FINANCIAL SUSTAINABILITY OF CHILDHOOD IMMUNIZATION: ISSUES AND OPTIONS[1]

EXECUTIVE SUMMARY

This paper, commissioned by the Financing Task Force of the Global Alliance for Vaccines and Immunization (GAVI), provides a framework for discussion of the financing of immunization in developing countries. Narrowly, the paper is intended to contribute to the development of a template for the preparation of the financial sustainability plans required of countries receiving grants under the Children's Vaccine Fund. More broadly, the paper seeks to help leaders in poor and wealthier nations think about specific actions that can contribute to—or conflict with—a long-term goal of stable and adequate financing for childhood immunization.

Childhood immunization represents one of the quintessential "best buys" for the health sector, yielding tremendous benefits for individuals and society. The intervention is most effective when coverage is at 80 percent or higher, and when children are immunized during a rather narrow age span. These characteristics imply that the greatest health benefits are reaped when immunization programs can depend on adequate levels of funding on a reliable basis.

In developing and industrialized countries alike, the financing of immunization is primarily a domestic and public sector responsibility: a core public health function of the state. However, the political nature of resource allocation decisions, competition among health (and other) programs for very scarce resources, large increases in funding requirements as coverage expands and new vaccines become available all add up to the potential (and reality) that dependence on domestic government resources alone will leave poor countries falling further and further away from achieving the benefits of immunization.

Out of both self-interest and a concern for social welfare in poor nations, the international community may see some level of financing of immunization services in developing countries as a global responsibility. This perspective has been manifested historically in grant support from wealthy countries to poor ones for the development of basic childhood immunization programs (primarily through the Expanded Program on Immunization). Currently, as significant coverage gaps for routine immunizations are found, and as new and more costly vaccines are added to immunization schedules, resource transfers for immunization programs continue under the Children's Vaccine Fund and through GAVI partners. Over the foreseeable time horizon, then, for many countries of the world, the financing of immunization services will be a shared

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responsibility: national governments have the primary role; and development partners have a secondary but crucial role.

Broadening the Concept of Financial Sustainability. Traditionally, financial sustainability has been taken to mean the ability of a country to mobilize sufficient domestic (public and private) resources to finance a given set of goods and services, such as primary health care or family planning services. Financial sustainability has been synonymous with "self-sufficiency," and often applied to situations where external financiers (aid agencies) sought to induce developing country governments to mobilize domestic resources for activities that previously had been donor-funded. However, more than for many other health interventions, the nature of immunization and the international interest in the future success of immunization programs may require that the focus of financial sustainability be shifted toward the *ability of a country to mobilize and allocate sufficient domestic and external resources on a reliable basis to achieve target levels of immunization performance*. The emphasis turns away from single-minded attention to phasing-out external funding, and toward the question of how to structure the full financing package—and, importantly, how to use available resources efficiently—so that sufficient funding is available on a reliable basis. Specific actions can be taken by developing country governments and development partners to promote this objective.

Dimensions of Financial Sustainability. Financial sustainability is part and parcel of good management of immunization programs, and of the health sector as a whole. Many of the facets of financial sustainability overlap with sound program management.

We identify nine dimensions of financial sustainability of immunization systems, falling into the categories of *efficiency in the supply chain*, and *appropriate funding structure*. These are:

Lower Costs through Efficiency in the Supply Chain

- Sustained high demand
- Efficient vaccine procurement
- Efficient immunization services

Reliable and Sufficient Revenues through Appropriate Funding Structure

- Steady and sufficient funding for vaccines
- Steady and sufficient funding for labor and other non-vaccine recurrent costs
- Steady and sufficient funding for investments
- Timely resource flows from source to service delivery points
- Balance between public and private financing
- Effective mobilization and management of supplementary, external resources and long-term financing

Government Actions to Foster Sustainable Financing. Among the many actions that national governments can take to evolve toward higher and more stable levels of funding for immunization systems, the following stand out as the ones with the highest potential impact:

- Promote allocation of resources on the basis of cost-effectiveness and public finance principles.
- Use international procurement mechanisms.
- Establish legal mandates for baseline funding of national immunization programs.
- Develop and implement a targeted program to reduce waste, with quantitative endpoints.
- Engage development partners in informed discussion of resource requirements, and seek structured commitments to fill in key funding gaps.
- Earmark funds and establish performance targets for sub-national entities.
- Develop targeted program to reduce barriers to access through new delivery strategies, including those that involve the private sector.

Development Partner Actions to Promote Sustainable Financing. As noted above, it is likely that external aid will continue to play an important role in financing immunization services in many developing countries, and development partners are motivated to provide funding in a way that is reliable and fosters high levels of immunization coverage.

There are actions that donor (and lending) agencies can take within the constraints of existing funding instruments. There are certainly ways in which standard funding mechanisms can be made less detrimental to the cause of financial sustainability. Key messages from an assessment of the advantages and disadvantages of different instruments are:

- Restricting external funding to capital investments does not contribute to reaching the objective of financial sustainability.
- Sectoral (rather than immunization-specific) programs have tremendous potential to contribute to sustainability, but to date the experience has not been highly positive.
- Performance-based funding criteria can be strong instruments to encourage governments to increase the efficiency in the supply chain.
- Incorporating policy conditions related to immunization system performance and/or financing can be a useful tool to promote long-term sustainability.
- Most existing instruments do not address the fundamental international and domestic political risks to steady funding for immunization programs. Mediating this risk would require one or more new funding instruments that are designed to be buffered from the political process.

Indicators of Financial Sustainability. Indicators of financial sustainability should be selected based on the criteria of: validity and reliability; availability of data (without special collection procedures); relevance to worker and ease of explanation; relevance in variety of country contexts; and relationship to high priority policies and programmatic actions.

Applying these criteria, the Financing Task Force may select among a large number of indicators of financial sustainability. Section VI of the paper lists these possible indicators.

It is recommended that in establishing uniform indicators and setting targets toward financial sustainability, GAVI:

- Establish a small, core set of indicators of financial sustainability that would require information that is available in most countries.
- Request of countries that in their financial sustainability plans they propose an additional set of country-specific indicators, tied to their proposed policy and programmatic actions.
- For both the core and the country-specific indicators, set targets for financial sustainability in a participatory fashion, with the full input of health financing specialists, immunization program specialists, and policymakers in recipient countries.
- Tying together progress toward both institutional and financial sustainability, encourage countries to engage in a benchmarking process.

FINANCIAL SUSTAINABILITY OF CHILDHOOD IMMUNIZATION: ISSUES AND OPTIONS

I. INTRODUCTION

Large sums are being mobilized to increase immunization coverage in the developing world. A coalition of international funding agencies, foundations and technical agencies have joined forces under the Global Alliance for Vaccines and Immunization (GAVI) to stimulate investment in childhood immunization. Under GAVI, the Global Fund for Children's Vaccines ("the Fund") has obtained on the order of US$1 billion in commitments for immunization support, including an initial US$750 million from the Bill & Melinda Gates Foundation, and sizeable amounts from the Governments of Norway, the United Kingdom, the United States and the Netherlands. Other funding agencies, including the World Bank and large foundations, are also making funds available for immunization outside of the Fund mechanism. Correspondingly, a growing number of developing countries are seeking to increase the intensity of immunization efforts, and trying to find additional domestic resources for them.

With these contributions comes a huge opportunity for low-income countries[2]: Those with very low levels of coverage of the basic Expanded Program on Immunizations (EPI) vaccines[3] can obtain grant funding for five years to significantly increase their ability to reach children who otherwise would not benefit from immunization. Those with moderate levels of coverage of the basic EPI vaccines can obtain five years of grant funding for the new and underused vaccines, hepatitis B (hepB), *Haemophilus influenzae* type b (Hib), and yellow fever (GAVI, 2000).

With these contributions also comes an enormous challenge, which must be addressed in the near future if it is to be met: To ensure that, during the process of expanding coverage, both recipient governments and development partners[4] adopt policies and take actions that will lead to stable and adequate financing for immunization *after* the five-year period of grant support (see Box 1). Without the implementation of realistic plans for immunization financing, countries that have benefited from Fund resources may be in no better shape (and conceivably could be in worse shape) than before the Fund came into existence. At the same time, without implementation of financing plans, donors to the Fund will face the extremely awkward situation of having created dependence, without systematically considering the consequences and options for resolution.

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[2] Only countries with annual per capita income under US$1000 are eligible to be beneficiaries of the Fund.
[3] The basic six EPI vaccines include: measles, pertussis, diphtheria, tetanus, BCG and OPV.
[4] "Development partners" is a term intended to encompass bilateral and multilateral aid agencies, multilateral financial institutions, private foundations and technical agencies. In cases where reference is made only to those development partners providing cash assistance in the form of grants or heavily subsidized loans, the term "donors" is used. It is important to note that non-governmental organizations in developing countries also play a role in development activities, but they are not referred to with this term.

GAVI's Financial Sustainability Plans. The need for a financial sustainability plan was recognized from the inception of GAVI and the Fund. Under current guidelines, countries applying for funding must address questions of financial sustainability to a limited degree in their multi-year strategic plans. Countries receiving funding are required to prepare detailed financial sustainability plans at the midpoint of funding, at the end of the second year. According to the "Guidelines on Country Proposals for Support to Immunization Services and New and Under-used Vaccines," the financial sustainability plan is supposed to indicate a gradual phasing-in of government funding for immunization inputs (and correspondingly a phasing-out of Fund support). To date, financial sustainability has been addressed in a cursory manner in proposals submitted, and the GAVI Board has not yet elucidated the specific requirements for the midterm financial sustainability plans.

Box 1.
Why Does Stable and Adequate Funding Matter?

Stable and adequate funding is more important for immunization than for many other health programs because of the nature of the intervention. Childhood immunization constitutes the cheapest and most effective way to reduce the incidence of major communicable diseases—a quintessential "best buy" for the health sector. To be most effective on a population level—that is, to attain herd immunity—at least 80 percent of children must be immunized at the right time in their lives. Instability in funding can result in a wholesale breakdown in the immunization system, and in outbreaks of disease that jeopardize the health of large portions of the population. Over the long term, funding for immunization that fluctuates widely from one birth cohort to another leaves many age segments of the population vulnerable.

There are equity and efficiency benefits to stable and adequate financing, as well. Stabilizing the flow of funds ensures consistency in program components such as outreach activities that are of most benefit to the poor but are also among the first to suffer from year-to-year fluctuations in the immunization budget. From an efficiency angle, security in financing often results in lower vaccine prices being offered to governments, as well as a reduced need to fund the costly measures required when outbreaks occur.

From the perspective of the development community, moving toward financial sustainability—typically viewed as a relative increase in the government's monetary commitment to a specific program or set of programs—is also a hallmark of "ownership." It is a material indication that the government has adopted the priorities that are judged to be correct by the donor agencies. In the case of immunization, movement toward greater reliance on domestic funding is a signal to donors that recipient governments are putting their scarce health resources into high-impact, cost-effective interventions, rather than into interventions and services that may benefit fewer at higher cost.

In June 2001, the Financing Task Force (FTF) of GAVI is slated to provide additional guidance on the content of the financial sustainability plans. In addition, the FTF is to propose performance indicators to monitor progress toward sustainability. Those indicators, along with others, may eventually be used to judge the performance of countries, and their eligibility for future funding.

Discussions about what those financial sustainability plans should entail have brought to light the different assumptions and expectations held by GAVI members. Divergent views about what sustainability means and what can be done to foster it have emerged. The questions raised about financial sustainability are not small ones, and they—like many challenges of development in a rapidly globalizing world—touch on fundamental philosophical and political issues. They bring up deeper questions regarding the nature of the relationship between the rich countries and the poor ones, and the extent to which international priorities can be imposed upon sovereign states, rich or poor.

Purpose of the Paper. This paper was commissioned by the FTF to provide a framework for discussion about what developing country governments and development partners can do to promote and measure financial sustainability of immunization systems. As such, it seeks to contribute to the FTF's near term objective of providing guidance for the financial sustainability plans.

The paper treats financial sustainability in a practical way, while acknowledging (but not resolving) the core ideological questions. It highlights the close relationship between financial sustainability and sound program management and policy development. It describes the likely impact on sustainability of various financing and programmatic strategies. In addition, it discusses the criteria for selecting indicators of financial sustainability, and reviews the options for those indicators. Because many of the financing challenges facing Fund-eligible countries over the long term are facing higher-income countries now, the discussion covers a range of economic contexts, rather than focusing exclusively on low-income countries.

