

4 The Market Shaping Goal

Shape markets for vaccines and other immunisation products.

Supply and Procurement Roadmap

Pentavalent (DTwP-hepB-Hib) Vaccine

May 2017 addendum to this 2016 Roadmap:

Since the completion of this roadmap, UNICEF-SD completed a tender in Q4 2016 for the supply of pentavalent vaccine to Gavi-supported countries and a number of other middle income countries across 2017 to 2019; a total 449 million doses, averaging 150 million doses a year. The procurement strategy for this tender was aligned with the objectives and targets defined in this roadmap. Awards achieved significantly lower prices (weighted average prices of USD \$0.87 to \$0.79 across 2017 to 2019, versus USD \$1.65 in 2016) while sustaining a healthy supply market for the long-term.

Link to UNICEF-SD pentavalent vaccine market and supply update, May 2017:

https://www.unicef.org/supply/files/Pentavalent_2_Supply_Update.pdf

Gavi engagement and market shaping implications

Pentavalent vaccine remains the cornerstone of the expanded program on immunization and Gavi engagement. It combines five different antigens in a single vaccine to protect against five diseases: diphtheria, tetanus and pertussis (DTP); hepatitis B (hepB); and *Haemophilus influenzae* type B (Hib).

The increase in hepB and Hib vaccination through the uptake of pentavalent routine immunization represents the most significant achievement to date of Gavi, the Vaccine Alliance. It is the first vaccine to have been introduced in all 73 Gavi countries; and across these countries it is projected that around 65-70 million children will be vaccinated each year from 2016 onwards. Gavi Alliance investments in pentavalent (and Hib- and hepB-containing) vaccination across 2011-2020 will have helped avert an estimated 5.6 million future deaths.

Now is a critical period for Gavi to focus efforts on improving coverage and equitable access, particularly in light of one of two of Gavi's vaccine goal indicators not being met (to reach 77% coverage of 3rd dose pentavalent by the end of 2015). Moreover, 2016 saw the first Gavi countries experience transition from Gavi support to be fully self-financing, and so support in accessing appropriate pricing for these countries will play an important role in sustaining their immunisation programmes. Pentavalent procurement represents Gavi's second largest vaccine expenditure (accounting for 17% of Gavi's total planned vaccine expenditures across 2016-2020) and even modest movements in prices will have a significant impact on Gavi and Gavi country financials.

Market overview

Global demand for DTP-containing combination vaccines is divided between products that contain acellular pertussis (aP) component, used by High-Income Countries (HICs) and most Upper Middle Income Countries (UMICs), or a whole-cell pertussis (wP) component, used by Gavi countries and most non-Gavi Lower Middle Income Countries (LMICs). The wP-based pentavalent market is estimated to represent 9% of global DTP-containing combination vaccine market value.

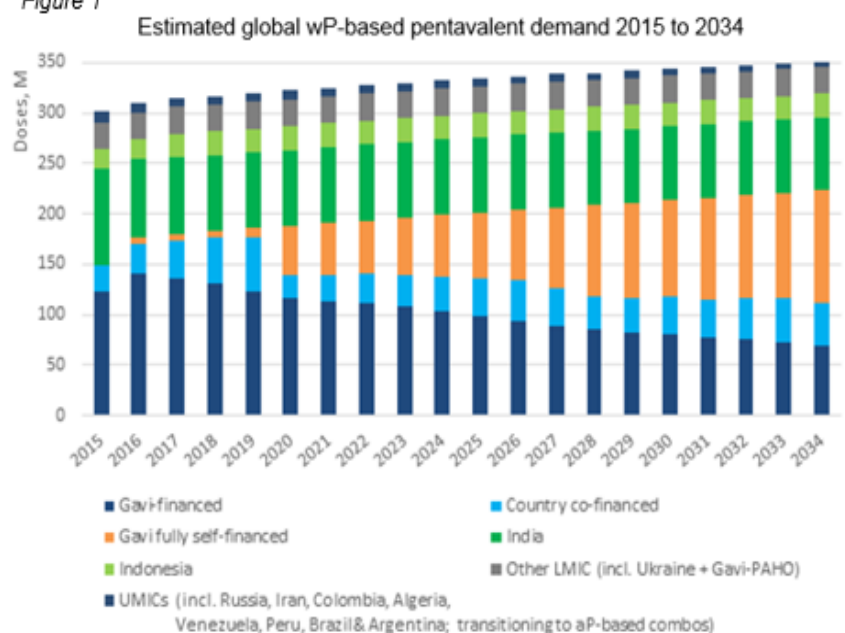
Gavi supports only wP-based pentavalent vaccines and WHO's Strategic Advisory Group of Experts (SAGE) recommends that countries using wP should continue using this vaccine. Considering SAGE recommendations and vaccine profiles and costs, Gavi believes that the current split of product preference will continue.

