<th>Measles presentation</th>
<th>Packed volume per dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single dose</td>
<td>26.1 cm(^3)/dose</td>
</tr>
<tr>
<td>5 doses/vial</td>
<td>5.2 cm(^3)/dose</td>
</tr>
<tr>
<td>10 doses/vial</td>
<td>2.6 cm(^3)/dose</td>
</tr>
</tbody>
</table>

Currently in most countries, measles vaccine is given only once at 9 months using 10 doses/vial presentation. Considering the estimated wastage rate and packed volume for each presentation, the introduction of MCV2 will have an impact on cold chain capacity.

- With 10 doses/vial, the storage volume required for MCV2 increases by 15–25%.
- With 5 doses/vial, the storage volume required for MCV2 increases by 60–100%.

It is important to note that the cold chain capacity required for MCV2 may already exist – that is, depending on the national situation, it may not always be necessary to expand the cold chain to introduce MCV2. Programme managers

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\(^{13}\) It is more accurate to use the number of surviving infants. But estimates of surviving infants are more difficult to obtain and the number of live births serves as a good surrogate.
are advised to use the Excel-based WHO Vaccine Volume Calculator 2012\textsuperscript{14} in order to precisely determine the specific cold chain capacity needs for introducing MCV2 in their country.

Adequate dry storage will also need to be available for the additional injection materials, such as syringes (including reconstitution syringes) and safety boxes that will be needed for the delivery of MCV2.

**Is it better to use a 10 or 5-dose vial of measles vaccine?**

As the 5-dose vial is both more expensive per dose (more than double the cost per dose of the 10-dose vial) AND has a larger packed volume per dose (i.e. requires more cold storage), the choice to use a 10- or 5-dose vial is largely dependent on programmatic considerations.

It is felt that due to fear of high wastage rates some health workers may not open a 10-dose vial to vaccinate only a few children (less than four to five children). If this is the case, and if the country can afford it, then there may be an advantage to switching to a 5-dose vial which will have a lower wastage rate, hence health workers will be less hesitant to open a vaccine vial. With this strategy there would be fewer missed opportunities and higher measles vaccine coverage.

However, if switching to a 5-dose vial also results in holding more frequent vaccination sessions (e.g. increasing from one to two sessions per week with a 10-dose vial, to holding daily sessions with a 5-dose vial), the coverage may well be higher (which is the main objective) but the 5-dose vial wastage might be higher than estimated in Table 1 and consequently more space in cold chain could be needed.

Although daily sessions with 10-dose vials will have higher wastage, the 10-dose vial presentation still remains “preferable” in terms of cold chain space and cost when compared to the 5-dose vial at current unit price and volume. In fact, it is less costly to train health workers not to worry about wastage and to always open a 10-dose vial so as to vaccinate and protect eligible children even if few children are present.

**What impact does MCV2 introduction have on waste management?**

The biggest impact of MCV2 on waste management will be the need to safely dispose of almost double the number of syringes and safety boxes, compared to a MCV1 schedule. It will be necessary to verify that the current waste management system is able to cope with this increase or to make adjustments so that it can. Introduction of and procurement of healthcare waste management/disposal systems could be planned within the cMYP and introduction plans.

Advocacy, communication and social mobilization

In order to assure good uptake and acceptability, effective advocacy, communication and social mobilization activities need to be planned and implemented as part of MCV2 introduction.

The objectives of advocacy, communication and social mobilization are to:

- inform people about the MCV2 introduction;
- create momentum for MCV2 immunization in particular the need to bring children over 1 year of age for vaccination;
- create dialogue and engagement with communities on immunization activities;
- help increase immunization coverage for all antigens.

It is best practice to develop an advocacy and communications plan for MCV2. The plan should draw from the existing communications plan or strategy for the national immunization programme, if one exists, and be aligned with the Ministry of Health’s overall health promotion and communication strategy. A technical sub-committee on advocacy and communications can be helpful in contributing to the development and implementation of the plan. To ensure that the communications activities are effective in reaching all key target audiences and that messages about MCV2 are appropriate for the target audience, the sub-committee should include representatives from different target groups such as parents, community leaders, women or children’s associations, religious or ethnic groups, educators, private practitioners and professional associations, health workers and teachers. The sub-committee should also include experts in health promotion and social mobilization from the Ministry of Health and the Ministry of Education.

A communication needs assessment should be carried out to:

- understand current routine immunization communication and social mobilization strategies;
- understand culture and belief systems relating to measles illness and measles vaccination;
- understand the media environment and media use by target audience and identify appropriate communication channels;
- develop specific messages and communication – Information, education and communication (IEC)/Behaviour change communication (BCC) material for MCV2;
- develop a communication strategy for an adverse event following immunization (AEFI) for MCV (if not already developed);
- assess the resources required to implement the communications activities.
The communications plan and subsequent activities, materials, and messages will be most effective if they are informed by a study of the public’s knowledge, attitudes, beliefs and practices (KABP) about measles, measles vaccine, and immunization in general. KABP studies can range from a series of focus group discussions to more involved community and household surveys. They should target a range of different groups, including community and opinion leaders, teachers, health workers, and parents. The study can identify gaps in the public’s knowledge and attitudes about measles, misperceptions and concerns about receiving a second dose of vaccine, and other factors that may affect the public’s acceptance and thus uptake of MCV2, such as the influence of anti-vaccination groups.

To improve acceptance among health workers, parents, teachers, and others in the community, IEC messages and activities should also address issues and concerns identified in the KAPB study or others that may arise due to the nature of MCV2. Such issues might include:

- worries about vaccinating older children;
- concerns about an additional injection;
- not understanding why up until now only one dose of measles vaccine was given routinely;
- fears that two doses of measles vaccine will be too much and harmful (i.e. overdosing);
- confusion that their child can wait until school entry to receive the second dose of measles vaccine;
- anxieties about school-based verification of vaccination status and/or school-based vaccination.

IEC activities and materials should also go beyond promoting just MCV2 itself. They should include messages about the importance of all childhood vaccines and having children up-to-date on all their immunizations. With the advent of newer vaccines, e.g. HPV, Meningococcal etc., IEC materials and activities should include messages on adolescent vaccination too.

It is important to develop materials tailored for different target audiences and to use a range of different channels and media to deliver the messages. Obtaining support from and involving respected political leaders and a broad range of influential groups and members of society is vital to communicate information to the community, renew awareness of immunization and allay possible safety concerns about MCV2 and correct misinformation.
Successful MCV2 introduction depends on strong advocacy with all relevant stakeholders including:

- government departments;
- development partners and donors;
- civil society including local NGOs working on health and development issues;
- media;
- medical professional groups;
- academics;
- private sector;
- leaders at community level (e.g. village heads, religious leaders, teachers);
- communities and families.

