Vaccines don’t deliver themselves: field experience in vaccine delivery and scale-up

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Enablers of routine immunization: the seven “A’s”

- Accessibility
- Availability
- Affability
- Awareness
- Acceptability
- Accountability
- Affordability
Age groups targeted to receive vaccines

- **Infants**
- **Young children** (e.g., measles 2nd dose)
- **Pre-adolescents** (HPV)
- **Women of child-bearing age** (tetanus toxoid)
- **Expanded age groups during campaigns** (e.g., polio, measles, meningitis A)
New vaccine introductions
Overview 1991-2013 of introduction status and 2014-2016 projections

Source: WHO/IVB Database as of 18 October 2013
Date of slide: 18 October 2013
New vaccines have brought new challenges

• Increase in number of vaccines (6 → 12-15)
• Age restrictions (Rotavirus vaccine upper age limit)
• New target age groups (HPV: adolescents) requiring new service delivery channels
• New messages (syndromes, partial protection)
• Integrated approaches to disease control
• Cost of new vaccines
• Cold chain/logistics challenges (bulk and waste disposal)

Most new vaccines require a well-functioning routine immunization program.
Challenges to the immunization supply chain

Growing volume (cm³) to vaccinate per child

Increasing number of doses

Introduction of more expensive vaccines

Increase in stock keeping units

2010

2020

Note: All figures relate to GAVI-funded vaccines
1. UNICEF Supply 2012 Financial report, WHO data for Pneumo and Rota vaccines, and HPV (only for girls); 2. 2010: GAVI Shipment Data; 2020: GAVI SDF Forecast; Including volume for GAVI future graduated countries; 3. Comparison based on 2013 Price; 2020 Vaccines include: Rota, Pneumo; HPV; 2010' vaccines include: YF, Measles, DPT, OPV (UNICEF SD); 4. GAVI Background SDF Information; 2010*: estimates based on 2009 data; 2020: estimates based on 2013 forecast
Immunization challenges: cold chain and logistics management
Examples of impact of increasing vaccine volumes on developing country supply systems, 2007

4100 doses of Polio and Measles Vaccines
Rural hospital storage, Mozambique

625 doses of Rotavirus Vaccine
District vaccine store, Brazil
Cumulative value and volume of vaccines used in routine childhood immunization: Ethiopia

What have decision makers mostly focused on before introducing a new vaccine?

- Disease burden (incidence, mortality, morbidity, disability)
- Vaccine efficacy, effectiveness
- Vaccine safety, reactogenicity
- Fits with existing immunization schedule (e.g., timeliness issues)
- Simultaneous administration possible?
- Combination with other antigens into single product possible?
- Current and future price, stability and security of vaccine market
- Trade-offs with other investments
- Immunogenicity
- Expected health gains
- Health care cost savings
- Care-related productivity gains
- Outbreak potential
- Public perception of the disease
- How to communicate about the disease/syndrome
- Willingness to give/accept more than one injection on same visit
But what other things are informed decision makers increasingly concerned about?

Programmatic characteristics of competing products:

- heat stability
- storage temperature
- number of doses per vial
- wastage rate
- storage volume
- volume of waste for disposal
- acceptability by health staff (e.g., # injections on same day)
- ease of use (preparation and administration)
- volume of dose administered
<table>
<thead>
<tr>
<th><strong>Rotarix™ (GSK)</strong></th>
<th><strong>RotaTeq® (Merck)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of vaccine</strong></td>
<td>Live, liquid vaccine</td>
</tr>
<tr>
<td><strong>Method of administration</strong></td>
<td>1.5 ml for Oral use</td>
</tr>
<tr>
<td><strong>Presentation and vial size</strong></td>
<td>Mono-dose, liquid tube</td>
</tr>
<tr>
<td><strong>Target age group</strong></td>
<td>Infants &lt;32 weeks of age, first dose no earlier than 15 weeks</td>
</tr>
<tr>
<td><strong>Number of doses</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>Schedule</strong></td>
<td>Co-administered with Penta1 and Penta2</td>
</tr>
<tr>
<td><strong>VVM type</strong></td>
<td>14</td>
</tr>
<tr>
<td><strong>Packaged volume per dose</strong></td>
<td>17.1 cm³ in 50 dose carton</td>
</tr>
</tbody>
</table>