The paper builds on a tremendous amount of earlier and ongoing work. In particular, it is important to acknowledge a wealth of information developed under the Gates CVP at PATH Project and the Partnerships for Health Reform Project (under a contract with Abt Associates), the many other studies and reviews being conducted under the auspices of the GAVI FTF, and the intellectual contributions of several policy analysts and other researchers. (A literature review is available as Annex 1 of this paper. An annotated bibliography and list of relevant websites is available as Annex 2.[5])

The paper is organized as follows: Section II presents a very rough estimate of the magnitude of current and future financing requirements. In addition, we identify the factors that will contribute to large (or small) increases in requirements in the future, highlighting the uncertainty of any projection. Section III defines sustainable financing, and elucidates its dimensions. Sections IV and V describe actions that developing country governments and development partners can take to promote financial sustainability through existing instruments. A brief discussion of new instruments is also included. The intent is to provide a framework for development of financial sustainability plans—a sort of checklist as countries engage in this process under GAVI. Section VI identifies the characteristics of good and useful indicators of financial

[5] Draft versions of the literature review and the annotated bibliography are available for review upon request.

sustainability, and lists several possible indicators. Comment is made about the process of setting targets and monitoring progress.

It is useful to acknowledge in advance the limitations and boundaries of the paper. There are two key limitations. First, we did not collect any new data, but rather used existing (and relatively accessible) information. The quantitative information presented is subject to a host of caveats, most of which can be found in the original sources. Second, although attempts have been made through an extensive review process to obtain a range of views, the paper does not yet benefit from an intensive consultative process with representatives of the public sector and civil society in developing countries.

The boundaries of the paper are defined by the related topics that we do *not* cover in detail, but which are essential elements of the larger set of questions related to sustainability. These are:

- Institutional capacity and sustainability
- Public sector resource allocation—in general, and specifically in the health system
- Impact of the international community's actions on prices set by vaccine manufacturers
- Details of proposed new funding mechanisms for vaccines

II. WHAT IS AN IMMUNIZATION SYSTEM AND HOW MUCH DOES IT COST?

When we refer to an immunization system we are talking mainly, but not exclusively, about a country's national immunization program, the government-financed and -operated set of activities related to procuring, storing, handling and transporting vaccines and related supplies, assuring quality, delivering immunization services and undertaking surveillance of vaccine-preventable diseases.

Immunization systems are largely public. In most developing countries, including those with relatively high national incomes, the government provides more than 90 percent of all immunization services (De Roeck and Levin, 1999). The story is similar in most industrialized countries (see Box 2). Even in countries such as India, where the private sector accounts for up to half of all health service delivery even among the poor, immunization stands out as a service that is predominantly obtained through government facilities.[6] In addition to providing the majority of immunization services, the public sector typically is the sole purchaser of EPI vaccines.

[6] According to the India's National Family Health Survey (1999), the private sector provides half of all institutional deliveries. At the same time, the private medical sector accounts for 12.5 percent of vaccinations of children under age 3. Utilization varies greatly across socioeconomic groups. Households classified as having a high standard of living used the private medical sector 29.5 percent of the time; those with a medium standard of living used private services 10.7 percent of the time, and households in the

Although the expenditure figures in this section correspond to public spending—and therefore capture the majority of resources—it is important to note that the full immunization system financing includes private payments and private delivery of immunization services. For relatively well off populations in urban areas, private providers, usually operating on a fee-for-service basis, provide one-quarter to one-half of all immunization services, and routinely offer newer vaccines that are not generally available through the public sector. As discussed later sections, the availability of private immunization services can contribute to public health objectives, at no cost to the public sector, and thus should be included in a comprehensive conceptualization of the immunization system.

Box 2.
Who Pays for Immunization in Developed Countries?

In most parts of the developed world, taxpayers finance vaccine purchases and the delivery of childhood immunization services. In Sweden, Finland, Iceland, Norway and Denmark, for example, vaccinations are provided free of charge to patients, with financing from a combination of national and sub-national (e.g., county) budgets. Depending on the structure of the health system in a given country, services are delivered through publicly-run well-child clinics, and/or through private pediatricians and general practitioners who are provided with vaccines and reimbursed by the state.

The United States operates somewhat differently, depending much more on private financing and service delivery. About half the major childhood vaccines are purchased under federal contracts, and a corresponding share of immunization services are provided through public health clinics that primarily serve lower-income groups and private providers who are then reimbursed by federal and state agencies. For the rest of the population, private pediatricians and family practitioners provide immunization services that are reimbursed, partially or fully, by employment-based insurance. There is little out-of-pocket payment for childhood immunization.

A. ***Current Costs.*** Estimates of the level of current spending on national immunization programs in developing countries are hard to come by and, when found, they vary widely, which may represent both real differences as well as differences in the attribution of costs to the immunization program.[7] GAVI has recognized the dearth of good data on immunization expenditures, and has commissioned the preparation of various estimates. Obtaining better data remains a high-priority challenge.

Spending has been estimated at 0.03, 0.1 percent and 0.09 percent of GNP in in-depth studies of Morocco, Bangladesh and Côte d'Ivoire, respectively, corresponding to US$0.38, 0.23 and 0.63 per capita, annually, for these low-income countries (Kaddar *et al*, 2000; Levin *et al*, 1999; and Kaddar *et al*, 1999). Relative to the entire government health sector budget, the government-financed portion of the immunization program

lower socioeconomic stratum used private services 5.3 percent of the time (International Institute for Population Sciences and ORC Macro, 2000).

[7] It is difficult, for example, to know what proportion of health sector infrastructure and staffing costs to attribute to on-going immunization efforts, and researchers cited have chosen different approaches (Over, 1988).

represents between 2.2 and 4.6 percent of all health spending. Interestingly, in this small sample of three countries, there is little correlation between the level of immunization coverage and the amount spent; Morocco has the highest DPT3 coverage, and spends the least per capita in absolute terms.

Mahoney *et al* (2000) present somewhat higher estimates, indicating that developing countries with a per capita GNP of less than US$3,000 allocate about 0.13 percent of GNP to immunization services. In middle-income countries, about **x** percent of GNP, or about US$0.**, is spent annually on public immunization programs (**citation and figures pending**).

The costs of an immunization system are largely recurrent ones. The studies in Morocco, Bangladesh and Côte d'Ivoire found that recurrent costs represent about 90 percent of the total in all three countries, with health worker salaries accounting for 50-60 percent of all costs. Vaccines, the second largest line-item in an immunization program budget, account for 20-30 percent of the total costs. Much smaller shares of recurrent costs are attributed to supplies (1-4 percent), transport (2-5 percent) and social mobilization (1-3 percent). Capital costs, which together account for about 10 percent of the total in the three countries studied, are mostly accounted for by buildings (5-8 percent), vehicles (less than 1 percent) and refrigerators and other equipment (2-4 percent). A study prepared by the Asian Development Bank (ADB), which used a somewhat narrower scope to define immunization program inputs, found that vaccines account for about 35-54 percent of total program costs in Laos, Cambodia and Viet Nam (Schwartz and Loevinsohn, 1999).

B. ***The Current Gap***. It has been estimated that the cost per fully-immunized child (FIC) in the developing world (both low-income and middle-income) is about US$15-20 (Brenzel and Claquin, 1994; De Roeck and Levin, 1999). Assuming that US$20 is a reasonable estimate for the easiest-to-reach children (i.e., those already being reached by the immunization system), but that serving the harder-to-reach populations (i.e., the difference between the current level of coverage and the ideal of 100 percent), might require significantly more—perhaps on the order of US$30 per fully-immunized child—we can calculate the gap between current expenditures and requirements for full coverage. Given a birth cohort in the developing world of 83 million children in low-income countries, and 29 million children in middle-income countries (and an estimated current coverage of 65 percent in low-income countries and 85 percent in middle-income countries[8], we estimate total annual expenditures for coverage today at US$1.56 billion (of which about US$1.1 billion is for low-income countries). To cover every child with EPI vaccines would require an additional US$870 million annually in low-income countries, and US$130 million in middle-income countries—a gap totaling US$1 billion. In all, full EPI coverage of all children in low- and middle-income countries (exclusing hep B) would require expenditures representing between 1 and 5 percent of total current health spending.

[8] Averages to be verified.

Other estimates can be found in the literature. Bhushan (1999) estimates that in Asia (including India and China), universal coverage of routine EPI vaccines (excluding hep B) would require an additional US$12-15 million for the program; this implies a total expenditure for 100 percent coverage of US$125 million to finance vaccine and other program inputs. Looking only at the inputs of vaccines themselves, it has been estimated that the EPI procurements to cover all children in the developing world would represent the equivalent of about US$173 million (assuming a wastage of 10 percent) (Mahoney *et al*, 2000).

C. ***Sources of Financing***. Again, there is wide variation in sources of financing across countries and over time—and tremendous gaps in information, particularly about private sector spending. Country case studies have found that in the very low-income country of Bangladesh (GNP per capita of US$260), the government accounts for 58 percent of total immunization system costs, donors provide 19 percent of the total, and a World Bank loan—in the gray area between domestic and external financing (see Box 3)—provides the remaining 23 percent of program funds. In Morocco, with a higher per capita income of US$1,250, public funds account for 73 percent of program expenditures, donors provide only 4 percent, and a World Bank loan accounts for 23 percent. In Côte d'Ivoire, with a per capita income of US$700, program funding is split between the government (66 percent) and donors (34 percent). In middle-income Latin American countries, domestic funding accounts for almost all spending on immunizations, except for technical assistance provided by the Pan American Health Organization.

Box 3.
Are Loans External or Internal Resources?

Loans from international development banks fall into the gray area between external and internal sources of financing. If the interest rate is at or close to the market rate, then it makes sense to consider them part of a national government's contribution to the immunization program. If the interest rate is far below market, as is the case for the loans available under the World Bank's International Development Association (IDA) facility, then the subsidized share of the loan—typically calculated to be about 65 percent—is in fact the equivalent of an external grant, and the remaining 35 percent is fundamentally domestic.

Both market- and low-interest development loans are different than standard, tax-based public sector funding, however, because they imply an on-going relationship with an outside agency that is not directly part of a country's political or administrative structure. The availability of loan funding (overall, and for specific sectors and programs) is determined largely by factors outside the control of a national government. Similarly, the use of the loan resources—how much movement is permitted among funding categories, for example, and how procurement is managed—is subject to the rules and regulations of the development banks, rather than the national governments.

Although loans are a potentially important source of financing for domestic expenditures, their use for this purpose has been limited to date—in part because grant funds have been forthcoming. Currently, immunization-related lending (commitments) accounts for less than 10 percent of the US$3.6 billion overall health sector development lending portfolio of the World Bank.

With respect specifically to vaccines, donor funding plays a prominent role, with the proportion of donor funding only roughly corresponding to the income level of the

country. UNICEF identifies 29 countries with per capita income less than US$785 that contribute less than 25 percent to financing their EPI vaccine purchases; of these, 17 are completely dependent on donors for their vaccine supply. At the same time, another 24 low-income countries finance 25 percent or more of routine EPI vaccines, with countries including Burkina Faso, Ghana, Honduras, Nicaragua, Nigeria, Pakistan and India, among others, financing very close to 100 percent of all vaccine purchases. Virtually all middle-income countries finance vaccine purchases solely with domestic (public) funding.

From the donor perspective, support for immunization programs in general, and vaccines in particular, represents a very small share of contributions to the health sector, and a tiny share of all overseas development assistance (ODA). According to the ADB study, total ODA from members of the Organization for Economic Development and Cooperation amounted to a total of US$66.5 billion in 1995 (representing about 0.27 percent of GDP for the donor countries). Of that amount, 5.6 percent were committed to health and population programs (Schwartz and Loevinsohn, 1999). Given the numerous types of investments that donors are involved in within health, it is reasonable to assume that spending on immunization constitutes less than one-fifth of that total, or perhaps around 1 percent of ODA.

D. ***How Much Will be Needed?*** It is one thing to estimate current spending on immunization systems, a bigger challenge to estimate future requirements for EPI vaccines, and an entirely different and still more complex task to estimate the costs of introducing newer vaccines. Mahoney *et al* (2000) estimate that it would cost an additional US$9.83-18.16 per child, and a total for the developing world of US$1.13-2.09 billion, to introduce five new vaccines. These figures are calculated based on the optimistic scenario of 10 percent wastage rates, and an average of $0.50 for each of the three doses of five new vaccines.

Bhushan (1999) estimates that in Asia the additional resource requirements associated with the introduction of hepB (at 50 percent coverage level) amount to US$90 million. Even more ambitiously, universal coverage of EPI vaccines, hepB and Hib would require an estimated US$943 million for the immunization programs.

E. ***Determinants of Future Resource Requirements.*** Resource requirements for both the routine EPI immunization programs and for extension to new vaccines are likely to change dramatically in the next five to 10 years as a result of the factors listed below. Of these factors, only the first can be forecast with some degree of confidence; the remainder have a somewhat unpredictable course, and estimates would have to be made on the basis of clear assumptions.

- Population growth. The size of the birth cohorts in the developing world, and particularly the lowest income countries, will continue to increase for the foreseeable future. In 2010, the number of babies born in the developing world will be approximately 1 million greater than today.

- Cost of reaching marginal populations. The additional unit cost of immunizing children currently not reached with the traditional EPI vaccines is not known, but is likely to be substantially higher than the average costs estimated to date. Although the cost of social mobilization to stimulate demand may not be very high, relative to total program costs, geographic remoteness implies high transport, cold chain and personnel costs.