It is essential to develop a briefing kit or note about MCV2 introduction. The briefing kit or note should contain simple and attractive material that gives key data and background on the measles situation in the country, explain why MCV2 is necessary, what the benefits will be and when and how MCV2 will be introduced.

There should be activities to inform and educate the media about the MCV2 in advance of its introduction and to obtain journalists’ support to get messages out, since they can have a major influence on public perceptions about vaccines. Good preparation and partnership with media will be very useful in the event of any AEFI. Special media advocacy efforts include:

- media kits: comprising factsheets, FAQs, pictures (if possible), list of contact addresses of spokespersons, key messages;
- media briefings, workshops, periodic updates on progress once implementation has begun;
- radio/TV talks involving public health authorities, respected clinicians;
• a possible journalist competition for the best article written about MCV2;

• a well-publicized start date announced by the media, which has proven to be a successful strategy in many countries to promote the change to a 2-dose routine schedule and create public awareness and demand.

To maintain political and public support for MCV2, it is important to periodically disseminate information to policymakers and the media on the impact of the second dose in reducing the disease burden, as well as achievements of the overall immunization programme.

**Examples of Key messages for MCV2:**

- Measles is a dangerous disease which kills children.
- Measles is a disease caused by a germ (the measles virus). The signs include a red, blotchy rash over the whole body, fever and a runny nose, red eyes or a cough.
- Children with measles must be taken to a health centre immediately. If not treated, a child with measles can develop problems such as pneumonia, eye infections, ear infections, sores or thrush in the mouth and other complications, sometimes leading to death.
- Measles can be prevented by giving measles vaccine. All children should have at least two doses of measles vaccine. The first dose is given when the child is 9 months or soon afterwards. For additional protection against measles a second dose has been introduced for all children aged 15–18 months.
- Measles vaccine is safe and is used in all countries in the world.
- Measles vaccination may cause mild and transient reactions such as local reaction, fever and rash, which do not cause long term problems.
- A child with mild fever may be vaccinated with measles vaccine.
- Receiving two injections on the same day will not cause any extra side effects and will in fact save you an additional trip to the health centre.
- The risk of complications from natural measles infection and disease is much higher than the risk of the mild reactions after vaccination.
- Take your child aged 15–18 months to the nearest health centre for the second dose vaccination against measles.
- It is important that your child receive two doses of measles vaccine and is vaccinated on time against all diseases in the schedule.
Community and local religious leaders play a very influential role on the attitudes and behaviours of community members. For this reason, they must be engaged and informed about any change to the immunization programme, the reasons for the change and the benefits and risks. Rumours and resistance to vaccination can often be overcome if community and religious leaders endorse and support the immunization programme. Advocacy activities should include:

- organizing meetings with community/religious leaders, especially with leaders of resistant religious groups;
- engaging the community to develop appropriate messages, pre-test messages.

Social mobilization for MCV2 needs to ensure that hard-to-reach communities are addressed and reached with immunization activities. In particular, the impact of MCV2 will be greatest if those children who never received MCV1 are reached and vaccinated. It is the children who have never been vaccinated that are the most vulnerable and at risk and special efforts need to be made to find them.

Finally, if the MCV2 dose is to be given to older children at school, or if children starting school will be asked to show proof of vaccination, it will be necessary to advocate with the Ministry of Education and School Health Programmes by:

- organizing meetings with school heads, teachers’ unions of all schools with children in the target group for MCV2;
- meeting with the Ministry of Education to establish policies and procedures for screening children for MCV2 vaccination at the time of school enrolment/registration.

Ministries of education may be quite decentralized – as much as or more than the Ministry of Health. Therefore, it will be important to consider briefings for regional/provincial and local educational authorities on school entry screening and/or vaccinating at school.

Communication regarding AEFI

Although serious AEFI due to measles vaccine per se are extremely rare, coincidental occurrence of a serious AEFI and sensational media coverage may seriously undermine immunization activities. Programme managers must therefore plan in advance a special communication strategy regarding AEFI. For MCV2 this may be particularly important as parents and health workers might not be used to routinely vaccinating older children either at the health centre or at school.

Risk communication is important to build trust with the public. This involves including information on possible side effects in the IEC materials and when
Communicating with parents and the community. Awareness among health workers and the public of possible adverse events will also facilitate early recognition and treatment of side effects, which may reduce their consequences.

A key component of risk communications is the preparation of a crisis communications plan to allow for a rapid and effective response to AEFI\textsubscript{s}, anti-vaccine movements, and any allegation that can have a negative effect on public acceptance of the new MCV\textsubscript{2} vaccination and trust in the immunization programme.

A poor response by the vaccination programme to a real or imagined adverse event can rapidly lead to a loss of trust that can take years to rebuild. Since the exact nature of the crisis will not be known until it arises, it is not possible to plan for a detailed response ahead of time. However, countries can have in place the basic elements of a crisis plan\textsuperscript{15}, which may include:

- an AEFI committee at different levels which can meet immediately to discuss an action plan;

- identified, well-respected spokespersons at all levels;

- clear channels of communication with various media;

- engaging with credible opinion and traditional leaders to address misconceptions and rumours;

- training of health workers in how to communicate with the public about AEFIs and safety concerns; and

- having an AEFI action plan with specific roles for immunization programme partners.

\textsuperscript{15} For more information, see: link to UNICEF Communications Framework for new vaccines and child survival available at: https://sites.google.com/site/commframe/
Useful tips for advocacy, communications and social mobilization activities:

- Establish a sub-committee to help plan and implement advocacy, communications and social mobilization activities and sensitize them about the new vaccine and targeted disease.
- Conduct formative research on knowledge, attitudes, beliefs and practices about MCV2, measles, and other vaccines and immunization in general to inform communications activities and messages for the new vaccine.
- Educate and mobilize a broad range of stakeholders (e.g., community and religious leaders, the private sector, NGOs, universities) to promote two doses of measles vaccine and immunization in general.
- Train health workers in how to communicate with parents and the community about measles, ways to prevent it and the need for two doses, as well as in effective communication methods. Develop job aides to assist them in conveying these messages.
- Particularly aim to reach parents of children who have never been vaccinated against measles (no MCV1).
- Include the promotion of all childhood vaccines in IEC activities, messages and materials.
- Include information about possible side effects (adverse events) and what to do if a child has a bad reaction in communications to parents and the community (and in the training of health workers and job aides).
- Before MCV2 introduction, establish a crisis communication plan to be able to rapidly respond to reports of severe adverse events or other potential crises.
- Begin MCV2 introduction with a well-publicized start date by the media.
- Disseminate information on the progress of MCV2 introduction, its impact on disease burden (if possible) and performance of the immunization programme on a regular basis to policymakers and the media to build and sustain support for MCV2 and the overall immunization programme.
Implementation
Training and supportive supervision

Before implementing MCV2, health staff will need to receive training – even though they will be familiar with measles vaccine from administering MCV1 as part of the infant immunization schedule.

