Trends in use of multi-dose vaccine vials in UNICEF procuring countries

WHO informal consultation to develop further guidance on vaccines for the UNEP-convened Intergovernmental Negotiating Committee Meeting 4 (INC4)

4 April 2012
Geneva, Switzerland

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Acknowledgements

- WHO Headquarters:
  - Diana Chang Blanc

- UNICEF Supply Division, Copenhagen:
  - Robert Matthews
  - Katinka Rosenbom
  - Jennifer Rubin
  - Selenge Lkhagva
  - Ann Ottosen

- UNICEF Program Division, New York:
  - Maya van den Ent
Objectives of study

- Identify trends in multi-dose vial use of DTP-based, hepatitis B, and measles-containing vaccines from 2000-2011
  - Review UNICEF Supply Division vaccine procurement database
  - Determine if there is an obvious trend of countries shifting from larger to smaller multi-dose vials or vice versa

- Assess factors that influence the use of different vial sizes, e.g. global supply and country-driven preference
Limitations of study

- Trends in UNICEF procurement are not representative of global trends. Study excludes:
  - Procurement through the PAHO Revolving Fund
  - Countries that procure independently

- Limited information on country preference
  - Difficult to ascertain drivers for use of a particular vaccine presentation
  - An aggregate of country-driven preferences is considered here
Assumptions

• Country-driven preference:
  – Price, e.g. HepB: $0.2/dose for 10 dose vial vs. $0.4/dose for 1 dose
  – Cold chain volume requirements, e.g. DTP-HepB/Hib: 23-26 cm³/dose for liquid 1 dose vial vs. 2.6 cm³/dose for liquid 10 dose vial
  – Programmatic feasibility, e.g. fully liquid preferred over liq/lyo

• Source of funding is considered external, internal, or mixed
  – External: donors funds from outside a country
  – Internal: self-financing from government resources
  – Mixed: both external and internal funding in a given year

• Annual weighted average price per dose was used to compare cost of vaccine presentations
DTP

- UNICEF procurement for 20 - 70 countries each year during 2000-2011 (70 in 2001; 20 in 2010)

- WHO prequalified: 1, 10, 20 dose vials in fully liquid form

- 2000-2011: Overall decline in DTP procurement as the use of combination vaccines has increased; mostly procured in 10 dose vials

- Country preference for 10 or 20 dose vials often flexible but 7 countries switched from 20 to 10 dose vials
2006 WHO recommends universal use of Hib

Note: a single country may procure more than one vaccine presentation in a given year; thus, one country may be counted in more than one vial size category.
DTP-HepB

  - GAVI co-financing 2001-2011, but will not continue after 2011
- WHO prequalified: 1, 2, 5, 10, 20 dose vials in liquid form
- Mostly procured in 10 dose vials
- 2006-2008: Increase in use after increase in global supply
  2009-2011: Decline in use with increasing uptake of pentavalent
- No observed trends in use of different vial sizes
DTP-HepB

Number of countries

Weighted avg price / dose (USD)

2004-2005
Increase in
global supply

2 dose 
10 dose 
2 dose price 
10 dose price
DTP-Hib

- UNICEF procurement for 1 - 17 countries each year during 2000-2011 (1 in 2002; 17 in 2007)
- WHO prequalified: 1 and 10 dose vials in both liq and liq/lyo
- Mostly procured in liquid 10 dose vials
- 2006: Increased uptake after universal Hib recommendation
  2008-2011: Decline in overall use due to pentavalent, expected to continue to decline in future years
- No clear trend in use of different vial sizes
2006 WHO recommends universal use of Hib
DTP-HepB/Hib Timeline

(1) GAVI begins financing liq/lyo 2 dose

(2) WHO universal recommendation of Hib use
Global prioritisation for allocation

(3) PQ: liq/lyo 2 dose (1 supplier)
PQ: liq and liq/lyo 1 dose (2 suppliers, but initially insufficient supply)

(4) PQ: liq 1 dose (2 suppliers)
PQ: liq 10 dose (1 supplier)

(5) PQ: liq & liq/lyo 10 dose (1 supplier)
Delisting: liq 1 and 10 dose (1 supplier)
PQ: liq & liq/lyo 2 dose (1 supplier)
PQ: liq & liq/lyo 1 dose (1 supplier)

(6) Delisting: liq & liq/lyo 1 dose (1 supplier)
PQ: liq 1 dose (1 supplier)
PQ: liq 10 dose (1 supplier)

WHO prequalified: 1, 2, 10 dose vials all in liq and liq/lyo

2001-2006: Mostly procured as liq/lyo 2 dose vials
2007-2010: Greater uptake in overall use; shift from liq/lyo 2 to fully liquid 1 dose due to increasing global supply of 1 dose vials and country-driven preference for fully liquid
2011: Shift from 1 dose to fully liquid 10 dose vials due to global supply (delisting of liquid 1 dose vial in 2010)
2006 WHO recommends universal use of Hib
HepB

- WHO prequalified: 1, 2, 6, 10, 20 dose vials all in fully liquid form
- HepB is mostly commonly procured in 10 dose vials
- 6 countries switched from 10 to 1 dose vials due to increasing use of DTP-HepB/Hib (1 dose vials often used for HepB birth dose)
### Measles

- UNICEF procurement for 54 - 72 countries each year during 2000-2011 (72 in 2000; 54 in 2011)
- WHO prequalified: 1, 2, 5, 10, 20 dose vials all in lyo form
- Procured for both routine and supplementary activities
- Mostly procured in 10 dose vials
- No trends in vial size observed

### MR

- UNICEF procurement for 1 - 11 countries each year during 2000-2011 (1 in 2000; 11 in 2007)
- WHO prequalified: 1, 2, 5, 10 dose vials all in lyo form
- Procured for both routine and supplementary activities
- Procured only in 10 dose vials
- No trends observed
MMR

- UNICEF procurement for 3 -14 countries each year during 2000-2011 (3 in 2000; 14 in 2010, 2011)
- WHO prequalified: 1, 2, 5, 10 dose vials all in lyophilised form
- Mostly procured in 1 and 10 dose vials
- In the WHO European region, 5 countries switched from 10 to 1 dose vials due to country-driven preference
- 2009-2011: 5 dose vials procured in large quantities for a few countries
Conclusions

- The evolution of multi-dose vaccine vial use contains micro-patterns but no clear overall pattern was observed
  - Shifts in national use of larger to smaller vial sizes and vice versa were observed in the UNICEF procuring countries
  - The use of different multi-dose vial sizes is affected by global supply and country-driven preference, e.g. DTP supply, DTP-HepB/Hib supply and programmatic feasibility with fully liquid presentation

- Despite the availability of single-dose presentations, 10 dose vials are most commonly used and there is no evidence of increasing use of 1 dose vials

- Multi-dose vials are commonly used in UNICEF procuring countries and are likely to continue to be a vital part of immunization programs
Questions?
References


## WHO prequalified vaccines

### Vaccine presentation and supplier information

<table>
<thead>
<tr>
<th>Vaccine type</th>
<th>Doses per vial</th>
<th>Form</th>
<th>Current number of suppliers</th>
<th>Years prequalified (number of manufacturers*)</th>
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* 1 manufacturer unless otherwise specified
Number of countries

Weighted avg price / dose (USD)

10 dose
10 dose price
