



The GAVI Alliance White paper

Market shaping: ***strategic considerations for a healthy vaccine marketplace***

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Market shaping: strategic considerations for a healthy vaccine marketplace

GAVI's market shaping approach is underpinned by its public-private partnership model. Experience to date has yielded some valuable lessons that GAVI will build on over the coming years as it extends its involvement in introducing new and innovative vaccines in low and low-middle income countries.

This paper aims to highlight the market shaping considerations faced by GAVI in achieving its mission to save children's lives and improve people's health. The first section reviews the dynamics of the vaccines marketplace in which GAVI operates. The second section describes some of the past successes, challenges and lessons learnt. The final section outlines current considerations for promoting a healthy vaccine marketplace and for ensuring the long-term sustainability of low prices available to developing countries through GAVI.

GAVI and the global vaccine market

GAVI aims to have a lasting impact on the vaccine market to ensure a sustainable supply of affordable, safe and effective vaccines. The GAVI Alliance strategy for 2011-2015 has a new explicit goal to shape vaccine markets. Market shaping in this context is defined as supporting the efficient procurement of quality vaccines while ensuring sustainable supply at affordable prices to eligible countries. To understand how GAVI can be effective in this area, it is important to consider the role and relative importance of the Alliance in the global vaccine marketplace.

GAVI's share of the global vaccines market is relatively small in terms of value, but not in terms of volume. Total vaccine sales, estimated at US\$ 10 billion per year, have seen a high rate of global growth over the last decade, and this growth is set to continue. In 2010, it is estimated that vaccines purchased with GAVI funding accounted for 5% of the value of the global market, a relatively small but nevertheless meaningful amount as GAVI is one of the largest individual funders of vaccines. With new vaccines such as those protecting against rotavirus, human papilloma virus (HPV) and pneumococcal diseases, the trend in the global market is for rapid annual growth of 8-12%.¹ These innovative vaccines account for a high proportion of the total market, rapidly generating higher revenues than more established vaccines. GAVI's proportion of the global market value will thus decrease as revenue from the higher income segments and non-pediatric vaccines such as flu vaccines outweighs the incremental sales generated from GAVI funding. This contrasts with the effect that GAVI has on the overall marketplace in terms of volume, where it accounts for a significant share of the total volume. In any given market, GAVI can represent 30-70% of the market volume. Therefore, the signals and actions GAVI takes in those markets can have a material impact on the attractiveness of the market to manufacturers.

¹ McKinsey & Co, 2010



The picture differs when looking at the source of revenue for individual suppliers: the proportion of total sales due to GAVI-funded vaccines vary from single or low double-digit percentages for some companies to very significant amounts for others. Hence, the GAVI segment can be seen to be more valuable to some suppliers than to others, affecting its relative ability to influence overall market dynamics. GAVI's influence on individual manufacturers may also be somewhat higher than pure revenue numbers would suggest as economies of scale are critical in vaccine production; GAVI being one source of large volumes will help drive unit costs down for manufacturers on the totality of their production. Furthermore, emerging markets are an increasingly important area of growth for manufacturers: initial entry and traction through GAVI countries has the potential to help support a stronger and long term position in these markets.

GAVI has varying levels of influence in its key product markets. Underneath the global market figures lie further nuances around the strength of GAVI's ability to shape particular vaccine markets through the magnitude of its procurement. For pentavalent vaccines², GAVI represents a significant market share in terms of value, and accounts for 60% to 70% of doses worldwide. Demand is now in a relatively steady state, and GAVI's ability to pool demand will continue to translate into further price decreases. For rotavirus vaccines, GAVI currently has moderate market power through its market share as this vaccine is in the early stages of introduction in GAVI-eligible countries. If fully funded in coming years, there is strong potential for GAVI to increase its share of the global volumes from approximately 10% in 2011 to 50% in 2015 (also partially due to lower than expected uptake in high and upper-middle income countries).³ For pneumococcal vaccines, GAVI's demand makes up a relatively small portion of global market value. GAVI's market influence occurs through the Advance Market Commitment (AMC), which enables GAVI to secure a share of the market over the long-term at or under a defined ceiling for the tail price. There are currently two suppliers; additional manufacturers are due to enter the market in the medium term, and GAVI volumes are projected to increase to 40-60% of global demand volume by 2015.

