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Evaluation of the First Five Years of GAVI Immunization Services Support Funding

Prepared for
The GAVI Alliance

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ACRONYMS

APR	Annual Progress Report
CGD	Center for Global Development
DQA	Data Quality Audit
DTP	Diphtheria, Tetanus, Pertussis vaccine
EPI	Expanded Program on Immunization
FSP	Financial Sustainability Plan
GAVI	GAVI Alliance (formerly Global Alliance for Vaccines and Immunization)
GDP	Gross Domestic Product
GFATM	Global Fund to fight AIDS, Tuberculosis and Malaria
HLSP	HLSP Limited
HSS	Health System Strengthening support
IBRD	International Bank for Reconstruction and Development
ICC	Inter-agency Coordinating Committee
IRC	Independent Review Committee
ISS	Immunization Services Support
JRF	WHO/UNICEF Joint Reporting Form
LICUS	Low Income Country Under Stress
MCV	Measles-containing Vaccine
MNT	Maternal and Neonatal Tetanus
MOH	Ministry of Health
MYP	Multi-Year Plan
cMYP	Comprehensive Multi-Year Plan
NGO	Non-governmental organization
NID	National Immunization Day
NIP	National Immunization Program
NORAD	Norwegian Agency for Development Cooperation
OLS	Ordinary Least Squares
RED	Reaching Every District
RFP	Request for Proposal
RWG	Regional Working Group

SIA	Supplementary Immunization Activity
SC	Steering Committee
SNID	Sub-National Immunization Day
TOR	Terms of Reference
TT	Tetanus Toxoid
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WR	WHO Representative

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EXECUTIVE SUMMARY

This report presents the findings of an evaluation commissioned by the GAVI Alliance (formerly the Global Alliance for Vaccines and Immunization) to analyze the impact of the first five years' of Immunization Services Support (ISS) funding. GAVI is an alliance involving multiple partners from the private and public sectors, dedicated to improving health and saving the lives of children through the support of widespread vaccine use. During the first phase of GAVI (2000-2005), GAVI provided support to immunization programs in the form of ISS cash contributions, in-kind support for the introduction of new vaccines, and in-kind and cash contributions for injection safety. ISS funding, the focus of this study, primarily supports routine immunization. GAVI makes continued ISS funding conditional upon improved performance and high quality coverage data to encourage countries to make the necessary investments to vaccinate more children. This strategy allows countries and governments to spend ISS funds in any manner they deem appropriate, but funding in later years is based on increases in the number of immunized children.

Under GAVI Phase 1, country applications were approved for five years of support, usually including new vaccines, safe injection supplies, and ISS funding. Initial ISS "investment" funding was paid in installments over three years, based on each country's self-projected number of children to be immunized with DTP3 in the first year after application. Thereafter, additional ISS "reward" funding was paid for immunizing additional children above the projected first year targets. The reward funding was calculated at $20 per additional child[34] receiving DTP3 above the number of children targeted the first year after application. The system for reporting the number of children immunized with DTP3 was validated through a one-time Data Quality Audit (DQA) conducted by GAVI-retained external auditors. Reward funding was contingent upon both increasing the number of children immunized with DTP3 and achieving a verification factor of 80 percent or higher on the DQA. GAVI began disbursing reward funding in 2004, beginning with the first round of countries that applied for ISS funding in 2000.

In 2004, GAVI commissioned an evaluation of the ISS program. The report *Evaluation of GAVI Immunization Services Support Funding* was prepared by Abt Associates and submitted to the GAVI Board in July 2004. The evaluation found that countries made systematic and strategic decisions regarding the allocation and use of ISS funds. Twenty-three out of 33 countries demonstrated an increase in the number of children immunized with DTP3. Government funding for immunization had increased, as had the total funding for immunization. However, given the limited data, there was no attempt to attribute any of these changes to ISS funding – these were merely observed changes. A recommendation was made to conduct another evaluation after most countries have had several years' experience with GAVI funding, providing more data on the impact of GAVI funds on immunization performance.

As GAVI enters its second phase, it is interested in evaluating whether ISS funding continues to further GAVI's objectives, and how best to maximize any positive impact. As of June 2006, US $145 million of ISS funds have been disbursed to 53 countries. This current evaluation of ISS funding reviews more countries than in 2004, with several years of data, as well as a substantial increase in funding disbursed to countries. The Request for Proposal (RFP) issued by GAVI indicated three specific objectives:

1. To assess the experience of the ISS scheme in Phase 1 (2000-2005).

[4] $20 represents an estimate of the cost of fully vaccinating a child with the basic series of six antigens.

2. To assess the application [implementation] of ISS funding at country level and its relation to overall immunization financing

3. To identify the relationship between the allocation of ISS funding and immunization coverage rates (DTP3)

A Steering Committee (SC) established by the GAVI Board representing several partners, and other independent organizations, provided guidance to the implementation of this evaluation. The SC provided additional guidance on the TOR prior to data collection, approved changes in the study approach as described below, and provided comments to an earlier draft of this report.

Approach and Methods

We used both quantitative and qualitative approaches to understand the impact of GAVI ISS funds on immunization program performance. The quantitative analysis relied on publicly available data as well as data provided by the GAVI secretariat to analyze the global impact of ISS funds. The qualitative analysis relied on information collected in six countries to identify differences in ISS management and allocation, immunization program strategies, and other factors that affected country-level performance.

Collection of quantitative data for this study took place in October and November 2006 and relied on documents and data from the GAVI Secretariat and online public data sources (primarily the GAVI, WHO and World Bank websites). The GAVI Secretariat provided all of the Annual Progress Reports, funding disbursement files, and each country's status concerning reward shares. The Secretariat facilitated contact with WHO to obtain immunization coverage data. Data was obtained from Annual Progress Reports (APRs) for all countries for 2004 and 2005. We also relied on information from earlier APRs that we had reviewed in the 2004 ISS Evaluation, and returned to those earlier APRs as necessary.

We used a regression model developed by Lu *et al*.[5] to test the effects of ISS expenditures on immunization rates. Data for the model consisted of DTP3 coverage rates for each of 52 countries for each calendar year from 1995 to 2005, ISS expenditures[6] (which were zero in years before disbursements began), and covariates including GDP and the IBRD Political Stability Index to model the effects of the social and economic context of countries. We adjusted Lu's model specifications in a few ways. First, we used the logistic transformation of the DTP3 coverage rate, which assumes that unit costs increase as coverage approaches 100%. Second, we accounted for trends in immunization coverage rates by including a variable that represents the global trend in coverage, adjusted to match each country's coverage level during 1998-2000. This differs from Lu's model that included a term for the prior year's coverage rate. We also tested for the effects of additional covariates, which were not included in the primary model.

In addition to this model, which is the basis of our findings, we tested other models using alternative specifications to model the ISS effects. Thirty-six additional model variations, with data from the entire sample of 52 countries, as well as for the sub-sample of 23 countries with 1998-2000 DTP3 coverage rates above 65%, confirmed the findings of our primary model.

We used a modified case control approach for qualitative analysis of three pairs of ISS recipient countries that had similar characteristics at the beginning of GAVI funding, but quite different outcomes

[5] *The Lancet*, 2006.

[6] Our use of expenditure data as the key independent variable differs from Lu et al., who used data on funding disbursements from GAVI as the key independent variable.

(one country with significant performance improvements and another with smaller or no improvements) at the time of data collection. The three pairs of countries were Cambodia and Laos, Tanzania and Zambia, and DR Congo and Guinea-Conakry. Three of the countries were declined at one point for ISS reward shares, but for different reasons. The selection represented a range of immunization program performance at the beginning of GAVI, including one high performing pair (Tanzania and Zambia), one mid-level pair (Cambodia and Laos), and one weaker pair (DRC and Guinea, with Guinea being an imperfect substitute since its DTP3 coverage rate at baseline was closer to our definition of a mid-level performer). Data collection was conducted between April and July 2007 by two-person research teams. For each pair of countries, at least one of the researchers was the same in both countries, as the goal was to identify critical differences in the country context and ISS management that may have led to differences in outcomes.

Discussion of Findings

Experience of the ISS Scheme

Very broadly, the vast majority of countries report that ICCs are involved in programming and oversight of ISS funds, 10 out of 25 countries reported that planning is district-driven, and 21 out of 29 countries reported that funds are held in a GAVI-only account. The majority of funds were used for recurrent expenses (83%), and at subnational level (77%). These expenditure patterns generally reflect our findings in 2004.

In all in-depth study countries, the effectiveness of the ICC in political advocacy and fundraising for routine immunization has waned. The role of technical support is assigned to a Technical Working Group (TWG) or ICC sub-committee, but the technical capacity of these technical teams varied significantly. In all countries visited, the central level was responsible for overall allocation of ISS funds – either by activity or by district. Countries tended to allocate funds to underperforming districts and/or underfunded districts. The degree to which districts were given flexibility in programming their allocated funds varied.

In all in-depth study countries, ISS was well-integrated within the NIP. Harmonization across health programs and across administrative levels was much more challenging, reflecting the general level of harmonization within the health system – issues cited by key informants were not specific to ISS, but were indicative of the difficulties in developing integrated health services. There did not seem to be any patterns related to the degree of health system harmonization and immunization performance. Based on the proposed procedures for managing HSS funding in Cambodia and DRC, countries plan to integrate HSS funding into the broader health system more so than with ISS funding, and planned HSS activities will not only focus on immunization.

Lastly, we observed that Low Income Countries Under Stress (LICUS) tended to apply for GAVI ISS funding much later than other countries, and were less likely to receive rewards. More information on the reasons behind these differences may allow GAVI to adapt its design to better address the needs and limitations in these countries. This finding poses a question regarding the strategic vision for GAVI ISS funding – if ISS funding remains a primarily performance-based funding mechanism, funding by definition will go primarily to better performers, which are unlikely to be countries under stress. Another mechanism may be more suitable for improving immunization performance in LICUS countries.

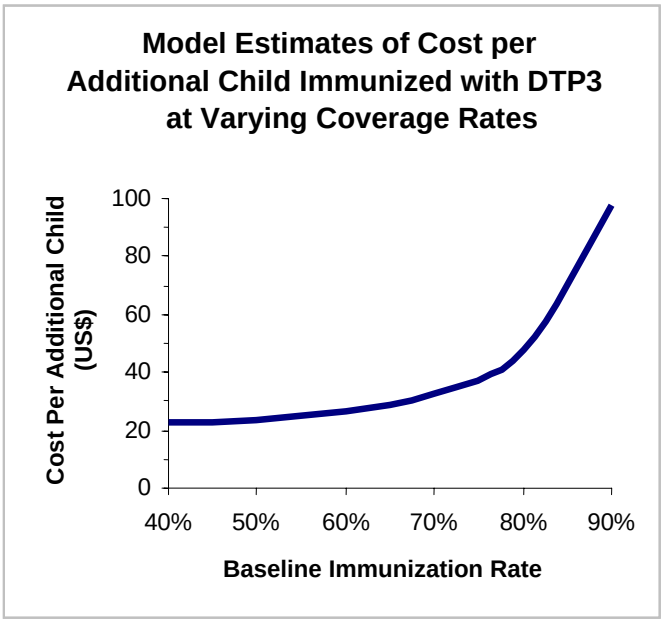
Impact of ISS Funds on Overall Immunization Financing

GAVI funding – including ISS and other funding – has increased total funding for routine immunization. The proportion of government and donor funding for routine immunization remains largely the same as pre-GAVI. Because of conflicting results from different analyses, it is unclear whether ISS funding has displaced other sources of immunization funding. Using FSP data, we find that total immunization funding increased in all but three of 27 countries, with a median increase of 11%. Excluding new vaccine expenditures and ISS funding, however, we find that expenditures decreased in 20 of 27 countries. Our quantitative analysis did not indicate that ISS funding was used to fill gaps in immunization funding, but our data for this analysis was limited. Data from the in-depth study countries strongly support the finding that ISS was used to fill gaps. Given this set of mixed results, we urge future attention to this issue.