- Price of traditional EPI vaccines. Changes in demand, the number of producers in the market, the efficiency of manufacturing processes, and volume, type and stability of financing available for procurement of the traditional EPI vaccines, and inflation in key inputs may make them marginally more expensive over the medium term.

- Development and introduction of new versions of EPI vaccines. Currently afoot are research efforts designed to make traditional EPI vaccines easier (and cheaper) to deliver. For example, there is active research to develop a measles vaccine that would not require cold storage, and/or that could be delivered orally or though another non-injection mechanism. While these are products that will come to fruition only after a long period of research and testing, if at all, the costs associated with getting vaccines to children at risk could be significantly reduced. At the same time, prices charged for the new products may be much higher than for the traditional versions, making the net effect impossible to estimate.

- Development and introduction of vaccines for other diseases. In addition to Hib, hepB and yellow fever, other new vaccines (rotavirus, pneumococcus and others) will soon be available for introduction into national immunization programs. The pricing may follow the traditional course: high during product launch, as manufacturers first confront a small market and are eager to recoup their research and development costs; lower as the market is penetrated; and then lower still as the product reaches maturity, with the market expanding widely and manufacturers achieving greater efficiencies. On the other hand, prices for the new vaccines may drop more slowly—and ultimately not as much—as has been the case for the traditional "pennies per dose" EPI vaccines. Prices for new products may remain relatively high over time due to the costs of meeting new regulatory requirements; the costs of procuring and securing intellectual property; the costs of high technology manufacturing processes; and the inability to achieve the economies of scale associated with production of the older vaccines. It is likely that even over the long run the newer vaccines will be priced at levels significantly higher than the traditional vaccines—perhaps on the order of US$2 per dose. While several researchers have attempted to estimate future costs of introduction, and there are active discussions between development agencies and manufacturers to keep prices for low-income countries at affordable levels (even for the new products), the actual trajectory of prices offered to developing countries is uncertain.

- Changes in the efficiency of the health care system, and/or health worker salaries. Estimates of future resource requirements are based on current patterns of organizing health services, and paying and deploying health workers. Recalling that personnel

costs represent about 60 percent of total program costs, this assumption has large implications. Reforms currently being introduced or strengthened in many developing countries, both within the government health sector and in the broader realm of the civil service, have the potential to change personnel costs and performance.

F. ***Conclusion***. Although the figures presented above are far from definitive—and in fact their shortcomings should stimulate further data collection and analytic work—three key messages should be clear:

- First, ***expenditures on basic immunization programs, including all sources of funding, represent a very small share of health sector spending.***

- Second, ***within immunization programs, vaccine purchases account for a significantly smaller share of spending than the operational costs—and particularly the salaries for health workers.***

  Therefore, the fact that many low-income countries rely to a large extent on international aid to support key program inputs (particularly vaccines) is not due to an absolute lack of funds, strictly speaking. Rather, it is due to a combination of availability of international resources for this purpose, and the reluctance of political leaders to divert spending from other priorities, in the face of tight budget constraints.

- Third, ***future funding requirements are uncertain*** because there is no way to estimate with confidence: (a) the cost of reaching marginal populations; (b) the price of vaccines, including the traditional EPI vaccines, improved versions of EPI vaccines, and entirely new products; or (c) the changes in the costs of other program inputs. At the same time, for the purposes of individual country planning exercises over a medium-term horizon, a set of reasonable scenarios for resource requirements can be established, based on assumptions about the trajectory of the cost of key inputs.

III. WHAT IS SUSTAINABLE FINANCING?

A. ***The Traditional Concept of Financial Sustainability***. The concept of financial sustainability of health sector development programs emerged in the 1980s, when donor agencies observed that many of the large-scale investments in health care infrastructure made 10 to 20 years earlier were deteriorating dramatically. Developing country governments, facing severe economic hardships and many competing demands for scarce resources, often failed to maintain facilities, provide adequate staffing, or ensure the availability of drugs and supplies. The health centers and posts that had been relatively functional when aid flowed too often ended up as empty (and soon crumbling) shells when the national government bore a greater responsibility for financing.

It became apparent that the priority that development partners placed on primary health care and core health interventions, including immunization, was not always shared (or adopted) by host governments. In addition, donors noted that even when recipient governments did place a high priority on primary health programs, international aid for immunization and other basic interventions often displaced domestic resources, freeing up national funds for lower-impact activities. The mismatch between stated priorities and the allocation of the national health budget has often been rationalized: "If donors will pay for the basic services, then we can use our money for the hospitals."

As the international development community became alarmed in the 1980s by the rapid depreciation of investments in the health sector, so academics and others in developing countries began to observe the down-side of the generosity of aid agencies. International aid was found to be unreliable as geographic and thematic priorities changed, and as the fortunes of wealthier countries waxed and waned. With an initial infusion of funds—often directed toward construction of new facilities—unrealistic expectations were built up among the citizenry. Then, after a cessation or reduction in aid, beneficiary governments were often left with the unwelcome responsibility of maintaining a government health system that was extended beyond the public sector's financial means.

Experience has taught the developing world that the priorities of donors are subject to a variety of forces: Geopolitical changes have been shown to elevate the importance of providing new or additional aid to one set of countries, while diminishing the emphasis of giving aid to others. The trajectory of aid to African countries, for example, partially paralleled the course of the Cold War. Donor commitments to Central American countries have also tracked political events.

Across sectors, priorities have changed as one school of thought about the process of development cedes ground to another. This has been seen as the pendulum as swung between investments in the productive sectors to investments in the social sectors.

Within the health sector, new understanding of the causes of diseases and the problems inherent to health systems—and new conceptual frameworks and methodologies for identifying priorities—have had dramatic implications for the types of interventions that donors seek to support. For example, in the late 1980s and early 1990s, international attention began to turn from support to specific disease control programs and health interventions, such as maternal and child care, to more system-wide concerns of organization and financing. On a parallel track, in 1993 the World Development Report, *Investing in Health*, brought new emphasis to the concept of investing in interventions that are cost-effective and that correspond to the diseases that extract the highest toll (World Bank, 1993; Jamison et al 1993; Bobadilla et al, 1994).

Variability in the volume and orientation is manifested in the field of immunization. UNICEF funding of immunization programs, for example, fell from a high of US$181 million globally in 1990 to US$60.5 million in 1998. USAID commitments for immunization support were about US$60 million in 1987, rising to

more than US$67 million in 1993, and then falling to less than US$50 million in 1998. Within immunization, support among some donors, including USAID, has shifted away from general EPI to polio eradication measures in recent years (Bhushan, 1999; De Roeck and Levin, 1999).

In addition to being fraught with insecurity, the "free" money obtained as grants or as the concessionary portion of low-interest loans from development banks may often come at quite a high price. The support may be in the form of tied aid (funds that can only be used for purchase of goods or services of specific national origin) or aid in kind (most often, consultancy services in lieu of cash). The support may be linked to policy conditions and/or the achievement of performance targets. Finally, transaction costs for obtaining access to and using the funds are high.

Recognizing the limitations of development assistance and frustrated with the persistence of patterns of national resource allocation that have not favored primary health care, in the past couple of decades both donors and recipient countries have moved to reduce dependency on external support for health programs. The efforts made have been under the rubric of "financial sustainability," which has generally been taken to mean a country's ability to mobilize and allocate sufficient *domestic* (public and private) financial resources. "Sustainability" typically has been synonymous with "self-sufficiency."

Several strategies have been employed to develop long-term financial support for health systems, diversifying sources of financing away from external aid. These include, among others: (a) the establishment of *efficiency- and equity-based criteria* for public sector spending; (b) the introduction of *user fees*, which have the potential to offset some of the costs to the public sector and to signal both providers and consumers to preferentially use certain services instead of others;[9] (c) introduction of *efficiency measures* (including contracting with the private commercial and non-profit sectors) to reduce costs of service delivery; (d) promotion of risk-pooling and private financing through community-based and other forms of *health insurance*; and (e) *greater private sector participation* in the financing and delivery of clinical services, and a corresponding reduction in the burden on the public sector. In some countries, including Colombia and Zimbabwe, these strategies have been applied on a system-wide basis. In others, they have been applied specifically to programs such as family planning that have traditionally received substantial donor support.

The concept and instruments for financial sustainability are perhaps best developed for family planning services, where many countries have been able to mobilize a diverse and sustainable set of domestic funding sources for all or most of their family planning programs. Other basic health services have also had some success in reducing dependence on external financing (see Box 4).

[9] For example, if user fees are put into effect at hospital outpatient clinics but not at stand-alone health centers, this can signal patients to user the less costly health centers.

B. ***Applying the Traditional Concept of Financial Sustainability to Immunization***. Although it is relatively easy to see the dangers for immunization programs of high levels of dependence on external aid and thus the imperative to increase the commitment of developing country governments, the traditional "self-sufficiency" arguments work less well for immunization than for many other health services. This is the case because:

- ***Immunization financing does not lend itself to some of the strategies typically employed to foster sustainability***. For example, in contrast to financing of some types of curative care, user fees have been shown to reduce utilization of immunization services in many contexts (England et al, 2001). Unlike the case of family planning, the market for private provision of immunization services is limited. Similarly, insurance financing of a classic preventive intervention directed at children is likely to be very limited in most countries. In short, while for other types of services a push toward "self-sufficiency" can mean shifting from external toward private financing, for immunization "self-sufficiency" means near total dependence on tax-based, public spending.

- ***Short-term, unpredictable fluctuations in financing for immunization programs have disproportionate impact***. The health benefits of immunization depend, to a large degree, on reaching relatively high levels of coverage among cohort after cohort of children, and thereby interrupting disease transmission. Immunization programs can function only when a specific set of inputs (principally vaccines, cold chain equipment, vehicles,

Box 4.
The Challenge of Sustainability for Other Health Services

A concern for sustainable financing is not unique to the field of immunizations. Other health programs, family planning and primary health care in particular, have approached this challenge in various ways, some of which have been quite successful. In Thailand, Indonesia and Cambodia, for example, a combination of five strategies has been successful in promoting the financial and programmatic sustainability of family planning programs. These include: demand generation, principally through extensive "information, education and communication" activities; targeting of public subsidies to the poor (and, of equal importance, targeting cost recovery efforts at individuals and groups where a willingness to pay already exists); developing alternative delivery strategies, primarily by encouraging participation by non-governmental organizations and for-profit providers in service delivery; improving management and efficiency, with a strong focus on human resource policies and internal incentive structures; and diversifying the service base of family planning clinics to include fee-charging medical and surgical services, and using the income generated by these activities to cross-subsidize family planning services for the poor (Smith *et al*, 1998). In Colombia, PROFAMILIA, a large NGO that historically received donor aid to finance reproductive health services, now operates under a combination of government contracts and private financing.

In the case of primary health care, the main strategy for promoting financial sustainability has been the use of community financing schemes (such as those of the Bamako initiative) in which the recurrent cost of pharmaceuticals or health center operations is met, at least in part, by community contributions. These efforts have been variably successful, with some health centers running surpluses and others requiring ongoing external support, though their broader impact on quality of care and community responsiveness has been generally positive.

fuel and personnel) are available on a reliable basis. Thus, there are serious and long-term health consequences associated with short-term fluctuations in the availability of resources—such as those often seen in the domestic resource allocation process.

- ***Funding requirements to achieve optimum health benefits may increase quickly, while the political culture in developing countries may be slow to change.*** The potential introduction of new and more costly vaccines, continuing uncertainty about international pricing mechanisms, and unanticipated costs associated with reaching populations that previously had attained low levels of immunization coverage all may add up to large increases in funding requirements for some countries in the near future—and for most countries in the medium term. Given the slow pace of change in both the budgeting process (still done on an historical basis, for the most part) and the tax base, it is unlikely that public sector allocations in developing countries will keep pace with rapid escalations in the costs of immunization programs, even if the cost-effectiveness of those investments could be demonstrated. If "self-sufficiency" were the goal, governments that were successful could find themselves further and further from achieving the potential health benefits associated with immunization. The growth of the health gap between rich and poor countries will accelerate.

- ***Some long-term international support may be justified on the basis of global externalities***. Vaccine-preventable diseases do not respect national borders, and thus better health conditions in the developing world have direct benefits for the health of the citizens of wealthier nations. This is clearest in the case of eradication programs: the eradication of polio, in fact, has greater benefits for rich nations than for poor ones (Taylor *et al*, 1997). Given this situation, it is expected that developing countries would systematically under-invest in immunization without external assistance.

