

Immunization Financing Analysis

A look across 50 GAVI countries

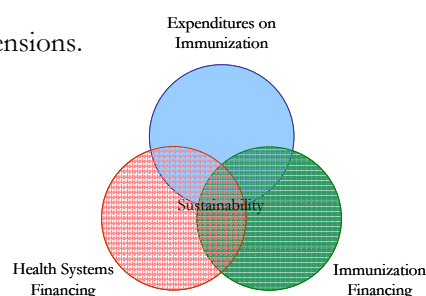
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Introduction

This paper captures the experience of the GAVI Phase I model of immunization financing through the data collected with the financial sustainability plan (FSP) development in 50 eligible countries. In particular, the analysis will broadly review the experience of introducing Hepatitis B (HepB) and Haemophilus influenzae type B (Hib) vaccines in the poorest countries, and explore how financing for immunization has changed since GAVI resources have been made available.

This analysis will present findings according to three dimensions.

- The expenditure dimension will review past and future trends and answer the questions of how much is being spent on immunization in poor countries; what is the composition of this spending and their source of variability; and what are the trends with future efforts to scale up with new vaccines.
- The financing dimensions will review past and future trends in immunization financing; their sources; how these have changed with new investments through GAVI; and what are expected financing shortfalls to scale up immunization.
- The health systems dimension will look at how immunization expenditures and financing fit within the broader health macroeconomics context. The questions of immunization shared health systems costs (such as human resources) will be looked at, along with what immunization represents in overall financing for the health sector.



Understanding the financial sustainability of introducing HepB and Hib vaccine in national immunization schedules of poor countries requires looking at common factors that intersect with the three dimensions. Within the spectrum of factors, three will be highlighted and related to vaccine prices, the ability of government to finance vaccines and the issues of fiscal space creation for immunization and aid volatility.

Methodology

This analysis is based on the data from 50 Phase I eligible countries¹ as reported in the financial sustainability plans submitted to GAVI. More specifically, the data provided through the FSP costing, financing and gap analysis tool² were extracted into an immunization financing database. The data extracted may be different from those contained in the original FSP materials submitted to GAVI due to a process of data harmonization, cleaning, and updating³.

As with previous analysis of financial sustainability plans, the costing methodology for presenting the data is the same⁴. Unless otherwise specified, all dollar value data correspond to routine immunization programme specific spending. In other words, shared health systems costs and

¹ There were 50 countries used: Afghanistan, Albania, Armenia, Azerbaijan, Benin, Bhutan, Bosnia and Herzegovina, Burkina Faso, Burundi, Cambodia, Cameroon, Comoros, Côte d'Ivoire, Democratic People's Republic of Korea, Democratic Republic of the Congo, Eritrea, Ethiopia, Gambia, Georgia, Ghana, Guinea, Guyana, Haiti, Kenya, Kyrgyzstan, Lao People's Democratic Republic, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Republic of Moldova, Rwanda, Senegal, Sierra Leone, Sri Lanka, Sudan, Tajikistan, Uganda, Ukraine, United Republic of Tanzania, Uzbekistan, Viet Nam, Yemen, Zambia, Zimbabwe

² Available on http://www.who.int/immunization_financing/tools/annexes/en/index.html

³ For more information, consult http://www.who.int/immunization_financing/data/en/

⁴ Lydon P, Financial Sustainability Plan Analysis: A look across 22 GAVI countries, WHO-IVB Mimeograph (2004).

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those for campaigns have been excluded from the figures reported in order to improve cross-country, and cross-temporal comparisons.

The data is presented for three periods - a baseline year without GAVI support, a year with GAVI and a period between 2005-2010⁵. In order to compare across a wide range of immunization and non-immunization data, most indicators used the same denominator (infants under 1)⁶. The measures of central tendency favoured in this report are population weighted averages. An optimistic funding scenario was chosen for this analysis by including both committed (secured) and non committed (probable) future funds for immunization.

Rather than presenting country specific information which would be difficult to synthesis in a short report, most of the analysis is presented using relevant groupings of countries. For income levels and development status, the GAVI grouping of countries was used⁷. For geographic differences, countries were group by WHO regions⁸. Other groupings were made by vaccines offered by GAVI. Namely HepB and Hib.

Limitations

Important limitations and caveats need to be acknowledged from the outset. Firstly, the data used captures all the assumptions and limitations of the financial sustainability plans. This relates to both the limitations of the guidelines and tools themselves, but the quality of the data reported which can vary from country to country. However, the data from all 50 countries were kept in the analysis since the aggregate findings and trends are not affected in any significant way by excluding countries.

Because of uncertainties relating to future needs and funding availability, information on past expenditures and financing is likely to be more reliable than the information about future trends. Moreover, for some countries, the data may be old - there is a mix of countries that developed an FSP in the year 2002. Others finalized the plans in 2005 with more recent data.

Likewise, future projections of resource requirements and funding gaps could sufferer from under or overestimation for several reasons. The projection of new vaccines may no longer capture revised programme objectives as these are based on the needs for yellow-fever, Hepatitis B and Haemophilus Influenza type B (Hib) vaccines only. In addition, projections were based on holding constant the vaccine prices available at the time when new intelligence indicates that vaccine prices will drop in the future. Therefore, future estimates of resource requirements and funding gaps are likely to be overstated. This is compounded by the fact that at the time of FSP development, new sources of financing from GAVI Phase II and the IFFIm were not known of.

Lastly, this analysis is unable to account for the impact of financial sustainability strategies that countries have outlined in their plans, and how these might change the future financing landscape.

Finally, interpretation of the findings in this analysis should be made with some understanding of the composition of the sample used. While the set of 50 countries used have in common that

⁵ The baseline corresponds to the most recent year for which data on expenditures and financing are available before any GAVI Fund support has been received by the country (for new vaccines, immunization services strengthening and injection safety). The GAVI year corresponds to the first few year after GAVI Fund support is received with at least a full year of implementation. For the most part, baseline years for countries will be either 2001 or 2002 whereas the year with GAVI will likely be 2003 or 2004 depending on when a country developed its financial sustainability plan.

⁶ This contrasts to previous use of DTP3 immunized children as the preferred denominator. This implies that cost per infant values are significantly lower that those presented using DTP3 immunized children.

⁷ GAVI has grouped countries according to their level of income and development. The poorest group of countries are those that are both classified as least developed by the UN and have GNI per capita below \$1,000. The intermediate group of countries are those that are not classified as least developed by the UN but have a GNI per capita below \$1,000. The least poor group of countries are those that are not classified as least developed by the UN but have a GNI per capita that moved above the \$1,000 mark by 2005. Finally, the fragile states regroup countries that are in conflict or post conflict situation.

⁸ The regional groups are the following : AFR (for Africa), AMR (for the Americas), EMR (for eastern Mediterranean), EUR (for Europe), SEAR (for South East Asia) and WPR (for the West Pacific). <http://www.who.int/about/en/>.

they rank among the poorest countries with per capita income levels under \$1,000 (in 2000), the regional representation of the countries is heavily biased towards Africa - more than half of the countries are in the AFR. Moreover, almost 65% of the birth cohort of children is located in the AFR. Based on the GAVI grouping of countries, the poorest countries constitute the majority of the sample (50%).

Table 1: Sample characteristics and country groupings

Grouping	Countries	Infants
	No.	No. / (% Total)
Total	50 (100%)	25,510,482
Regional Grouping		
AFR	27 (54%)	64%
AMR	2 (4%)	1%
EMR	3 (6%)	11%
EUR	10 (20%)	6%
SEAR	5 (10%)	10%
WPR	3 (6%)	8%
GAVI Grouping		
Fragile	8 (16%)	23%
Poorest	25 (50%)	53%
Intermediate	8 (16%)	18%
Least Poor	9 (18%)	6%

The main caveat when interpreting the findings is that representation of countries in the AMR, EMR and WPR is fairly limited. Yet, this is a reflection of the geographic coverage of GAVI Phase I eligible countries which mainly capture the countries located in the AFR region (36 of the 75).

It should be highlighted that the representation of countries in certain groupings used in this analysis is not static over time. Immunization schedules change across the 3 periods considered and so do the countries that make up the groups using these criteria.

Table 2: Changes in the composition of country groupings across the 3 periods

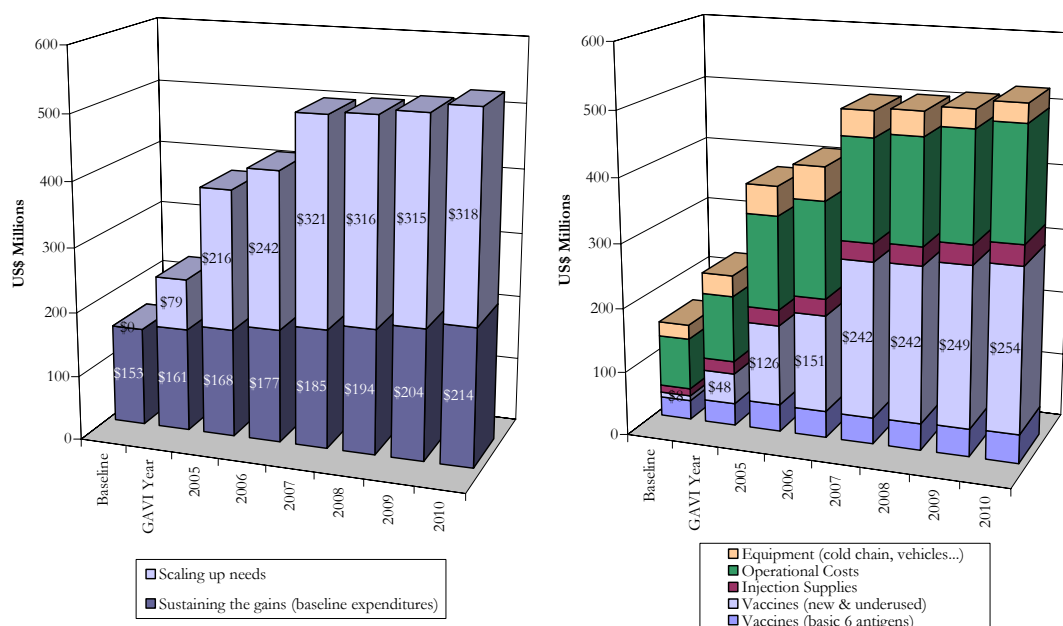
No. Countries	Baseline	Year with GAVI	2005-2010 Period
	No.	No.	No.
New Vaccine Grouping			
HepB (mono)	20	20	18
DTP-HepB	9	9	8
DPT-HepB+Hib	8	8	19

I - Immunization Expenditures

Immunization expenditures are on the rise...