Impact of ISS Funds on Performance of the Immunization Program

Our data shows that ISS had a significant positive effect on DTP3 coverage rates from 2001-2005. A $1 influx of ISS funding per surviving infant increased the odds of immunization by approximately 10% in the year funding was received, and by another 10% in the next year. Our model found that the cost of increasing coverage is higher in countries with higher baseline coverage rates, as shown in Figure ES1. The imputed cost of immunizing an additional child is approximately $23 at the lowest coverage rates, however, once coverage rates are above approximately 60% to 70%, the cost per added child immunized increases significantly.

Figure ES1: Model Estimates of Cost per Additional Child Immunized at Varying Coverage Rates



This finding is confirmed by 36 alternative model specifications tested. Generally, costs are in the range of $20 to $50 for countries with 50% baseline coverage, and rise exponentially with higher baseline coverage rates. While the degree of uncertainty related to the cost per additional child immunized increases at higher coverage rates, the important policy implication is that **all** models show the imputed cost per additional child immunized to be substantially above $20 at 80% coverage. The model used throughout this report estimates cost per additional child immunized to be $53.

Our analysis does not confirm the finding by Lu *et al.* (*The Lancet* 2006) that ISS funding has no effect in countries with baseline coverage above 65%. The difference in our findings and those of Lu *et al*. arise from data differences, not from modeling differences, as we tested our data with the Lu *et al*. modeling specifications (and others) and found the same results. Two key differences in the data used explain our different findings. First, Lu *et al*. had one fewer year of post-GAVI immunization data available for their analysis – our analysis included 2005 immunization coverage rates. Second, our key independent variable was actual ISS expenditures, in contrast with the Lu *et al*. study, which used ISS disbursements to countries as the main independent variable.

We confirmed that GAVI's focus on DTP3 did not negatively affect measles coverage. Measles coverage rates generally mirrored DTP3 coverage rates, and our model showed no statistical difference in these two indicators.

Lastly, while we do not find any statistical correlation between GAVI ISS funding and improvements in equity of coverage, we do see that geographic equity improves with increasing national coverage rates, and ISS funding improves national level coverage. Based on the observation of geographic equity trends, it does not appear that ISS funding is creating more inequity by motivating countries to immunize the easiest-to-reach children, one of the concerns regarding the reward incentive.

Factors Correlated with Differences in Performance

We tested a variety of variables that we hypothesized would have impact on immunization performance and the ISS effect, including macroeconomic and political factors, health funding and other health priorities, immunization program activities, ISS management and planning, and ISS expenditures by category. The variables that proved statistically significant in influencing the ISS effect included GDP (negative effect), political stability (positive effect) and the presence of a current conflict (negative effect). The importance of political stability confirms Lu *et al*.'s findings (*The Lancet* 2006), and highlights the challenges of working in many of the ISS recipient countries. Other variables, such as national health expenditures, are correlated with higher coverage rates, but did not change the estimated effect of ISS funding.

We did not find any statistical correlation between immunization performance and variables representing specific immunization program activities, ISS planning and management, or ISS expenditures by category. The lack of correlation highlights several issues. First, our data was fairly limited, and the items we tried to analyze were not easily quantified, for several of these analyses. Secondly, the lack of a statistically significant correlation does not rule out the possibility that there is an effect – while we do not see a correlation, we cannot show statistically that there is no correlation.

Findings from the in-depth study countries pointed to three factors that seemed common in higher performing countries – more emphasis on social mobilization, higher technical capacity within the NIP and more technical inputs from its partners, and increased expenditures on immunization from sources other than GAVI. Although community mobilization is a core component of the Reaching Every District (RED) strategy, the high performing countries placed more emphasis on these activities, and perceived them to be an important factor in achieving coverage gains. Whereas our 2004 evaluation focused on strengthening ICCs to improve outcomes, our findings here point to the level of technical input as the more critical factor for success. Lastly, the country visits showed that ISS funding is most effective when it is supported by additional investments from governments and other donors.

The lack of an effect based on ISS expenditures by category[7] should be considered carefully in many ways. Since data on ISS expenditures was available for all countries over a 3-5 year period, we are less inclined to accept that our findings were due to data limitations. The introduction of ISS funding represents a relatively small change to immunization program funding (increasing total funding 15% from pre-GAVI levels). Bearing this in mind, it is understandable that whether a country spends 10% or 20% of ISS funds on training (representing 1.5% or 3.0% of total immunization expenditures) may have little impact on performance. However, despite representing a relatively small amount of incremental funding, ISS funding does improve performance. These results lead us to believe that the specific items on which each country spends its ISS funding to produce a positive effect are not the same across countries – what matters is that the funding is being used to meet immunization program priorities. The lack of correlation between specific types of expenditures and immunization performance suggests that, from its global perspective, it would be extremely difficult for GAVI to direct ISS expenditures toward relatively more effective uses, as individual country priorities differ.

Impact of ISS Design and Structure on Immunization Performance

We had only limited data to test design features of the ISS scheme – specifically programming flexibility and the reward system. Using variances in line item expenditures as a crude indicator of programming flexibility, the data do not confirm a relationship between flexibility and higher performance. Across all in-depth study countries, however, informants were quick to note the benefits of the flexibility of ISS funds – ISS' funding flexibility allowed NIPs to function under duress (e.g., funding an unforeseen vaccine shortage) and to operationalize internationally-recognized strategies for improving immunization coverage (funding RED implementation). While these activities are undoubtedly important to strong immunization performance, what is not possible to determine is whether in the absence of ISS funding, another funding source would have come forward. This question, considered together with further analysis of the changes in donor and government funding, is important in assessing the impact from the programming flexibility feature of ISS funding. We also found that the amount of unspent ISS funding has no effect on performance, which supports the principle of allowing countries the flexibility to program ISS funds both *how* and *when* appropriate.

Our analysis of reward funding leads us to many additional questions. We found that countries with higher population growth rates were much more likely to have been approved for rewards than countries with lower population growth. GAVI's focus on *number* of children immunized rewards countries with higher population growth, potentially even those countries in which the DTP3 coverage rate is decreasing. Our finding that the population growth rate alone explains 76% of whether a country receives rewards is cause for further examination of the reward system. Based on the quantitative analysis, receiving rewards has little effect on performance, perhaps in part because much of the funding is not immediately used (based on findings from in-depth study countries).

The two in-depth study countries that have never received rewards have both experienced reductions in their target populations due to declining birth rates. As a result, neither reached their projected number of children immunized. Qualifying for reward funding not only depends on the number of children immunized, but also on the number of children initially **projected** to be immunized in the first year, potentially allowing countries to manipulate their projections to ensure funding is received upfront as investment shares. Even with significant increases in the DTP3 coverage rate, based on reliable survey data, reductions in target population make it very difficult for those countries with declining birth rates to receive rewards. Although using the *number* of children immunized is effective in simplifying the reward criteria, some adjustment may be warranted in countries with declining birth rates.

[7] The expenditures categories used were those reported in the APRs, including vaccines, injection supplies, per diem, fuel, outreach, IE&C and social mobilization, training, supervision, monitoring and evaluation, vehicles, and cold chain. We also tested several aggregations of these categories and found no effect.

Conclusions and Recommendations

Overall, we would conclude that GAVI ISS funding has been successful in achieving its stated goal of improving access to immunizations. GAVI ISS funding has had a positive effect on DTP3 coverage in recipient countries. The flexibility of GAVI funding is a unique characteristic allowing NIPs unprecedented ability to pursue country-specific priorities, although the ability of each country to use this funding effectively to improve immunization performance depends very much on the available technical capacity. There is room for improvements that focus on refining the reward mechanism to broaden the program objectives and to increase their applicability for higher coverage countries. At the same time, developing ways to support countries that are underperforming, and improving assistance to fragile states, is equally important to achieving the goals of ISS. These recommendations based on our evaluation findings are organized into three broad categories – policy and design of ISS funding scheme, GAVI management, and ongoing monitoring efforts.

Policy and Design Recommendations

1) **GAVI should continue to provide ISS funding, which has had a positive effect on DTP3 coverage rates.** These positive effects can be found across various baseline coverage rates, although there are differences in performance outcomes in individual countries. Countries likely to benefit from the ISS reward system are more stable countries with better managed immunization programs (non-LICUS countries, more politically stable countries, countries with higher baseline DTP3 coverage rates), as well as countries with higher population growth rates.

2) **GAVI should continue to use DTP3 as the indicator of immunization program performance. This focus did not appear to have diverted attention from other antigens.** There was no evidence of negative impact on measles coverage rates (an indicator of performance with other antigens) over the GAVI Phase 1 period.

3) **GAVI should continue its approach of allowing countries flexibility in how and when to use ISS funding.** Our statistical analysis showed no correlation between different expenditure items and performance. Nor did we find any correlation between expenditure at different health system levels and performance. Informants noted the benefits of ISS' flexibility in all country visits, allowing the NIP to address acute funding shortfalls, and to implement internationally-recognized strategies for improving performance. Further, the lack of statistical correlation between performance, and how ISS funds are used also means we do not have any basis for recommending that countries use funding in any particular manner. Lastly, the rate of expenditure of ISS funding is not correlated with performance, so encouraging countries to spend more of its funding would not improve performance.

4) **GAVI should reconsider how ISS investment funding is calculated, perhaps with a standardized formula, or more critically scrutinize the feasibility of first year projections on which investment funding is based.** The current formula, based solely on self-projected numbers of children to be immunized in the first year, is easily subject to manipulation.

5) **GAVI should reconsider its approach to working with countries that are in conflict or recovering from conflict.** ISS funding was less effective in LICUS countries than other countries. LICUS countries were also less likely to receive reward funding. Although we do not have data on the reasons for these results, it is certainly conceivable that a fragile government responds differently to an incentive-based funding mechanism than a well-functioning, established government. As such, GAVI should investigate alternative approaches for working

with fragile governments, including more involvement and up-front assistance (such as the additional "post-conflict investment" suggested by the GAVI task team), different rules and procedures, and a package of technical assistance – ensuring high quality technical support is especially important for this group of countries.