If well prepared and organized, it is feasible to cover all the necessary background information, operational issues and hands-on practice in one day of training. Ideally, rather than organizing a special MCV2 training, it is desirable to schedule the implementation so that the training can be included as part of any regular annual or refresher training (in fact, introducing MCV2 might provide the justification for holding a refresher training). However, training should not be conducted too far in advance of the actual start-up of MCV2.

Training for MCV2 should include the following:

- Brief overview of the measles control or elimination strategies and goals and the rationale for adding to the routine schedule a second dose of measles vaccine.
- Review of relevant policies, for example, providing MCV1 to children older than 1 year of age, school entry vaccination screening to ensure all children have received two doses of measles vaccine, measles treatment with vitamin A, multi-dose policy, ensuring that any contact with the health system is not a missed opportunity for vaccinating if child is eligible, etc.
- Key messages/materials for communities and mothers/care-givers about MCV2, and the social mobilization efforts that will be needed to ensure that this new older target group comes for vaccination.
- AEFI – how to detect and how to handle/report.
- Instruction and practice on how to administer MCV2, including schedule, reconstitution and dosage, storage and handling of the vaccine, vaccine vial monitors (VVMs), co-administration with other vaccines, safe injection and waste disposal.
- Using the MCV2 contact to provide other vaccinations and/or check for any missed vaccinations, and deliver other health interventions such as vitamin A, deworming etc. if appropriate.
- Record keeping and reporting of MCV2 doses administered, including calculation of coverage, drop-out rate, and use of coverage wall monitoring chart.
- Administration and reporting on any other interventions planned to be given with MCV2.
- Stock management of measles vaccine supplies, including how to forecast supplies and wastage rates.
- Micro-planning to ensure that all communities (especially hard to reach) have access to vaccination services.
- Retraining on reconstitution, immunization safety and waste disposal.
Training materials need to be prepared (or translated) in the appropriate local language and in sufficient quantities. Summarized reference materials and job aids should be developed and provided to the participants attending training so that they have information to review themselves and with others they work with when they return to their post.

Studies suggest that for more effective learning interactive and hands-on training like field visits, showing videos of correct practices, small group discussions, demonstration and skills practice is generally more successful than passive classroom lectures.

Once MCV2 is introduced in a country, implementation should be periodically reviewed through supportive supervision\textsuperscript{16}, which includes “on-the-job-training” (see box).

EPI supervisory schedules and integrated supervisory tools should be adapted to include MCV2. Staff should be specifically asked about MCV2 coverage and any problems (supply or demand) that they face with this vaccine. Annex 10 provides an example of how an immunization supervisory checklist can be easily adapted to include MCV2.

\textbf{Supportive supervision:}

- encourages open, two-way communication;
- builds team approaches that facilitate problem solving;
- focuses on monitoring performance towards goals;
- uses data for decision-making;
- depends on regular follow-up with staff to ensure that new tasks are being implemented correctly.

\textit{Supportive supervision is helping to make things work, rather than checking to see what is wrong.}

\textbf{Service delivery}

\textbf{Demand creation}

Vaccination cannot occur if no children turn up! Effective communication and social mobilization prior to implementation is critical for MCV2 as it is uniquely targeting children older than the usual infant schedule for vaccination. Parents/caregivers/communities need to know that they should now take their older children for MCV2. See the section on Advocacy, Communication and Social Mobilization.

\textsuperscript{16} For more information see Training for Mid-Level Managers (MLM), Module 4: Supportive Supervision. WHO, 2008 (WHO/IVB/08.04).
As for all vaccinations, creating and sustaining demand for MCV2 requires a firm commitment on the part of health workers/clinics to provide quality services that parents/caregivers and communities will value and support. Quality services mean:

- informing what days, when and where vaccination sessions, including MCV2, will be held (and sticking to this schedule);

- providing safe and professional vaccination services;

- being respectful of the parents/caregivers and educating them about the vaccines, including MCV2, that their child is to receive and fully answering any questions they may have;

- developing a relationship with communities and their leaders that is built on trust.

The opportunity and challenge of reaching toddlers
For many immunization programmes, it is likely that the introduction of MCV2 will be the first time the national vaccination schedule has expanded beyond 1 year of age – from infants to toddlers. Both health workers and parents/caregivers will need to adjust to this new and important change.

Using MCV2 to expand beyond the infant target group is a positive development showing that the national immunization programme is maturing and moving towards protecting individuals over their life-course. As mentioned previously, the MCV2 contact can be an opportunity to catch-up children who missed any of their other vaccine doses, and a platform upon which additional booster doses may be considered, for example DTP.

Depending on the country context, it may be challenging to get mothers/caregivers to bring their toddlers to receive MCV2. This reluctance may be because of wrongly held beliefs that older children do not need to be vaccinated, or perhaps a more practical reason that toddlers are in day-cares and not constantly with their mothers like the infants are. This means that it may be necessary to develop some sort of reminder system (i.e. cards, community follow-up or SMS messaging) and make use of a well maintained defaulter tracking system (see Section 6 for more details). It is essential to remind parents after the first measles dose that they need to return for the next dose. Where appropriate, strategies such as outreach visits to day-cares, or even mandating MCV2 for day-care entry should be considered.

Whatever the local situation, it will be important not to miss opportunities and to use all contacts that toddlers have with the health system to administer MCV2. This includes scheduled well child visits for growth monitoring and also
Integrated Management of Childhood Illness (IMCI) contacts. Making this happen is likely to require policy changes, re-orientation of staff, better collaboration between programmes and close supervision.

Providing service to children presenting later than the recommended age
As with the infant vaccinations, some children will come late for their MCV2 vaccination. Others will turn up not even having had MCV1! In either case, both should still be vaccinated, as all children need two doses of measles no matter what their age.

- For the child who **comes late for MCV2**, but already has received MCV1 simply give the MCV2 dose, record it on the child’s card and in the clinic registry (and other records). Take special care to record the dose in the appropriate age column on the tally sheets (normally the columns should indicate “doses administered to children <24 months” and “doses administered to children >24 months”).