Since 2007, global demand for wP-based pentavalent vaccines has increased rapidly from <100M to ~300M doses per year, mainly due to Gavi-supported vaccine introductions. Demand is expected to stabilise from this point at ~300M doses per year.

Across 2016-20, Gavi-supported countries will continue to be the world's largest market for wP-based pentavalent vaccines,

however with India moving to self-procurement in 2016 and a significant wave of Gavi countries transitioning to full self-financing from 2020, the Gavi-funded share of the global market volume is

Figure 1



Source: Gavi market shaping analysis; based on Gavi Alliance Adjusted Demand Forecast Version 11

expected to decrease from approximately 80% in 2015 to 45% in 2020. Starting in 2016, the Government of India has become a strong force in the wP-based pentavalent market, with procurement through a national tender, for approximately 25% of global demand.

It has taken the wP-based pentavalent market around 14 years to mature to a state where supply capacity exceeds demand and true competition exists. It is estimated that global aggregate production capacity across manufacturers of prequalified wP-based pentavalent vaccines now likely exceeds 400M doses per year and is increasing. In 2016 there were seven manufacturers of prequalified liquid wP-based pentavalent vaccines; most offering 1-dose and 10-dose vial presentations. The 10-dose vial has become the preferred presentation by most Gavi countries, constituting over 70% of doses funded by Gavi, due to lower price per dose and lower cold chain capacity dimensions per dose. Liquid 1-dose vials make up the remaining market. Low multi-dose liquid presentations (e.g. 5-dose vials) are also prequalified and may play a role going forwards, but country demand is not well understood at present, and procurement costs would need to be commensurate with benefits.

The increase in competition, global market capacity, predictability of demand, economies of scale and demand for lower cost per dose 10-dose vials have all had contributed toward lowering of the pentavalent vaccine prices offered in UNICEF tenders for both Gavi and non-Gavi countries, as well as PAHO tenders. Tiered prices are converging and manufacturers have recently offered similar prices to Gavi and non-Gavi countries. The weighted average price (WAP) paid by Gavi decreased by almost 25% from 2012 to 2015, with a 2015 WAP of USD 1.68/dose or USD 5.04/course. 10-dose vials are significantly lower cost to Gavi, with a wastage-adjusted price 61% the cost of 1-dose vials in 2016. In addition to the market forces mentioned above, the decline in Gavi WAP across this period has been influenced by UNICEF long term agreements as well as market incentives by the Bill & Melinda Gates Foundation.

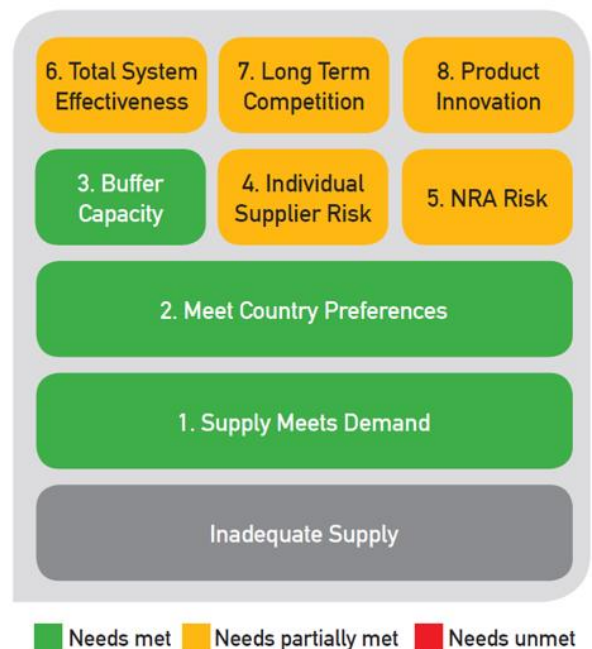
Healthy Market Analysis

The pentavalent market is currently in a moderately healthy state. The ‘Healthy Market Framework’ shown in Figure 2 summarises eight attributes of a healthy market, and it can be argued that the pentavalent market in 2016 meets or partially meets all of these attributes or market needs. Looking forward across the next three years (the 2017-19 UNICEF tender period), the five ‘partially met’ healthy market attributes will require careful consideration. It is anticipated that the needs of these attributes will be met, but with some trade-off against cost (through tender procurement choices). The market shaping considerations for each of these attributes are summarised as follow:

Individual supplier risk (partially met): The risk profile across individual pentavalent manufacturers is mixed. For some manufacturers, sourcing of bulk antigens is complex and changing, and production is not yet fully scaled, and so technical and regulatory risks need to be considered. This risk can be mitigated by ensuring supply is not concentrated amongst too few and/or higher risk suppliers.