In the past years, expenditures for routine immunization have seen an upward trend and are projected to increase in the future. Whereas total baseline expenditures for the 50 countries totalled \$153 million, by 2010 the needs to both sustain the gains and scale up will exceed \$500 million. In other words, resource requirements to scale up immunization during 2005-2010 need to increase beyond baseline investments in immunization by at least a factor of 3 - or approximately a doubling of current investment that include GAVI support.

Fig 1: Immunization expenditures and future resource requirement trends



On a per infant basis, baseline expenditures averaged \$6.0. These increased to \$9.2 in the year with GAVI and are projected to reach an average of \$17.5 per infant during the 2005-2010 period in order to scale up of immunization coverage, including with new vaccines.

While the good news is that immunization expenditures are rising, the challenge will be to ensure that these find their equivalent in secured funding so that reaching programme goals and objectives in the future will not be compromised.

Cost profile of immunization is changing...

Looking at the composition of expenditures gives some insight as to what cost categories are driving their rise. It is not surprising to see that new vaccines account for the majority of the increase. Combined with related injection equipment, vaccines are now becoming the single largest cost driver of routine delivery systems. Their importance in overall expenditures will increase in the future to account for at least 50% of overall resource requirements - in the baseline, vaccines accounted for 20% of overall expenditures on routine immunization⁹.

⁹ Over time there is a gradual scaling up of new vaccines. An analysis of coverage showed that countries took on average 2.5 years before coverage levels for combination HepB and Hib vaccines reached the DTP3 levels. This suggests that most countries opted to phase in the vaccines and supports a 3 year rule of coverage catch up following introduction.

This contrasts to the baseline cost profile where the largest expenditure item were the operational costs - the bulk of which are the cost of human resources. Whereas personnel costs have traditionally been the single most important cost driver of programmes, by the time countries fully scale up with Hepatitis B and Hib vaccines, the cost profile will change and this will have implication in terms of mobilizing greater annual funding to guarantee the provision of all vaccines and injection materials to countries.

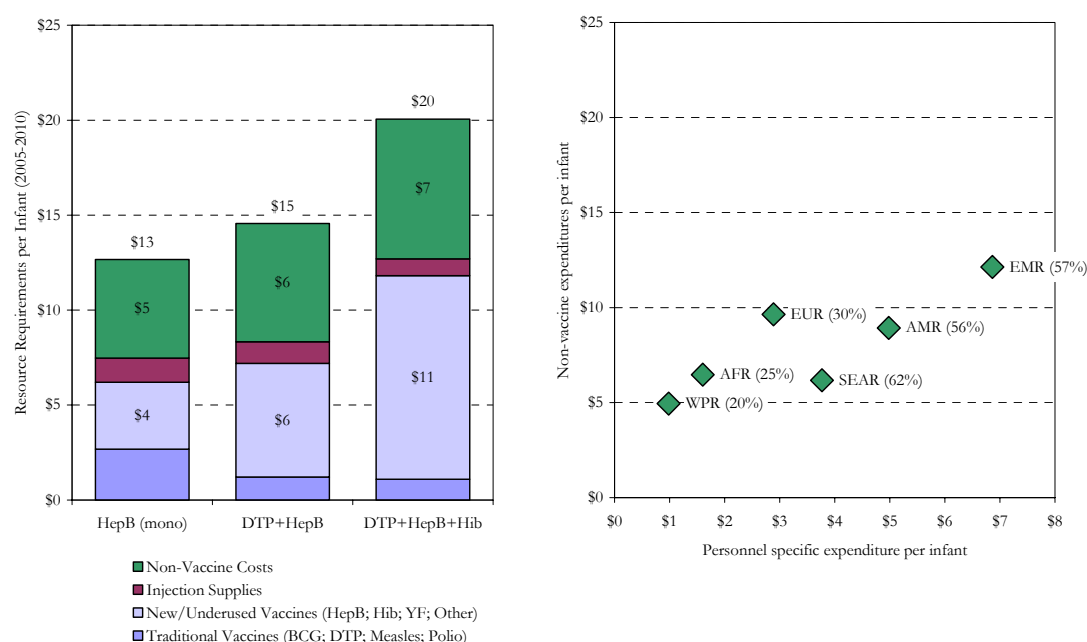
It is interesting to note that initial scale-up years will require greater upfront investments in capital equipment. More specifically, there are indications that most countries will require additional vehicles and cold chain equipment to reach programme objectives and targets.

The cost profile of immunization can vary....

The description of the overall trends is different from one country to the next, particularly when moving away from looking at aggregate expenditure flows. The reason being that immunization schedules are country specific, as are labour costs.

Closer inspection of unit expenditures per infant across regions shows positive relationships between non-vaccine and personnel expenditures. Personnel in AMR, EMR, and SEAR account for more the 55% of overall non-vaccine expenditures. This compares to 25% or less in WPR and AFR where labour costs are cheaper. While this confirms the widely held belief that human resources are an important cost driver, there is important variability across regions due to differences in wage bills, human resource constraints and levels of integration of immunization in the health system¹⁰.

Fig 2: Variation in expenditures by immunization schedule and human resource costs



The variability in cost profiles for immunization comes out strongly when grouping countries according to their vaccination schedules. The average cost per infant in countries that expanded their immunization programme beyond the traditional vaccines¹¹ to include Hep B monovalent is approximately \$13. This contrast against the \$20 per infant in countries that introduced DTP+HepB+Hib vaccine. The relative share of new vaccines in the total can range from \$4 per infant in countries with monovalent HepB vaccine, to \$11 per infant in the group of countries that introduced DTP+HepB+Hib. Thus, at country level, the cost profiles will vary and the

¹⁰ In other words, how much of the human resources are shared with the health system.

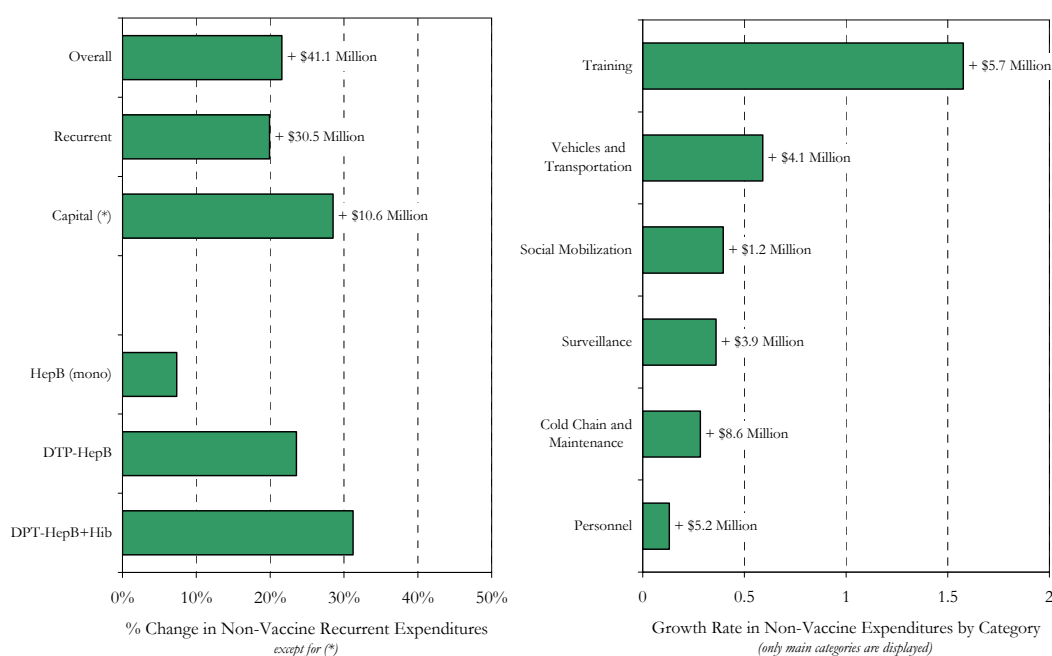
¹¹ The EPI6 vaccines, also referred to as the traditional vaccines include BCG, DTP, OPV and Measles.

requirements for vaccines can be expected to increase by a factor of 3 to 4 if both HepB and Hib containing vaccines are added to national immunization schedules.

It should be noted that the cost implication of new vaccines will go beyond the vaccine alone. Additional operational expenditures are needed for the training of health workers to administer new antigens (including the use of auto-disable injection equipment), and to increase social mobilization activities. Combined with the added needs of transportation and cold chain, these non-vaccine costs have a tendency to rise in the immediate years following introduction.