- ***Some level of long-term international support may be justified on the basis of equity objectives.*** Increased immunization efforts have the potential to greatly benefit poor communities, which have much lower access to (and use of) immunization services, and are affected by a large number of risk factors, such as undernutrition, that make them more vulnerable to suffering severe harm in the face of outbreaks. Properly structured investments in immunization can meet an equity objective, which often is prominent in the justification for the work of international aid agencies.[10]

C. ***Broadening the Concept of Financial Sustainability for Immunization Programs***. As noted above, financial sustainability traditionally has meant domestic "self-sufficiency" in financing, and often applied to situations where external financiers (aid agencies) sought to induce developing country governments to take on the responsibility for funding activities that previously had been donor-funded. However, the nature of

[10] It is important to note that investing in immunization by itself is insufficient to achieve equity objectives. In a recent review of household survey data from 39 countries, children from the richest households were found to be receiving almost twice as much benefit from immunization programs as those from the poorest households, with 67.9 percent coverage in the richest group vs. 37.9 percent in the poorest (Gwatkin, 2000).

immunization and the international interest in the success of immunization programs may require that the focus on sustainability be shifted toward the *ability of a country to mobilize and allocate sufficient domestic and external resources on a reliable basis to achieve target levels of immunization performance*. The emphasis turns away from single-minded attention to phasing-out external funding, and toward the question of how to structure the full financing package—and, importantly, how to use available resources efficiently—so that sufficient funding is available on a reliable basis.

This departs from the traditional understanding of financial sustainability by considering that the key to sustainability in the foreseeable future may be the *stability* of funding, rather than strictly the *source*. Even if it is fully understood that immunization financing is primarily a domestic and public sector responsibility, and the long-term goal is increased domestic commitment, financial sustainability over the foreseeable future can be achieved by employing a combination of domestic and external resources.[11] From this point forward in the paper, we will employ this concept of "financial sustainability."[12]

If *self-sufficiency* were the objective underlying the GAVI financial sustainability plans, the challenge would be great. It would require concerted political action to increase the share of domestic spending on immunizations. However, if *stability* is an equally important aspect of financial sustainability in this case, the challenge is even greater, and will likely require new—and more nuanced—instruments. Stability requires mitigation of the risks associated both with uncertainty about future funding requirements, and with the inherent insecurity in both domestic and international resource flows. It requires that safety nets are put into place, so that rapid declines in one source of funding (for example, tax-based domestic financing) are offset in a timely fashion by other sources (hypothetically, an international emergency fund). But the design of such a safety net should not induce developing countries to abdicate what is primarily a national responsibility. Similarly, a focus on stability requires that rapid increases in costs are accompanied by expansion in financing. At the same time, the promise of financing should not create an incentive to artificially elevate prices of program inputs.

Given all of this complexity, what can be done? The following section attempts to describe the dimensions of a system that has stable financing, at a level that permits achievement of coverage targets. These dimensions will later be used to classify policy options and performance indicators.

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[11] As hinted earlier, this definition begs the question: Over the long term, should wealthier countries commit to paying for the immunization programs of poor countries? We do not seek to answer this question, which is fundamentally an ideological (or philosophical) one. The definition proposed is based on the reality that many poor countries will, for one reason or another, be unable to adequately fund immunization programs. Given that some level of international assistance is likely to continue, the practical issue becomes how to ensure that it is stable, thereby maximizing the health impact of immunization and achieving greater efficiencies.

[12] Readers will recognize the risks of redefining a term that has an accepted meaning in the literature. GAVI may wish to use a different term altogether—such as "stable financing"—and eliminate references to financial sustainability.

D. ***Dimensions of Financial Sustainability***. The immunization system can be divided into two parts: First, a typical *supply chain* structure, with the standard building blocks—supply, transportation and distribution, delivery to patients—and the corresponding supporting blocks of planning, information systems and control, and management of resources and personnel (Shah *et al*, 2001). Second, a *funding structure* to enable the continued existence and operation of the supply chain. This funding structure includes availability of maintenance and operational costs (purchase of vaccines and consumable materials, direct labor and other recurrent costs associated with the immunization program, maintenance costs of facilities and equipment used for the immunization program); availability of capital funds specifically associated with the immunization programs; the stability of the flow of funds from the source to destination points; and the balance of public, private and external financing. In all, this leads to *results*, such as the number of children receiving immunization at the right ages, coverage equality (across geographic and income groups), as well as overall measures of efficiency, such as cost per fully-immunized child.

Financial sustainability, as defined above, is characterized by a situation in which the supply chain operates as efficiently as possible, and the funding structure is balanced and stable. The dimensions of financial sustainability are listed in Box 5, and described briefly below.

Box 5. Dimensions of Financial Sustainability

Lower Costs through Efficiency in the Supply Chain

- Sustained high demand
- Efficient vaccine procurement
- Efficient immunization services

Reliable and Sufficient Revenues through Appropriate Funding Structure

- Reliable and sufficient funding for vaccines
- Reliable and sufficient funding for labor and other non-vaccine recurrent costs
- Reliable and sufficient funding for capital investments
- Timely resource flows from source to service delivery points
- Balance between public and private financing
- Effective mobilization and management of supplementary, external resources and long-term financing

Efficiency in the Supply Chain. The key dimensions of keeping costs of the immunization system as low as possible include:

(1) ***Stimulating and maintaining demand, and ensuring that barriers to access are low for socially vulnerable populations***. High and enduring demand for immunization services is a fundamental pre-requisite for a financially sustainable system because such demand: (a) reduces the average cost of reaching children, and reduces the waste associated with delivery of only a partial set of immunizations; (b) creates a potential constituency for the all-important job of persuading politicians to allocate resources for immunization programs; and (c) in selected contexts leads to the possibility that the private sector can play a role in providing immunization services to a certain portion of the population, thereby reducing the financing burden on the public sector.

Demand is made effective only if the geographic, economic and cultural barriers are low enough that parents actually take their children to get vaccinated, once they have a wish to do so. In many low-income countries, mass immunization campaigns (such as National Immunization Days) have been used successfully to reach children—even children of parents who otherwise might be disinclined (or unable) to visit health posts or health centers. However, over the long term, childhood immunization programs that achieve consistently high levels of coverage depend on parents' initiative and action—and correspondingly on a health system that minimizes barriers to access. The higher the level of coverage sought across all geographic areas in a country—that is, the more that immunization programs are reaching marginalized populations[13]—the greater the importance (and potential cost) of ensuring access to services.

(2) ***Attaining efficiency in vaccine procurement***. Small and/or cash-poor countries with insecure financing mechanisms constitute a part of the market that is generally not of much interest to private manufacturers. They face relatively high prices, reflecting the additional risks to the supplier, as well as relatively high transaction costs. The extent to which vaccine procurement practices, such as the international procurement mechanisms developed by UNICEF, can be structured to reduce those risks—while at the same time not driving prices so low that manufacturers lose interest—will largely determine the costs, quality and reliability of the vaccine supply (see Box 6).

In some countries, governments have sought to reduce vaccine costs by investing in domestic production. While efficiency gains may be obtained under some conditions, in general this has proven to be a costlier approach than buying on the open market, using existing international procurement mechanisms (Milstein, 1999; Batson et al, 1994; Hausdorff, 1996; Mahoney and Maynard, 1999).

Box 6.
Low Prices Are Not the Only Objective

From one country's perspective over the short run, the most desirable outcome of the procurement process is to attain the lowest possible price for vaccines. However, it is useful to remember that there are tradeoffs between low prices, on the one hand, and high quality and reliability of supply, on the other. The prices paid for vaccines must be high enough to ensure that manufacturers will maintain or expand their production capacity, and invest in research and development toward improved products. Long-term sustainability is best served by procurement mechanisms that recognize the need to provide industry with an incentive to continue to produce quality products.

(3) ***Attaining high levels of technical efficiency.*** One of the major features of a program that can, over the long term, achieve stable financing is the ability to monitor and minimize wastage. Resource wastage can be reduced by better utilization of personnel and health facilities, reduction in loss of vaccines due to poor handling and weak logistics systems,[14] and reduction in

[13] Depending on specific context, marginalized populations may be low-income, rural, part of a linguistic minority, and/or part of ethnic or cultural groups that have experienced discrimination.
[14] Vaccine losses can be very high. WHO estimates that in 1992, "almost 60 percent of vaccines were thrown away because of doubts about their potency after breaks in the cold chain and possible damage from

use of immunization program resources (refrigerators, vehicles) for purposes that do not benefit the program.

The magnitude of recurrent costs is partially determined by the quality of planning and management. This quality is reflected in the accuracy of the vaccine requirement forecasts, the quality of stock management, the efficiency of service organization (e.g., the number of immunization sessions; national immunization days versus continuing provision of immunization within primary health services); the adoption of an open-vial policy, and other measures (Phonboon, et al, 1989; Robertson et al, 1984; Brenzel and Claquin, 1994; Feilden, 1995; DeRoeck and Levin, 1999).

Appropriateness of the Funding Structure. The key dimensions of raising sufficient and reliable revenues are:

(1) ***Mobilizing reliable and sufficient financing for procurement of vaccines to attain specified coverage.*** It is self-evident that an immunization program cannot be sustained without the vaccines—delivered to service points without loss in potency (i.e., cold, for heat-sensitive vaccines, and within the expiration date). Procurement of vaccines requires not only the availability of a steady flow of funds, but also the availability of foreign exchange in cases where countries are buying from international manufacturers.

(2) ***Mobilizing reliable and sufficient financing for labor and other (non-vaccine) recurrent costs specifically associated with immunization programs***. As noted, non-vaccine inputs represent the largest share of expenditures. Health worker salaries, above all, contribute to the financing burden. In addition, expenditures on syringes, transportation, cold chain maintenance, information campaigns, and other inputs contribute to the total funding requirements of an immunization program. Typically, even in poor countries the availability of funding for health worker working conditions (including salaries) are "protected," if by no other means than politicians' fears of the reaction of unions. Expenditures on non-personnel inputs, however, have long been vulnerable to rapid changes, and may be particularly vulnerable in decentralized settings.

(3) ***Mobilizing reliable and sufficient funding for capital costs specifically associated with immunization programs***. Capital costs represent a relatively small share of all expenditures required to keep an immunization system working—but without them, there is no cold chain or other necessary infrastructure. Investments that require foreign exchange—such as many of the components of the cold chain, as well as vehicles for field workers—are particularly vulnerable.

(4) ***Ensuring timely resource flows from source of funds to service delivery points.*** In most countries—industrialized, middle-income and low-income—the central government plays a strong role in financing the immunization system, because immunization is recognized as a public good, and because of the economies of scale that can be realized in the procurement of vaccines. Typically, a central authority purchases the national

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exposure to high temperatures. . . [T]o reduce unnecessary wastage by 10 percent . . . will provide a saving of US$10 million annually." (http://who.int/vaccines-access/Vaccines/Vaccine_Supply/wastage.htm)

vaccine stock using national (and international) funds, and takes responsibility for distributing it to the provincial authorities, who then distribute to district and local levels. Similarly, funding for at least a portion of other immunization-related inputs is transferred from the central government to local authorities (Feilden and Nielsen, 1998; WHO, 1999).

The allocation of funding for vaccine and/or other immunization system inputs at the central level rarely guarantees that the necessary resources will reach the service delivery points. Both legal and illegal diversion of funds presents a chronic challenge. There are indications that this is particularly problematic in decentralized settings, where local authorities have greater discretion about the spending of health sector budget. Reports indicate that in decentralized contexts, funds originally directed to support immunization are frequently used for other (health-related) purposes that are seen as higher priority. Erosion of immunization coverage has been reported (WHO, 1999).

(5) ***Balancing public and private financing***. As noted earlier, immunization systems are largely public, and with good reason. In one study, private involvement in immunization services was estimated at between one and 10 percent of immunizations in most of the countries surveyed, with the remaining 90 to 99 percent being met by the public sector. The range of estimates was, however, quite wide, with several countries estimated to have a zero contribution (Cambodia, Yemen, Albania and Benin, among others) and others estimated to have contributions as high as 30 percent or more (Cameroon, Lebanon, Lesotho) (De Roeck and Levin, 1999).

Recognizing the active involvement of the commercial and non-profit sector in health service delivery in general, there is reason to examine the actual and potential contribution of privately-financed immunization services within the full context of financial sustainability. Private providers can decrease the amount of public money required for an immunization program by providing their services without drawing on the public purse. This can have the added advantage of allowing a government to better extend its own limited resources to the poorest and hardest to reach (see Box 7).

(6) ***Effectively mobilizing and managing supplementary, external resources and long-term financing***. If it is accepted that financial sustainability of immunization over the foreseeable future includes some external financing, either in the form of direct grants or subsidized development loans, then the effective mobilization and use of those external resources needs to be carefully thought through. Experience has shown that external funding can work against the objectives of increased efficiency of service delivery, for example, and can reduce incentives for domestic investments. Mitigating against these negative effects requires close collaboration among development partners, and between donors and beneficiary governments.

Box 7.
What Role Exists for Private Financing of Immunization?

In the health sector as a whole in developing countries as well as industrialized ones, the private sector is a very important (and often undervalued) participant. Private provision of services typically accounts for about half of all health care use in developing countries, even where the government nominally has taken on the responsibility of providing universal coverage through publicly-owned and –operated facilities. In differing ways, members of both rich and poor households use private services to obtain treatment for illness and, to a much lesser degree, preventive care. Recognizing this, health policymakers take into consideration the current and potential role of both out-of-pocket payments and insurance-based financing, as part of the financing mix.