6) **GAVI should reconsider its policy of a standard reward of $20 per additional child immunized for all countries, as $20 may not provide sufficient incentive in countries with higher immunization coverage rates.** Our analysis found that it can cost much more than $20 to immunize an additional child. This finding impacts higher coverage countries in two ways. First, it means that the GAVI investment funds allow higher coverage countries to immunize fewer additional children than lower coverage countries, so the total amount of their rewards will be lower. Secondly, the $20 reward may not be sufficient incentive for higher coverage countries to make the necessary investments to reach additional children, given the high cost of reaching additional children in these countries. Although it may be more cost effective to immunize additional children in lower coverage countries, ignoring the hardest to reach (the last 10% or 20%) violates general public health policies. If GAVI wishes to ensure that the hardest-to-reach children in higher coverage countries are immunized, it may need to increase the reward per child in higher coverage countries.

7) **GAVI should consider additional and/or different measures of immunization performance in higher coverage countries – such as improving equity or coverage consistency.** GAVI's focus on the number of additional children immunized becomes less appropriate in higher coverage countries, as costs of increasing coverage are harder to justify in terms of disease reduction, and the amount of reward funding that countries will receive becomes lower as coverage increases and it becomes harder to immunize *additional* children. Nonetheless, continued vigilance to maintain consistent high coverage and make other immunization program improvements is valuable for public health. With this in mind, GAVI should consider rewards based on criteria other than, or in addition to, the number of children immunized in higher coverage countries.

   Coverage consistency could be measured using the number of children immunized, entitling a country to receive a reward for three consecutive years without any decrease in the number of children immunized (adjusted for birth rates). Rewarding coverage consistency (for example, $3 per child based on the total number of children immunized in the last year), would encourage constant vigilance – ensuring good performance *every* year. Measuring equity is much more complex – precise data on immunization rates by income categories would only be available through costly surveys. A crude indicator of equity may be changes in the number of districts with DTP3 coverage under 50%. This is a simple, but not ideal indicator, as it does not capture income differences within districts, and the data is difficult to verify. Testing of proposed indicators at country level is required if GAVI wants to incorporate an equity indicator.

8) **GAVI should revise the ISS investment and reward structure balancing GAVI's internal equity objectives, cost effectiveness of various options, and overall resource limitations.** GAVI must decide how to allocate ISS funds in accordance with its internal investment policies – to support fragile and underperforming countries, to immunize additional children, to improve equity in higher performing countries, or to ensure more consistent year-to-year performance. These decisions must reflect GAVI priorities and are beyond the research scope of this evaluation, but we propose a framework for decision-making.

   As a basis for discussion, below are specific proposals to address the key evaluation recommendations that require additional GAVI ISS funding.

Objective	Proposal
Encourage high coverage countries continue to immunize additional children	For countries with DTP3 coverage rates over 80%, the reward per additional child immunized should be increased to $40
Encourage countries to maintain consistent high performance	An additional reward ($3 per child) should be provided based on demonstrated consistency of performance
Encourage countries to focus on underperforming districts	For countries with DTP3 coverage rates over 80%, an additional reward should be provided for improved coverage equity. A potential formula to consider is to provide a reward per child ($3 per child), based on the percentage point decrease in the number of districts with DTP3 coverage rate under 50% multiplied by the total target population to calculate the number of children
Provide additional support to LICUS countries to maximize their potential for success	Provide more upfront support (GAVI task team proposed "post-conflict investment") and package of technical assistance

Each of these proposed changes should be considered separately, based on its projected cost and estimated health impact, as well as total GAVI ISS resources, and overall allocation of ISS portfolio. Once an initial estimated cost and health impact is calculated, GAVI must prioritize these objectives, and decide which ones to pursue. The most important ones should then be reconsidered to refine the amount of reward and/or the formula for calculation. Once there is consensus on each of the proposed funding or reward mechanisms, then GAVI can then adopt specific proposals.

Management Recommendations

9) **GAVI should increase its advocacy efforts at global and country level**. During country visits, senior level officials in MOH and MOF noted the importance of GAVI visits in promoting national commitment to immunization. While these visits are important for raising awareness and commitment, such efforts tend to have only short-term impact. GAVI should consider other ways to increase commitment at country level – possible activities may include working with media agencies to disseminate comparative data regarding national government contributions to immunization, and benchmarking countries based on their financial contributions.

10) **GAVI should increase its efforts to coordinate support from all GAVI partners at country level, particularly to support ICCs.** It is likely that at least part of the positive ISS effect is due to increased focus on immunization from GAVI partners in-country and at global level. In most countries, it seems that GAVI has generated this increased focus and coordination – ensuring a process for replicating these efforts in still underperforming countries can help to improve the performance in all countries.

    The attention of senior officials on ICCs has waned and must be invigorated in order to ensure renewed attention and funding for immunization. In some cases, senior officials of GAVI's key partner agencies are not attending meetings, which clearly provide inappropriate signals to senior government officials. GAVI must work with its partner agencies at global level to ensure country-level commitment to ICCs. Because ICCs are most active in preparation for high profile events (for example, coordinating a polio campaign or signing the FSP), it may be useful for GAVI to organize relevant events every few years to renew interest and enthusiasm.

11) **GAVI should establish procedures to respond to country-level problems quickly, drawing on support from all GAVI partners in-country and at regional level.** While GAVI has a procedure for rewarding high performers, it does not currently have any mechanism to support underperforming countries. Options to consider include providing direct technical assistance to underperforming countries (as strong technical inputs seem closely linked with improved performance), or facilitating reviews of underperforming countries among key partners at regional and global level to map out new strategies and additional inputs from all partners. These reviews should result in partners committing to specific response plans in target countries.

    Further, GAVI has no procedure to respond to allegations of misuse of funds. Although GAVI's principle of allowing country-level control has been effective, ISS funding must not be seen as a source of funds with little oversight. GAVI must be perceived as capable and interested in ensuring its funds are used appropriately to prevent any abuse. Even where in-country partners suspected misuse, there was not a clear procedure to follow-up on allegations. Similar to the DQA process, GAVI could institute a standard process for auditing use of funds that can be implemented quickly once any allegation is made. To respond quickly, for example, standard Terms of Reference could be drafted, and an international accounting firm retained in advance. Alternatively, GAVI could make external random audits a condition for future funding, selecting 2 – 4 countries each year for external audit.

12) **GAVI should more consistently implement its policy of adjusting the projected number of children immunized with DTP3, used as the basis for reward calculation, in countries with documented reductions in target populations.** Although GAVI has adopted a policy of allowing countries with declining birth rates to adjust their target population used to calculate reward shares, this policy is not widely disseminated, nor does GAVI consistently identify all countries where the adjustment should be applied. Improved dissemination and consistency is needed to ensure that there are appropriate incentives for all countries.

13) **GAVI should include more emphasis on in-country technical review in its standard procedures and reporting**. Just as the initial application included the condition of an established ICC, it may be helpful for GAVI to require that countries have an established technical team. Alternatively, GAVI may consider adding a section to the APRs requesting information on the technical team, such as the name and title of individuals on the technical team, vacancies on the technical team, frequency of meetings, meeting minutes, key strategic decisions over the past year, etc.

Monitoring and Evaluation Recommendations

14) **Total immunization funding, particularly non-vaccine funding, should be closely monitored at global and country level**. The data on whether ISS has displaced government and other donor funding is inconclusive, as it relies on limited information from FSPs, and the six country studies. However, the flexibility of ISS funding often makes it the *easiest* source of funding to meet NIP priorities, compared with more concerted efforts to generate government and other donor support for critical components of immunization programs. More effort must be made to ensure that ISS does not become the funding source of *first* resort. GAVI should also closely monitor total global funding for immunization (compiling country level data, as well as funding directly to GAVI and other global level efforts), as some donors have opted to fund GAVI directly in lieu of country-level funding. In addition to total funding for immunization, it would be useful to monitor funding excluding new vaccines, as new vaccine costs account for a large portion of the global immunization expenditures, and may distort comparisons over time.

15) **GAVI should establish a process for actively following up on information reported in APRs as part of routine monitoring procedures**. Follow-up on reported expenditure and coverage information that do not total correctly or are inconsistent with previous years is encouraged to promote vigilance in data quality. APRs sometimes report specific problems, but there is no mechanism for GAVI follow-up. GAVI should establish a country level monitoring system, documenting all problems identified (including those highlighted by the IRC), tracking country responses and resolution, which could be shared and updated regularly with country partners. Further review of the expenditure categories (as was recommended in 2004) to ensure more accurate reporting would also be useful for monitoring and future evaluation.

16) **GAVI should continue to use in-country data collection to monitor performance at country level.** As this evaluation found, although the global level results are positive, there is significant variation at country level. In-depth country studies are a valuable source of country-specific information, however, they are costly to implement and impose on in-country resources, and so must be used judiciously. In-country data collection is necessary for gathering complex information on management and strategy to supplement understanding of global data – there is no other way to gather and document these important differences in country context.

17) **GAVI should expand its current monitoring efforts, including regular compilation and review of additional data related to internal operations.** Regular analysis of internal performance based on measures such as time elapsed between funding approval and disbursement is important to assess internal administrative procedures.

1. BACKGROUND TO THE STUDY

GAVI (formerly Global Alliance for Vaccines and Immunization) is an alliance involving multiple partners from the private and public sectors, dedicated to improving health and saving the lives of children through the support of widespread vaccine use. GAVI partners include WHO, UNICEF, the World Bank, the Bill and Melinda Gates Foundation, bilateral aid organizations, governments, research institutes and foundations, non-governmental organizations (NGOs), and vaccine industry representatives. During the first phase of GAVI (2000-2005), GAVI provided support to immunization programs in the form of cash contributions for immunization services support (ISS), in-kind support for the introduction of new vaccines, and in-kind and cash contributions for injection safety. ISS funding, the focus of this study, primarily supports routine immunization.

Countries with per capita gross national income of less than $1,000 (which includes 75 of the world's poorest countries) and DTP3 coverage rates (for children at 12 months of age) below 80 percent[8] were eligible for ISS funding. To receive GAVI support, eligible countries were required to submit an application to GAVI and demonstrate three conditions: 1) an inter-agency coordination committee (ICC); 2) a review of its immunization program conducted within three years of the application year; and, 3) a multi-year plan for its immunization program. Applications were reviewed by an independent review committee (IRC).

ISS funding is an innovative performance-based strategy that makes continued funding conditional upon improved performance and high quality coverage data to encourage countries to make the necessary allocations and immunization investments to vaccinate more children. This strategy allows countries and governments to spend ISS funds in any manner they deem appropriate, but funding in later years is based on increases in the number of immunized children.

Under GAVI Phase 1, countries were approved for five years of support, usually including new vaccines, safe injection supplies, and ISS funding. While the calculation of funding or in-kind support was based on five year projections, for many countries, the period of support was extended over seven years. Initial ISS "investment" funding was paid in installments over three years, based on each country's self-projected number of children to be immunized with DTP3 in the first year after application. Thereafter, additional ISS "reward" funding was paid for immunizing additional children above the projected first year targets. The reward funding is calculated at $20 per additional child[9] receiving DTP3 above the number of children targeted the first year after application. The number of children receiving DTP3 serves as the primary performance indicator for routine immunization. The system for reporting the number of children immunized with DTP3 is validated through a one-time Data Quality Audit (DQA) conducted by GAVI-retained external auditors. Reward funding is contingent upon both increasing the number of children immunized with DTP3 and on achieving a verification factor of 80 percent on the DQA. If a country did not achieve the 80 percent verification factor on its DQA, it may work to improve data quality and receive reward funding if it passed a subsequent DQA.