The research and production of vaccines are governed by a number of economic factors. The production of vaccines is complex as it is based on numerous biological processes. This often leads to high manufacturing costs due to high direct costs associated with production inputs and processes, and high indirect costs due to the regulatory requirements for biological production facilities and their need to be constantly maintained and updated. Another challenge is the long period of time required to build and validate new manufacturing facilities, each facility often being dedicated to one specific vaccine. Therefore, significant investments are undertaken at risk, with little visibility of future demand for suppliers upon which to base production forecasts. Furthermore, the standards required by regulatory authorities for the necessary clinical trials to register a vaccine are changing to meet increasingly higher safety standards. For example, whereas combination vaccines made available as in the early 1990s could be licensed on a clinical database required by the authorities with approximately 5,000 subjects, recent rotavirus vaccines have clinical trials

² Containing whole-cell pertussis

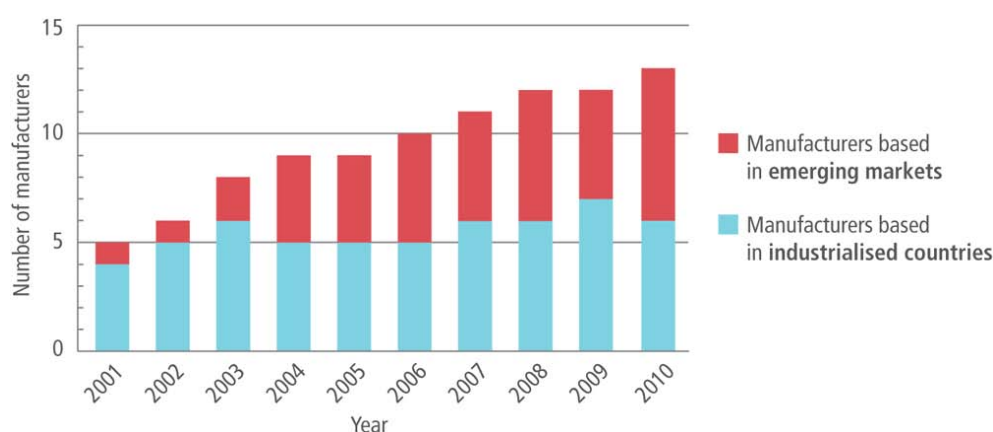
³ McKinsey & Co, 2010

involving more than 90,000 people.⁴ These and other factors can lead to uncertainty in supply and potentially higher costs of production and licensing. The relatively low number of vaccine suppliers, high barriers for market entry and a lack of reliability in demand not only negatively impact the potential for competition in the global vaccine market, but also lengthen the period of time before which substantial price decreases can be achieved.

GAVI progress to date and lessons learnt

GAVI's initial impact on the global vaccine market included changes to the production and supply base, price declines of some vaccines and in the application of tiered pricing enabling low-income countries to pay significantly less for the same vaccine than higher income countries. GAVI-funded vaccines now account for nearly half of the total value of UNICEF's vaccine procurement, where UNICEF itself represents 40% of the global volume of vaccine doses. These large volumes have helped promote the entry of vaccine manufacturers, particularly from emerging economies. Over the 2001-2010 period, GAVI increased its supply base from five manufacturers to thirteen in 2010, including seven developing country manufacturers (Figure 1).⁵ The hepatitis B, tetraivalent and pentavalent vaccines illustrate how these dynamics play out, with pneumococcal vaccines as an example of how innovative financing mechanisms can influence the market. However, the speed and magnitude of price declines for certain key vaccines and the number of new entrants to date initially fell short of expectations. In recent years, however, additional manufacturers have come into key vaccine markets with a favorable outlook for GAVI and GAVI-eligible countries.