- For the child who **comes for MCV2 but has not received MCV1**, administer measles vaccination but record it as MCV1 on the child’s card and in records, and instruct the mother/caregiver to return one month later to receive MCV2.

- For the child who comes for MCV2 but has **no vaccination card** attempt to verify from the mother/caregiver the child’s vaccination history. If the information provided by the mother/caregiver is felt to be reliable then vaccinate on the basis of the information obtained and fill out a new vaccination card with the history of vaccinations. If the verbal history is felt to be unreliable, then assume that the child has not received measles vaccination previously and start by giving and recording the administration of MCV1. Tell the mother/caregiver to return one month later for MCV2.

School health and involvement of the education sector
Measles is a highly infectious disease that spreads rapidly. For this reason, when vaccination rates are low among students, measles outbreaks in schools are common. To avoid the spread of measles as well as huge disruptions to children’s education, it is very important to ensure that children attending school have been vaccinated.

For countries providing MCV2 between 15–18 months of age, it is suggested that a policy and process for screening and verifying the measles vaccination status of children at the time of primary school enrolment should be put in place. This verification in schools will require good collaboration between the Ministry of Health, Ministry of Education, its school health programme, teachers and parents.
Where the capacity exists a school or health nurse may vaccinate undervaccinated children in the school itself. Because schoolchildren are often unaccompanied, this will therefore require to take into account national regulations regarding consent from parents or caregivers for the vaccination. In countries where informed consent from parents is required, i.e. where measles vaccination is not mandatory, parents need to be adequately informed of the measles vaccination and provided with a consent form. In those cases, it is most efficient to establish an “opt-out” procedure that requires those parents not wanting to vaccinate their child to sign a form.

A school entry screening works by asking parents/caregivers to provide proof of vaccination (i.e. vaccination card) when their child enrols/registers for primary school – normally this is around the age of 5 to 6 years. Any child that does not have documented two doses of measles vaccination should be referred to the health clinic.

A school entry vaccination screening policy requires that the following be considered:

- long-term retention of immunization cards by parents/caregivers. This means communicating the importance of keeping cards safe as well as ensuring that the cards are made of durable material, ideally with a protective plastic sleeve;

- provision of replacement cards or certificates of vaccination status for those who have lost or misplaced their cards. This means that clinic vaccination records for several previous years need to be available, and that the health staff are empowered to issue a certificate confirming a child’s vaccination status if needed;

- a clear policy outlining the procedure for those parents/caregivers who refuse to have their children vaccinated. It is not the intention of a school vaccination screening programme to prohibit children from attending school.

Finally, a school entry vaccination screening programme should also be used to screen and provide “catch-up” for other missed vaccination doses, other than measles.
Monitoring and evaluation
The main recording tools that are used for immunization-related activities should be adapted to include MCV2. At the service delivery level these are:

1. Immunization or child health card
2. Tally sheet
3. Register
4. Defaulter tracking system
5. Stock record
6. Integrated monthly report.

**Immunization or child health card**

The immunization or child health card records the child’s immunization history and status. The immunization card is important, and should be adapted to include MCV2, for many reasons:

- it serves as a reminder for parents that measles vaccination requires two doses and for them to return to the health facility for the second dose;
- it helps the health worker determine a child’s immunization status and eligibility for MCV2;
- it is useful when coverage surveys are conducted;
- if a school entry screening policy is implemented, then the vaccination card needs to show that the child has received two doses of measles vaccine.

The card may be the only record of immunization history and status available for health workers if facility registers are not well maintained or if clients move from one health facility to another. Each child should have a card with immunization and the MCV2 dose marked correctly.

For an example of a child vaccination card from Swaziland see Annex 3.

**Tally sheet**

Tally sheets are the forms that health workers use to document an immunization session, by making a record for every dose of vaccine given. Tally sheets should be used for all sessions whether fixed, outreach or conducted by mobile teams. It is always worthwhile for a supervisor to spend time reviewing tally sheets with staff to improve the quality of reporting.

Tally sheets need to be adapted to include MCV2. For an example see Annex 4.

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Immunization register

While tally sheets record the doses given for each session, the immunization register records doses given to each individual and helps health workers keep track of the immunization services that they have given each child (and pregnant woman). The register should be adapted so that the same can be done for MCV2. Each dose of MCV2 given to every child in the catchment area should be recorded against their names in the register.

In this way, the immunization register is the basis for tracking individual immunization status (should for example, the child health or vaccination card be lost) and for tracking defaulters.

What to include in the register:

The register is a permanently available record of a child’s vaccination history. It should include the following information as well as any information required by your health facility:

- a unique identification number;
- registration date (usually the date of the first visit);
- name of infant;
- infant’s birthdate;
- infant’s sex;
- name and address of mother/parent;
- other interventions as per MoH policies: other vaccinations, vitamin A supplementation, LLIN distribution and SP-IPTi doses that have been provided.

For an example of Immunization Register adapted to include MCV2 see Annex 8.

Defaulter tracking system

It is important to follow up and track children who fail to present for MCV2 (and any other vaccinations). If many children in the catchment area of the health facility are defaulting, this may indicate a widespread lack of confidence in vaccines, poor outreach services or problems with stock-outs. A system to track drop-outs is an integral part of the Reaching Every District (RED) strategy and is well described in Microplanning for immunization service delivery using the Reaching Every District (RED) Strategy (2009, WHO)¹⁸. The RED approach can and should be used for planning the delivery of MCV2.

There are many ways to monitor and follow-up on defaulters. Two of the most common ways are:

(i) Using the immunization register – at the end of each month, review the immunization register to identify infants who may have failed to receive their MCV2 dose when due. For example, if a child received its MCV1 dose in February (at 9 months of age) check to see whether he/she received MCV2 in August (at 15 months of age) when the next dose was due.

(ii) Reminder cards – another way to identify “drop-outs” is to make “reminder cards”, which are copies of the infant’s immunization cards. File the copy of the immunization card in a box with dividers for each month as shown below.

For example if an infant receives MCV1 in January when he/she is 9 months old, place the reminder card in the July section, the month when MCV2 is due six months later (if scheduled to be given at 15 months of age). In July if the child comes when he/she is due and is given MCV2, update and remove the reminder. Every month, review the reminder cards and follow up those who did not attend when due.