Countries applying for ISS funding in the first round of applications in 2000 became eligible in 2004 for two years of reward share funding, based on the difference between the baseline and the actual

[8] GAVI has made exceptions for some countries whose coverage exceeds 80 percent.
[9] $20 represents an estimate of the cost of fully vaccinating a child with the basic series of six antigens.

number of additional children immunized with DTP3. Countries that failed the DQA did not receive reward shares, and those that passed the DQA and increased the number of children immunized began to receive reward shares in 2004.

In 2004, GAVI commissioned an evaluation of the ISS program. The report *Evaluation of GAVI Immunization Services Support Funding* was produced by Abt Associates and submitted to the GAVI Board in July 2004. When the 2004 ISS evaluation took place, only $38 million had been disbursed to 50 countries (as of December 2003). The evaluation was based on a desk review of data from 50 countries and six country case studies, involving in-country qualitative and quantitative data collection, conducted between March and May 2004. The main areas of evaluation were:

- Implementation and management of ISS funds
- Allocation and use of ISS funds at country level
- Impact of ISS funds on immunization performance
- Factors affecting successful implementation of the ISS scheme and improved performance
- Costs of administering the ISS scheme
- Comparison of GAVI and GFATM application processes and impact on the overall health system

Of the 52 countries reviewed, only 33 had received funding as of June 2002. This date was used as the cutoff point for the analysis as later recipients would not have had sufficient time to program their funding and meaningful impact could not be measured within a short time period. The timing of the funding disbursements and the available immunization data meant that countries were being evaluated after one to two years of ISS funding, a rather short period of time to assess meaningful changes.

The 2004 evaluation found that countries made systematic and strategic decisions regarding the allocation and use of ISS funds. Twenty-three out of 33 countries demonstrated an increase in the number of children immunized with DTP3. Government contributions to immunization had increased, as did the total funding for immunization. However, given the limited data, there was no attempt to attribute any of these changes to ISS funding – these were merely observed changes. A recommendation was made to conduct another evaluation after most countries have had several years' experience with GAVI funding, providing more data on the impact of GAVI funds on immunization performance. The Executive Summary from the 2004 evaluation can be found in Annex A.

Since that evaluation, there have been two studies of immunization performance with findings of particular interest to this evaluation. In 2005, the World Bank published a study reviewing trends in immunization in African countries, which found that reasonably good execution of all management components of the immunization program were required for success. In 2006, an article in *The Lancet* found that ISS funding has had a positive impact on immunization rates, but only for countries with coverage rates at baseline below 65%.

As GAVI enters its second phase, it is interested in evaluating whether ISS funding continues to further GAVI's objectives, and how best to maximize any positive impact. As of June 2006, US $145 million of ISS funds have been disbursed to 53 countries. This current evaluation of ISS funding reviews many more countries, with several years of data, as well as a substantial increase in funding disbursed to countries. This evaluation not only aims to re-examine some of the findings of the 2004 evaluation, as

well as other studies of GAVI funding and immunization performance, but also aims to investigate the impact of the ISS funding scheme on immunization performance, and to identify ways to improve its design. This evaluation does not represent an audit of the use of funds in recipient countries.

The Request for Proposal (RFP) issued by GAVI indicated three specific objectives (Terms of Reference from the RFP is included as Annex B):

1. To assess the experience of the ISS scheme in Phase 1.[10]
2. To assess the application [implementation] of ISS funding at country level and its relation to overall immunization financing
3. To identify the relationship between the allocation of ISS funding and immunization coverage rates (DTP3)

A Steering Committee (SC) established by the GAVI Board representing several partners, and other independent organizations, provided guidance to the implementation of this evaluation. The SC identified additional areas of interest that were not explicitly part of the original TOR. These areas included getting detailed information on reasons for lack of progress, understanding alignment of ISS and global policies and country needs, and investigating whether focus on DTP3 limits countries' investments in other vaccines. The SC provided additional guidance on the TOR prior to data collection, approved changes in the study approach as described below, and provided comments to an earlier draft of this report.

This evaluation was originally designed to include a desk study and case studies, conducted concurrently. In order to accommodate internal GAVI deadlines, the study approach was revised so as to be conducted in two phases. The first phase provided findings based on statistical analysis of quantitative data from 53 ISS recipient countries. These findings were then used to design the in-depth studies of six countries. This evaluation report integrates the findings of the quantitative analysis and the in-depth country research.

[10] Phase 1 refers to GAVI's first five years of operations (2000-2005).

2. APPROACH AND METHODS

We used both quantitative and qualitative approaches to understand the impact of GAVI ISS funds on immunization program performance. The quantitative analysis relied on publicly available data as well as data provided by the GAVI secretariat to analyze the global impact of ISS funds. The qualitative analysis relied on information collected in six countries to identify differences in ISS management and allocation, immunization program strategies, and other factors that affected country-level performance.

2.1 Quantitative Analysis

2.1.1 Quantitative Data Collection

Collection of quantitative data for this study took place in October and November 2006 and relied on documents from the GAVI Secretariat and online public data sources. The GAVI Secretariat provided all of the Annual Progress Reports, country disbursement files, and country status with reward shares. The Secretariat facilitated contact with WHO to obtain all coverage data. Documents prepared by countries and submitted to GAVI – applications and Financial Sustainability Reports were obtained from the GAVI website. Macroeconomic data, health expenditure data, and political stability data were obtained through the WHO World Health Statistics database and the World Bank. Data on countries pursuing the RED strategy and country supplementary immunization activities (SIAs) were also obtained from the WHO website.

In addition to the quantitative data for analysis, we consulted several sources to identify important issues to address. Both the GAVI Secretariat and the SC provided guidance on priority issues of interest. The GAVI Secretariat also provided access to reports of the monitoring Independent Review Committee (IRC) and minutes of the Regional Working Groups (RWG), which we reviewed to identify pertinent issues for study.

2.1.2 Data Sources

For this evaluation, we used many different sources of information for indicators of immunization coverage, immunization expenditure and GAVI funding, immunization program strategies, and political, economic, and health sector conditions. Table 1 summarizes the key indicators and sources of data.

Table 1: Summary of Key Indicators and Data Source

Indicators	Data Sources	Years Available
Immunization coverage		
DTP3 Coverage Rate	Joint Reporting Form (JRF) official country estimates WHO-UNICEF Estimates	2000-2005 1995-2005
Numbers of children vaccinated with DTP3	JRF official country estimates	2000-2005
Numbers of children vaccinated with measles	JRF official country estimates	2000-2005
Target population (surviving infants)	JRF official country estimates	2000-2005
% of districts with <50% DTP3 coverage % of districts with 50-79% DTP3 coverage % of districts with >=80% DTP3 coverage	JRF official country estimates	2000-2005
Immunization expenditure and GAVI funding		
ISS expenditures per year	Annual Progress Reports from 53 countries[11] Data from IRC member Dr. Viroj Tangcharoensathien	2001-2005
ISS Disbursements to countries	GAVI disbursement files	2000-2006
Approvals for country reward shares	GAVI rewards files	2002-2005
Immunization expenditures before and during GAVI Phase 1	GAVI Financial Sustainability Plans from 27 countries	Depends on country
Immunization program strategies and activities		
Implementation of RED strategy	WHO	2003-2006
Supplementary Immunization Activities	WHO	2001-2006
Political, economic, and health sector conditions		
Per capita total expenditure on health at average exchange rate[12] (US$)	World Health Statistics 2006	1998-2003
Per capita government expenditure on health at average exchange rate[8] (US$)	World Health Statistics 2006	1998-2003
Per capita GDP in international dollars[8]	World Health Statistics 2006, WHO	1998-2003
Global Fund for AIDS, Tuberculosis, and Malaria disbursements	GFATM disbursements data on website	2002-2006
List of LICUS (Low Income Countries Under Stress) countries	Improving GAVI's Engagement and Effectiveness in Fragile States, GAVI October 2006	2006
IBRD Political Stability Index	World Bank	1996-2005

[11] In earlier years, the number of APRs is less than 53, because countries begin submitting APRs only after they receive GAVI funding. Countries applied for support at different phases – only recipient countries would have completed APRs in earlier years.

[12] Health expenditure data was only available at average exchange rate. We did not convert to international dollars, because we used this indicator to look at the relative size of GAVI funding, which is also unadjusted for purchasing power. GDP data was available at average exchange rate or international dollars. We used GDP at international dollars since we were particularly interested in whether differences in GDP affected the ISS impact by affecting cost of immunizing additional children – that is, it may cost more to immunize additional children in higher income countries.

2.1.3 Data Cleaning Process

Annual Progress Reports (APRs)

We reviewed data from Annual Progress Reports (APRs) for all 53 countries for 2004 and 2005. We also relied on information from earlier APRs that we had reviewed in the 2004 ISS Evaluation, and returned to those earlier APRs as necessary. Some countries have revised information submitted in APRs prior to 2004 – these revisions are not reflected in our current analysis.

As part of the APRs, countries reported the amount of ISS funds received and spent in a given year, as well as the amount of any unspent ISS funds that were carried-over from previous years. Expenditure of ISS funds was reported in a table showing the amount spent at each level (central, province, district) by expenditure category.[13] In some cases, the reported total spending across the three levels for one or more expenditure categories did not match the sum from the three levels (likely due to computation errors by those who completed the APRs). In these cases, we calculated and used the sum of expenditures at central, province, and district level for each category of spending, rather than the total reported.

Some countries added expenditure categories other than those already in the APR template, or provided additional information on what ISS money had been spent for. This helped us place such expenditures in the relevant template category. We added two categories for expenditures that could not be assigned to any of the APR template categories: other recurrent expenditures and other capital expenditures.

Financial Sustainability Plans (FSPs)

We reviewed data from 27 FSPs that were submitted to GAVI, and available publicly on the GAVI website.[14] The FSPs provided data on the recurrent and capital expenditures on immunization services made by a country's government and by donors, including GAVI. We used FSPs for data on the expenditures for routine immunization services (i.e. excluding NIDs, SNIDs, and SIAs) in the year before and two years after GAVI support in each country. In general, there were two reporting formats that countries used for their FSPs – one allowed us to distinguish government from donor expenditures for routine immunization services, while the other format did not allow us to make such distinction (resulting in missing data for a number of countries in some analyses involving FSP data).

2.1.4 Data Limitations

The quality of our analysis depends on the quality of the data from the sources cited. There were data limitations both in terms of availability and reliability. Based on our evaluation experience in 2004 and from the in-country research conducted as part of this evaluation, we know that data from the APRs can be inconsistent. Changes in the staff responsible for preparing the APRs can result in inconsistent categorization of expenditures and inaccurate funding carry-overs from year to year. Although the APRs remain the best source of ISS expenditure data available, inconsistencies in the data may skew our findings.