Figure 1: Number of GAVI vaccine suppliers



Hepatitis B vaccine prices have dropped by 64% since 2000. Hepatitis B monovalent vaccine prices began declining in the 1990s as the technology became simpler and more efficient and attracted manufacturers from emerging economies. While there was a surplus supply available of hepatitis B vaccines, there was no funding available to buy the product. With the launch of GAVI in 2000, and the infusion of significant resources for hepatitis B

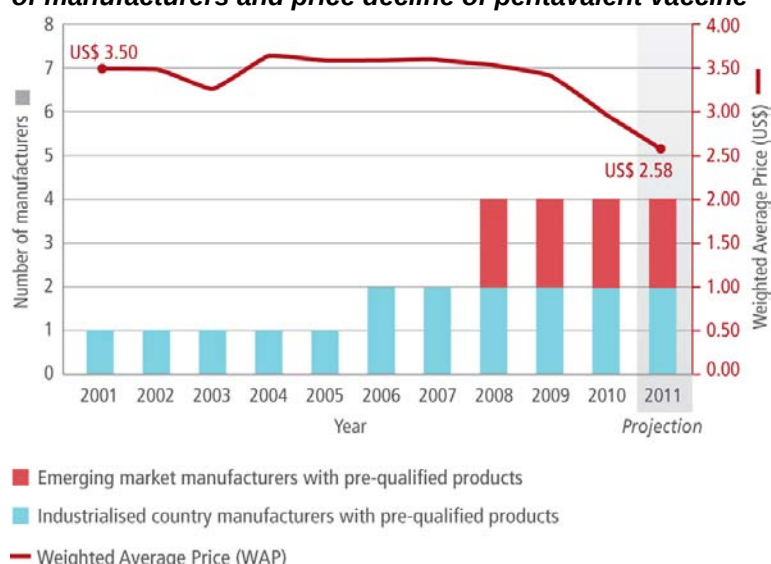
⁴ GlaxoSmithKline statement on new information relating to manufacture of Rotarix (rotavirus vaccine). Press release 2010. http://www.gsk.com/media/pressreleases/2010/2010_pressrelease_10029.htm

⁵ UNICEF Supply Division, 2011, Suppliers with pre-qualified product receiving UNICEF awards in tender processes for GAVI funded vaccines.

vaccine purchase, prices declined rapidly. A significant reduction of 68% has been achieved between 2000 and 2010 with the price declining from US\$ 0.56 to US\$ 0.18 per dose.⁶

Combination vaccine prices have declined, and momentum for pentavalent is now in place. With increasing demand in GAVI eligible countries, many new suppliers of tetravalent vaccines (DTP-hepB) were attracted to the market. The number of suppliers to which UNICEF awarded contracts increased from one to four, enabling price decline due to competition. From a peak of US\$ 1.26 in 2006, a strong drop of 45% was achieved, resulting in a price of US\$ 0.69 in 2010. For pentavalent vaccines (DTP-hepB-Hib), a more modest decline of 29% was achieved between 2007 and 2011 from US\$ 3.61 to US\$ 2.58 (Figure 2). Expectations of more rapid price declines have not been met as competition in the pentavalent vaccine market remained very limited until recently, and the volume of GAVI related demand has taken over seven years to become ‘significant’ (greater than 50 million doses per year). Between 2007 and 2010, three new manufacturers entered the market (with one being suspended due to manufacturing problems) and the volume of GAVI related demand has increased more than fourfold to over 90 million doses in 2010. Even with the increased level of competition, the existence of “micro markets” (e.g. differences between the products offered to countries) has reduced GAVI’s ability to leverage economies of scale in purchasing. With growth of predictable demand supported by GAVI funding and additional market entrants, further price decreases are projected in years ahead.

Figure 2: Number of manufacturers and price decline of pentavalent vaccine



The Advance Market Commitment (AMC) for pneumococcal vaccine accelerated the production of more appropriate and affordable vaccines. Although pneumococcal vaccines were already available in high income countries, both the product profile and the price made it unsuitable for developing countries. Through the launch of the pilot AMC, long-term contracts create incentives for producers to commit to large volumes of appropriate, high quality vaccines at lower unit prices. Through the two-stage price model of the AMC,

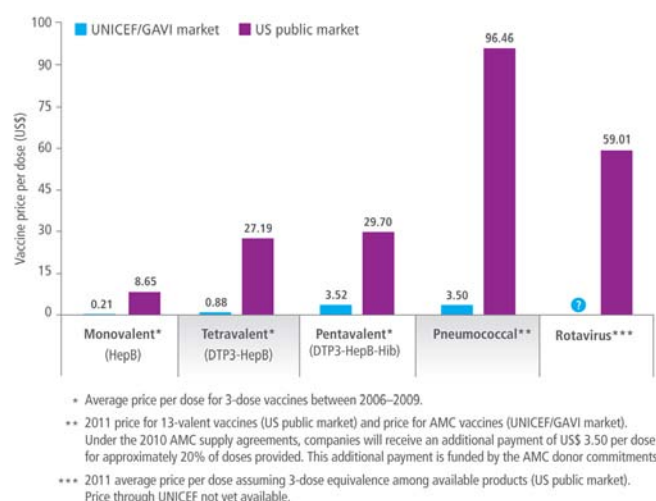
⁶ UNICEF Supply Division, 2011.