The potential positive role of private financing has received little attention in discussions of how to pay for immunizations in developing countries. In fact, although some countries—notably China—employ user fees to partially finance immunization services, an international consensus is emerging against the application of user fees for immunization. This is primarily because there is demand for childhood immunization services that may be quite price-sensitive in developing countries (unlike in industrialized ones, where price is insignificant in determining demand) (England, *et al*, 2001; Frank, *et al*, 1993). Even relatively well off segments of the population are willing to rely on the public sector for preventive services and, seeing little profit margin, private providers may not promote (or even offer) vaccination services. Looking at insurance-based financing, we see that insurance coverage is low in general in the developing world, and even among those individuals who are insured many do not have benefit packages that include immunizations for dependent children.

There is a difference, however, between envisioning a small role for private financing and excluding it altogether from the financing strategy. Although immunization is largely a public good that benefits society at large, it also directly benefits the individuals being vaccinated, and so it is likely that there is at least some private demand among segments of the population that can afford to pay for services and that understand the benefits of prevention.

Prospects for financial sustainability are marginally enhanced when the private provision (and financing) of immunizations is facilitated. Such facilitation can be in the form of ensuring that private providers have access to quality vaccines and vaccination supplies at a reasonable (or zero) price; providing information resources to private physicians (such as fact sheets about who should be immunized, and when); permitting private providers to offer new vaccines that are not on the country's official vaccination schedule; ensuring the quality of vaccines that are available through private markets; and providing minimal tax or other incentives to insurers that include childhood immunization as part of a benefit package.

IV. HOW CAN GOVERNMENTS ACHIEVE ADEQUATE AND STABLE FUNDING FOR IMMUNIZATION?

To move to a situation in which funding for the immunization system is adequate in volume and reliable from year to year, developing country governments can introduce or strengthen specific policies, and can enhance program management in particular ways. These are actions that recipient governments may wish to consider when putting together their plans for financial sustainability under the GAVI mechanism. Keyed to the dimensions of a financially sustainable system described in the previous section, these actions are summarized in Box 8, with the strongest measures indicated in boldface type.

Box 8.
Government Actions to Foster Financial Sustainability

Lower Costs through Efficiency in the Supply Chain

Sustained high demand
- Identify level of existing knowledge of and demand for immunization
- Sponsor public information and social mobilization programs
- Manage public information
- Conduct situation analysis to identify critical barriers
- **Develop targeted program to reduce barriers (new delivery strategies through public or private sectors)**

Efficient vaccine procurement
- **Use international procurement mechanisms (PAHO, UNICEF)**

Efficient immunization services
- Systematically assess sources of waste
- **Develop and implement targeted program to reduce waste, with quantitative endpoints**
- Explore potential for outsourcing support functions

Reliable and Sufficient Revenues through Appropriate Funding Structure

Reliable and sufficient funding for vaccines
- Forecast requirements accurately
- Develop line-item in national budget
- **Foster political and/or legal mandate for baseline funding level**

Reliable and sufficient funding for labor and other non-vaccine recurrent costs
- Estimate total program costs
- **Promote allocation of resources on the basis of cost-effectiveness and public finance principles**
- Develop line-item in national budgets
- **Foster political and/or legal mandate for baseline funding levels**
- Determine potential for private sector partnerships
- Determine potential for insurance coverage of immunization

Reliable and sufficient funding for capital investments
- Put aside funds annually, based on amortization schedule

Timely resource flows from source to service delivery points
- Create complete and accurate sub-national plans
- Develop line-item in sub-national budgets
- **Earmark funds and establish performance targets for sub-national entities**

Balance between public and private financing
- Assess current patterns of use and financing
- Identify barriers to greater private sector participation and low-cost ways to overcome them

Effective mobilization and management of supplementary, external resources and long-term financing
- **Demonstrate increasing national commitment by adopting efficiency measures and assuring consistent relative domestic contributions**
- **Demonstrate commitment to "additionality"**
- **Coordinate support, and utilize financial planning tools**
- **Negotiate long-term financing**

A. *Lower Costs through Efficiency in the Supply Chain*

(1) ***Stimulating and maintaining demand, and ensuring that barriers to access are low for socially vulnerable populations***. The actions that can be taken by government are, first, *to identify the level of existing knowledge of and demand for immunization*. Often this is best done using household survey methodology, with a range of specific questions to parents (typically mothers) regarding their understanding of the benefits and risks of immunization, as well as their knowledge of the appropriate timing and sources of immunization services. Once the knowledge strengths and gaps are identified, the government can *sponsor public information and social mobilization programs* through mass media, schools, health facilities, work sites, gathering places and other venues, targeting specific populations with immunization-related messages. While this type of social communication may seem remote from the question of financial sustainability, it is in fact central to it and, if well-targeted, constitutes a sound public sector investment.

Equally important is deft *management of public information in the event of outbreaks, widespread fears about adverse effects of immunization*, or other factors that may suddenly change the willingness of parents to expose their children to vaccines. The government has a key role to play in providing accurate, timely information to the general population, and thereby seeking to stem erosion in demand for immunization.

The government may wish to conduct a *situation analysis in low-coverage areas* to determine the magnitude and type of barriers, with special attention to the types of cultural barriers that can be remedied relatively cheaply, once identified. Based on the information obtained, the government can develop and implement a *targeted (and well-costed) plan to address specific barriers*. In the case of economic barriers, it is advisable to assess the potential for targeted demand subsidies—payments to parents who otherwise would not be willing to have their children immunized for them to complete a course of childhood immunizations.[15] In the case of cultural barriers, the preparation of materials in appropriate languages, or outreach by specially trained individuals who are members of the same cultural group, may reduce the obstacles to improved coverage.

In the case of geographic barriers, there are three possible approaches: One is to examine carefully the potential for (and cost of) mobile workers to travel regularly to provide immunization services, both through mass campaigns and to serve smaller groups of families. The second is to increase the resources for free-standing health facilities closer to the target communities. If this involves adding marginal resources for better immunization services within existing facilities, the benefits may outweigh the costs. If it involves construction and full staffing of new public facilities, it is very likely that—from a financial sustainability perspective—this would be an unsuccessful approach. The third approach is to identify non-governmental or private health services that serve the

[15] The introduction of demand subsidies will only work in settings where it is culturally permissible and technically possible for the government to officially provide non-universal (targeted) benefits. If the provision of demand subsidies to one group immediately implies that all groups in society will demand the same benefits and/or that the government will not be able to prevent high levels of leakage, then demand subsidies have the potential to send the immunization program further into the red ink.

community of interest, and induce those providers to deliver immunization services. This may require that the government contract with them to perform this service, reimbursing on a per-child (or per-immunization) basis at a sufficient level to maintain the providers' interest and enthusiasm. Although often seen as a drain on public coffers, contracting with health care providers outside the government system has been shown in several industrialized and developing country settings to be cost-effective in reaching poor populations, relative to publicly-operated services (**Guatemala citation pending).

(2) ***Attaining efficiency in vaccine procurement***. In general, developing countries can achieve the best prices for vaccines when they *participate in multi-country procurement mechanisms* that pool demand, such as UNICEF's vaccine procurement program. These mechanisms, though differing in their details, provide participating countries with the advantages of greater purchasing power, quality assurance, and reduced risks of default or late payment and/or delivery (De Roeck and Levin, 1999; Bhushan, 1999; Kaddar *et al,* 2000). All of these add up to lower prices and less wastage (see Box 6). In addition, under some circumstances participating countries are permitted to pay all or a portion of the costs in local currency, reducing the hard currency demands that are often problematic for countries experiencing economic hardships.

(3) ***Attaining efficiency in the production of immunization services***. Governments can realize tremendous savings by *systematically assessing sources of waste* in their immunization program, and *developing and implementing a targeted waste-reduction program*, with quantitative endpoints. Several technical agencies (including WHO and UNICEF) have developed innovative approaches to forecasting demand, improving logistics and storage functions, increasing the efficiency of service delivery, using data for programmatic decisionmaking, and generally improving management effectiveness.

A strategy that should be assessed in specific country contexts is the *outsourcing* (or contracting-out) *of support functions*, such as fleet management, transportation and storage. In a competitive environment, such an approach has the potential to reduce unit costs and improve quality and accountability within the immunization system.

B. *Reliable and Sufficient Financing through Appropriate Funding Structure*

(1) ***Mobilizing sufficient and reliable financing for procurement of vaccines.*** As noted earlier, vaccines represent a relatively small share of the total resource volume of an immunization system, but a low-income country may have a hard time mobilizing the required hard currency, particularly if the government has become accustomed to relying on donors to finance vaccine purchases. There are three possible actions that governments can take to promote the reliability of domestic sources of financing for vaccines.

First, they can *forecast the vaccine requirements and associated costs for a reasonable planning period* (five years is the planning horizon generally promoted by technical agencies). Methods for estimating vaccine requirements have been developed

taking into consideration the size of birth cohorts, assumptions about wastage and other variables (Kaddar, Makinen and Khan, 2000).

Second, the Ministry of Finance can *institute a line-item in national budgets* specifically for vaccine procurement. The potential advantage is that it provides specific and easily accessible information about the foreign exchange requirements. In addition, it provides advocates for the immunization program with information about the absolute and relative level of financial commitment that the government has for the immunization system.

Although the line-item can be useful, its importance can be overstated. The existence of the line in the budget does not guarantee that the allocation will be adequate. Similarly, budget allocations do not always translate into expenditures.

Finally, and most critically, government officials who are eager to ensure the long-term reliability of financing for vaccines have important political work to do. They must *gain political consensus within and outside of the health sector for earmarking a certain amount (typically of hard currency) for vaccine purchases over the planning horizon.* The amount could either be an absolute figure, or a proportion of total vaccine costs.[16] It could be based on something like a three-year historical (pre-Fund) trend of the share of total vaccines that are financed with domestic resources, and could be considered a baseline or threshold figure. Ideally, the earmarking should be done through a legislative process, giving it the force of law. However, in many cases it may only be possible to obtain an explicit political statement of commitment.

Debt relief for Highly Indebted Poor Countries (HIPCs) may provide a strong impetus for increasing domestic financing for vaccines—if the improvement of immunization is given prominence in these countries' poverty reduction strategies papers and if the long-term proceeds from debt relief are allocated to improving immunization programs. By one estimate, a commitment of 15 percent of the proceeds from debt relief would be enough for the average HIPC to finance the standard set of EPI antigens plus Hepatitis B (Fairbank and Makinen, 2000). Despite this potential, it is important to note that there are many claims on the funds released through the HIPC initiative.

(2) ***Mobilizing reliable and sufficient financing for labor and other non-vaccine recurrent costs***. The primary strategy here is a very strong one: *promoting the allocation of health sector funds on the basis of cost-effectiveness and the tenets of public finance theory.* Basic childhood immunization is characterized by its cost-effectiveness, which has been extensively researched and documented both in settings with high prevalence of immune-preventable diseases, and in low-prevalence contexts (Jamison et al, 1993; World Bank, 1993; Jamison and Saxenian, 1993; Shepard et al, 1995). Moreover, immunization's ability to confer benefits both on the individual receiving the vaccine and on society at large—its positive externalities—is widely recognized. Using

[16] If the percentage approach is used, then it is likely (but not certain) that the absolute figure would rise annually, reflecting increased demand and other factors influencing the cost of vaccines.

cost-effectiveness and public finance criteria, immunization comes out at or toward the top of the any list of public health priorities. It is likely that any movement by governments to inform resource allocation decisions on this basis, however incomplete and limited by lack of information, will favor immunization.

A secondary strategy is to *carefully identify the actual costs of the full immunization program*, to serve as an empirical basis against which to judge budget performance and to engender cost consciousness among program managers. As for the financing of vaccine inputs, it may be useful to institute a *line item in the national budget*, and to *foster political and/or legal commitments to provide a baseline level of funding for immunization*, protected from competing demands.

In middle-income countries, it may be possible to earmark funds for immunization from a tax on social insurance institutes, or private sector firms, if the arguments can be made regarding the economic benefits of a strengthened immunization program.

(3) ***Mobilizing reliable and sufficient financing for capital costs***. Technically, the proper way to budget for capital costs is to *estimate the rate of depreciation, and the corresponding amortization schedule*. Then, an *equivalent amount of resources from the national or sub-national budget would be set aside* for eventual use in the procurement of equipment, construction of buildings, and so forth.

In the real world of tight health budgets and short-term, crisis-oriented allocations, this disciplined behavior cannot be expected. Therefore, a more realistic approach may be to *establish a fixed cycle for capital investments* in which, for example, a fixed (and small) proportion of the vehicle fleet and/or the cold chain equipment is replaced annually. National development (or capital) budgets may be able to accommodate this, given that it will represent a relatively small amount.

An alternative approach, which is preferable in certain settings,[17] is to contract out many of the transport and logistics functions. Potentially, this will have three benefits: First, all the *capital costs are transformed into predictable recurrent costs*, and the challenge of large, "lumpy" outlays for vehicles and refrigerators is eliminated. Second, the firm being contracted to transport and/or store the vaccines bears the direct responsibility for maintenance, and the risk associated with equipment breakdowns. Third, in settings where a competitive market for the provision of transport and storage services exists, the contracting option may result in lower overall costs and higher quality.