Overall, non-vaccine recurrent expenditures have risen by 22% and are mainly attributable to increases in cold chain equipment and maintenance, training, additional human resources, vehicles, transportation, and surveillance activities. Moreover, it appears as though the average increase in non-vaccine recurrent expenditures is lowest in countries that introduced monovalent HepB vaccine as compared to the average in the group of countries that expanded their schedules with DTP+HepB+Hib.

Fig 3: Variation in non-vaccine expenditure following new vaccine introduction¹²



It is difficult to reach any firm conclusion on these trends without knowing what increases would have occurred in the absence of new vaccines. What is clear however, is that the immunization services strengthening (ISS) support from GAVI has contributed to their rise, along with the \$100,000 new vaccine introduction cash grants. On average, ISS funds can account for 11% of overall non-vaccine expenditures, and in some countries represented more than 30%.

Other important sources of variability

Whereas the variability of expenditure flows are largely influenced by differences in immunization schedules and in human resource costs, the data shows evidence of further variability in unit costs (cost per infant) linked to economic development, demographics, performance and delivery strategies.

By grouping countries according to population size, there is evidence to suggest that expenditures per infant in smaller countries exceed that of larger ones, and for similar levels of immunization

¹² This is based on the percent change in non-vaccine expenditures between the baseline and the year with GAVI.

coverage. In the 18 countries with birth cohorts under 250,000 infants, the expenditures per infant are about double those of countries with at least twice as many children to immunize. This would suggest that economies of scale occur in large countries that can achieve lower unit costs. In other words, it is easier than in smaller countries to spread many of the fixed costs over a larger number of children to vaccinate.

Table 3: Variation in expenditure per infant by population size

Grouping		Baseline Coverage	Routine Baseline Expenditure	Maximum	Resource Requirements 2005-2010
No. Infants	No. Countries	% DTP3	\$ per infant	\$ per infant	\$ per infant
< 250,000	18	71%	\$10.3	\$43.0	\$33.4
> 250,001 - < 500,000	14	72%	\$6.9	\$16.6	\$25.5
> 500,001 - < 1,000,000	18	64%	\$5.4	\$12.9	\$18.7

Other analysis of variability suggests that expenditures on immunization will tend to have a positive relationship with levels of development, income and coverage¹³. One way of illustrating this relationship is by grouping countries according to the GAVI classification which combines both dimensions of development status and income levels. As countries develop and their levels of income rise, so do the expenditures on immunization. Fragile states spend on average \$5 per infant compared to \$10 in the least poor group of countries. What this money buys is also different since coverage in fragile states is below 50% and exceeds 85% in the least poor group. It is hardly surprising to find that the scale up needs for 2005-2010 are higher in fragile states than in the least poor countries.

Table 4: Variation in expenditures by development, income and coverage status

Grouping and no. countries		Baseline Coverage	Routine Baseline Expenditure	Scale Up Needs 2005-2010	Expenditures on Outreach Services	Expenditures on Campaigns
		% DTP3	\$ per infant	Factor of increase in cost ¹⁴	% Routine expenditure	% Total immunization expenditures
Average	50	66%	\$6.0	3.1	30%	36%
Min	50	31%	\$2.5	1.0	0%	0%
Max	50	99%	\$43.0	5.8	83%	82%
GAVI Grouping						
Fragile States	5	47%	\$5.4	3.0	40%	51%
Poorest	27	65%	\$5.8	2.9	34%	35%
Intermediate	8	84%	\$6.3	2.8	20%	25%
Least Poor	7	86%	\$10.1	2.7	21%	17%

Lastly, immunization expenditures will vary depending on the types of delivery strategies used to vaccinate children. As countries become more developed and their coverage improves, the

¹³ More in-depth cost coverage relation analysis has revealed an interesting pattern in the 50 countries. Preliminary results confirms a positive relationship between cost and coverage and that the relationship follow a non-linear functional form with various inflection points at different levels of coverage reflecting changes in economies and diseconomies of scale. This would suggest that while unit costs per child may go up and down with increasing coverage, the overall trend is for unit cost to increase with coverage. And at faster rates as coverage rates tend towards full coverage.

¹⁴ From baseline expenditures.

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reliance on outreach services tends to drop. In fragile states, 40% of expenditures are used to support outreach delivery services. This compared to 21% in the least poor countries which can rely less on a supply sided delivery strategy to demand driven immunization service through fix site vaccinations.

Likewise, many countries rely on supplemental immunization activities to reach more children, and respond to epidemiological needs or eradication initiatives. While mass campaigns, national immunization days, mop-up activities and outbreak responses are becoming an integral part of national immunization programmes, the amounts being spent to support these are important, and can sometimes exceed the resources provided for routine delivery systems.

Overall, for every \$3 spend on immunization, at least \$1 is for supplemental immunization activities beyond routine delivery services. The reliance on campaign activities however, drops from 51% of all immunization expenditures in fragile states to 17% of total expenditures in the least poor group of countries. Given the weak systems, important resources for immunization will countries to be tied up in supplemental immunization activities in the fragile states and poorest countries.

Although one third of all spending on immunization is for campaigns, the trend in the future is showing a net reduction in campaign activities over the 2005-2010 period.

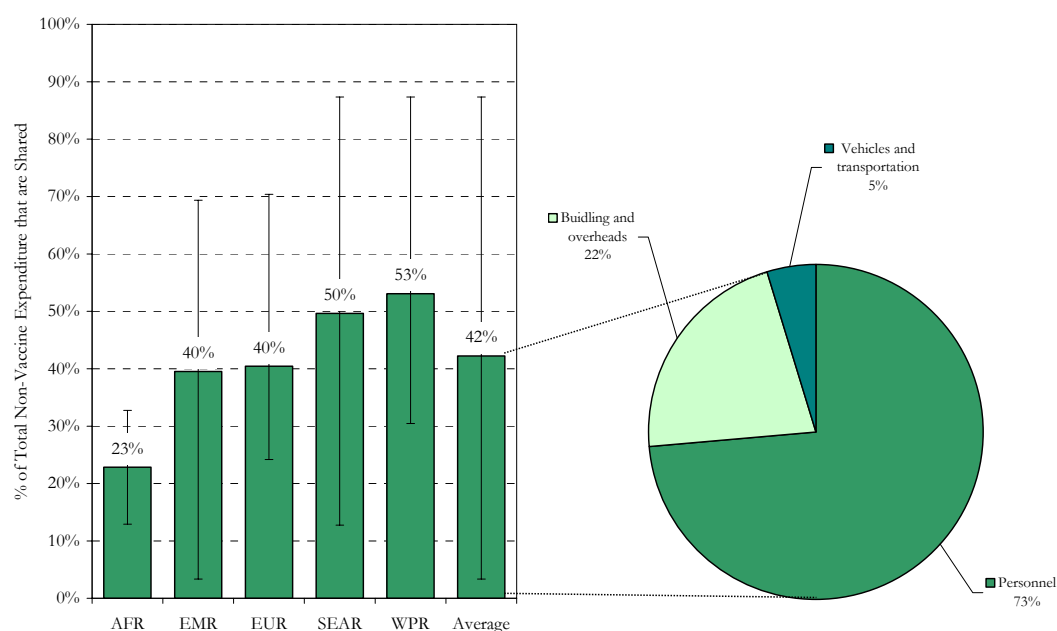
II - Immunization and the Health Systems

Shared health systems costs are important ...

Immunization and the health system interface at many levels. On the expenditure side, it is often the case that immunization service delivery relies on certain inputs that are shared across many other health interventions. At subnational levels human resources, health centres and transportation are not immunization specific, but often integrated with the rest of a countries' health delivery system. These indirect costs are critical for the immunization systems ability to deliver vaccines to children and were not included in the expenditure figures reported in the previous section. If considered, these shared expenditures on routine immunization would represent approximately 20% of total expenditures (both specific and shared).

A better indication of the relative proportion of shared inputs for immunization requires looking at their importance in non-vaccine expenditures¹⁵. In this light, these can account for 42% of total non-vaccine expenditures, and are essentially composed shared health worker wages (73%); building and overhead costs (22%), and shared vehicles and transportation (5%).

Fig 4: Shared health systems costs by region and their composition



Important variability in shared costs is seen across regions and indicates the varying degree of integration of immunization with the health system. Likewise, these show variation according to development status and income levels. In fragile states where health systems are weak, shared costs will represent 18% of total non-vaccine expenditures. In the least poorest countries where health systems are much stronger and health interventions are more integrated, shared costs represent on average, 57% of all non-vaccine expenditures on immunization.

The interplay of immunization with the health systems on the expenditure side is a complex one. The data highlights that these shared costs are important and contribute significantly to an immunization programmes ability to achieve target coverage levels. It also highlights indirect

¹⁵ By definition, there are no shared vaccine costs.

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immunization financing that are covered by the budgets from Ministries of Health which are not always reflected in government financing for immunization.

Immunization in overall health financing ...

The ability of national governments to finance immunization is linked to the availability of overall financing for the health sector.

On average, per capita government expenditures on health were \$7.8 in the baseline year. These are projected to rise to \$13.6 over the course of 2005-2010. These can range from \$3.1 per capita in fragile states to \$19.2 in the least poor countries. Important regional variations are worth noting. In AFR, government health expenditures equal \$131 per infant compared to \$1,343 per infant in EUR.

At the same time, the composition of government health expenditures differs. In the fragile states and poorest countries, 30% to 50% of government health financing is external donor funded. Conversely, in the intermediate and least poor countries there is less dependence on outside aid with 10% or less, of government health financing being provided from external sources. In AFR, 56% of government health expenditures is external donor financed.