NRA risk (partially met): About three quarters of awarded supply in 2016 depends on India’s NRA remaining fully functional. Non-Indian manufacturers are in the process of scaling up capacity of liquid multi-dose prequalified presentations and increasing the level of supply released from alternative NRAs would help improve risk associated with NRAs.

Figure 2: Healthy Markets Framework



Long-term competition (partially met): Maintaining at least a minimum number of suppliers will be critical to ensure natural competition over the long-term. A price premium could be required to maintain a minimum number of suppliers. The interdependencies between Gavi, India and the global market will also be important to consider, hence good dialogue with the Government of India will be important.

Product innovation (partially met): There is a need for the vial size of 1-dose presentations to be optimised while maintaining or minimising the overall cost to Gavi and Gavi countries. No other needs for innovation within the pentavalent market are currently identified for active engagement by the Alliance, but it is important that the wider product portfolios and pipelines of manufacturers are considered in procurement decisions, to ensure important innovations are not disincentivised.

Total systems effectiveness (partially met): There is a potential need and opportunity to optimise presentation mix across and within countries according to coverage needs and cost per dose; including establishing demand for low multi-dose presentations, and exploration of regional level presentation usage optimisation (i.e. country procurement of multiple presentations).

Supply and Procurement Objectives and Target Outcomes

Objective 1: Balance of supply and demand. Currently there is sufficient pentavalent supply available to meet global demand and a sufficient level of buffer capacity. There remain three main supply interruption risks: (1) downgrading the predominant national regulatory authority (NRA) from “functional” would put at risk up to three quarters of global wP-based supply; (2) supply failure related to production of either bulk-components or finished product; and (3) key suppliers exit the wP-based market judging it commercially unattractive. The following targets aim to mitigate these risks:

- Maintain a minimum level of buffer capacity among all Gavi suppliers (across presentations) to be able to compensate for a potential loss/interruption in supply.
- Maintain a diversified UNICEF/Gavi supplier base (with a maximum share of 10-dose and 1-dose presentation volumes sourced from single suppliers), whilst avoiding concentration of supply from ‘high risk’ manufacturers and from a single NRA.
- Maintain the functionality of all NRAs of the global supply base.

Objective 2: Cost of vaccine to Gavi and countries. It is important to harness the benefits of and maintain competition as the driver of price trends. There is also a need to see the wastage adjusted prices of 1- and 10-dose presentations become more closely aligned.

- Achieve significant weighted average price (WAP) reductions across the 2017-19 UNICEF tender period for liquid 1- and 10-dose presentations (versus the 2016 WAP); with a narrower spread of prices across manufacturers and closer alignment of wastage adjusted WAP across presentations.
- Maintain enough manufacturers to ensure long-term competitive dynamics.
- Understand and provide guidance on optimal usage and total systems effectiveness of different vaccine presentations, according to coverage and cost per dose.

Objective 3: Appropriate and innovative vaccines. Currently available vaccines are reliable in terms of quality and satisfy the medical impact requirements. However, there is an explicit need for optimised 1-dose presentations in terms of cold chain capacity per dose. The need for low multi-dose (i.e. 5-dose) presentations is currently not well understood.

- At least 1 manufacturer offers a low multi-dose presentation with a wastage-adjusted price equal to or less than equivalent 10-dose presentations.

- Encourage suppliers currently producing vials with a large cold chain capacity to reduce and optimise vial size
- New devices made available should be offered at a price commensurate with benefits.

Objective 4: Information. Information is a cross-cutting objective and enabler for all vaccines. Gavi and partners' ability to collaborate with the Government of India on maintaining a healthy global pentavalent market and better pricing will be important with India fully self-financing and self-procuring pentavalent vaccines. As other Gavi countries transition to self-financing, it will also be important for Gavi and partners to engage with these countries to ensure procurement opportunities are communicated.

- Establish dialogue with the Government of India and other Gavi countries transitioning to full self-financing, to explore opportunities to collaborate on interdependent aspects of supply and procurement strategies.
- Ensure any use of market incentives is transparently communicated to all manufacturers
- Ensure rapid and efficient transparency on price developments as a strategic enabler of competition.

Supporting Stakeholder Action Plan

A concerted action plan between Gavi Alliance market shaping stakeholders will ensure optimised coordination leading to the achievement of the above supply and procurement objectives and target outcomes.