(4) ***Ensuring timely funding flows from center to service delivery points***. Three strategies can be devised to improve the chances that immunization-targeted funds flow in a reliable manner. The first is to *institute an immunization line-item in sub-national*

[17] This approach works best where there is a competitive market for support services, such as transportation, and where the government has reasonably well developed capacity to create contractual arrangements and monitor performance. The government's ability to ensure timely payment is also a prerequisite for success of such an approach.

recurrent budgets—no panacea, but a reasonable option to promote transparency in resource flows. The second is for the central and sub-national levels to work together to *estimate and prioritize sub-national funding requirements* based on current coverage levels, realistic medium-term targets, and assessments of the difficulty of expanding coverage (and therefore the higher marginal costs that might be expected). If done in a serious and consultative fashion, the act of arriving at a joint estimate might promote greater reliability.

The third strategy—and potentially the strongest one—is the use of *contracts between central and sub-national authorities, and independent monitoring of results*. The essence of the contracts is that the central government would oblige the sub-national authorities to use identified funds for immunization, and to match them in a specified way with sub-national resources. Compliance with the contracts would be measured in terms of both inputs assigned to immunization, and immunization-related outputs (e.g., number of children vaccinated). Ideally, the size of future contracts would be influenced by recent performance of the sub-national entity. The benefits of a contracting arrangement, from the perspective of the central government, are an increase in control over expenditures, and a clear link between resources transferred and health benefits "purchased." If constructed fairly, the contract also would have benefits for the sub-national unit (a province or a district): the central government would be committing itself to transferring the resources in a timely manner, and future transfers would use a transparent process, conditioned on recent performance (WHO, 1999).

One key to a successful contracting arrangement is independent monitoring. Both the inputs assigned by the sub-national entity to the immunization program and the results achieved should be assessed by an outside agency—one that has nothing to win or lose by the outcome of the assessment.

(5) ***Balancing public and private financing***. One of the key strategies promoted for sustainability of health services is encouraging the private sector to play a more active role in delivery. In middle income countries, in particular—and for the initial introduction of newer vaccines in countries that have not yet achieved high levels of EPI coverage—this may be an effective approach. Similarly, in middle-income countries with an evolving insurance market, there may be some marginal benefit to extension of immunization coverage through insurance mechanisms.

The government's role in promoting private sector delivery of immunization services—and insurance coverage for those services—is relatively limited, but real. First, governments can *assess the current use of private sector immunization services, and insurance coverage* by income and residence, to get a sense of how important a player the private sector currently is. Second, the government can *identify barriers to additional private sector involvement, and seek low-cost ways to overcome those barriers.* For example, if private providers have a difficult time obtaining vaccine supplies, government agencies could arrange to provide them at little or no cost to physicians who wish to expand their ability to deliver immunization services.

(6) ***Mobilizing and effectively managing external resources and long-term financing***. A developing country government's ability to mobilize external resources and long-term financing in a way that contributes to financial sustainability can be enhanced if, first, the government *demonstrates its own commitment by adopting the key policy and programmatic measures that can increase efficiency and assure consistent levels of domestic financing for immunization programs*, at a minimum. Increasingly, development partners look at enhanced domestic effort as a signal that marginal external resources will be money well spent. As part of this strategy, mobilization of external funds is more probable, and more likely to contribute to a sustainable system, if the government can clearly *demonstrate that the external funds will be "additional" to public funds, and not substitute for domestic allocations*.

Second, countries can make best use of external resources (grants or the grant portion of loans), and/or long-term financing in the form of unsubsidized development loans, if the resources are seen within a *comprehensive financial plan for the program that is prepared with participation of all parties*, rather than as isolated parts. That is, if the full range of financing options are examined simultaneously, along with a careful forecast of the foreseeable resource needs. Governments may request of development partners that they engage in a coordinated process to identify requirements, and the advantages and disadvantages of various funding sources. Finally, if a government can demonstrate a reliable and even increasing domestic commitment to immunization, it may be in a relatively strong position to *negotiate* (and benefit from) *long-term, targeted external support.*

C. ***Conclusion***. From the range of actions that governments can take to reduce the unit costs within an immunization system, to increase the funding available, and to reduce year-to-year variation in funding, several stand out as the strongest. Roughly in order of importance, these are:

- ***Promote allocation of domestic resources on the basis of cost-effectiveness and public finance principles.***
- ***Use international procurement mechanisms.***
- ***Establish legal mandates for baseline funding of national immunization programs.***
- ***Develop and implement a targeted program to reduce waste, with quantitative endpoints.***
- ***Engage development partners in informed discussion of resource requirements, and seek structured commitments to fill in key funding gaps.***
- ***Earmark funds and establish performance targets for sub-national entities.***
-

- ***Develop targeted program to reduce barriers to access through new delivery strategies, including those that involve the private sector.***

V. HOW CAN DEVELOPMENT PARTNERS PROMOTE ADEQUATE AND STABLE FUNDING FOR IMMUNIZATION?

If external grant aid and long-term financing from development banks can be expected to continue to play an important role in financing immunization services in many developing countries over the foreseeable period, then development partners have reason to structure their funding to be as reliable as possible—and to avoid some of the missteps of the past. In doing so, they can take on the challenge of sustainability as one that they share with national governments.

In this section, we discuss a variety of instruments currently available to international funding agencies to support both immunization-specific and general health sector programs in low- and middle-income countries. Development agencies often seek to support the government's efforts toward a stable immunization system by providing resources for the procurement of vaccines, vehicles, equipment and supplies; the development of infrastructure and surveillance systems; and training of management personnel and health workers. More generally, donors and multilateral lending institutions support immunization through broader investments in health systems strengthening and policy reform. And even more broadly, development agencies may highlight the importance of immunization by tying macroeconomic adjustment programs, budget support or debt relief to immunization coverage targets. For each of these instruments, we assess their potential for fostering (or conflicting with) the goal of achieving financial sustainability—sufficient and stable funding—for immunization. That is, we examine the inherent incentives each one implies for improving efficiency, expanding available resources, and/or reducing the risk associated with available resources. At the conclusion of this section, we briefly highlight the characteristics of new funding instruments that may be required to move further toward stable and adequate financing in the future.

A.. ***Grants and Soft Loans for Immunization-specific Services***. For the most part, grants and the grant portion of low-interest loans are used as supply-side subsidies through the public sector. They can be designed and organized in a range of ways:

(1) ***Non-vaccine recurrent cost support and capital investment***. Typically, donors prefer to direct their resources toward capital investment, leaving the recurrent cost support to national governments. The main advantages of this approach are that: (i) donors can more easily "see" and monitor the use of their funds; (ii) donors may believe that sustainability (in the self-sufficiency sense) is promoted by leaving the recurrent cost burden to national governments; and (iii) a portion of the funds typically are used to make purchases from international suppliers, which may support part of development agencies' complex mission.

Because they may not be readily apparent, it is worth noting two disadvantages of investing predominantly in capital, from the perspective of financial sustainability. First, such investments nearly always increase the recurrent cost burden for recipient governments. Yet experience has shown that governments rarely make adequate arrangements to maintain equipment, vehicles or buildings purchased under grants or concessionary loans; they are, in some cases, considered almost disposable. Second, investing in capital may reduce governments' motivation to look for more cost-effective (and potentially sustainable) solutions, such as outsourcing fleet management, equipment maintenance, and/or transport and storage functions.

Although there are also risks associated with funding recurrent costs (and some development agencies' policies specifically proscribe these actions), programs that provide recurrent cost support can be designed to (a) phase-out external support and phase-in domestic support over the course of the execution of a program; and/or (b) build up resources for a trust fund or endowment that can support a portion of recurrent costs after the termination of external support. It is easier to track the shares contributed by the recipient government and the donor for recurrent costs than for capital costs.

(2) ***Vaccine procurement***. As noted in Section II, some low-income countries depend on external support for a very large share—up to 100 percent—of vaccine purchases. Other low-income countries depend on external support for a smaller but still significant proportion.

From the perspective of financial sustainability, the disadvantages that vaccine procurement carries are quite obvious. Depending on external sources for the key input into the immunization system is very risky.

However, there are some advantages of targeting external support to this input. First, procurement mechanisms required by donors may result in lower prices than developing country governments would otherwise be able to attain. Second, the perceived short- to medium-term security and timely payments associated with external support may reduce risk to suppliers, and therefore bring about lower prices.

(3) ***Sectorwide and program-specific approaches***. Some external support for immunization programs is developed independent of other donor and government actions in the health sector. The donor assigns priority to the immunization program, and directs resources accordingly, regardless of general sectoral spending patterns. In other cases, sometimes falling under the category of sector-wide approaches, the funding requirements for immunization programs are placed within the larger set of health system strengthening needs, and covered (to some extent) as donors divide up the funding "pie."

In concept, from a long-term sustainability perspective, a holistic, sectoral approach is more likely to lead to steady and reliable funding for immunization because it simultaneously addresses the funding needs of immunization programs, and of other "competing" programs. It has the potential of inducing more rational planning and resource allocation, based on cost-effectiveness and public finance criteria. In practice, the picture is not so clear and a careful review of experience with this instrument is

required to draw definitive conclusions. From limited experience, it appears that as a relatively small program within the entire health sector, immunization needs may get aggregated into some larger funding stream and/or fail to get direct, earmarked and protected funding.

(4) ***Performance-based and input-based funding criteria***. Traditionally, external support has been provided on the basis of inputs required and used, rather than on the results achieved. In general, however, performance-based funding criteria, in which governments are required to demonstrate results as "payment" for external support, are more likely to lead to a financially sustainable system. Properly structured performance-based funding is likely to induce recipient governments to increase the efficiency of their actions (i.e., reduce average and marginal costs), whereas input-based funding is likely to induce governments to simply expand the scope and scale of their actions, rather than improving their efficiency and quality. Independent and transparent verification is a prerequisite for this mechanism to realize its potential.

(5) ***"Matching" and non-matching funding strategies.*** A common strategy used by donor agencies to stimulate "ownership" and to increase domestic funding for immunization (and other health) programs is to require that the recipient government match the external funds provided. This is used in low-income countries, and even more frequently in middle-income countries. The difficulty with this approach is obvious: The countries and/or sub-national units with the fewest economic possibilities are the least able to come up with the matching funds; existing inequities are reinforced. However, the match concept can be designed so that the proportional match required is adjusted for the economic status of the national or sub-national government. When this is done, the "matching" approach can have a beneficial effect on long-term diversification (and stability) of financing.

B. ***Grants and Concessionary Credits for General Health Sector Strengthening.*** Compared to the funding specifically for immunization work, a much larger amount of donor funding is put into programs that strengthen the primary health care system generally, enhance Ministry of Health capacity and/or promote various types of health sector reform (rationalization of resource allocation, partnerships with the private sector, public sector performance contracting, extension of insurance coverage, and so forth). The inputs provided under these financing arrangements generally take the form of investments in health sector infrastructure and equipment, management and technical training, and consulting services.

The potential for general health systems strengthening programs to have a salutary effect on the financing of immunization programs remains largely theoretical. In concept, all the possible interventions—from better health infrastructure to improved resource allocation policies—should lead to a positive results for basic health services. In practice, it has generally been found that programs that do not specifically highlight immunization programs and/or immunization-related output measures have little positive effect on the delivery of immunization services. In addition, unless the special characteristics of immunization programs are taken into account, health sector reform can

have a detrimental effect on program performance (WHO, 1999, **pending additional information on/citations for Colombia).

C. ***Policy-based Grants and Concessionary Credits***. A final set of instruments includes funding that is made available on the promise or the reality of policy changes that development partners wish to promote. For example, the European Union makes budget support for the social sectors available to some governments that institute changes in their budgeting and resource allocation processes. The World Bank has a full portfolio of adjustment loans (many of them under the IDA facility), which provide budget support to the Ministry of Finance in large tranches upon satisfactory completion of agreed-upon policy changes. These policy changes always include actions intended to promote better macroeconomic conditions and, often, fiscal discipline; policies related to the protection of spending for the social sectors (health, education and social protection) are common as well.

The impact of these instruments on the financial sustainability of immunization programs is very hard to ascertain. To the extent that the macroeconomic picture improves and stabilizes, the results can only be positive for the immunization (and every other high-priority) program. However, at best this is an indirect route to an immunization system's financial sustainability. More directly, policies that protect core spending within Ministries of Health can have a positive effect on the stability of funding for immunization. For the most part, however, the funds are not earmarked with sufficient clarity—and there is little ability to trace how funds have actually been spent. Increasing the transparency of funding flows to specific programs of interest may be a useful approach. More promising for immunization programs are policy-based funding instruments that use outcome measures—immunization coverage targets, for example—as the criteria for disbursement of future budget support. This creates the right set of incentives: for the government to accomplish a task, and at the lowest possible cost.