Table 5: Health financing and immunization¹⁶

Grouping		Baseline GHE	GHE 2005-2010 (Proj.)	Child Health ODA	Externally Funded HE	Baseline Routine Expenditure	Resource Requirements 2005-2010
Grouping	No.	\$ per capita	\$ per capita	\$ per infant	% GHE	% GHE	%GHE
Average	50	\$7.8	\$13.6	\$34.2	22.2%	2.4%	3.7%
AFR	27	\$5.0	\$7.3	\$41.2	45%	3.6%	8.6%
GAVI Grouping							
Fragile	5	\$3.1	\$7.9	\$27.7	27.9%	6.8%	7.3%
Poorest	27	\$5.5	\$7.4	\$39.4	49.5%	4.0%	7.5%
Intermediate	8	\$9.8	\$13.4	\$29.6	10.2%	1.5%	2.9%
Least Poor	7	\$19.2	\$49.8	\$25.7	6.1%	0.8%	0.8%
New Vaccine							
HepB (mono)	-*	\$11.3	\$22.8	\$24.2	8.1%	1.5%	1.1%
DTP-HepB	-*	\$8.4	\$7.6	\$42.8	52.8%	3.4%	6.0%
DPT-HepB+Hib	-*	\$5.4	\$7.7	\$53.1	50.9%	3.1%	9.2%

* See Table 2

Expanding fiscal space to finance the ever increasing costs of scaling up immunization will be a great challenge for the majority of countries that are highly reliant on external assistance to provide funding for health - particularly in the poorest GAVI group which includes the majority of the countries.

Within this overall health financing context, immunization represented on average, 2.4% of government health expenditures in the baseline year. During 2005-2010, immunization is expected to average 3.7% of projected government health expenditures. If campaigns and shared health systems expenditures are included, total immunization expenditures would represent more than 5% of overall government health expenditures.

¹⁶ Estimated based on data from, WHO National Health Accounts and Lancet

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Stratifying the analysis by vaccine introduced gives a sense of the relative affordability of different vaccination schedules in the poorest countries and the pressure on overall government health expenditures. During 2005-2010 when we can expect full introduction of GAVI Phase I supported new vaccines, the findings suggest that for those that opted for monovalent HepB vaccine, a 1.1% allocation of the government health budgets would be sufficient to cover the entire future needs to scale up immunization. This compared to an average of 6.0% and 9.2% in the groups of countries that introduced DTP-HepB or DTP-HepB+Hib vaccines.

If we take as a benchmark the 3.7% average future immunization requirements in estimated health budgets, the figures presented suggest that the pressure on health budgets will be significant in countries that choose to introduce combination vaccines with Hib. This raises concerns about their medium term affordability at current price levels for these vaccines. Likewise, creating additional fiscal space will be a greater challenge for the group of fragile and poorest countries, as compared to the intermediate and least poor group. The total needs to scale up immunization in the former group will represent over 7% of the estimated government health budget during 2005-2010.

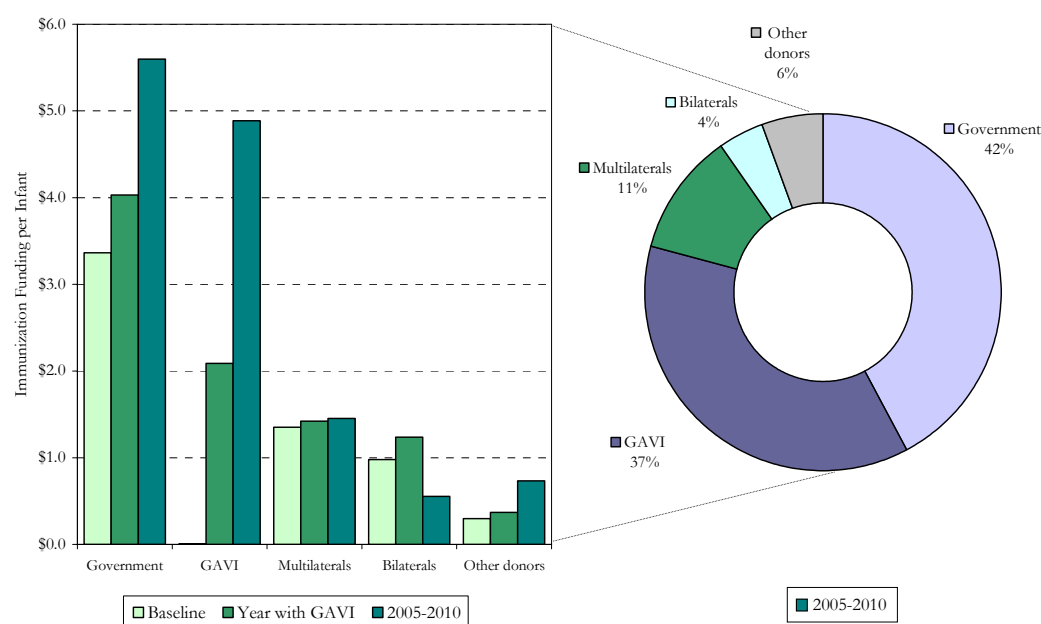
While most of fiscal space creation is likely to come from economic growth, there is perhaps scope for additional budget room from external donor support for immunization. Looking specifically at child health ODA, it appears that more is available in the poorest countries than in the richer one which is encouraging. The poorest countries receive on average \$39 per infant of child health ODA as compared to \$25 in the least poor countries. Similarly, on a per infant basis, twice as much child health ODA is available to countries that introduced DTP-HepB+Hib vaccine than HepB (mono) - \$53 per infant compared to \$24.

III -Immunization Financing

Immunization financing is also on the rise...

Increasing costs always come with the challenge of mobilizing the needed financing. The good news is that immunization financing experienced a positive trend in the past years, and funding from all sources has been increasing to support routine immunization. This would suggest that overall, GAVI Phase I support has been additional with only limited replacement of existing investment for immunization¹⁷. In the absence of GAVI awards, immunization financing from all sources has increased between the baseline and the year with GAVI.

Fig 5: Immunization financing trends and profile (routine)¹⁸



The rise in immunization financing is confirmed over the 2005-2010 period from all sources, except bilateral agencies. A few reasons complicate the interpretation of this latter trend. Firstly, bilateral agencies have annual or biennial budgetary cycles which makes it difficult to commit funds more than a year or two into the future. Secondly, there are measurement challenges when it comes to tracking bilateral funding flows¹⁹. The reasons being that bilateral funds are sometimes provided directly to government, channelled through multilateral donor agencies, or provided directly to support national immunization programmes. As such, it is unclear to what extent the drop in future funding from bilateral is an artefact of the measurement challenges or in fact, their contributions are being reflected in the increased funding from other sources.

¹⁷ While not all national governments finance vaccines, for those countries that do, the introduction of combination products through GAVI is likely to have unintentionally substituted national funding for DTP vaccine in many countries. In addition, a review of past changes in immunization schedules and vaccine procurement revealed that 7 countries had introduced and procured Hepatitis B vaccine before GAVI, 1 country had introduced and procured Hib vaccine, and 6 countries had been using under-utilized Yellow Fever vaccines in their national immunization programmes. There is indications that 9 of these 14 countries were funding these vaccines through alternative source before GAVI support was made available.

¹⁸ If national government contribution to shared inputs to the programme were included in the calculation, their financing would be much higher than presented here.

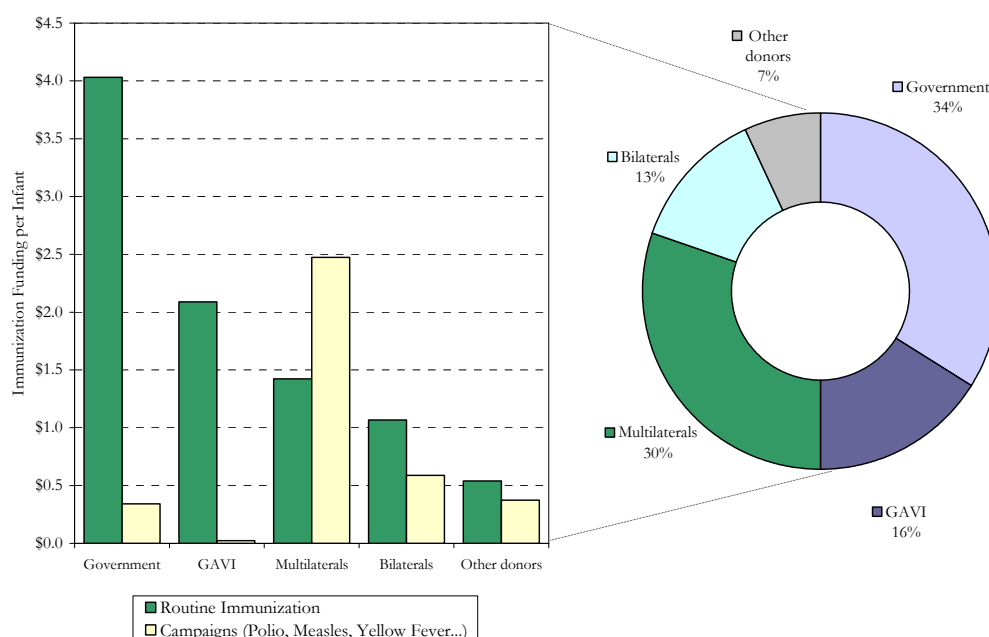
¹⁹ Given the difficulties in tracking the exact source of financing, in the FSP methodology countries were asked to report only the source of financing closest to the end use. Therefore, transfers of bilateral donor agency resources to multilateral agencies (such as WHO or UNICEF), or to a health fund or the national treasuries (through pooled funds or budget support) are not attributed to the donor countries.

