What is the optimal age to give MCV2?

Recommendations on timing

Measles SAGE Working Group Meeting
January 29-30, 2009

Tracey Goodman, WHO (EPI+/IVB)
MCV1 Recommendation

- Recommended age of MCV1 depends on epidemiology and programmatic considerations.

- Dose 1 at 9 months where attack rates high and risk of serious disease among infants
  - Two doses, at 6 and 9 months, for HIV-infected infants

- Dose 1 at 12-15 months where risk of infant infection is low

- Where the transmission is widespread and mortality is high, keep dose 1 at 9 months. (Nov 2006 SAGE)

- Where transmission has been substantially reduced (for example, following high quality nationwide SIAs), increasing the age of dose 1 from 9 months to 12 months represents a rational and desirable policy change. (Nov 2006 SAGE)

# MCV1 estimated coverage by schedule

*(WHO/UNICEF Estimates 2007)*

<table>
<thead>
<tr>
<th>Schedule</th>
<th>Mean 2007 estimated MCV1 coverage (number of countries)</th>
<th>Global mean MCV1 coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AFRO</td>
<td>AMRO</td>
</tr>
<tr>
<td>≤9 months</td>
<td>75.4 (44)</td>
<td>83.3  (3)</td>
</tr>
<tr>
<td>12 months</td>
<td>98.0 (1)</td>
<td>92.0  (28)</td>
</tr>
<tr>
<td>12-24 months</td>
<td>99.0 (1)</td>
<td>90.8  (4)</td>
</tr>
</tbody>
</table>
MCV2 Recommendation?

- All children should receive two doses
- Minimum interval of one month between doses

What is the optimal age to give dose 2 of measles vaccine?
"Generally" administered at school age (4-6 years), but 2nd dose may be given as early as one month following 1st dose, depending on local programmatic and epidemiological situation.
2004 Position Paper - Issues

- Current (2007) schedule practices are more varied

- "Generally" 2\textsuperscript{nd} dose at school entry only when MCV1 at \( \geq 12 \) months (and hence vaccine efficacy is 95%)

- Most with MCV1 at 9 months give MCV2 in early 2nd year of life (as do 20\% of those with MCV1 at \( \geq 12 \) months)

- New SAGE recommendations (to keep MCV1 at 9 months if transmission and high mortality, and yet to give all children 2 doses) not addressed.
### 2 Dose Measles Schedules - 2007

#### Optimal Age to Give MCV2: Recommendations on Timing

January 30, 2009

#### Total Proportion of countries with 2nd dose

<table>
<thead>
<tr>
<th>Ages of administration</th>
<th>AFRO</th>
<th>AMRO</th>
<th>EMRO</th>
<th>EURO</th>
<th>SEARO</th>
<th>WPRO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early &amp; 2nd year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>9 M &amp; 12-24 M</td>
<td>3</td>
<td>1</td>
<td>9</td>
<td>0</td>
<td>3</td>
<td>4a</td>
<td></td>
</tr>
<tr>
<td>Early &amp; school-age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>9 M &amp; 4-6 Y</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1st &amp; 2nd year</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>12 M &amp; 13-24 M</td>
<td>0</td>
<td>4</td>
<td>2</td>
<td>6b</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>1-2 years &amp; school-age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>70</td>
</tr>
<tr>
<td>12-18 M &amp; 3-7 Y</td>
<td>2</td>
<td>21</td>
<td>5</td>
<td>34</td>
<td>0</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>1-2 years &amp; older</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17</td>
</tr>
<tr>
<td>12-24 M &amp; &gt;7 Y</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13c</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

**Proportion of countries with 2nd dose**

- 6/46 in AFRO
- 26/35 in AMRO
- 17/21 in EMRO
- 53/53 in EURO
- 7/11 in SEARO
- 23/27 in WPRO

**Total: 132/193**

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#### Ages of administration

- Early & 2nd year: 9 M & 12-24 M
- Early & school-age: 9 M & 4-6 Y
- 1st & 2nd year: 12 M & 13-24 M
- 1-2 years & school-age: 12-18 M & 3-7 Y
- 1-2 years & older: 12-24 M & >7 Y

**Proportion of countries with 2nd dose**

- 55% at 18 mos
- 20% at 15 mos
- Probably not desirable

#### Proportion at different ages

- 80% at 12 mos (7 w 12-15; 1 w 12-18 mos)
- 16% at 15 mos (2 w 15-18 mos)
- None at 18 mos
Considerations - Trade-offs

- Not all measles schedules are equal in terms of protection or risks
  - Seroconversion rates, accumulation of susceptibles
- Risks depend on the level of measles control that has been achieved
- Select age that can get the highest coverage
- Opportunities for other vaccinations or health interventions to be given at same time
Countries giving two MCV doses in their routine immunization system (2007)

No  (63 countries or 32%)
Yes  (130 countries or 67%)*

Source: WHO/IVB database, 193 WHO Member States. Data as of 8 August 2008, based on 2007 JRF.
*Myanmar and Democratic Republic of Korea introduced MCV2 in 2008 (132 countries had a second routine dose by 26 Aug. 2008.)