*Note: The VVM technology has been validated for use.*
## Single dose versus multi-dose trade-offs

<table>
<thead>
<tr>
<th>Comparison of the Major Programmatic and Economic Advantages of Single- Versus Multi-Dose Vaccine Containers&lt;sup&gt;a&lt;/sup&gt;</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single-dose</strong></td>
<td><strong>Multi-dose</strong></td>
</tr>
<tr>
<td><strong>Production</strong></td>
<td>Eliminates use of thiomersal</td>
</tr>
<tr>
<td><strong>Packaging</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>Simplified logistics</td>
</tr>
<tr>
<td><strong>Cold chain</strong></td>
<td></td>
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<tr>
<td><strong>Safety</strong></td>
<td>Less risk of contamination</td>
</tr>
<tr>
<td></td>
<td>Ensures more accurate dose delivery</td>
</tr>
<tr>
<td><strong>Syringe usage (for injectable vaccines)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Vaccine wastage</strong></td>
<td>Significantly less vaccine wastage</td>
</tr>
<tr>
<td><strong>Coverage rates</strong></td>
<td>Facilitates innovative outreach strategies</td>
</tr>
<tr>
<td></td>
<td>Prevents missed opportunities due to reluctance to open a multi-dose container for small sessions</td>
</tr>
<tr>
<td><strong>Medical waste</strong></td>
<td></td>
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</tbody>
</table>


<sup>b</sup> Compact prefilled autodisable syringes (Uniject) have less waste volume than multi-dose vials with syringes.
Fear of vaccine wastage using some larger multi-dose vials leads to delayed protection

**Policies/Practices**
- Measles vaccine on specific days to increase session size (weekly or monthly)
- Minimum number of children required to open a vial

**Consequences**
- Mothers not sure when to come for services
- Children are turned away, untimely vaccinated, never vaccinated
Missed opportunities, UNICEF survey, 2012

Countries’ policies on opening measles vial (N=33)

- Open vial for any child: 55%
- Ask Caregiver to come back on scheduled day: 42%
- Other: 3%

Distribution of demand for 5-dose & 10-dose measles vial by country (n=34) procuring through UNICEF (UNICEF survey, 2012)

Countries indicated that 35% of their demand is for 5 dose vials
### Practices related to wastage

<table>
<thead>
<tr>
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<th>Cambodia (95% MCV1 coverage)</th>
<th>Nigeria (57% MCV1 coverage)</th>
</tr>
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<tbody>
<tr>
<td>Average measles vaccine wastage rate in health centers</td>
<td>58%</td>
<td>19%</td>
</tr>
<tr>
<td>Average number of children before opening measles vaccine vial</td>
<td>2.2</td>
<td>6.2</td>
</tr>
<tr>
<td>Proportion of parents saying they were turned away for vaccination</td>
<td>4%</td>
<td>30%</td>
</tr>
<tr>
<td>Proportion of turned away who never received vaccine</td>
<td>12%</td>
<td>53%</td>
</tr>
<tr>
<td>Vaccines missed among turned away</td>
<td>MCV: 63%</td>
<td>BCG: 33%</td>
</tr>
<tr>
<td></td>
<td>MCV: 26%</td>
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**How to reduce the threshold to open a vaccine vial?**

*Source: unpublished data, 2011 Nigeria CDC/WHO/NPHCDA study, 2013 Cambodia WHO/CDC/MOH study in nationally representative samples of health facilities*
Vaccine presentation can influence

- Vaccination coverage
- Timely coverage/early protection
- Vaccine wastage
- Supply chain
- Safety
- Vaccine cost
- Total vaccination cost
Key messages

• managers have become better informed
• research markets to learn product preferences **directly** from prospective clients
• design more programmatically suitable vaccines
• think downstream earlier in deciding formulation, presentation and packaging
• be nimble and responsive to needs in developing country
• vaccine presentations influence coverage/equity
New vaccines require a well-functioning routine immunization program

- Identify system issues to be fixed before introduction of new vaccines
- Use new vaccine introduction to deliberately strengthen routine immunization
- Apply sustainable approaches

Vaccines do not deliver themselves!
Lessons from USAID’s MCHIP on new vaccine introduction


Let’s make sure every child is a VIP…

Vaccinated, Immunized & Protected!

Thank You

JSI