Individual country variability show different trend than those observed in the aggregates. Of the 50 countries used in the analysis, 5 saw a drop in their overall funding even with additional GAVI resources made available. By excluding GAVI Phase I support, 17 countries saw a drop in immunization financing. Having said this, it is difficult to ascertain whether this trend is simply cyclical, or indicative of a real downward movement in financing. The counterfactuals are difficult to determine in the absence of more trend information. As such, it is difficult to conclude that these specific country trends would have occurred whether or not GAVI resources had been made available. Anecdotal evidence in the financial sustainability plans highlight changing priorities of some key bilateral donors in specific countries or regions which complicate the interpretation.

The financing profile for immunization is changing ...

Traditionally, it has been the case that routine immunization was supported mainly with funds from national government and multilateral agencies. This was certainly the case in the baseline year where both sources accounted for at least 75% of total funding for immunization. With GAVI, the funding profile has changed. Its support during Phase I is expected to become the second largest funding source to routine immunization during the 2005-2010 period by covering 37% of the needs. Combined with funds from national government, close to 80% of funding for immunization will come from these two sources alone. This is followed by multilateral funding (11%), specific bilateral funding (4% - other than those that may be channelled through multilateral agencies or to support national budgets) and funding from other donors (6% such as civil society, NGO...).

Fig 6: Immunization financing trends and profile - year with GAVI (routine and campaigns)



The cost profile for immunization is quite different if funding for campaigns is included. The funding to support these are important, and can sometimes exceed the resources provided for routine delivery systems. This is the case for multilateral donor agencies. During the year with GAVI, multilateral donors provided \$1.4 per infant for routine immunization as compared to \$2.5 per infant for campaigns.

Although substantial funding for immunization are tied up in supplemental immunization activities, campaigns as a strategy to deliver vaccines continue to play a significant role in reaching the objectives and targets of immunization programmes. If funding for campaigns is included,

the top 3 sources of immunization financing will come from national government and multilateral and bilateral donor agencies. In this broader picture of immunization financing, GAVI provides 16% of overall financing for immunization.

The financing trends and profiles by specific sources can vary....

The financing trends and profiles will show important variability from one country to the next, particularly when looking beyond aggregate financial flows and by specific source of funding.

The trend in government financing for immunization is one characterized by increasing financing - from \$3.4 to \$4.0 per infant between the baseline and the year with GAVI; and projected to be around \$5.6 per infant over the 2005-2010 period ²⁰.

Fig 7: Immunization financing trend by income and development status



Governments in fragile states and poorest countries are able to finance much less per infant, than countries that fall in the intermediate and least poor grouping of countries. Hence the ability of national government to financing immunization increases with income levels and development status. Having said this, within the different group of countries, the range in funding is important but where the maximum levels per group follow the same positive relationship. The minimum levels for the fragile, poorest and intermediate group of countries can be zero. This implies that within these three groups there are countries that continue to be entirely donor dependant in the funding of their programme.

Important variability are also apparent across regions. The government funding per infant is lowest (under \$5) in the AFR and WPR and highest in EUR.

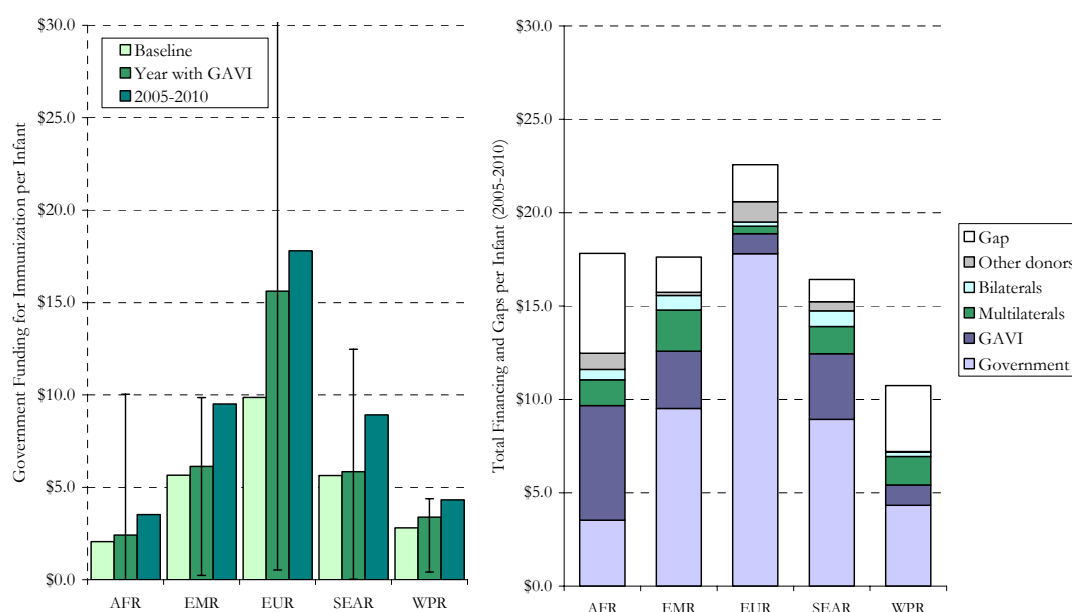
More in-depth analysis of the data uncovered a negative relationship between overall government funding for routine immunization and the type of new vaccine being introduced. Countries that have introduced monovalent HepB vaccine tend to fund more per infant using government resources (\$5.92), than countries with DTP-HepB (\$3.39 per infant), who in turn fund more that

²⁰ In relative terms in the baseline year, 24 countries funded 50% or less of the total needs for immunization using government funds, of which 12 funded less than 25%. While the overall trend of government funding is positive, in should be noted that in 16 countries, a drop in government funding was noted between the baseline and year with GAVI support. As mentioned earlier, the lack of trend data prevents from understanding the specific nature of these movements in financing.

countries that introduced more expensive DTP-HepB+Hib combination vaccine (\$1.92 per infant).

It appears as though countries with the greatest ability to pay for vaccines and injection supplies have tended to choose less expensive vaccines to introduce. On the other hand the poorest countries of the group had a tendency to select the more expensive vaccines for which they have a lesser ability to finance.

Fig 8: Immunization financing trend by region



During the first phase of GAVI funding, an average of \$ 6.5 per infant was committed²¹. More support per infant was provided to fragile states and the poorest countries in relation to support awarded intermediate and least poor countries. Fragile states were awarded \$5.1 per infant, compared to \$7.7 in the poorest group, and \$4.3 in the least poor grouping of countries.

The cost profile in the fragile states and poorest countries is different and where GAVI is the single most important funding source for immunization. Thus, transitioning away from GAVI support to other sources of funding will be a particular challenge in these countries. On the other hand, the importance of GAVI as a funding sources is less pronounced in both the intermediate and least poor countries. The issues of financial sustainability is maybe of lesser concern in these countries.

The importance of GAVI in immunization financing differs from one region to the next. In AFR SEAR, and EMR, the awards per infant are above \$3. These are less than \$1 per infant in EUR. This is largely a reflection of the different types of vaccines that were introduced and varying levels of immunization coverage (62% average in AFR compared to 95% in EUR). Sustaining the GAVI gains in AFR will be the biggest challenge.

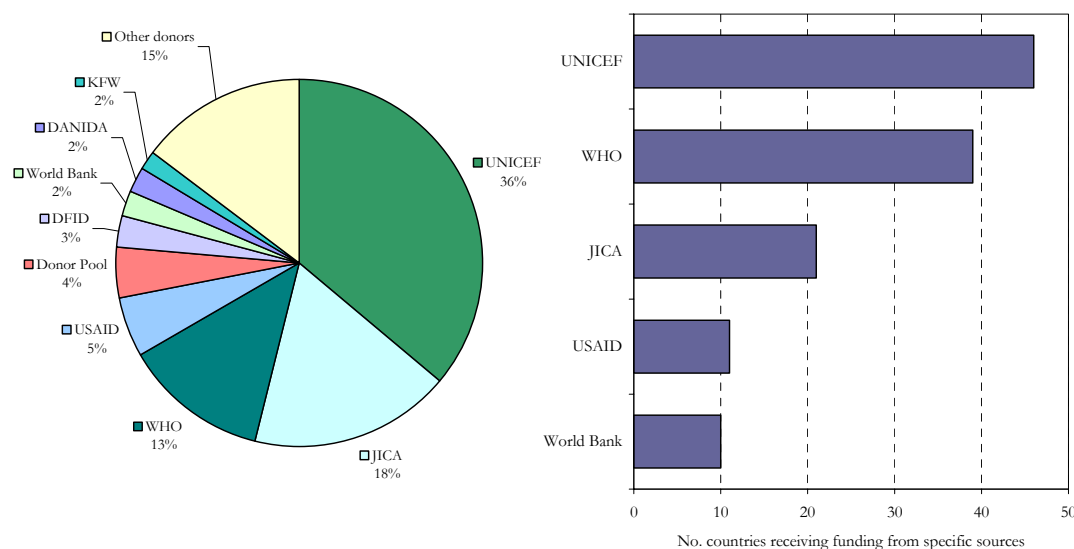
Multilateral donor funding for immunization has seen a positive trend over the 3 period covered in this analysis, although the increases are relatively modest²². An additional \$0.07 per infant was

²¹ The awards for the introduction of new and underused vaccines constituted the largest portfolio - 70% of the total commitments. The remaining support was to provide cash support for immunization systems strengthening (23%) and the in-kind support of AD syringes and safety boxes to promote injection safety for all childhood immunizations. Based on GAVI Secretariat figures. http://www.gavialliance.org/resources/5yr_commitment_Dec05.xls (last accessed on December 2006)

²² While the overall trend of multilateral funding is positive, in should be noted that in 24 countries, a drop in funding occurred between the baseline and year with GAVI support. Multilateral donor support for immunization is higher in the fragile and poorest

provided between the baseline and year with GAVI, and this is expected to be topped up with another \$0.03 per infant during the 2005-2010 period. The main multilateral agencies that fund immunization are UNICEF and WHO. Combined the two agencies provide half of all non-GAVI external funding for routine immunization.