Data availability also affected our analysis. Some indicators were only available for a few points in time, or over a short time period. In particular, FSPs only provide data on immunization expenditures for one point pre-GAVI and one point during GAVI Phase 1. Even where data is available over a longer time period, the timing may be such that we cannot see the effects well. For example, health expenditure data was available for five years from 1998-2003, which spans 2-3 pre-GAVI years and 2-3 GAVI Phase 1

[13] This data is reported in Table 1.1.2 in the Annual Progress Reports.
[14] Additional countries have submitted FSPs, but they are deemed incomplete, and as such the report is not publicly available.

years. Given that ISS expenditures were limited in the early years, it would be difficult to see the effect of health expenditures on ISS impact. Our data on supplementary immunization activities (SIAs) was such that our analysis was dependent on the variable of any occurrence of SIA, without any indication of scale or scope, which we deem to be of insufficient accuracy for reliable conclusions. Limited data availability affected our ability to model effects of different variables and draw conclusive findings.

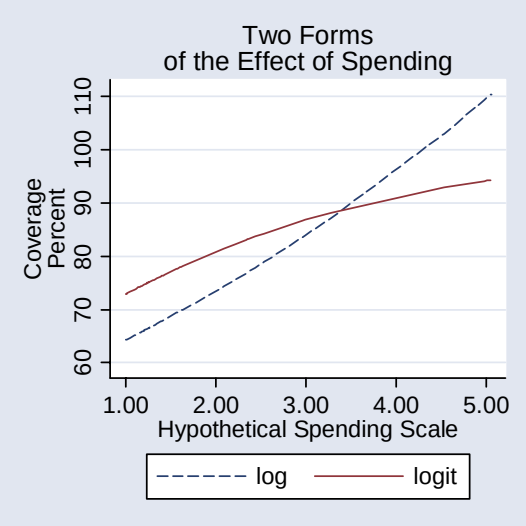
Many of the hypotheses we tested showed inconclusive results. In some cases, we are confident that the data was sufficient and reliable and simply did not support our hypothesis. In other cases, we would argue that the data was insufficient and further data collection and analysis is needed. Some of the additional data may be available in-country and further analysis will be conducted in the second phase of this evaluation. Other analyses require data that is not collected on an ongoing basis, or can only be available after more time.

2.1.5 Modeling Methods

We used a regression model developed by Lu *et al*.[15] to test the effects of ISS expenditures on immunization rates. Data for the model consisted of DTP3 immunization rates for each of 52[16] countries for each calendar year from 1995 to 2005, ISS expenditures (which were zero in years before disbursements began), and covariates (discussed in more detail below). Following Lu *et al.*, we used panel-corrected standard errors[17] to construct significance tests appropriate to cross-sectional time series. In addition to the model specifications that Lu used, we explored two alternative specifications that reflected different possible views about the functional relationship between expenditure and outcomes.

Figure 1: Two Forms of the Effect of Expenditures

First, Lu *et al*. tested two functional forms for the marginal cost of immunization. One (a linear model) assumed that the cost was the same at all levels of coverage. That is, the cost of moving from 50 percent coverage to 51 percent was the same as the cost of moving from 80 percent to 81 percent. The other (a log model) assumed that costs decreased at higher levels of coverage. We tested a third functional form (the logit) widely used in the literature[18] to measure diffusion of innovation that assumed that unit costs increased as coverage approached 100%. (The figure at the right illustrates the difference between the log and logit functions.) The logit arises from probability. If P is the probability that an event occurs, then (1-P) is the



[15] *The Lancet*, 2006.
[16] To date, 53 countries have received ISS funding. However, Papua New Guinea is excluded from our model and from all analyses (except for discussion of ISS management, Section 3.1.3) as it received its initial funding in 1Q 2006.
[17] Because errors in cross-sectional time series are not independent, the usual assumptions of ordinary least squares regression are violated, and standard errors estimated by OLS are biased. Our model allows the errors to be correlated across time and heteroskedastic among countries. We used Prais-Winsten regression to account for the serial correlation of disturbances within countries.
[18] Pierre Verhulst is credited with introducing this curve in 1838. It was later adopted by Ryan & Gross (1943), "The Diffusion of Hybrid Seed Corn in Two Iowa Communities," Rural Sociology 8 (March): 15. which became the classic template for innovation studies. For a more complete history of the field, see Rogers, E.M. (1995). Diffusion of Innovations (4th ed.). New York: Free Press.

probability that it does not occur. P/(1-P) is called the "odds" of the event occurring. The logit is $\ln\left(\frac{P}{1-P}\right)$, sometimes called the log-odds. To compare logits, we take the antilog of the difference. This is the ratio of the odds under one condition to the odds under the other, generally referred to as the "odds ratio."

Second, Lu's model included a term for the prior year's coverage level. (That is, $C_{2005} = \alpha + \beta C_{2004}$.) This has the approximate effect of modeling differences in coverage levels, rather than absolute levels. When applied to ISS funding, it implies that if $20[19] of ISS expenditure in year 1 adds one immunized child to the baseline, then $20 of ISS expenditure in year 2 will add two immunized children to the baseline (the one added in year 1 plus one added in year 2), $20 of ISS expenditure in year 3 will add three immunized children (the two added in years 1 and 2 plus a third child in year 3), and so on. The alternative model is that $20 in additional expenditure adds one child to the baseline level, regardless of the year. Lu's specification fits the pre-ISS data better than the alternative, but implies a response to funding that may not correspond with general expectations.

Immunization coverage rates had been rising in most of the beneficiary countries over the two decades preceding GAVI's intervention. GAVI's intent was not merely to continue these trends, but to raise coverage above the level that business as usual would have produced. Lu's model implicitly accounts for trends by including the prior year's coverage. Since we chose not to use this variable, we accounted for trends explicitly by including the calendar year as a term in the model. This term produces an average of the trend across all 52 countries. We made two further adjustments to this trend. First, we shifted the level of the trend so that it matched each country's average coverage level during 1998-2000, by adding the 1998-2000 coverage as a term in the model.[20] Second, we allowed the slope to vary among different coverage levels by adding to the equation a variable defined as: [Year] x [1998-2000 coverage].

Lu *et al*, used GDP[21] and the IBRD Political Stability Index to model the effects of the social and economic context of countries. We used the same covariates in the same form. In later sections we discuss several other covariates that we tested, such as LICUS status. We did not incorporate these other covariates in our general model of ISS effects.

Based on comments from the Steering Committee, we explored the sensitivity of our results to the modeling assumptions by testing several changes to the basic specification.

- Our results are based on the logit of the coverage rate. In addition, we looked at the two specifications used by Lu *et al*., *log*(coverage) and at the untransformed coverage rate as dependent variables.
- We added the previous year's value of the dependent variable as a predictor, and also tried models with only the lag (and no trend).
- We tried models with and without fixed effects for each country – fixed effects add 51 parameters to the model, adjusting for the mean coverage in each country.
- We fit all these models to the entire sample of 52 countries, and to the 23 countries where DTP3 coverage in 1998-2000 had exceeded 65 percent.

[19] $20 represents an estimate of the cost of fully vaccinating a child with the basic series of six antigens.
[20] We applied the logit transformation to the 1998-2000 coverage so that it was measured in the same units as the dependent variable.
[21] Log (GDP per capita).

In all, we fit 36 separate models to the ten year data series. Our main findings were confirmed in all or nearly all of the alternative models. More details of the results from these alternative models are discussed in Section 3.3.1.

There are two key differences in the data we used and the data used by Lu *et al*, which explain differences in the findings. First, Lu *et al*. had one fewer year of post-GAVI data available for their analysis – our analysis included 2005 immunization coverage rates. Second, our key independent variable was actual ISS expenditures, in contrast with the Lu *et al*. study, which used ISS disbursements to countries as the main independent variable. The different findings arise from these data differences, not from modeling differences, as we tested their modeling specifications (and others) and found the same results.

2.1.6 Indicator of Immunization Performance

GAVI uses the numbers of children immunized with DTP3 as the key indicator of immunization performance. This indicator serves as the basis for GAVI reward calculations. Unlike the DTP3 coverage rate, the number of children immunized avoids the problems of unreliable or changing target population denominators. However, using this performance indicator means that it is possible that countries that do not increase immunization performance beyond vaccinating a larger birth cohort will receive reward funds.

We considered using the number of children immunized with DTP3 because this was the indicator used by GAVI, however, this data is incomplete over the timeframe we wished to study. There are two possible sources of the numbers of children immunized with DTP3 – the WHO/UNICEF Estimates and Official Country Estimates – neither is complete, nor considered reliable, prior to 2000.

Thus, we use the DTP3 coverage rate for children at 12 months of age to measure immunization program performance. There are multiple sources of the DTP3 coverage rate – the most common ones are country official estimates, survey data and WHO-UNICEF estimates. These are all reported in the WHO-UNICEF Joint Reporting Form (JRF) each year by WHO member countries. While the variance between WHO-UNICEF estimates and the official country estimates has decreased in recent years, there are still variances between these two sources. Official country estimates were only available from 2000 to 2005. Prior to 2000, the official country estimates are incomplete and not considered reliable. WHO-UNICEF estimates were available over a long time period and generally deemed reliable. Therefore, we used WHO/UNICEF Estimates of DTP3 and measles coverage rates (for children at 12 months of age) from 1995-2005 in our model. The final alternative, survey data, is considered very reliable, but is not available on an annual basis.

The WHO/UNICEF Estimates and the Official Country Estimates of DTP3 rates are generally very similar. There are some cases where the rates differ. To see whether these differences affected our results, we ran the model twice, using the two different data sources. Country official estimates were only available for 209 of the 502 country-year observations from WHO/UNICEF Estimates. Substituting these 209 data points with Country official estimates provides virtually identical results. Annex C presents graphs of WHO/UNICEF Estimates and Official Country Estimates for each of the 52 countries included in our analysis.

2.2 In-depth Country Studies

The in-depth country studies were designed after the quantitative analysis was completed to fill gaps in knowledge. Questions that could not be answered with quantitative data were explored through country-level data.

2.2.1 Country Selection

As suggested by the GAVI Steering Committee, we used a modified case control approach for studying three pairs of countries (a total of six countries). All study countries were ISS recipients, so there are no true "control" countries. However, we identified pairs of countries with similar characteristics and immunization rates at the beginning of GAVI funding, but which had different outcomes at the time of data collection. By studying differences between similar countries, we can better understand continued problems that countries are unable to address, factors that encourage and constrain improved performance, and the role of in-country partners in managing ISS funding and supporting immunization activities.

The three pairs of countries were Cambodia and Laos, Tanzania and Zambia, and DR Congo and Guinea-Conakry. Guinea-Conakry was not the ideal match for DR Congo – its per capita income and health spending was much higher than DRC, as was its DTP3 coverage rate at baseline (57% compared with 31% in DRC). Further, although it was meant to represent a lower-performing comparator to DRC, its performance was quite good. Due to problems with scheduling visits to other countries, however, Guinea was substituted as the comparator for DR Congo. Four LICUS countries were selected (Cambodia, DRC, Guinea and Laos) because the GAVI Steering Committee was particularly interested in exploring whether LICUS countries manage and utilize their funds differently, especially in light of the findings from the desk review. Three of the countries were declined at one point for ISS reward shares, but for different reasons. The selection represented a range of immunization program performance at the beginning of GAVI, including one high performing pair (Tanzania and Zambia), one mid-level pair (Cambodia and Laos), and one weaker pair (DRC and Guinea, with Guinea being an imperfect substitute since its DTP3 coverage rate at baseline was closer to our definition of a mid-level performer). Comparative indicators for the six in-depth study countries are shown in Table 2.