Whatever system is used, it will only be effective if you make sure every child receives the MCV2 doses that are overdue. If you track defaulters regularly every month it will make the task of follow-up much easier. To follow up with defaulters you may be able to contact the mothers or ask members of the community to help.
Module 8 of *Immunization in Practice: A practical guide for health staff* (2004, WHO) (http://whqlibdoc.who.int/publications/2004/9241546514_(Module8).pdf) describes ways of working with the community. For example you may be able to give a list of children and mothers to a community leader or volunteer who can then advise mothers to return for MCV2 and other vaccination doses that are due. Increasingly, mobile phone and SMS text messages are being used to send vaccination reminders to mothers/caregivers.

**Integrated monthly report**

Traditionally, immunization data are collated into a monthly report at each level of the health service. The monthly report contains critical data on most of the components of the immunization system without being too detailed and without putting too much burden on health staff. When MCV2 is added to the immunization schedule, the monthly report should also be adapted.

The health facility compiles the data it collects into a monthly report that is forwarded to the district. The district then consolidates data from all the health facilities into a monthly report and forwards this on to the provincial or regional level. Finally, the province/region consolidates all the district data into a provincial monthly report, which is then sent up to the national level.

Annex 5 provides an example of a monthly report, including MCV2, sent from the health facility. It shows:

- the number of MCV2 doses administered in the month, including the number of fixed and outreach sessions;
- stocks received and used, including vaccines and injection equipment;
- disease surveillance (cases and deaths in the month);
- number of adverse events following immunization (AEFI) identified.

Note that this is an “integrated” monthly report, meaning that it includes immunization data as well as disease data. In some countries, however, the disease data is completed in a separate report. For a manager both types of data are important to help monitor the progress and impact of services and to take action when problems are identified.

Ideally, data collected from monthly reports and other sources should be consolidated into a computer database for easy reference and to generate useful tables and graphs.
The database should be sufficiently comprehensive to include all the quantitative data provided in the monthly report; for example immunization doses, disease incidence, AEFI, vaccine/injection equipment and SP drug supplies and stock levels, etc.

There are many examples of computerized databases available in various countries. One example is an Excel-based database tool\(^\text{19}\) that has been developed at WHO-HQ to include the quantitative data likely to be collected in a monthly report. It can be readily adapted to include MCV2. (Available from EPI Team, Department of Immunization, Vaccines and Biologicals (IVB), WHO, Geneva).

### Coverage/drop-out monitoring charts

A coverage/drop-out monitoring chart is a simple and effective tool for visually monitoring the progress towards immunization coverage targets in one area (health facility catchment, district or region). These “wall monitoring charts” are used and displayed in health facilities around the world.

Coverage monitoring charts should be adapted to include MCV2 and the drop-out between MCV1 and MCV2 calculated.

See Annex 6 for an example of a Coverage Monitoring Chart with MCV2 and drop-out rates.

### Do not forget to include MCV2 in surveys

Periodic immunization coverage surveys, Demographic and Health Surveys (DHS) and Multi-Indicator Cluster Surveys (MICS) are all opportunities to include an assessment of MCV2 once it has been introduced into the national immunization schedule.

Ensure that the questionnaire is modified to include all relevant questions on MCV2!

### Annual WHO/UNICEF Joint Reporting Form

National immunization programmes administer measles second dose to different age groups. For international comparison of second dose coverage data and for calculating regional and global coverage by a certain age (for example by 2 years or by 5 years) all countries will be requested (from 2014, if agreed to by the
For a sample tally sheet to record the second dose of MCV (where it is delivered in the second year of life), please see Annex 4, which depicts the tally sheet currently used in Ghana. Another opportunity to assess the coverage with MCV2 is to screen children entering primary school (provided that the national schedule specifies MCV2 before the age of school entry). The cohort of 5-year olds entering primary school can be screened and the coverage of MCV2 in the 5-year old cohort can be estimated. All surveys (e.g. EPI, DHS, MICS etc.) should include the estimation of MCV2 wherever it is part of the national schedule (see box on page 42).
EPI Programme Reviews

EPI Programme Reviews are undertaken every three to five years and should be adapted to include MCV2 once it has been introduced. Coverage monitoring should also accommodate monitoring of MCV2.

Vaccine safety monitoring (vaccine pharmacovigilance)

It is increasingly important that any country introducing a new vaccine be able to adequately monitor its safety, including detecting and investigating possible reactions or AEFI.

Not being able to promptly deal with suspected severe vaccine-related adverse events can cause concern amongst the public, especially in countries with active anti-vaccine groups. This can lead to low utilization of MCV2 and potentially of other EPI vaccines as well, and may reduce public confidence in the immunization programme as a whole.

While AEFI can be due to a reaction to the vaccine itself – with most reactions being mild and short-term – they can also be due to programme errors, such as contamination of the vaccine or diluents during handling or by using reconstituted vaccine after six hours, improper sterilization of injection equipment and administering the vaccine at the wrong site or through the wrong route. AEFI surveillance can therefore be an effective way to detect problems with the handling and administration of vaccines and to correct these mistakes through training and supervision of health workers.

WHO and partners have developed a Global Vaccine Safety Blueprint that is available at http://www.who.int/immunization/documents/monitoring/WHO_IVB_12.07/en/ which identifies the minimum capacity that all countries should have to monitor and address possible vaccine safety problems. At a minimum, all countries should have the ability to conduct spontaneous reporting (“passive surveillance”) of AEFIs by health workers of community members using standard forms (which should be adapted to include MCV2); have reports of serious cases investigated with the help of a competent local AEFI expert review committee; and have an effective communications strategy to inform the public, address their concerns and correct misinformation.
Once all the monitoring tools have been adapted to include MCV2 and the information has been collected, this information should be used to measure performance and plan action. MCV2 data should be used in the following ways.

- Ensure that a wall chart for monitoring MCV2 coverage and drop-out is kept by each health facility and that it is updated monthly. Check if health facility workers know how to fill in the chart and interpret it correctly, and to plan activities.

- Analyse MCV2 vaccination coverage and drop-out rates by strategy (fixed, outreach) and by month. Adjust plans based on what this analysis reveals.

- Follow vaccine wastage at health facility level and utilization rate at district level to improve system efficiency.

- Monitor monthly district measles vaccine stocks and other supplies to avoid stock-outs.

- Review reported measles cases and deaths by age, vaccination status and month to monitor effectiveness of strategy and make changes.