Fig 9: Composition of external donors to immunization (excluding GAVI)



Bilateral donor funding for immunization also showed a positive trend between the baseline and year with GAVI with an additional \$0.27 per infant being provided²³. An important limitation is the difficulties in tracking the exact source of bilateral financing. This is of particular, and growing, significance in countries receiving bilateral aid through sector-wide approach (SWAp) programmes and national budget support. Despite these limitation, an interesting result is the growing trend of donor pooled funds. These represent some 4% of overall donor funds for immunization. The main bilateral agencies that fund immunization programmes directly are JICA, USAID and DfID. Combined these three agencies provide some 26% of all non-GAVI external funding for immunization.

The importance of certain external donors in financial terms is equally reflected in the number of countries the funding supports. Most countries receive some funding through UNICEF and WHO. The funding from bilateral agencies tends to be provided to specific priority countries although JICA funding is present in quite a number of countries outside of the WPR and SEAR, including supporting 10 countries in AFR.

Funding gaps are looming

Despite positive immunization financing trends, expected future funds will not be enough to match the needs to sustain the gains, and scale up immunization to complete the HepB and Hib agenda. The growth rates in financing are far outpaced by the growth rate in resource requirements presented earlier in this analysis.

Overall funding gaps during 2005-2010 will approximate \$4.26 per infant if both committed and non-committed funds are considered. Interestingly enough, one would expect decreasing funding

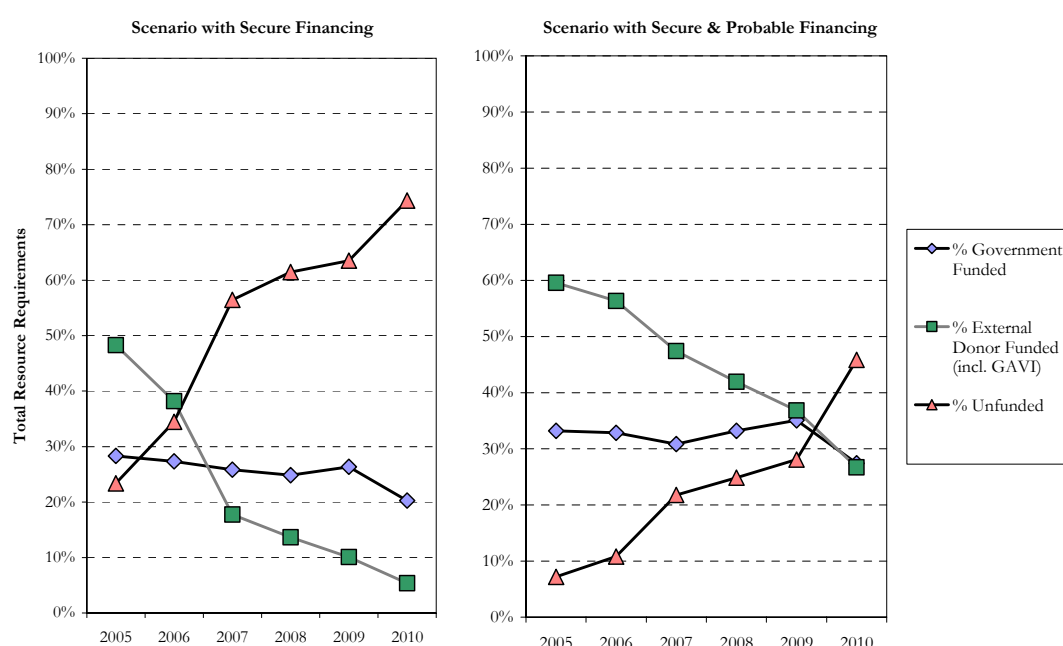
countries as compared to the intermediate and least poor. Multilateral donor support is relatively homogenous across all regions except for EUR.

²³ While the overall trend of bilateral funding is positive, it should be noted that in 28 countries, a drop in funding occurred between the baseline and year with GAVI support. When considering probable bilateral funds, the overall trend between 2005-2010 is towards a reduction of support.

gaps with development status and income levels. In the optimistic funding scenario, the funding gaps per infant are the highest in intermediate countries (\$5.74 per infant) and lowest in the fragile states (\$1.75 per infant). The explanation is that many fragile states have more important contributions from GAVI to fill the gaps. The poorest group, which represent the bulk of countries, have an estimated \$5.22 funding gap per infant - above the average. Regionally, the largest gaps are found in AFR with over a \$5.35 per infant shortfall from what is needed to reach programme objectives. The size of the gaps reflect the different capacities and opportunities available to countries to mobilize the needed resources for their programme in the short term and medium term.

Whereas in dollar terms, government funding is on the rise, in relation to the overall needs for immunization, their relative share of government financing will remaining within a range of 20%-30% if both secured and probable funds are taken into consideration.

Fig 10: Future immunization financing trends and funding gaps - 2005-2010



Similarly, while external donor financing in volume terms is increasing, the relative share in total needs is in fact dropping over the 2005-2010 period. In the optimistic scenario that includes both secured and probable funds, we clearly see the tapering off of GAVI support over the period; how the financial transition by national government and other partners is limited; and how the share of the unfunded mandate is growing.

Thus, despite the favourable context for immunization financing, there is little evidence to suggest that the GAVI model, with the new funds it provided, succeeded in fully catalysing the needed support for immunization to ensure a financially sustainable transition. The most pessimistic view of financing that includes only currently committed funds indicates that by 2010 over 70% of resource requirements for immunization will be unmet if no additional funds are forthcoming. The majority of these funding gaps are for new vaccines which highlight the challenge of future co-financing by countries.

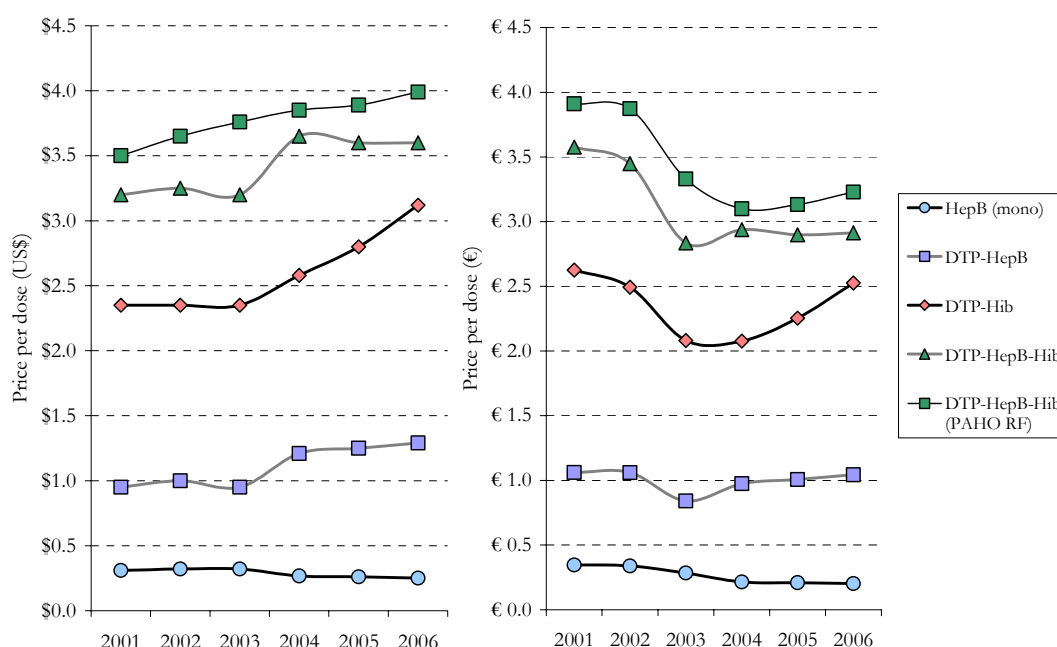
IV - Immunization Financial Sustainability

Trend in vaccine prices...

Getting on a path of financial sustainability during the first phase of GAVI has been constrained by the optimistic assumptions about vaccine price movements towards lower and affordable levels²⁴. With the exception of HepB vaccine in monovalent formulation, the price of other GAVI supported combination products have shown a pattern of rising cost per dose since 2000. Based on UNICEF Supplies Division information²⁵, the price of DTP-HepB+Hib vaccine rose from \$3.20 to \$3.60 between 2000 and 2006. The price per dose through the PAHO Revolving Fund mechanism is higher and was recently listed at \$3.99 for 2006²⁶.

Although assumptions of falling prices have not borne out to date, some of the increase could simply be a reflection of rising prices due to inflation. Likewise, the trend in vaccine prices depends on the reference currency.