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# MCV2 Reported Coverage (JRF 2007)

(Reported by 103 out of 132 countries that have routine MCV2)

<table>
<thead>
<tr>
<th>Type of schedule</th>
<th>Ages of administration</th>
<th>Mean 2007 reported MCV2 coverage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early &amp; 2nd year</td>
<td>9 M &amp; 12-24 M</td>
<td>70.7% (15/20)</td>
</tr>
<tr>
<td>Early &amp; school-age</td>
<td>9 M &amp; 4-6 Y</td>
<td>80.2% (6/6)</td>
</tr>
<tr>
<td>1st &amp; 2nd year</td>
<td>12 M &amp; 13-24 M</td>
<td>84.8% (16/20)</td>
</tr>
<tr>
<td>1-2 years &amp; school-age</td>
<td>12-18 M &amp; 3-7 Y</td>
<td>88.4% (52/70)</td>
</tr>
<tr>
<td>1-2 years &amp; older</td>
<td>12-24 M &amp; &gt;7 Y</td>
<td>94.4% (13/16)</td>
</tr>
</tbody>
</table>

**Global average MCV2 coverage**

85.2% (103/132)

*2006 JRF reported coverage used for 18 countries that did not report MCV2 coverage in 2007*
Primary School Attendance Levels offer opportunities for school-based immunization

Female Primary School Attendance (net) 1990-1996 vs 2000-2006

Preliminary Survey Results
(as of August 2008)

<table>
<thead>
<tr>
<th>Preliminary Survey Results</th>
<th>AFRO</th>
<th>AMRO</th>
<th>EMRO</th>
<th>EURO</th>
<th>SEARO</th>
<th>WPRO</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number of Countries</td>
<td>46</td>
<td>35</td>
<td>21</td>
<td>52</td>
<td>11</td>
<td>27</td>
<td>192</td>
</tr>
<tr>
<td>Number of countries replying</td>
<td>37</td>
<td>35</td>
<td>13</td>
<td>24</td>
<td>11</td>
<td>23</td>
<td>143</td>
</tr>
<tr>
<td>Response Rate</td>
<td>80%</td>
<td>100%</td>
<td>62%</td>
<td>46%</td>
<td>100%</td>
<td>85%</td>
<td>74%</td>
</tr>
<tr>
<td>Countries reporting School-Based Immunization</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>15</td>
<td>5</td>
<td>17</td>
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</tr>
<tr>
<td></td>
<td>17%</td>
<td>26%</td>
<td>33%</td>
<td>29%</td>
<td>45%</td>
<td>63%</td>
<td>32%</td>
</tr>
<tr>
<td>Countries reporting no School-Based Immunization</td>
<td>29</td>
<td>26</td>
<td>6</td>
<td>9</td>
<td>6</td>
<td>6</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>63%</td>
<td>74%</td>
<td>29%</td>
<td>17%</td>
<td>55%</td>
<td>22%</td>
<td>43%</td>
</tr>
<tr>
<td>Countries not replying</td>
<td>9</td>
<td>0</td>
<td>8</td>
<td>28</td>
<td>0</td>
<td>4</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>20%</td>
<td>0%</td>
<td>38%</td>
<td>54%</td>
<td>0%</td>
<td>15%</td>
<td>26%</td>
</tr>
</tbody>
</table>

→ 32% of all countries report some kind of school-based immunization program!

Note: 5 SEAR countries with a school-based immunization program are: India, Indonesia, Nepal, Sri Lanka, Thailand
Note: 17 WPRO countries with a school-based immunization program are: Brunei, China, Cook Islands, Fiji, Kiribati, Malaysia, Marshall Islands, Micronesia, Mongolia, Nauru, Palau, Samoa, Singapore, Solomon Islands, Tonga, Tuvalu, Vanuatu
Where MCV1 is given at 9 months (on-going transmission/mortality):

1. MCV2 should be given early in the 2\textsuperscript{nd} year of life from 15-18 months of age.

2. The exact age of MCV2 contact depends on epidemiology and programmatic considerations but should be selected to:
   - Maximize coverage and population immunity
   - Consider timing of boosters or other vaccines
   - Linkage with other health interventions (vitamin A, deworming, etc),

3. Additionally, all children should be screened/checked at school entry. Those who have not already received a 2\textsuperscript{nd} dose of measles or do not have documentation should be vaccinated, and recorded on child's immunization card and registry.
Where risk of infection is low (near or at elimination):

1. MCV1 should be given at 12-15 months
2. MCV2 be given at school entry (specify age?)
3. All doses should be recorded on the child's vaccination card and in registries.