Using information for action requires that regular (monthly/quarterly) reviews of the analysed data are conducted. The health facility should involve community focal points. The district should involve facility staff, other programme officers and local non-health authorities. These opportunities can be used for on-site training of health workers.
Post-introduction evaluation (PIE)

WHO recommends that all countries that have introduced MCV2 conduct a post-introduction evaluation (PIE) six to 12 months following introduction. The purpose of the assessment is to evaluate the impact of introduction on the country’s immunization programme and to rapidly identify problems needing correction that are the result of the introduction of MCV2 or that pre-existed it. The evaluation can not only lead to improvements in the implementation of the new vaccine and overall immunization programme, but can also provide valuable lessons for future vaccine introductions.

WHO has prepared a user-friendly tool for assessing MCV2 implementation, which includes questionnaires and checklists that countries can adapt (Annexes 7a and 7b). Two different versions of the assessment tool exist – one for programmes that give MCV2 in the second year of life through health facilities and another for programmes that give MCV2 to older children through schools.

The MCV2 assessment, which can be carried out by a local team, takes place at all levels of the health system – down to the health facility level. It examines all key aspects of the MCV2 implementation, from pre-introduction planning to cold chain and logistics management, vaccine coverage, training, injection safety and waste management, communications, financial sustainability and disease and AEFI surveillance. These tools can also be used by programmes that introduced MCV2 a long time ago in order to improve implementation.

Where possible, the assessment of MCV2 should be conducted in conjunction with other immunization evaluation activities, such as EPI reviews or a review of the implementation of measles elimination strategies including surveillance, to optimize the use of time and resources.
Additional references


Microplanning for immunization service delivery using the Reaching Every District (RED) strategy; http://whqlibdoc.who.int/hq/2009/WHO_IVB_09.11_eng.pdf


Perry RT, Halsey NA. The clinical significance of measles: a review. J Infect Dis. 2004; May 1;189 Suppl 1: S4-16


## Annexes

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
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<td>Sample messages for parents and caretakers (Ghana)</td>
</tr>
<tr>
<td>Annex 3</td>
<td>Sample child vaccination card (Swaziland)</td>
</tr>
<tr>
<td>Annex 4</td>
<td>Sample tally sheet (Ghana)</td>
</tr>
<tr>
<td>Annex 5</td>
<td>Sample monthly vaccination report (Ghana)</td>
</tr>
<tr>
<td>Annex 6</td>
<td>Immunization monitoring chart (Ghana)</td>
</tr>
<tr>
<td>Annex 7a</td>
<td>Evaluation of routine second dose measles vaccination (health facility based implementation)</td>
</tr>
<tr>
<td>Annex 7b</td>
<td>Evaluation of routine second dose measles vaccination (school based implementation)</td>
</tr>
<tr>
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<td>Sample immunization register for children</td>
</tr>
<tr>
<td>Annex 9</td>
<td>Frequently Asked Questions</td>
</tr>
<tr>
<td>Annex 10</td>
<td>Sample Supervisory check-list</td>
</tr>
</tbody>
</table>
Annex 1. e-learning Measles Strategic Planning Tool

Strategic Planning for Measles Control
This module is designed to support your use of the World Health Organization’s (WHO) computer-based Measles Strategic Planning (MSP) tool to:

- Assist informed decision-making when considering different measles vaccination strategies to reach your measles control goals.
- Estimate your current population immunity profile for measles.
- Understand the probable impact of different vaccination strategies on future measles cases and deaths.
- Assess cost considerations of different vaccination strategies.

This module can be used to:

- Inform and defend a measles vaccination strategy, given cost and management considerations.
- Serve as a technical resource about measles epidemiology and vaccination strategies.
- Help policy decision-makers and donors compare the estimated costs and impacts of different measles control strategies.
- Access resources for further study in measles control.

Important: The projections and estimated results generated by the MSP tool are not official WHO estimates. They are modeling estimates generated by the tool based on default values, user input, and the model assumptions.

Development of this module has been funded by WHO and the U.S. Centers for Disease Control and Prevention (CDC).

To begin, please click the section title "Begin" from the list at left.

Download the Table of Contents.pdf for this module.
Download a printable handout of this module.pdf. This handout does not contain all elements of the online module.

Please direct all questions and comments to info@aim_path.org

October 2009
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Annex 2. Sample messages for parents and caretakers (Ghana)

ANNOUNCEMENT!

INTRODUCTION OF 2ND DOSE OF MEASLES INTO ROUTINE IMMUNIZATION IN GHANA

- Are you a father, mother or a caregiver with a child aged 18 months old?

- Then, don't let your child at 18 months old miss the second dose of measles being introduced into routine immunization, starting from 1st February, 2012. You don't have to lose your child at this early age; your child needs to be healthy and strong.

- Measles is a highly infectious disease causing complications such as diarrhoea, pneumonia or brain infection.

- One dose of measles vaccine at 9 months of age protects 85% of those vaccinated. With the second dose, all children who remained unprotected after the 1st dose will receive protection.

- Mothers, Fathers and Care-givers are to send children at the age of 18 months to a Child Welfare Clinic throughout the country for second dose of measles which will be given together with vitamin A and bednet from 1st February.

- Vitamin A improves children's eyesight and their ability to fight illnesses

Remember Measles kills; fully immunized children still need the extra doses for more protection.
Annex 3. Sample child vaccination card (Swaziland)
### GHANA EPI TALLY SHEET (SIDE A): CHILDREN IMMUNIZATIONS

**Sample tally sheet, side A (Ghana)**

<table>
<thead>
<tr>
<th>ANTIGENS/ITEMS</th>
<th>0-11 MONTHS</th>
<th>TOTAL</th>
<th>12-23 MONTHS</th>
<th>TOTAL</th>
<th>24 MONTHS &amp; ABOVE</th>
<th>TOTAL</th>
<th>TOTAL CHN VACCINATED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hep B</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hib 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hib 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hib 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles 1</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Long Lasting Insecticidal Net</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Fever</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully Immunized</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A (starting 6th month)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
### GHANA EPI TALLY SHEET (SIDE B): TT Among Women in their Fertility Age (WIFA)

#### TT Dose given to pregnant women 15 - 49 years

<table>
<thead>
<tr>
<th>TT1 (a)</th>
<th>TT2 (b)</th>
<th>TT3 (c)</th>
<th>TT4 (d)</th>
<th>TT5 (e)</th>
<th>More than 5 TT doses - Fully Protected (f)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
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<tr>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
</tbody>
</table>

#### TT Dose given to non-pregnant women 15 - 49 years

<table>
<thead>
<tr>
<th>TT1 (g)</th>
<th>TT2 (h)</th>
<th>TT3 (i)</th>
<th>TT4 (j)</th>
<th>TT5 (k)</th>
<th>More than 5 TT doses - Fully Protected (l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
</tbody>
</table>