D. ***New Instruments***. What should be clear from the discussion above is that the existing granting and lending instruments can be designed to *minimize* the problem of insecurity and inadequacy of funding for immunization, but none of them is able to *actively mediates the fundamental risk* that put immunization programs in jeopardy: the unpredictability of the political component of resource allocation decisions at the national and international levels. This observation that has already inspired GAVI itself, as well as related proposals for the structuring of aid from wealthy to poor countries for immunization (Mahoney *et al*, 2000; Bhushan, 1999; England, 1999; Barton, 2000) and other public health priorities.

Although a full treatment of the characteristics of a new international funding instruments would require a separate effort, a few principles can be offered. To contribute to long-term financial sustainability of immunization, such an instrument would have to:

- Reward governments for efficiency in program implementation, rather than providing a safety net for dysfunctional health systems.

- Reward governments for performance, tying future funding to progress in achieving coverage targets.

- Stimulate recipient governments to remove immunization funding from the domestic political process; for example, with the establishment of trust funds dedicated to the financing of core public health interventions.

- Take into consideration the varying needs of low-income, low middle-income and upper middle-income countries, and require that countries maintain at a minimum the historical (absolute) funding levels for immunization programs.

- Provide incentives for rational introduction of new vaccines.

- Include provisions for conflict and post-conflict situations, as well as other emergency conditions.

E. *Conclusion*

The international community can play an important part in promoting reliability and adequacy of financial resources for childhood immunization, using existing instruments. The conclusions to be drawn from the discussion above are:

- ***Restricting external funding to capital investments does not contribute to reaching the objective of financial sustainability.***

- ***Sectoral (rather than immunization-specific) programs have tremendous potential to contribute to sustainability, but to date the experience has not been highly positive.***

- ***Performance-based funding criteria can be strong instruments to encourage governments to increase the efficiency in the supply chain.***

- ***Incorporating policy conditions related to immunization system performance and/or financing can be a useful tool to promote long-term sustainability.***

- ***Most existing instruments do not address the fundamental international and domestic political risks to steady funding for immunization programs. Mediating this risk would require one or more funding instruments that are designed to be buffered from the political process.***

VI. HOW CAN WE MEASURE FINANCIAL SUSTAINABILITY?

If GAVI is to use progress toward financial sustainability as a measure of the performance of a national immunization system, specific indicators will have to be developed and agreed upon. The indicators must be defined, the sources of data for estimating their value must be identified, and the frequency of reporting must be determined.

Several basic criteria can be established to judge potential indicators. Recognizing that no indicators are likely to be ideal across all criteria, the GAVI FTF and others can assess which criteria are most important, and therefore which indicators suit the GAVI purposes best. The criteria are shown below; possible indicators are listed in Table 1.

- ***Validity and reliability***. Does the indicator measure a concept of interest (such as "donor dependence")? Is it relatively unaffected by potentially confounding factors (such as country size)? Can it be measured in a similar way from country to country, and across time?

- ***Availability of data***. Are the data readily available from government and/or donor administrative records or other sources, or must they be obtained from new sources, such as household surveys?

- ***Relevance to workers/ease of explanation***. Are the indicators relevant to the workers who will be charged with collecting the basic information, or will they have little motivation to collect accurate data on a timely basis? Can the meaning of the indicators be understood intuitively, or with minimal explanation?

- ***Applicability to varied country contexts***. Are the indicators useful for both poor and better-off countries? Small and large? Those with a large and small private sector?

- ***Correspondence to high-priority policies and/or programmatic actions***. Do the indicators correspond to the actions of most relevance and importance for the objective of financial sustainability? Do they relate to core concepts and actions, or only to marginal ones?

Table 1
Possible Indicators of Financial Sustainability

DIMENSION	*Indicator*	*Unit*	*Valid, reliable?*	*Data available?*	*Relevant to workers?*	*Applicable to varied contexts?*	*Related to high priority dimensions ?*	*Remarks*
Lower Costs through Efficiency in the Supply Chain								
Sustained demand and reduced barriers to access	Does National Immunization Plan include acceptable plan of action for demand generation?	Yes/No						
	Share of population knowledgeable about benefits and source of immunization services	%						
	Patterns of utilization by income and/or ethnic group, and residence (and/or benefit incidence analysis)	%						
Efficient vaccine procurement	Does country use international procurement mechanism	Yes/No						
	Have public sector subsidies to domestic production, if any, been evaluated for financial feasibility?	Yes/No						
	Difference between prices paid for vaccines vs. lowest possible price for each vaccine	%, $						
Efficient immunization services	Has country diagnosed sources of wastage and developed action plan?	Yes/No						
	Has country estimated costs of different delivery strategies (including outsourcing, contracting out)	Yes/No						
	Does plan for service delivery reflect comparison of costs of service delivery strategies, including private sector alternatives	Yes/No						
	Share of total costs dedicated to administration	%						
	Share of total costs dedicated to health worker salaries	%						
	Trends in waste over time	%, $						
	Trends in costs per fully-immunized child over time	$						
Reliable and Sufficient Resources through Appropriate Funding Structure								
Steady and sufficient funding for vaccines	Have vaccine requirement forecasts been prepared using up-to-date methodology?	Yes/No						
	Incidence of vaccine stock-outs, by region	#/time period						
	Existence of line-item in national budget for vaccine procurement	Yes/No						
	Existence of high-level statements “guaranteeing” baseline funding for vaccines	Yes/No						

Table 1
Possible Indicators of Financial Sustainability

DIMENSION	*Indicator*	*Unit*	*Valid, reliable?*	*Data available?*	*Relevant to workers?*	*Applicable to varied contexts?*	*Related to high priority dimensions ?*	*Remarks*
	Existence of laws guaranteeing baseline funding for vaccines	Yes/No						
	Share of domestic funding for vaccines/total funding for vaccines	%						
Steady and sufficient funding for labor and other non-vaccine recurrent costs	Does National Immunization Plan project *total* funding requirements (recurrent and capital)?	Yes/No						
	Is cost-effectiveness information systematically used to allocate health resources?	Yes/No						
	Existence of line-item in national budget for National Immunization Program	Yes/No						
	Existence of high-level statements "guaranteeing" baseline funding for National Immunization Program	Yes/No						
	Existence of laws guaranteeing baseline funding for vaccines	Yes/No						
	Share of domestic funding/total recurrent funding for National Immunization Program	%						
Steady and sufficient funding for investments (capital costs)	Has depreciation schedule for key investments been estimated?	Yes/No						
	Are investment requirements protected in national budgeting?	Yes/No						
	Share of domestic funding/total capital funding for National Immunization Program	%						
Stable resource flows from source to service delivery points	Existence of sub-national immunization plan?	Yes/No						
	Existence of line-item in sub-national budget for immunization program	Yes/No						
	Existence of immunization performance contracts with sub-national authorities, with independent monitoring	Yes/No						
	Incidence of shortfalls, delays in access to transfers from national to sub-national entities	#/time period						
Balanced public-private financing	Share of total immunization costs financed by government (including external funding)	%						
	Share of total immunizations provided by NGOs, private sector	%						
	Share of total population covered by insurance (with benefit package including childhood immunization)	%						

Table 1 **Possible Indicators of Financial Sustainability**								
DIMENSION	***Indicator***	***Unit***	***Valid, reliable?***	***Data available?***	***Relevant to workers?***	***Applicable to varied contexts?***	***Related to high priority dimensions ?***	***Remarks***
Effective use of external and long-term financing	Planning process involving all potential financiers	Yes/No; list partners						
	Planning process employing up-to-date financial planning tools	Yes/No						
	Trends in domestic funding for vaccines/total funding for vaccines	$, % over time						
	Trends in domestic funding/total recurrent funding for National Immunization Program	$, % over time						
	Trends in domestic funding/total capital funding for National Immunization Program	$, % over time						
	Trends in share of immunization program/total health spending	$,% over time						
	Projected financing split (short-term domestic, long-term domestic, short-term external, long-term external) for projected resource requirements, over 5-year period, with commitments from development partners	$, %						

B. *Selecting Indicators and Setting Targets as a Participatory Process*

There is little consistency in the availability of data from country to country, or in the priority that should be accorded to specific policy and programmatic actions in the long-term search for financial sustainability. In some countries, public budget data is relatively easy to access, and corresponds well to allocations and expenditures, even at the sub-national level. In others, public budgets represent only the most general sense of resource allocation, and do not correspond well to actual spending. Similarly, there is wide variation across countries and programs in the extent to which efficiency measures can contribute to financial sustainability.

This variability poses a decided challenge to those seeking to establish uniform indicators, and to set targets toward financial sustainability. To address that challenge, we recommend that GAVI:

(1) ***Establish a small, core set of indicators of financial sustainability that would require information that is available in most countries***. It is suggested that this core set of indicators number not more than 5.

(2) ***Request of countries that in their financial sustainability plans, they propose an additional set of country-specific indicators, tied to their proposed policy and programmatic actions***.

(3) ***For both the core and the country-specific indicators, set targets for financial sustainability in a participatory fashion, with the full input of health financing specialists, immunization program specialists, and policymakers in the recipient countries.*** To gain high-level attention to the challenge of financial sustainability, GAVI may wish to help in the organization of country and/or regional workshops where the target-setting could be done.

(4) ***Tying together progress toward both institutional and financial sustainability, encourage countries to engage in a benchmarking process*** (see Annex 3 for details).

With respect to the difficult task of setting targets, one possible approach would be to conduct an intensive target-setting exercise with three to four countries about which there is already a good understanding of the structure of immunization system financing. (The ones selected for the recent case studies might prove to be useful.) Given the basic information, it may be useful for development partners, national health financing specialists, and immunization program managers to (a) identify feasible and potentially high-impact policy and programmatic actions (within the categories developed above); and (b) create financial scenarios, based on varying sets of assumptions about the effect of the policy and programmatic changes on costs and revenues over a given five- to 10-year period. Conducting such an exercise in several settings would provide an empirical basis to inform the development of targets for Fund-eligible countries.

VII. CONCLUSION

The challenge of financing childhood immunization programs—recently brought into high relief by the availability of funding under the Global Alliance for Vaccines and Immunization and the funding demands associated with new vaccine technologies—is neither new, nor unique to the developing world. In all countries, immunization represents a relatively low-cost part of the health budget, and a program which is most visible when it fails—when there is an outbreak of a vaccine-preventable disease, or when vaccine safety is questioned. Despite unquestioned cost-effectiveness and contribution to social welfare, immunization programs generally have weak political constituencies, and are at a disadvantage when competing for resources.

In developing countries, the financing challenge has traditionally been met, in part, by external aid: grant funds for vaccine procurement, health service infrastructure, training of health personnel, and other inputs. External support for immunization programs has proven to be no more reliable than domestic sources of financing, however, because of the ever changing volume and orientation of donor support.

Under the requirements of the Global Fund for Vaccines, low-income countries now have the opportunity to boost the available resources for their immunization programs *while at the same time* developing strategies to improve the medium- and long-term adequacy and stability of financing for immunization programs.

In this paper, we have argued that attaining stability in immunization financing is part and parcel of the management of immunization programs, and the health sector as a whole. It depends both on how efficiently the supply chain functions, and on how appropriate the funding structure is, within the overall health financing context. Even in the poorest countries, concrete and relatively low-cost policy and programmatic actions can be taken to reward efficiency and balance the structure of funding, resulting in greater volume and improved reliability of resources for immunization.

We have also argued that grant-making and lending institutions are likely to be contributing to the financing of immunization services over the foreseeable future, and can provide that support in ways that are likely to foster long-term sustainability. However, unless funding for immunization is buffered from both domestic and international political processes—a change that would have discernable benefits, but would also carry costs—it will not be possible to attain true financial sustainability.

In its role as a gatekeeper to funding for immunization programs, and a coordinator of technical resources, GAVI can play a crucial role in focusing attention on the path to stable and adequate financing for immunization systems. To that end, the financial sustainability plans requested of each participating country can be structured to permit an exploration of feasible, high-impact steps toward stable financing—and measurement of progress toward that objective. The preparation of the financial sustainability plans provides an opportunity for collaborative work between governments and potential

financiers to ensure progress toward financial sustainability. At the same time, recognizing that both individual countries and individual development agencies are limited by their current financing instruments, GAVI can provide a forum for international discussion of the options for new and innovative instruments that could foster long-term financing of immunization.

LITERATURE CITED

Batson A, P. Evans P and J. Milstien (1994). "The Crisis in Vaccine Supply: A Framework for Action." *Vaccine* 12: 963-965.

Bhushan, 1999. "Financing Immunization Programs in the Asia and Pacific Region: Issues and Options." Keynote address, "Expanding and Sustaining Immunization" conference. Brisbane, Australia, November. Available at: http://partners.health.gov.au/pubhlth/strateg/immunis/seminar/

Bobadilla, J-L, P. Cowley, P. Musgrove and H. Saxenian (1994). "Design, Content and Financing of an Essential National Package of Health Services." *Bulletin of the World Health Organization* 72(4): 653-662.

Brenzel, L. and P. Claquin (1994). "Immunization Programs and their Costs." *Social Science and Medicine* 39(4): 527-536.