Table 2: Comparative Indicators for In-depth Study Countries

	Cambodia	Lao PDR	Tanzania	Zambia	DRC	Guinea
Population in 2000 (World Population Prospects: the 2006 Revision)	12,819,000	5,244,000	33,954,000	10,485,000	50,824,000	8,225,000
Population in 2005 (World Population Prospects: the 2006 Revision)	14,002,000	5,689,000	38,611,000	11,519,000	58,900,000	9,029,000
Surviving infants in 2000 (WHO JRF)	411,252	196,599	1,335,631	426,838	1,268,509	320,068
Surviving infants in 2005 (WHO JRF)	367,455	188,858	1,392,679	567,560	2,365,521	338,874
DTP3 at baseline (GAVI application)	65% (2000)	56% (2000)	74% (1999)	75% (2001)	31% (2001)	57% (2000)
DTP3 in 2000 (WHO-UNICEF estimates)	50%	53%	79%	78%	40%	45%
DTP3 in 2005 (WHO-UNICEF	82%	49%	90%	80%	73%	69%

	Cambodia	Lao PDR	Tanzania	Zambia	DRC	Guinea
estimates)						
GNI per capita 2000 (international $, WHO)*	$280	$280	$280	$320	$90	$450
GNI per capita 2005 (international $, WHO)*	$430	$430	$330	$450	$120	$460
Per capita total expenditure on health 2000 (avg exchg rate)*	$31	$8	$12	$19	$10	$18
Per capita total expenditure on health 2003 (avg exchg rate)*	$33	$11	$12	$21	$4	$22
Gov't health expend. as % of Gov't budget (2000)*	10.4%	4.8%	12.6%	9.1%	2.6%	3.9%
Gov't health expend. as % of Gov't budget (2003)*	11.8%	6.2%	12.7%	11.8%	5.4%	4.9%
General government expend. on health as % of total expend on health (2000)*	14.2%	38.7%	48.1%	50.6%	5.3%	13.5%
General government expend. on health as % of total expend on health (2003)*	19.3%	38.5%	55.4%	51.4%	18.3%	16.6%
External resources for health as % of total expend. on health (2000)*	18.8%	22.5%	32.1%	18.2%	4.9%	5.8%
External resources for health as % of total expend. on health in (2003)*	18.5%	30%	21.9%	44.7%	15.1%	7.3%
Total health expend. as % of GDP (2000)*	11%	2.5%	4.4%	5.5%	3.7%	4.8%
Total health expend. as % of GDP (2003)*	10.9%	3.2%	4.3%	5.4%	4%	5.4%
LICUS status	Yes	Yes	No	No	Yes	Yes
Political stability index in 2000	-0.93	-0.27	-0.52	-0.73	-2.93	-1.44
Political stability index in 2005	0.29	-0.11	-0.37	0.02	0.23	0.29
DQA verification factor	98%	59%	90%	79%	88%	95%
Received rewards?	No	No	Yes	Yes	Yes	Yes (but only in 2005)
Reason for not obtaining rewards	Number of children immunized did not increase	Number of children immunized did not increase DQA verification factor under 80%	N/A	N/A	N/A	Number of children immunized did not increase in 2003 and 2004

* World Health Statistics 2006, WHO.

2.2.2 Data Collection

Country visits were conducted between April and July 2007. A two-person research team with expertise in immunization program management and immunization financing visited each of the study countries. The research team was in each country for 10-14 days. Although we would have liked to use

the same research team for each pair of countries, scheduling problems did not allow it. In DRC and Guinea, one of the two researchers participated in both country visits; the same was true in Tanzania and Zambia. In Cambodia and Laos, the same two-person team visited both countries.

The main questions of interest and the research framework were reviewed by the SC before beginning the in-depth country studies. The key research questions for the country studies are:

- What factors are correlated with differences in immunization performance?
- How does flexibility of ISS funding affect performance?
- How have ISS funds been managed (to identify difference between countries)?
- Do higher coverage countries spend their ISS funding differently?
- How has ISS been integrated with overall health system planning and budgeting (if at all)?
- How do reward shares affect coverage?
- What do countries do when they don't get reward shares because of a failed DQA? (only asked of countries with failed DQAs)

Data collection was conducted using semi-structured interviews. Interview guides were provided to the researchers and reviewed with them in advance. As in-country data collection was conducted in the earlier countries, specific points of interest were noted and discussed with the teams conducting the later country visits, to get more targeted information on notable issues.

2.2.3 Data Sources

In each country, the research teams met with government officials involved with immunization program management and financing (including officials from Ministry of Health, Ministry of Finance, and other related ministries as appropriate). The team also interviewed officials representing major stakeholders and donors. Table 3 illustrates the types of persons interviewed at country level (the complete list of key informants in each country is shown in Annex D). In a few cases, some of the persons below were not available due to scheduling issues.

Table 3: Illustrative List of In-country Informants

Group or Institution	Types of People Interviewed
MOH (central level)	Overall MOH manager – Director General level Manager of Directorate in which NIP falls – Director of Preventive Services level Manager of Finances for MOH – Director of Finance and Administration level
MOH (subnational level)	Medical Officer (or equivalent) Officer or in-charge responsible for immunization Financial manager for health
MOF	MOF manager responsible for oversight of and allocations to the health sector MOF manager responsible for oversight of and allocations to the immunization program MOF staff represented on the ICC
NIP	NIP manager

Group or Institution	Types of People Interviewed
	NIP financial manager Others identified by the NIP manager, ICC, or MOH
Facility level	Person responsible for immunizations
ICC	2-5 Donor representatives, especially the lead donor, if applicable, often including WHO and UNICEF
SWAp Representatives	1-3 Donor representatives, especially the designated lead donor, if applicable

In each country, the team also visited two districts to validate information collected at central level, and to see how policies and procedures were actually implemented in practice. In consultation with the NIP manager, consultants selected two districts with different experiences in immunization performance over the last 3-5 years (ie, one district with improving coverage and one district with stagnant or declining coverage). The key areas explored at district and facility level were:

- Management of ISS funds – what are the responsibilities for management and reporting at district level?
- Planning and use of ISS funds – how are districts and facilities involved in programming funds? Who decides how to spend ISS money? What were the criteria for deciding how to program funds? Do districts know their sources of funding for the NIP? Do districts receive unprogrammed funds for immunization (ie, they decide how to spend the funds)?
- Immunization strategies – what are the major challenges to high immunization rates? What strategies have been adopted to improve immunization performance? What are key factors responsible for improving performance? Or constraining performance improvements?

The research teams also requested the following country-level data:

- National Coverage data for BCG, DTP1, DTP3, Measles, TT2+ for 1999 to 2005, disaggregated by district, as well as province
- Monthly coverage data for the same antigens for the districts that were visited for 1999 to 2005
- WHO/UNICEF Joint Reporting Form (JRF) for 1999 to 2005
- Financial records for GAVI ISS funding, including allocation to each province/district and expenditure reports for each year of GAVI ISS money

This data was not always available in every country – monthly coverage data and detailed ISS financial records were particularly difficult to obtain. In some countries, sub-national level coverage data was missing for some years.

2.2.4 Data Limitations

Our informants were primarily limited to individuals currently representing the NIP and ICC partners. Many of these individuals have only been in their current position for a few years, while ISS funding was first disbursed to countries in 2001 or 2002. We rely on these informants' perceptions and their second-hand knowledge of the immunization program prior to their taking post. In selected cases, we were able to interview staff previously in these positions. Nonetheless, the information we have is

skewed toward the situation in recent years, even though it may have been quite different than earlier conditions, and even though the earlier conditions may have important impact on current immunization performance.

The primary purpose of the district visits was to compare information provided at the national level with information understood at sub-national levels. Information from the district level was not designed to be representative of the entire country. Because activities to improve immunization coverage were conducted at the district and facility level, it was important to understand whether strategies articulated at the national level translated into activities and funding at the operational level. The district visits also allowed us to get a field perspective of the key factors facilitating and hindering performance improvements.

3. FINDINGS

The findings from the desk review are presented for each of the main areas of this evaluation:

- Experience of the ISS scheme
- Impact of ISS funds on overall immunization financing
- Impact of ISS funds on performance of immunization programs
- Factors correlated with differences in performance
- Impact of ISS design and structure on immunization performance

These sections describe the management and use of ISS funds, and how ISS has affected overall immunization financing. We test whether ISS funds have an impact on the performance of immunization programs, then try to analyze the conditions under which ISS funds can have the highest positive impact. Lastly, we test to see which characteristics of ISS funding are most valuable to producing the positive impact.

3.1 Experience of the ISS Scheme

The data collected provided interesting insights on how countries managed and used their ISS funds. Though merely descriptive, expenditure patterns across countries and over time allow us to see how ISS funding is incorporated into immunization programs. Of particular interest is information describing experiences in fragile states, in comparison with other ISS recipient countries.

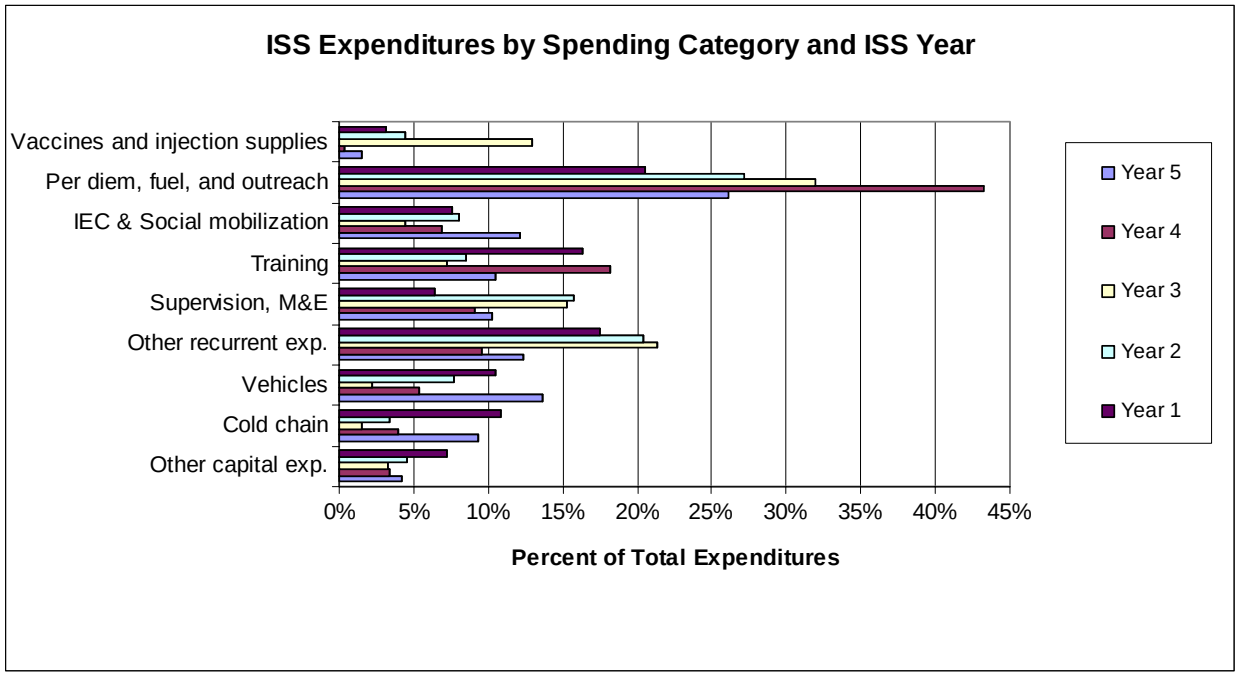
3.1.1 Expenditures of GAVI ISS Funds

We reviewed the data reported in Annual Progress Reports (APRs) and found several broad trends in ISS expenditures. To make comparisons across countries, which began receiving ISS funding at different times, we label the expenditures by the year of funding. For example, Cambodia started receiving ISS funds in 2002 while Myanmar started receiving ISS funds in 2004. In the analysis below, we compare countries' expenditures during each year of funding. In this case, Cambodia's 2002 year would be in the same year as Myanmar's 2004 year, which we call ISS Year 1 of the analysis. This allows us to compare how country expenditures change after several years' funding or as they gain experience with the ISS scheme.