#### Long Lasting Insecticidal Nets Given

<table>
<thead>
<tr>
<th>(m)</th>
<th>(n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0 0 0</td>
<td>0 0 0 0</td>
</tr>
</tbody>
</table>

#### Summary of TT Immunizations and LLINs Issued

<table>
<thead>
<tr>
<th>Status</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TT 2+ Among pregnant Women = (b+c+d+e+f)</td>
<td></td>
</tr>
<tr>
<td>TT 2+ Among non-pregnant Women = (a+j+k+l+m+n)</td>
<td></td>
</tr>
<tr>
<td>TT Vaccination to other persons = (p)</td>
<td></td>
</tr>
<tr>
<td>Long Lasting Insecticidal Nets Given = (h)</td>
<td></td>
</tr>
</tbody>
</table>

#### Summary of Vaccines and other logistics

<table>
<thead>
<tr>
<th>Antigen/Items</th>
<th>0 1 dose</th>
<th>2 doses</th>
<th>5 doses</th>
<th>10 doses</th>
<th>20 doses</th>
<th>Total doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>OPV</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hb</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Pneumococcal</td>
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<tr>
<td>Measles</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>LLINs</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Fever</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A (Blue)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A (Red)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

#### Total Children Immunized / Served

<table>
<thead>
<tr>
<th>Antigen/Items</th>
<th>0 - 11 months</th>
<th>12 - 23 months</th>
<th>24 months and above</th>
<th>Total Vaccinated</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hb 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hb 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DPT-HepB-Hb 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal 2</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pneumococcal 3</td>
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<td></td>
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</tr>
<tr>
<td>Measles 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLINs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yellow Fever</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully Immunized</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Annex 5. Sample monthly vaccination report (Ghana)**

### Monthly Vaccination Report

<table>
<thead>
<tr>
<th>Region</th>
<th>District</th>
<th>Name of Reporting Facility</th>
<th>Year</th>
</tr>
</thead>
</table>

#### 1. Demographic data

<table>
<thead>
<tr>
<th>Total Population</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants 0-11 months: annual target</td>
<td>B</td>
</tr>
<tr>
<td>Infants 0-11 months: monthly target</td>
<td>C = (B / 12)</td>
</tr>
<tr>
<td>Expected Pregnancy</td>
<td>D</td>
</tr>
<tr>
<td>Expected deliveries: monthly target</td>
<td>E = (D / 12)</td>
</tr>
<tr>
<td>Children 12-23 months: annual target</td>
<td></td>
</tr>
<tr>
<td>Children 12-23 months: monthly target</td>
<td></td>
</tr>
</tbody>
</table>

#### 2. Completeness & Timeliness of reports

<table>
<thead>
<tr>
<th>Measles</th>
<th>YF</th>
<th>TT 2+</th>
<th>PCV-3</th>
</tr>
</thead>
</table>

#### 3. Vaccination coverages

<table>
<thead>
<tr>
<th>BCG</th>
<th>Penta-1</th>
<th>Penta-3</th>
</tr>
</thead>
</table>

| 3.1 Monthly coverage (%) | |
| 3.2 Cumulative coverage (%) | |
| 3.3 Dropout rate (%) | |

#### 4. Monthly vaccinations given by strategy

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Number Given (By age group)</th>
<th>Total Administered</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV-0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus - 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penta-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penta-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penta-3</td>
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</tr>
<tr>
<td>PCV-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles - 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles - 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLIN - Pregnant Women</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fully Immunized</td>
<td>Pregnant Women</td>
<td>Non-Pregnant</td>
</tr>
<tr>
<td>TT-1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT-2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT-5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT-5+ (Not vaccinated)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLN - Pregnant Woman</td>
<td>6-11 months</td>
<td>≥12 months</td>
</tr>
<tr>
<td>Vitamin A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5. Information Education and Communication

<table>
<thead>
<tr>
<th>No. of IEC sessions conducted</th>
<th>No. of participants at sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of radio/TV spots conducted</td>
<td>No. of home visit sessions conducted</td>
</tr>
</tbody>
</table>

#### 6. AEFI

| No. of cases reported | |

#### 7. Waste management

| No. of safety boxes used during the month | No. of safety boxes disposed during the month |
| No. of hub-cutters used during the month | No. of hub-cutters disposed during the month |

#### 8. Cold chain temperatures at Health Facilities

| No. of facilities that have reported temp. status | No. of health facilities with temperature >2°C |
| No. of health facilities with temperature >4°C | Minimum temperature recorded |
| Maximum temperature recorded | |

#### 9. Stocks of safe injection equipment

<table>
<thead>
<tr>
<th>Safe injection equipment</th>
<th>Stock levels</th>
<th>Unused</th>
<th>Received</th>
<th>Stock at end</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS_0.05ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADS_0.5ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solution_2ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solution_5ml</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety boxes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hub-cutters</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 10. Status & utilization of vaccine stocks and other logistics

<table>
<thead>
<tr>
<th>No. of vials opened</th>
<th>Losses due to:</th>
<th>VVM status (3 or 4)</th>
<th>Expired</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stock at district store</th>
<th>Beginning</th>
<th>Received</th>
<th>Issued</th>
<th>stock at end</th>
</tr>
</thead>
<tbody>
<tr>
<td>BCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>YF</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLIN</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VILA (Blue)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VILA (Red)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Health Records</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 11. Disease surveillance

<table>
<thead>
<tr>
<th></th>
<th>AFP</th>
<th>Measles</th>
<th>NNT</th>
<th>Diarrhoea</th>
<th>Yellow fever</th>
<th>Meningitis</th>
<th>Pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-11 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-59 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-15 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;15 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaccination status</td>
<td></td>
<td></td>
<td></td>
<td>No. vaccinated</td>
<td>No. not vaccinated</td>
<td>No with vac status unknown</td>
<td></td>
</tr>
</tbody>
</table>

### 12. Remarks

**Compiled by:**
- Name: _____________________
- Designation: _____________________
- Date: _____________________

**Approved by:**
- Name: _____________________
- Designation: _____________________
- Date: _____________________
Annex 6. Immunization monitoring chart (Ghana)