Fig 11: Vaccine price for GAVI supported new vaccines (US\$ and €)



Since 2000, the US\$ has depreciated vis-à-vis many hard currencies, and particularly against the €. The 2000 exchange rate was \$1 = €1.2. By 2006, the dollar depreciated to \$1 = €0.8. Consequently, the price per dose of combination products in € terms has in fact dropped from €3.58 to €2.91 for DTP-HepB+Hib vaccine - more than a €0.50 difference. Whereas prices in US\$ from the GAVI Fund perspective are rising, from the perspective of European based manufacturer (such as the producers of DTP-HepB+Hib vaccine), the trend in the price per dose has been dropping.

Moreover, for the 16 countries that have currency pegs (of which 10 with the €), the evolution of currencies has important implications. One could argue that West and Central African countries in the FCFA zone²⁷ have in fact be experienced a drop in the cost of HepB and Hib vaccines

²⁴ Despite this challenge, a handful of countries were able to transition, or begin transitioning, to other sources of financing for new vaccines. But for the majority, this was not possible.

²⁵ See UNICEF website http://www.unicef.org/supply/index_7991.html (last accessed in December 2006)

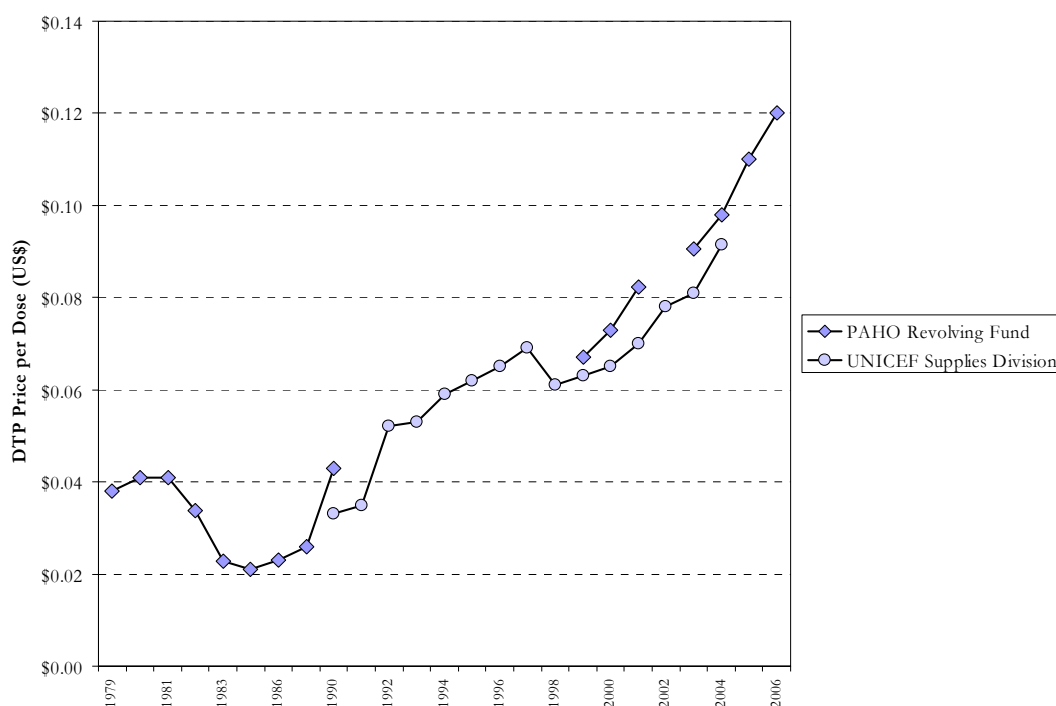
²⁶ See PAHO website <http://www.paho.org/English/AD/FCH/IM/snc2801.pdf> (last accessed in December 2006)

²⁷ Franc Communauté Financière Africaine

since 2000 given that the Franc Zone currency is pegged to the € and given the special ties with Europe²⁸. For these countries, the favourable exchange rate should increase the likelihood of sustaining the cost of new vaccines in the future. Conversely, those countries with currency pegs tied to the US\$ would indeed be experiencing the sharpest rise in the price of vaccines.

These trends are noticed beyond the combination products offered by GAVI. Since 2000, and earlier, the price of a 10 dose vial of DTP vaccines has been rising gradually. It reached \$0.12 a dose in 2006 - up from \$0.065 in 2000 - almost a doubling of the price per dose.

Fig 12: Price trend for DTP vaccine (10 dose vial)²⁹



Future evolution of prices are promising. Recent market intelligence shows encouraging signs of prices moving in a more affordable direction in the foreseeable future for HepB and Hib containing vaccines in combination with DPT³⁰. By 2010, it is expected that the price per dose of DPT-HepB+Hib will reach \$2.65 and further drop to \$1.85 by 2015 or earlier³¹. This is half of today's value.

Ability to finance vaccines and immunization

Transitioning away from GAVI support for vaccines and moving towards financial sustainability will depend on the ability of countries to support the financial burden of new vaccines and related costs.

The general trend in government financing presented above is confirmed when looking specifically at government financing for vaccines and injection supplies. Findings show that in value terms, governments are investing more in the purchasing of vaccines and injection supplies. Baseline government funds for vaccines averaged \$0.84 per infant and are expected to reach \$1.33 per infant between 2005-2010. Having said this, not all countries are financing vaccines using government resources. Of the 50 countries, 31 were financing all or part of the needs for

²⁸ Likewise for francophone countries in East and Southern Africa (Comoros...).

²⁹ UNICEF and PAHO

³⁰ BCG study

³¹ GAVI Secretariat

either vaccines, injections supplies or both³². The trends in the future are of concern with only 14 countries having projected vaccine financing with government monies in their financial sustainability plan.

Relative to the total needs for vaccines however, the share of government financing drops steadily over time. Estimated at 43% of overall vaccine needs in the baseline, it dropped to 21% in the year with GAVI and is expected to approximate 13% in the 2005-2010 period when full scale up of new vaccines will be reached.

An interesting observation is that government funding for vaccines dipped slightly between the baseline year and the year with GAVI - from \$0.84 to \$0.82 per infant. This may, or not, support the suspicion that the switch to combination vaccines supported by GAVI un-intentionally replaced existing national funding for DTP vaccine.

Table 6: Government financing of vaccines and injection supplies (\$ per infant)³³

Classifications	Grouping and No. Countries		Baseline	Year with GAVI	2005-2010
	Grouping	No.	\$ per infant	\$ per infant	\$ per infant
Overall	Total	50	\$0.84	\$0.82	\$1.33
GAVI Co-Financing	Fragile	5	\$0.37	\$0.36	\$1.06
	Poorest	27	\$0.71	\$0.70	\$0.83
	Intermediate	8	\$0.79	\$0.78	\$0.09
	Least Poor	7	\$4.10	\$4.10	\$11.75
New Vaccine	HepB (mono)	*	\$1.61	\$1.60	\$1.60
	DTP-HepB	*	\$1.14	\$1.12	\$0.17
	DPT-HepB+Hib	*	\$0.46	\$0.45	\$1.51
Budget Line Item for Vaccines	Yes	39	\$1.29	\$1.09	\$1.66
	No	11	\$0.12	\$0.15	\$0.71
Vaccine Procurement	UNICEF All	33	\$0.38	\$0.37	\$0.60
	UNICEF Partial	17	\$2.12	\$2.10	\$3.48

* See Table 2

An interesting pattern of government financing for vaccines is associated with the type of new vaccine introduced. Vaccine financing from the government is highest in the group of countries that introduced HepB monovalent vaccine in their schedule - at \$1.61 per infant. This contrasts to government vaccine financing in the group of countries that introduced DTP-HepB+Hib (\$0.46 per infant). This relationship holds for the baseline and year with GAVI but less so in the 2005-2010.

Similarly, a positive relationships between government funding of vaccines, income levels and development status is seen. In the baseline and year with GAVI, the government financing of vaccines in the fragile states was approximately \$0.36 per infant. This compared to \$0.78 per infant in the intermediate group of countries. The least poor group of countries have levels of government funding for vaccines above \$4.0.

³² Of these countries, 25 were financing some or all of their basic vaccines, 12 were financing vaccines categorized as under-used and new vaccines (not necessarily GAVI supported vaccines such as mumps and rubella), and 28 were financing all or part of the needs for injection equipment.

³³ This includes funding for all vaccines (traditional, underused and new) and related injection supplies from national governments.