GAVI will pay a price of US\$ 7 per dose for the initial vaccines procured from each supplier and a price of US\$ 3.50 or lower for the majority of doses procured thereafter. As developing country manufacturers enter the pneumococcal vaccine market, the price is expected to decline further with increased competition.

A number of lessons can be taken building on the past ten years of GAVI's experience:⁷

- **Simply increasing demand does not necessarily lead to a price decline.** Other factors include whether manufacturers invest in increased capacity, changes in product presentation or technology. The timelines required for manufacturers' investment to yield economies of scale and optimise batch sizes, for new entrants to be incentivised to enter a market and for improving manufacturing processes imply that strategies targeting price decreases need to be planned over the long term.
- **The tiered pricing model has been successful in obtaining significantly reduced prices for GAVI-eligible countries compared to high-income countries (Figure 3).** Tiered pricing is relevant for vaccines against diseases that are prevalent globally. However, for this model to be sustainable, the vaccines on immunisation schedules need to be similar in high- and low-income countries, and manufacturers need to focus on optimising manufacturing processes. Indeed, there needs to be an overlap between vaccines used in middle- and high-income countries and in GAVI supported vaccines to ensure increases in potential volumes in the overall market size and therefore to scale benefits of vaccine investment. Looking forward, this model of a global marketplace for key vaccines may be at risk. Divergence of demands in pediatric vaccines may accelerate if, for example, there is more specialisation of products to suit the burden of disease and product presentation preferences specific to developing countries. This may result in some manufacturers, for instance those with limited product ranges or capacity, being forced to make a choice about the market segment to serve.

Figure 3: Tiered pricing: vaccine prices in different markets



⁷ CEPA LLP, Applied Strategies GAVI Second Evaluation Report, Sept 2010

- ***Price decreases may only be achievable in the mid- to long-term.*** One of the main reasons for this is the length of the process for new entrants to get to market. A supply strategy for a new vaccine would ideally start seven years or more before the introduction of the vaccine and be matched with a procurement strategy supportive of new entrants. Price considerations thus may need to be weighed against public health benefits and expectations must be set realistically, taking into account the short, medium and long-term market dynamics.
- ***Pooling demand through UNICEF procurement has been an effective mechanism to reduce price through increased demand certainty and larger order purchases.*** The creation of a strategic demand forecasting platform and the use of long-term commitments and tenders over several years have increased the certainty of demand, enabling manufacturers to plan production more effectively, which in turn reduces the risk of supply shortages. However, challenges remain in matching supplier awards and forecasted country uptake in the early years of a vaccine introduction. A better understanding of in-country programmatic issues needs to be matched with anticipating any supply issues so as to better balance the strategic aspiration of high and rapid country uptake with the more tactical process of vaccine procurement and implementation at country level.
- ***Market segmentation and the emergence of micro-markets can negatively affect GAVI's ability to leverage economies of scale in purchasing.*** For instance, while all of the pentavalent vaccine products purchased with GAVI funds have equivalent clinical profiles (in terms of efficacy, safety, tolerability), they are quite different in terms of formulation (liquid versus lyophilised products) and presentation (1, 2 and 10 dose vials). These differences can have programmatic and cost implications to countries. While innovation that optimises product formulation or presentations to better meet country needs is welcome, the proliferation of these micro-markets can limit the value GAVI can add through pooling demand. Regular interactions with countries to solicit feedback on product preferences and cost implications, early signaling to manufacturers about desired product characteristics, together with careful management of the product menu offered to countries, can mitigate the negative consequences of micro-markets.
- ***Although price is of critical importance, other supply factors also help achieve rapid and wide coverage in developing countries.*** These factors include: the reliability of supply; sourcing products of the highest quality possible; ensuring that the products are optimally formulated for the countries' population needs and for the local distribution systems in place; and facilitating the entry of new suppliers. The need to address these factors may sometimes dilute the magnitude or speed of price reductions but are critical for the long-term viability of supplying the right vaccines to developing countries.
- ***Risk-sharing models have been successful at incentivising manufacturers.*** For example, part of the pilot AMC implies that GAVI guarantees a certain level of demand for pneumococcal vaccines. Having the AMC take on some financial risk through a demand guarantee has enabled manufacturers to produce vaccines suitable to GAVI countries and price guarantees over long periods of time. Demand guarantees have also been used to provide certainty to new suppliers of pentavalent vaccines.