**IMMUNIZATION MONITOR CHART**

Health Facility: ______________

Annual target population (0 - 11 months): ____________

Annual target population (12 - 23 months): ____________

Minimum coverage target for the year with BCG: ____________

Year: ______________

Minimum coverage target for the year with Measles 1: ____________

Minimum coverage target for the year with Measles 2: ____________

**Plot for only BCG and measles 1 and 2 Coverage**

100%

75%

50%

25%

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Total Immunized this month

Cumulative total for the month

Total Immunized this month

Cumulative total for the month

Total Immunized this month

Cumulative total for the month

**BCG/Measles 1 DROP-OUT RATE = \( \frac{(A-B)}{A} \times 100\)**

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

**Measles 1/Measles 2 DROP-OUT RATE = \( \frac{(B-C)}{B} \times 100\)**

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

A drop-out more than 10% is an indication for immediate action
Annex 7a and 7b. Evaluation of routine second dose measles vaccination

See: http://www.who.int/immunization/documents/intro_measles_2nd_dose_routine_schedules_annex7a_b.pdf
### Annex 8. Sample immunization register for infants

<table>
<thead>
<tr>
<th>Vaccinations (dates, day/month/year)</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DTP/Penta</td>
<td>0 1</td>
<td>2 3</td>
<td>1 2 3 1</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td>0 1 2 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPV</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BCG</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HepB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

#### Columns:
- **Name of Infant**: Name of the infant.
- **DOB**: Date of birth.
- **Sex**: Sex of the infant.
- **Registration date**: Date of registration.
- **No.**: Registration number.
- **BCG**: BCG vaccination.
- **Address**: Address of the infant.
- **Name of mother/parent**: Name of the mother or parent.
- **PAR**: Protected at birth from Neonatal Tetanus.
- **Remarks**: Additional remarks.
- **Yes/No**: Indicates completed or not.
- **Less than 24 months**: Vaccination details for infants less than 24 months.
- **24 months**: Vaccination details for infants 24 months or older.
- **Completed/died/moved**: Indicates the status of the infant.

---

*Notes:
- **Village/town**: Location of the infant.
- **Name of health facility**: Name of the health facility.
- **No.**: Registration number.
- **Registration date**: Date of registration.
- **DOB**: Date of birth.
- **PAR**: Protected at birth from Neonatal Tetanus.*
Annex 9. Frequently Asked Questions (FAQs)

1. **What is MCV2?**
   It is the administration of a second dose of measles containing vaccine (MCV) to a child who has earlier received one dose of MCV.

2. **When should MCV2 be given?**
   At 15–18 months of age or at school entry. The minimum interval between MCV1 and MCV2 is 1 month. However, when MCV2 is given in the second year of life it is recommended that countries develop a policy to screen children at school entry is put in place to verify that they have received two doses of measles vaccine and vaccinate any child missing any doses.

3. **Why is a second dose of measles needed?**
   Providing routine MCV2 to children in their second year of life reduces the rate of accumulation of susceptible children and the risk of an outbreak. Administration of MCV2 at age 15–18 months ensures early protection of the individual, slows accumulation of susceptible young children and may correspond to other routine immunizations (for example, a DTP booster).

4. **Who should receive MCV2?**
   Any child with one documented dose of MCV should get a second dose of MCV ensuring that a gap of 1 month is maintained after the first dose.

5. **Why is MCV2 limited only to young children? What about teenagers and adults?**
   The age of vaccination depends on the local epidemiology of the disease (measles) and the coverage achieved with the first dose of MCV. Since measles occurs predominantly in children and adolescents, they are the priority targets for vaccination.

6. **How is MCV2 administered?**
   The vaccine is diluted with the accompanying diluent and administered by sub-cutaneous injection.

7. **Is it safe to have another dose of measles vaccine? Is there any risk of overdosing?**
   Yes, it is safe and there is no risk of overdosing.

8. **Do other countries give a second dose of measles? Do they use the same vaccine?**
   Many countries have introduced a second dose of MCV into their national immunization schedules. The vaccine is the same but can be available either as measles vaccine or in combination with rubella and/or mumps vaccines.

9. **Will the measles campaigns (SIAs) stop now that there is a second dose of measles in the routine immunization schedule?**
   The decision to stop SIAs is based on many considerations like the coverage of the first and second doses of MCV, the duration for which that coverage has been achieved continuously, the incidence and age group of measles cases etc. Stopping SIAs is a serious decision, prior to which a careful review should be conducted by a national committee to evaluate the potential risks and benefits of relying solely on routine immunization. Among other things, it is suggested that the committee should consider subnational MCV1, MCV2 and SIA coverage, the expected rate of accumulation of susceptibles without SIAs, measles epidemiology and the performance of the surveillance system.

10. **Can I ignore the next measles SIA if my child has already received two doses of measles vaccine?**
    The purpose of SIAs is not only individual protection of your child but may also be the elimination of disease. So it will be better not to ignore the SIA if your child is within the age group targeted by the SIA.

11. **What will happen if my child starts school and they have only had one dose of measles vaccine?**
    Your child should get his second dose of MCV as soon as possible.
## Annex 10. Supervisory checklist

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes/No</th>
<th>Comment (problems observed)</th>
<th>On site corrective action</th>
<th>Longer term corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Is the session organized efficiently?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Is measles second dose being provided?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Are immunization cards in use for every infant and pregnant woman? Does the card mention measles second dose?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Is a register used for recording information on each child/mother/pregnant woman?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Are parents advised on when to return for subsequent vaccinations, including for measles second dose?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Does the health facility have a monitoring chart displayed that includes measles second dose?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Does the health facility have a map of the catchment area displayed?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Does the health facility have a work-plan for the quarter?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Are planned sessions monitored for completeness/timeliness?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Is there a system for tracking defaulters?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Does the health facility display a spot map of measles cases?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Is a temperature monitoring chart in use?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. Are the vaccines stacked properly inside the refrigerator?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Are there any expired vaccines inside the refrigerator?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Do the health workers know how to read and interpret the VVM? Ask them to describe the VVM stages.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Are there any vaccine vials with VVM that has reached the discard point?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Does the staff member know WHEN to perform the shake test? Ask them to demonstrate how they would do it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Is there an adequate supply of AD syringes for the planned sessions?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Are AD syringes used for every immunization?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Is the injection technique appropriate?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Are safety boxes being used for discarding AD syringes and needles?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Are immunization posters displayed on the health-facility wall?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. Is there a schedule of community meetings?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. Is there a community volunteer involved with immunization?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. Is there a stock register?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. Does the stock register show adequate vaccines and supplies?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a Adapted from Training for mid-level managers (MLM), Module 4. Supportive supervision* [http://www.who.int/entity/immunization_delivery/systems_policy/MLM_module4.pdf](http://www.who.int/entity/immunization_delivery/systems_policy/MLM_module4.pdf)
Contact

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20 avenue Appia
CH 1211 Geneva
Switzerland
E-mail: vaccines@who.int