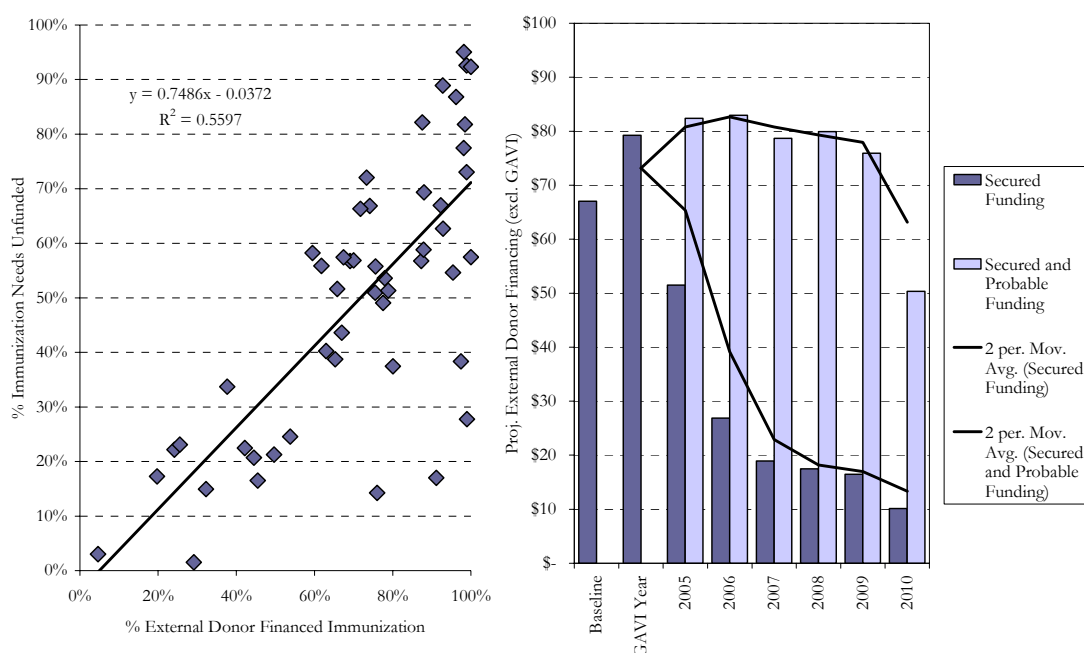
More in-depth analysis shows that countries with a line item in the national budget for the purchasing of vaccines have a higher government funding of vaccines (\$1.29 per infant) than those without (\$0.12 per infant). While this finding does not suggest that the absence of a line item is an impediment to funding vaccines using domestic resources, the ability to mobilize domestic resource for vaccines may be lesser³⁴. The ability to finance vaccines in the future will be a bigger challenge in the 11 countries who do not have a budget line item for vaccines.

It is no surprise that the levels of government vaccine financing are highest in the 17 countries that only partially rely on international procurement mechanism for vaccines. The amount of government financing is at least twice that of the 33 countries that are entirely dependant on UNICEF for procuring all their vaccines for childhood immunization.

External aid volatility...

Although GAVI Phase I was founded on partner commitments to support immunization over the medium and longer term, these commitment require that instruments be in place for international partners to be able to make multi-year commitments in the future. Progress towards reducing the unpredictability of external aid for immunization has been slow because of the difficulty international donors face in making multi-year commitments.

Fig 13: External donor financing for immunization (secured funding only)



In most countries, external financing for immunization continues to be pledged annually or biennially and remains subject to political and economic volatility. As such the average trend in future aid for immunization is characterized by declining secured commitments over time.

It is no surprise to find that countries with a higher proportion of external donor financing for immunization are subject to greater volatility in the financing for their programme. Consequently, the magnitude of future funding gaps is higher, and the financial transition to other sources of funding following GAVI Fund commitments is unclear.

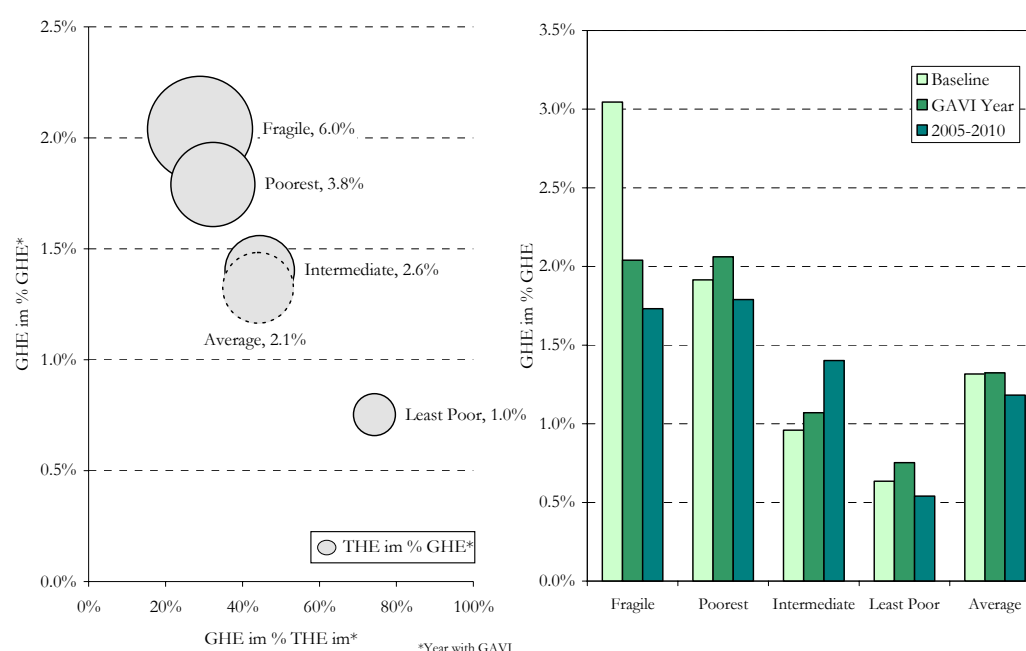
³⁴ In particular, a national budget line for vaccines is thought to increase awareness of the need to allocate funds to a priority health service. That the presence of a line item for vaccines - with the greater awareness it creates - will inspire national governments to increase their budgetary efforts in respect of this priority health programme. It signals long-term political commitment to immunization. It is assumed that governments that choose to introduce an immunization-related line item into the national budget will have a strong commitment to the programme if they are willing to make these budget allocations visible.

Pressure on the health budgets and fiscal space ...

Moving towards financial sustainability is invariably linked to future macroeconomic trends and how these will affect the availability of overall resources for health. This in turn will be influenced by the ability to finance immunization given health budget constraints, and the budgetary impact of expanding immunization with HepB and Hib vaccines.

Clearly the pressure on health budgets and fiscal sustainability of immunization will be a concern in the fragile and poorest countries. Both groups of countries are faced with a double challenge of having lower levels of government funding for immunization and greater pressures on government health budget to finance immunization. The latter partially reflects the cost implication of introducing new vaccines.

Fig 14: Pressure on health budgets and financial sustainability³⁵



Compounding the issue is that in some countries, the levels of government health expenditures on immunization are not keeping pace with overall government health expenditures. In the fragile states the share of government financing for immunization relative to overall government financing for health dropped from 3% in the baseline year to 2% in the year with GAVI. It is expected to drop further in the 2005-2010 period.

In the poorest countries, the trend is more stable and ranges between 1.8% and 2.1%. In the least poor countries, the amount of government funding for immunization within the overall government health resource is showing a similar pattern with levels hovering around 0.5% to 0.8%. In the intermediate countries, the share of government financing for immunization in the government health budget is increasing from less than 1% in the baseline and expected to rise to 1.4% on average over the 2005-2010 period. Hence, the estimated trends reveals a pattern of fiscal space reduction in fragile countries, sustained fiscal space in the poorest and least poor countries, and fiscal space creation in intermediate countries.

³⁵ The labelling of the bubble graph is the following: GHE im = government health expenditures for immunization (or government funding for immunization). GHE = government health expenditures. THE im = total expenditure on immunization. The indicator GHE im % GHE measure the relative share of government financing for immunization in government health expenditures. The indicators GHE im % THE im measures the relative share of government financing for immunization relative to total expenditures on immunization. Finally the indicator THE im % GHE measures the relative share of total expenditures on immunization relative to total government health expenditures. The data in the bubble graph is an average between the GAVI year and the 2005-2010 period so as to reflect to budgetary impact of GAVI awards.

V - Conclusion

In summary ...

This analysis allowed for some of the original funding assumptions of the GAVI model for immunization financing to be better tested against the realities in a wide set of countries, and to highlight the main issues and implications for future immunization efforts.

The findings have confirmed the challenges of introducing HepB and Hib combination vaccines into routine delivery systems in the poorest countries. The evidence gathered suggests that resource requirements for routine immunization will continue to increase, and primarily driven by the cost of new vaccines. In many countries this has led to a doubling and tripling of immunization programme budgets. The implications will be felt in terms of mobilizing greater annual funding to guarantee the provision of future vaccine which will account for at least half of needs for scaling up immunization - a risk that is limited at present with GAVI 5 year awards.

As long as the rise in costs find their equivalent in secured funding, reaching programme goals and objectives in the future should be achieved. Although GAVI awards were secured over the short and medium term, there are limited signs that countries will manage a smooth transition to other sources of financing once current commitments draw to a close. If the figures indicate that GAVI did not displace existing resources for immunization, the model didn't succeed in fully catalysing additional support from development partners. As such, widening funding gaps are expected in the future and could compromise the ability of countries to sustain the delivery of new vaccines and reach routine immunization programme objectives and coverage targets.

Several factors hindered countries ability to move towards financial sustainability not anticipated in the GAVI model. The most important has been the optimistic assumptions about movement in vaccine prices to more affordable levels. The second has been the realization that beyond GAVI, there lacks adequate frameworks for traditional immunization donors to make multi-year commitments in the future. Lastly, expanding government immunization budgets to accommodate for ever increasing costs of scaling up immunization with new vaccines has been limited. The majority of countries continue to be reliant on external assistance to provide funding for immunization - particularly in the poorest group which includes the majority of the countries. This is compounded by the fact that countries with the lowest ability to pay for vaccines and immunization have tended to choose the most expensive vaccines to introduce.

The road to financial sustainability will be a greater challenge for those that fund very little of their programme using more predictable sources of funding which can leave programme exposed to volatile financing and vulnerable to any shifts in donor priorities.

Closing the funding gaps for immunization and the probability of financial sustainability will require multiple factors that will favour greater funding for immunization: a larger public sector budget resulting from economic growth; greater government commitments to immunization and greater donor multi-year commitments; a reduction in vaccine prices; and under any scenario, will require a major sustained efforts by the Alliance in it's second wave of support.