De Roeck, D. and A. Levin (1999). "Review of Financing of Immunization Programs in Developing and Transitional Countries." Special Initiatives Report No. 12. Bethesda, MD: Partnerships for Health Reform Project, Abt Associates Inc.

England, S., M. Kaddar, A. Nigam and M. Pinto (2001). "Practices and Policies on User Fees for Immunization in Developing Countries." Geneva: World Health Organization.

Fairbank, A. and M. Makinen (2000). "Poverty Reduction and Immunizations—Considering Immunizations in the Context of Debt Relief for Poor Countries." Bethesda, MD: Abt Associates Inc.

Feilden, R. (1990) "Short communication: Estimating Vaccine Costs for EPI Cost-effectiveness Analysis." *International Journal of Health Planning and Management* 5: 221-226.

Feilden, R. (1995). "Costs and Effectiveness of Immunization Services in Moldova, Phase I: Preparation." Trip report. Arlington, VA: BASICS Project.

Feilden, R and OF Nielsen (1998). "Immunization and Health Reform: Making Reforms Work for Immunization." Geneva: World Health Organization, April.

Frank, RG., C. Dewa, E. Holt *et al* (1993). "The Demand for Childhood Immunizations: Results from the Baltimore Immunization Study." Working Paper, Health Services Research and Development Center. Baltimore, MD: The Johns Hopkins University.

GAVI (2000). "Guidelines on country Proposals for Support to Immunization Services and New and Under-used Vaccines, Revision 2," November.

Gwatkin, DR. (2000). "Reducing Health Inequalities in Developing Countries. In: *Oxford Textbook of Public Health.*.

Hausdorff, WP (1996). "Prospects for the Use of New Vaccines in Developing Countries: cost is not the only impediment." *Vaccine* 14(13): 1179-1186.

International Institute for Population Sciences and ORC Macro (3000). National Family Health Survey-2, 1998-99: India. Mumbai: IIPS.

Jamison, DT., WH Mosley, AR Measham and J-L Bobadilla (eds.) (1993). *Disease Control Priorities in Developing Countries*. New York: Oxford University Press for the World Bank.

Jamison, DT and H. Saxenian (1994). "Investing in immunization: conclusions from the 1993 World Development Report." In: *Vaccination and World Health* (eds FT Cutts and PG Smith): Wiley, Chichester: pages 145-160.

Kaddar M., A. Levin, L. Doughterty and D. Maceira (2000). "Costs and Financing of Immunization Programs: Findings of Four Case Studies." Special Initiatives Report 26. Bethesda, MD: Partnerships for Health Reform Project, Abt Associates, Inc.

Kaddar, M., M. Makinen and M. Khan (2000). "Financing Assessment Tool for Immunization Services: Guidelines for Performing a Country Assessment." Health Reform Tools Series PHR#3452. Bethesda, MD. Partnerships for Health Reform Project, Abt Associates Inc.

Kaddar, M., VL Tanzi and L. Dougherty (2000). "Case Study on the Costs and Financing of immunization services in Côte d'Ivoire." Bethesda, MD: Partnerships for Health Reform Project, Abt Associates Inc.

Levin A., S. Howlader, S. Ram, SM Siddiqui, I. Razul and S. Routh (1999). "Case Study of Costs and Financing of Immunization Services in Bangladesh." Bethesda, MD: Partnerships for Health Reform Project, Abt Associates Inc.

Milstein, J. (1999) "Local Vaccine Production: Issues of Quality and Viability." Geneva: Children's Vaccine Initative, 1999.

Mahoney, RT and JE Maynard (1999). "The Introduction of New Vaccines into Developing Countries." *Vaccine* 17: 646-652.

Mahoney, RT, S. Ramachandran and ZY Xu (2000). "The Introduction of New Vaccines into Developing Countries II: Vaccine Financing." *Vaccine* 18:2625-2635.

National Academy of Sciences (1999*). Calling the Shots: Immunization Finance Policies and Practices. Use* Committee on Immunization Finance Policies and Practices, Division

of Health Care Services and Division of Health Promotion and Disease Prevention. Washington, DC: NAS.

Over, M. (1988). "Cost-effective Integration of Immunization and Basic Health Services in Developing Countries: The Problem of Joint Costs." Policy, Planning and Research Department Working Papers, WPS 23.

Phonboon, K., DS Shepard, S. Ramaboot, P. Kunasol and S. Preuksaraj (1989). "The Thai Expanded Programme on Immunization: Role of Immunization Sessions and their Cost-Effectiveness." *Bulletin of the World Health Organization* 67(2):181-188.

Robertson, RL and N. Qualls (1985). "Cost-Effectiveness of Immunization in the Gambia." *Journal of Tropical Medicine and Hygiene* 88:343-351.

Schwartz, B. and B. Loevinsohn (1999). . "Sustaining Effective Social Programs: Financing immunization in Cambodia, Lao PDR, and Viet Nam." Manila: Asian Development Bank.

Shah, J. and H. Singh (2001). "Benchmarking Internal Supply Chain Performance: Development of a Framework," *Journal of Supply Management*, Winter.

Smith, J., R. Ritzenthaler and E. Mumford (1998**). "**Policy Lessons Learned in Finance and Private Sector Participation**"** POLICY Project Working Paper #2. Washington, DC: The Futures Group.

Taylor CE, Cutts FT Cutts and ME Taylor. "Ethical Dilemmas in Current Planning for Polio Eradication." *American Journal of Public Health* 87(6): 922-925, 1997.

UNICEF (2000). *Progress of Nations*. New York: UNICEF.

World Bank (1993). *World Development Report: Investing in Health*. New York: Oxford University Press for the World Bank.

World Health Organization (1999). "Report of a Meeting on Health Sector Reform and Priority Health Interventions: The Case of Immunization Services, Washington, 15-16 November 1999" (WHO/V&B/00.39). Geneva: World Health Organization.

ANNEX 1. LITERATURE REVIEW

available upon request

ANNEX 2. ANNOTATED BIBLIOGRAPHY

available upon request

ANNEX 3. BENCHMARKING

A. *Benchmarking – using key processes and indicators for quality improvement*

We have defined the key processes of immunization and their indicators. With the measurement of the indicators we get a baseline; thus we have a clearer picture on "where we are" in terms of quality. This first assessment represents the prerequisite for a quality improvement effort.

Improvements could be made in any of the key processes. But a set of criteria can be helpful in identifying priority processes for improvement. These criteria could be: improvement is easy and not costly to do, efficiency gains are particularly high, visible results will be quickly obtained, or long term sustained quality improvements will be achieved, etc. Quality improvements are implemented using the classical PDCA Plan-Do-Check-Act cycle. **Plan**ning the improvement includes the analysis of the causes of the problem and the evaluation of possible countermeasures. **Do** is the implementation of the action decided upon. We then **check** the results obtained by the change, and adjust – **act**- if necessary and start a new cycle.

The regular measurement of the specific indicators will help to see if improvements have actually been achieved and maintained. Thus we compare historically (trend over time) or to a prefixed objective to contribute to the "internal" quality improvement effort.

We can also compare to the outside. In this sense, benchmarking is defined as the external focus on internal activities, functions, or operations to achieve continuous improvement. Starting from an analysis of existing activities and practices within the organization, the objective is to understand existing processes, or activities, and then to identify an external point of reference, or standard, by which that activity can be measured or judged. A benchmark can be established at any level of the organization, in any functional area.[18] The ultimate goal is quite simple: to learn from those doing it well. Searching for best practices leads to superior performances.[19]

The original works on benchmarking date from the early 1900s, when Frank and Lilian Gilbreth focused on bricklayer activity, comparing different workers in terms of productivity to find out the best methods. The term "benchmarking" then was taken up by Xerox in 1979 in a project on "*competitive benchmarking*," and "*reverse engineering,"* comparing production costs of Xerox to Japanese competitors. This served as a reference point for Xerox to improve on their efficiency. According to David, T. Kearns, CEO of Xerox**, "*Benchmarking is a process of continuous measurement of our products, services and processes comparing them to our competitors or to those companies identified as leaders"*[20]. Because Xerox embraced the vision of searching for "best

[18] McNair, C.E., and English,.Benchmarking. A Tool for Continuous Improvement. Essex:Oliver Wight Publications. 1992.
[19] Bogan, C.E., and English, M.J. M.J. Benchmarking for Best Practices. Winning through Innovative Adpation. New York: MCGraw-Hill, Inc. 1994
[20] id.

practices," several other industries adopted benchmarking in the last two decades as a methodology to improve organizational results. Examples in health care include cancer centers in Great Britain, academic health centers, and managed ambulatory health care in the US,[21] and in medical group practices.[22] When transferred to the health sector, the basic concept remains the same: analyze the activities performed by different players in a sector or process and learn from the differences, identifying the best players and their best practices.

When benchmarking is to be performed within a given sector, in a collaborative way,[23] it is useful to have a neutral "benchmarking agency," which identifies operating practices and philosophies from leading organizations, highlights the best demonstrated practices and understands futures needs of the sector. This type of institution serves as a clearinghouse for benchmarking information, defines guidelines for benchmarking, understands the drivers affecting the processes, and the requisite level of comparability.

GAVI could play this role as "benchmarking agency" for immunization by providing the external focus and incentives for improvement. The wealth of information provided with the different indicators will allow GAVI to identify best or good performers, establish performance standards and provide the platform for countries to learn from each others, adapting best practices to achieve breakthrough process improvements and be more successful in getting to more sustainable immunization funding. Best performers would be identified for a given indicator, and the reasons behind this best performance analyzed. The lessons could be made available to other countries to take them on.

Thus the technology of benchmarking can be a very useful tool that can provide immunization providers and funding agencies the necessary performance improvement methodology to change their programs and processes, and achieve significant gains in their operations.

B. *Benchmarking - Practical Issues*

- Benchmarking is considered a continuous never-ending process.
- Benchmarking implies measurement. The quantitative differences in the performance of the different institutions and ours show the possible improvement opportunity, but to achieve it, we must study the processes behind the indicators.
- Benchmarking can be applied to all the "business" areas of a company. Therefore, the study of the existing process is a fundamental first step in any benchmarking exercise.

[21] Dewan, Naakesh A, et al., The national Outcomes Management Project: A Benchmarking Collaborative, The Journal of Behavioral Health Services and Research, November 2000.
[22] Witt, Mary J., Improving Group Practice Performance with Benchmarking, Healthcare Financial management, February 2001, p. 67-70.
[23] See, for instance, Gift, Robert G., and Mosel, Doug, Benchmarking in Health Care: A Collaborative Approach, Amer. Hospital Pub, 1994, or Rosenmöller, M. and Ribera, J. "The Hospital Sector in Catalonia", CCQ, Barcelona, Spain, 1994.

- Benchmarking must be aimed at institutions or countries which are considered [better or] best in a specific sector or process.

For successful benchmarking, one has to use comparable data. As the indicators GAVI will collect are all the same this is likely to be the case. Still one has to be sure, that they are clearly defined, accurately collected and have the same format. The objective of comparison has to be clear, i.e. improvement. "Not good enough" could create the feeling of blame or sanction which does not foster improvement. On the other side, "good enough" could lead to complacency, a feeling that no further improvement is needed. For mutual learning it is important to define *how* results were achieved (process). Another pitfall to avoid is "hit the medium," the average data ignore the potential for improvement and lead to mediocrity. Quality improvement can be a resource-intensive activity, but in the view the gains in terms of sustainable financing of immunization, this would be a sound public investment in the long run.

C. *The benchmarking process*

The process of benchmarking can be structured in five phases: planning, analysis, integration, action and maturity.

Planning
- Define which activities (key processes) are the object of the benchmarking process. In our case, these have already been identified in terms of the supply-chain processes and the funding processes.
- Identify the countries to compare. If possible, comparisons should be made among "similar" countries (those facing similar constraints –e.g., geographical dispersion of population) and countries with a known good performance in the immunization process.
- Determine the process of collecting information.

Analysis
- Study the performance gaps in each of the benchmarking areas. Find the examples which can be defined as "best practices" in each of the processes. The purpose is not to obtain the numerical gaps in performance but rather to understand the root causes for these gaps.

Integration
- Diffuse and communicate the findings throughout the organization[24] in the country. Gain high level consensual approval. Seek support and commitment from the rest of the organization.
- Establish objectives based on the previous findings. Show how the organization can achieve them through changes in the adequate processes.

[24] Organization – the type and level of organization depends on the key process to improve. But usually the Ministry of Health would have the leadership for quality improvement.

Action
- Define the corresponding projects , with clear indication of timings, objectives, responsible persons, etc.
- Implement the actions and monitor its progress. Compare results with objectives.
- Document the process.

Maturity
- Maturity is achieved when the organization has incorporated most of the best practices of the other institutions studied. At this point other institutions will use this one to benchmark against it.

The benchmarking process looks somewhat complicated, but once the different phases are institutionalized it is a ready made way to follow. It provides the basic framework for the exchange of learning and experience between the different countries.