The large majority of ISS funds were used for recurrent expenditures (83%)[22], although the changes over time seem to reflect the cyclical nature of capital needs. For example, expenditures on vehicles represent over 10% of expenditures in Year 1, then decline each year until Year 5, when they increase again to 13% of expenditures. A similar pattern can be seen with cold chain expenditures. Figure 2 presents the breakdown of ISS expenditures by item over the years of ISS funding.

[22] This rate is calculated using a weighted average across countries. Using a simple average, we find that 79% of ISS funds were used for recurrent expenditures.

Figure 2: ISS Expenditures by Category and ISS Year



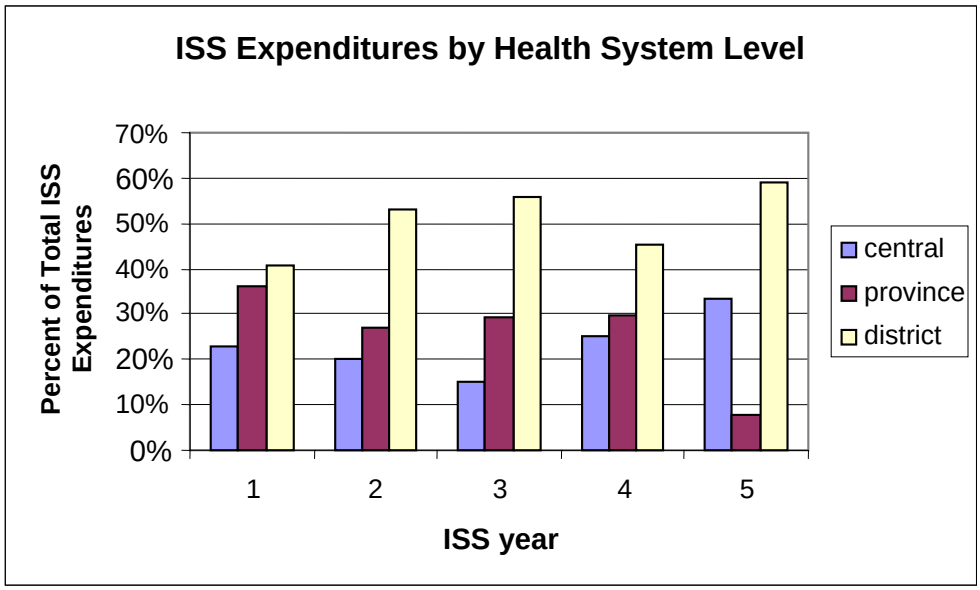
Source: Annual Progress Reports (weighted average across countries)[23]

Also worth noting is that expenditures on per diem, fuel, and outreach increase each year, except in ISS Year 5. These categories were grouped together because the 2004 ISS evaluation found confusion in reporting on these categories, with some countries reporting per diem and fuel costs related to outreach under per diem and fuel, while others reported it under outreach. In actuality, expenditures under all three of these line items are largely for outreach.

Also using data from the APRs, we analyzed the expenditures at various levels of the health system. Across all ISS recipients, 23% of ISS funds were used at central level, 26% at province level, and 51% at district level. As shown in the Figure 3, there do not appear to be clear trends in expenditures by health system level.

[23] All percentages were calculated using a weighted average across countries. Using a simple average results in different percentages, but the major trends for different expenditure categories remain the same.

Figure 3: ISS Expenditures by Health System Level



Source: Annual Progress Reports (weighted average across countries)

Calculating expenditures by level of the health system using an unweighted average across countries produces somewhat different results. Using a simple average, we find that 32% of ISS funds were used at central level, 24% at province level, and 44% at district level. The expenditure patterns also appeared somewhat more stable over time.

The rate of expenditure increases from year to year. In the first year of ISS funding, expenditures total 47% of funding received. Based on findings from the 2004 evaluation, there were initial disbursement delays within countries as they sorted out internal disbursement procedures. Over time the expenditure rate increased, and currently 75% of cumulative GAVI funding received through 2005 has been accounted for in Progress Reports, as shown in Table 4.[24] We also calculated a simple average across countries, to avoid the effect of countries with high ISS funding and low expenditure rates skewing the average. On average, through December 2005, countries have spent 85% of the funds they had received through December 2005.

[24] The 75% expenditure rate excludes years when countries did not receive funding, but spent previous years' funding. Including these expenditures would bring the cumulative expenditure rate to 79%.

Table 4: Expenditure Rate of ISS Funds (US$)

Cumulative Percent of Total ISS Funds Spent By End of Each ISS Payment Year[13]			
	ISS Funds Spent (USD)	**ISS Funds Received (USD)**	**Cumulative Expenditures of ISS Funds Received**
Year 1	9,942,478	21,319,232	47%
Year 2	28,706,466	43,730,071	66%
Year 3	54,437,570	78,058,766	70%
Year 4	72,429,524	100,761,659	72%
Year 5	79,553,286	106,410,489	75%

Source: Annual Progress Reports (weighted average across countries)

3.1.2 Application Processing and Funding Transfers

During the inception phase of GAVI, there was reportedly confusion over procedures and guidelines for the funding application process. In the evaluation of GAVI ISS funding in 2004, it was found that the average number of days between approval and disbursement of funds had decreased from Tranche 1 to Tranche 2 funding.[25] We had hoped to replicate this analysis to see whether that trend continues for later tranches and later applicants, indicating continuous improvement in the efficiency of GAVI procedures. However, we were unable to assemble the data required for this analysis. First, GAVI disbursement data in earlier years (available to us in 2004) included actual dates of disbursements, while later disbursement data provided to us only specified the quarter in which funding was made. Secondly, it was not possible to identify all the dates for funding approvals from IRC and Board documents. We did not aggressively pursue more specificity from GAVI, nor researched other sources of data to analyze processing time because the anecdotal evidence seems to show that processing delays are no longer problematic. For these reasons, we have no data to report changes in GAVI processing time.

3.1.3 Programming and Management of ISS Funds

We reviewed 2005 APRs to assess how ISS funds were being managed and programmed in ISS recipient countries. In section 1.1 of the APRs, countries are asked to describe the mechanisms for management of ISS funds, including the role of the ICC. This section is open-ended and countries can choose to include as much or as little information as they wish. We identified four procedures or characteristics that many countries used to describe how they managed their ISS funds. However, countries did not always provide enough information in this section for us to know whether they used such procedures. In some instances, countries are unlikely to specify the lack of a certain requirement (e.g., a country is unlikely to specify that expenditures are not reconciled), but in the absence of more detail, we used the information as reported.[26]

[25] Tranche here refers to each GAVI funding disbursement.

[26] Because information from the 2005 APRs was not always complete, we also reviewed the 2004 APRs to try to fill gaps in our understanding of ISS programming and management. Reviewing the 2004 APRs did not provide additional information, and it was decided that investing significantly time to review all APRs ever submitted would not yield much in additional data. Thus all data presented here is from the 2005 APRs only.

Across the 53[27] countries receiving ISS funding, the ICC reviewed or influenced the allocation or use of ISS funds (such as review and approval of EPI action plan, budget, or expenditures) in nearly all countries (48). A well-functioning ICC is important to effective management of the immunization program, and the effectiveness of ICCs varies greatly across countries, but there was not sufficient detail in the APRs to provide more analysis of the actual role of ICCs in each country.

Reports from 18 countries noted that districts are required to reconcile expenditures for ISS funds, and in some cases districts were not allowed to receive further funding before their expenditures were reconciled. In many cases, countries described in detail the process for disbursement of ISS funds, most often including information on whether ISS money was received in a special "GAVI-only" account, or in the general EPI or MOH account that includes funds from other sources. Of the 29 countries that included this type of information in their 2005 APR, the majority (21 countries) reported that ISS money is received in a GAVI-only account.

Among the 25 countries that provided information on whether the planning process for ISS funds or the overall immunization program is centrally- or district-driven driven, the majority (15 countries) were identified as having planning and budgeting decisions made by the central level without input from lower administrative levels (e.g. district micro-plans).[28] The central-level authority responsible for preparing action plans and budgets related to the use of ISS funds in these countries is usually the EPI or the MOH division responsible for immunizations. Table 5 summarizes the findings on management of ISS funds from the APRs.

Table 5: Summary of Management Procedures for ISS Funds

	Number of Countries (n=53)		
Management Procedures	Yes	No	Insufficient Information
ICC reviews or influences use of ISS funds	48	2	3
Districts must reconcile expenditures	18	0	35
ISS funds are held in a GAVI-specific account	21	8	24
Planning and budgeting is district-driven	10	15	28

Source: 2005 Annual Progress Reports

The in-depth country studies provided more useful information in this area. Although the ICC is often synonymous with coordination and oversight, it became apparent during the country visits that key functions under coordination and oversight needed to be further disaggregated and analyzed. We identified three key functions, as related to our evaluation – increasing the political profile of immunization (advocacy and fundraising), providing strategic and technical leadership for immunization, and monitoring the use of ISS funds. In addition to the ICC, five study countries had either ICC sub-committees or a Technical Working Group (TWG) responsible for technical areas – Tanzania did not have a formal technical group, but EPI, UNICEF and WHO staff worked closely together to perform technical functions. Different functions were assigned to the subcommittees or TWG.

[27] 53 countries includes Papua New Guinea, which received ISS funds in the first quarter of 2006. They submitted a 2005 APR reporting on the planned management of their first tranche funds.

[28] In Nigeria and Indonesia, planning and budgeting took place in the state and province level. Although there is another administrative level below the state and province level, these two countries were categorized as 'district-driven' in this analysis.