Strategic considerations for shaping vaccine markets

There are important market failures in the health sector and particularly in the vaccines market. Demand and supply dynamics do not work according to the theory of perfect competition. For example, incomplete information for both purchasers and producers creates a high level of uncertainty for production and purchasing decisions, which results in a long lag time for adjustments in supply to meet increases in demand. GAVI and its partners can play a strategic role to help address some of these market failures by promoting some of the key characteristics of a “healthy” competitive market. The aim is to ensure a sustainable quantity of appropriate quality vaccines is available through a diverse supplier base at an affordable price for GAVI and countries. This entails the following steps:

Use targeted methods to intensify competition between suppliers. Where the demand for a product is relatively stable, the focus should be on the procurement tools used to ensure a high level of competition between manufacturers. However, for relatively new products where there is a very limited number of suppliers, GAVI may need a strategy specific to each manufacturer, with emphasis placed on understanding capacity levels and future expansion plans so as to leverage economies of scale. Factors such as the lifecycle and cost structure of the product will help inform a choice of strategies, for example between splitting demand between several manufacturers, or concentrating volumes on a few. A strong drive to increase competition should nevertheless not be at odds with fostering an open and collaborative approach with manufacturers, with frequent interactions in order to ensure that demand and supply can be better matched.

Encourage new quality suppliers to enter the market. The success of introducing current vaccines will motivate R&D for new appropriate vaccines. Therefore, new entrants have a role to play for both existing vaccines to help stimulate current competition and for new vaccines to contribute to developing technological platforms. More established pediatric vaccines (e.g. oral polio vaccine, Bacillus Calmette-Guerin or BCG, diphtheria tetanus and pertussis or DTP, measles and tetanus toxoid) account for a relatively small and declining proportion of the total vaccine market value. Therefore, the opportunity for achieving overall cost savings through low cost production with new entrants is smaller compared to the benefit of new entrants in more innovative, but likely more expensive pediatric vaccines.⁸ In other words, due to the order of magnitude difference on price between more established and innovative vaccines, cost savings on the former would be rapidly wiped out in the face of a small price fluctuation on the latter. Furthermore, new entrants can also have an important role to help address specific production bottlenecks to ease overall supply. Bulk production for many vaccines is a major cost driver where a small number of manufacturers may be appropriate in order to achieve economies of scale, and this could be complemented by a larger number of producers to complete the downstream steps. Finally, alongside encouraging entrants, it will be equally important to support existing manufacturers if their participation in the market is critical to ensure supply security and sufficiency.

⁸ Mercer Management Consulting, Lessons Learned: New Procurement Strategies – Report to the GAVI Board, June 2002



Increase the bargaining power of purchasers. Described in the lessons learnt section of this paper, pooling procurement and flexibility in the nature and duration of purchase commitments have both been key factors in driving towards affordable and sustainable prices. The procurement process - competitive offers, decision-making - should remain confidential, but there should be transparency in sharing how the process works and in the data used leading up to procurement. This would enhance both the credibility and likely availability of capacity. This also needs to be tied to transparency in the country application process so as to safeguard against inappropriate marketing activity. Several forms of supplier engagement (multilateral or bilateral) may support manufacturer-specific engagement strategies, especially in the case of a very limited number of suppliers for one product, but this should be done within GAVI's vaccine supply and procurement objectives.⁹ Furthermore, the use of instruments such as the advanced purchase commitments, longer term awards and other procurement strategies can also make existing suppliers work harder to reduce costs through the award of substantial volumes over a long period of time, enabling manufacturers to forgo some level of margin in exchange for certainty of demand.

Support market shaping efforts with a strong advocacy voice. There is an important role for all Alliance partners in ensuring that the visibility and importance of market shaping remains high. Developing countries, civil society organisations (CSOs), donors and other actors of the wider public health community also have responsibility in ensuring their voices are heard. First, this involves advocacy so that the value of vaccination is widely understood and recognised. Second, the long term reliability of funding that the GAVI model offers to support both country and manufacturer confidence to plan for sustained vaccine uptake requires continual communication. Third, all involved should ensure there is transparency of awarded prices and to support the effort to lower prices, whilst allowing and being supportive of some of the non-price trade-offs described previously to ensure the long-term sustainability of the GAVI vaccine market.

Match supply with “true” demand. One of GAVI's core operating principles is “supporting national priorities, integrated delivery, budget processes and national decision-making.” To this end, GAVI provides countries with a choice of whether to adopt a particular vaccine by antigen class within the GAVI portfolio and when to adopt. This relies on a number of elements being in place. First, there needs to be clarity on GAVI's programmatic goals. These need to be communicated to both countries and manufacturers in a timely manner to inform their priority setting. Second, GAVI and its partners need to identify and use the right levers to help inform decision-making in recipient countries, for example, by ensuring scientific evidence (e.g. burden of disease studies) translates into appropriate recommendations on vaccine introduction. Third, countries are key in signalling their product preferences. This has important implications as presentation effects can have a multiple-fold impact on vaccine dose cost.¹⁰ A full cost/benefit analysis, including procurement spend, speed of introduction and the capacity to deliver any in-country programme savings are required for informing country product selections and overall portfolio management.

⁹ Currently under revision for presentation to the Board in November 2011.

¹⁰ Mercer Management Consulting, Lessons Learned: New Procurement Strategies – Report to the GAVI Board, June 2002



Begin information flows early. Due to the long lead times for product development and programmatic implementation, signalling the need for a specific vaccine by GAVI to suppliers should take place many years ahead of a new vaccine introduction. Strategic demand forecasts with a forward view of five to seven years will then lead to more integrated supply and financing strategies in the three to five year period prior to introduction. Commitments from countries and suppliers in the year or two leading up to vaccine introduction should enable successful implementation. These forward views are reliant on a strong base of information, which needs to be at a vaccine-specific level. These views will also help understand the technical challenges associated with each vaccine and realistic timelines to meeting those challenges. Furthermore, as the vaccine market is global in nature, and since allocation of supply can be restrained in the early years of a vaccine launch, it is critical to have vaccine forecasts that include other countries that self procure.¹¹

Deliver long-term sustainability. The final deliverable of market shaping efforts should be to achieve a long-term price that countries can eventually finance themselves in a sustainable manner once the market for a specific product is stable and the countries' level of income permits. The meaning of affordability remains to some degree subjective, as beyond absolute levels of wealth lies the question of individual countries' prioritisation of funding for health and the difficult allocation choices they face. Funding decisions also depend in part on the value they place on vaccination and the political will to drive vaccination uptake. These discussions are also critical to ensure that GAVI's market shaping efforts tie in with what countries deem to be an affordable price, and thus result in countries achieving self-sufficiency in immunisation financing.

Conclusions

As a significant player in the vaccine market, GAVI has an important role to play in actively shaping the market to fulfill its mission of increased availability of vaccines in developing countries. To enable GAVI to deliver on its market shaping strategy, GAVI must give due consideration to the economic realities that shape the vaccine market as price and non-price factors are weighed. A more efficient match of supply with demand needs to take place through more intense and targeted competition, the entrance of new suppliers, an increased bargaining power for purchasers, strong advocacy support to immunisation and stronger health systems to support vaccine uptake. A successful market shaping strategy will involve taking a short-, medium- and long-term view of: balancing supply to meet the totality of GAVI's demand in a way that ensures uninterrupted supply to GAVI countries; minimising the cost per course to both GAVI and countries; ensuring that new and appropriate vaccines of high quality are purchased; and communicating in a timely and transparent manner on the supply and demand dynamics. These factors need to be appropriately tailored to each vaccine to reflect its stage in the product life cycle, breadth of suppliers, complexity of manufacture and relevance to developed and developing country disease burdens. Further progress can then be made to address the market failures inherent to the vaccine market, so that more vaccines can be delivered in a sustainable manner and at a price that is ultimately affordable to developing countries.

¹¹ Boston Consulting Group, Global Vaccine Supply: The Changing Role of Suppliers, 16th GAVI Board, July 2005



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