Across all the study countries, the effectiveness of the ICC in increasing the political profile of immunization and generating tangible commitment (increased resources) has waned over time. In four of the study countries, senior officials have become less active over time, and the ICC has become more of a formality. In some countries, even high profile activities, such as campaigns or the GAVI HSS application, are only moderately successful at re-generating ICC interest. This declining interest may be associated with less active involvement from senior GAVI officials at country level – a few senior MOH informants noted the importance of frequent GAVI visits in generating commitment and interest in immunization.

Technical leadership, through a formal or informal technical committee, was very strong in Cambodia, Tanzania, and Zambia. ICCs generally were not closely involved in strategic planning – except in Zambia, ICCs do not seem to question strategic recommendations of the technical committee. Technical leadership seemed relatively less strong in Guinea and DRC – for example the DRC technical committee reportedly met on a monthly basis, less frequently than in other countries, while the Guinea technical sub-committee only met on an ad hoc basis. In Laos, the TWG met regularly, but they had a bureaucratic approach to their responsibilities – checking off the workplan items, and ensuring activities were within budget, rather than strategic review of performance.

There was little high level involvement in monitoring the use of ISS funds – except in Laos and Guinea, this function was performed at an administrative level. Except in DRC, informants did not have any concerns regarding monitoring the use of ISS funds. In DRC, however, there was real concern regarding the transparency of decisions made unilaterally by the former EPI management team, which ultimately led to the replacement of the EPI Manager. DRC also allocated 15% of its ISS funding for a performance-based bonus system for EPI staff at all levels – although criteria for determining bonuses are clearly documented, the decision process behind these bonuses has been questioned. Both the DRC experience and the more public misuse of funds in Uganda would have benefited from faster response from GAVI and in-country NIP partners. Based on the in-depth country studies, it appears that while ICCs are formally involved in management of ISS funds, their functional role is fairly limited. Annex E provides more details on the division of functional responsibilities between the ICCs and technical teams in each study country.

Confirming the data from APRs, the countries visited all required that districts reconcile expenditures before receiving additional funding. This requirement sometimes resulted in delays in disbursements to district level, or had to be waived in "emergency" situations. All of the study countries had dedicated GAVI accounts, so that funds were not co-mingled with other funding.

The situation related to planning use of ISS funds was relatively complex. In all countries visited, the central level was generally responsible for allocation of ISS funds, whether by activity or by district. The central level sets the priority activities or strategies, with some portion of ISS funding going directly to support district activities. District flexibility in programming cash funding varied by country and by activity. For example, in Cambodia and Laos, selected districts were allocated funding specifically for outreach activities, which they then "planned" according to the number of facilities and the outreach policy. In contrast, funding was allocated to selected districts in Tanzania, with central level technical support provided to program the funds for a variety of activities. In both cases, however, the larger decisions regarding how to use funds (on training vs media campaign or district support) are made at central level with limited district input.

Specific criteria for allocating funding to districts varied over time, however, there were two criteria that stood out as dominant – allocation to underperforming districts, and/or underfunded districts. Laos and Guinea used availability of funding from other sources as the sole criteria for allocating ISS funding to districts. Zambia did not consider the level of other funding and solely allocated ISS funds to districts

selected to implement the RED strategy, which were the lower performing districts. Cambodia and Tanzania used both criteria, with Tanzania considering the two criteria jointly and Cambodia creating two entirely different streams of funding. Cambodia funded outreach in the first quarter of the year for those districts not receiving other donor support, and funded catch-up outreach in the last quarter for those districts underperforming through the first three-quarters of the year.

3.1.4 Experience with Countries Under Stress

GAVI has been exploring how to increase the effectiveness of its engagement with fragile states, especially as GAVI Phase 2 funding will be more focused on reward funding. During Phase 1, countries with weak, ineffective or non-existent governments struggled to meet application requirements and administrative procedures to receive ISS funding.

A GAVI task team assigned to review GAVI's engagement with fragile states issued a report of findings in October 2006.[29] This team proposed use of the World Bank's Low Income Countries Under Stress (LICUS) designation as the GAVI definition of a country under stress, as it mirrored the list of countries which had experienced difficulties applying GAVI's rules and procedures for application and implementation. This team also proposed that these countries be treated differently for future new vaccine support and immunization services support.

We examined whether LICUS countries differed from the other ISS countries (non-LICUS) countries in terms of disbursement and utilization rates of ISS funds. On average, LICUS countries applied for GAVI later and received their first disbursement later than non-LICUS countries. The median first disbursement for non-LICUS countries was 2Q 2001 (Tajikistan). The median first disbursements for LICUS countries was 15-18 months later, with Sudan receiving funds in 3Q 2002 and Central African Republic receiving funds in 4Q 2002. Although official GAVI policy never prevented countries in conflict or other fragile states from applying for GAVI funding earlier, GAVI partners encouraged some countries to apply earlier by providing the support needed to complete their GAVI applications (conducting immunization program assessments, preparing multi-year plans, etc.)

The rate of expenditure of ISS funds is marginally higher in non-LICUS countries, compared with LICUS countries. On average, LICUS countries have spent 82% of funds received (as reported on APRs), while non-LICUS countries have spent 87% of ISS funds received. Despite similar expenditure rates, the impact of ISS funds is quite different in LICUS versus non-LICUS countries, as discussed in a later section.

LICUS countries are also less likely to receive reward shares. Thirty-six countries have now been approved for reward funds out of a total of 51 countries (71%) eligible to receive reward funds (Papua New Guinea only received their first investment share in 2006, and Indonesia is a special status country not eligible for rewards).[30] Of 22 LICUS countries eligible for reward shares, only 59% (13) have been approved for rewards, compared with 79% of non-LICUS countries (23 of 29) eligible for reward shares. Countries not approved for reward shares did not pass their DQA and/or did not increase the numbers of children vaccinated from the previous year. Annex F provides details of countries approved and not approved for reward funds, sorted by LICUS and non-LICUS countries.

Table 6 summarizes key indicators of ISS experience for LICUS and non-LICUS countries.

[29] GAVI, October 2006 "Improving GAVI's Engagement and Effectiveness in Fragile States".

[30] Of the 36 countries approved for reward shares, 26 have actually received funds. If we consider the percentages of countries that have already received reward shares, 32% of LICUS countries have received rewards, compared with 63% of non-LICUS countries.

Table 6: Indicators of ISS Experience for LICUS and non-LICUS Countries

	LICUS Countries	Non-LICUS Countries
Median Date of First Disbursement	2Q/3Q 2002	2Q 2001
Average Expenditure Rate of ISS Funds (as of Dec 2005)	82%	87%
Percent of Countries Approved for Rewards (of those eligible)	59%	79%

Four of the six in-depth study countries were designated LICUS countries (Cambodia, Laos, DRC, and Guinea). With the exception of Laos, the studied countries experienced moderate to good performance during the first phase of GAVI. DRC was the only post-conflict country, while two were earlier applicants (Cambodia and Laos) and two received rewards (DRC and Guinea). In support of the GAVI task team finding, the three LICUS countries studied with improving performance demonstrate the importance of in-country technical capacity within NIP and strong commitment and collaboration from GAVI partners, as discussed further in Section 3.4. The varied experiences of the four countries also demonstrate the difficulty of making generalizations for this group of countries.

3.1.5 Integration of ISS Scheme with Overall Health System Planning and Budgeting

GAVI promotes harmonization of the GAVI ISS scheme with the overall health system and other donor planning and funding. The SC expressed interest in how ISS funding is integrated into planning and budgeting for the immunization program and the overall health sector. In addition, there was also significant interest in how countries would or should integrate the ISS and Health System Support (HSS) funding in the future.

Harmonization of ISS with the overall health system requires coordination in many directions. First, there must be coordination of ISS funding and planning within overall health funding and planning at central and sub-national levels. Secondly, there must be coordination between central and sub-national planning and funding both within the NIP and the overall health system. Not surprisingly, this type of harmonization did not always occur smoothly in the study countries. The degree of coordination varied, and few countries had a well-coordinated system both across health programs and administrative levels – in this regard, Tanzania was the most well-integrated of the countries visited, with better coordination between all levels of the health system, and better integration of activities across programs within district and central level plans and budgets.

The one commonality among all countries was that ISS planning is integrated into NIP planning – most countries developed integrated NIP plans, and used ISS funding to implement selected activities. Beyond that, the situation was quite different between the study countries. In Cambodia, where donor coordination within the broader health system, and coordination across the health administrative levels, was more limited, the NIP was active in coordinating the EPI activities using a donor coordination meeting, and an annual EPI meeting to ensure funding in all districts. Even so, planning for some activities occurred only at central level, with districts informed rather late of activities that they had not included in their workplans – the 2007 measles campaign was given as an example. In Zambia, the level of health system-wide coordination was high, both at central and sub-national levels, but ISS funding at sub-national level was not always well-coordinated. Although district plans included activities funded by ISS and district budgets, often districts did not get advanced notification of the amount and timing of ISS funding. In Guinea, EPI was well-imbedded in the primary health care (PHC) strategy, but the health system suffered from poor coordination between central and sub-national levels. In Laos, health planning is in principle facility-based, but is not linked to budgets provided. District health budgets do not include

any EPI activities, so even though district health plans may include EPI activities, what gets implemented is only what is financed by the NIP through GAVI and other donor funding.

The six study countries were very different in their relative strengths and weaknesses in the area of harmonization. However, our findings seemed to reflect the general level of harmonization within the health system – issues were not specific to ISS, but were indicative of the difficulties in developing integrated health services. Annex G presents more detail by country of the different dimensions of integration of ISS within the NIP and overall health system.

Only Cambodia and DRC had been approved for HSS funding at the time of the country visit, so information related to implementation and integration of HSS planning and activities is more limited. In Cambodia, HSS funding will be managed through the Health System Strengthening Project (HSSP) Secretariat, which manages funding for GFATM, World Bank, and ADB projects. While one office manages all donor funding, the level of integration appears limited. Each donor still maintains its own procurement and disbursement procedures. Harmonization remains a challenge, with instances of duplication – with districts purchasing equipment that was then also procured with donor funds. Management of HSS and other donor funds through the HSSP Secretariat represents only the first step of integrating health system planning and funding. The planned HSS activities are much broader than EPI, with a strategy of using EPI to improve implementation of the Minimum Package of Activities (a standard package of PHC activities). Even selection of districts for HSS support will consider other health indicators beyond immunization coverage rates, such as infant and maternal mortality rates.

DRC was approved for HSS support (valued at US$ 56,812,806 for three years) in early 2007. DRC proposed to target 72 Health Zones (HZs) in the seven poorest performing provinces for strengthening central and sub-national program management (9%), restructuring and capacity building in the zones (40%), reinforcing human resources in 50 HZs that receive no other donor support (32%), and unspecified activities (19%). GAVI HSS funding will be integrated into an overall Strategy to Reinforce the Health Sector that covers the final four years of the National Health Development Plan (2000 - 2010). Approval of plans and budgets will rest with the national Health Sector Coordinating Committee. Funds will be held in dedicated bank accounts at national and provincial level, with the WHO Representative (WR) and MOH Director of Planning and Research being co-signatories on the national account. Management of HSS funds appear to follow the general direction of the DRC MOH – toward more integration and coordination between directorates and programs at national level, and greater autonomy at provincial and zonal levels.

3.2 Impact of ISS Funds on Routine Immunization Financing

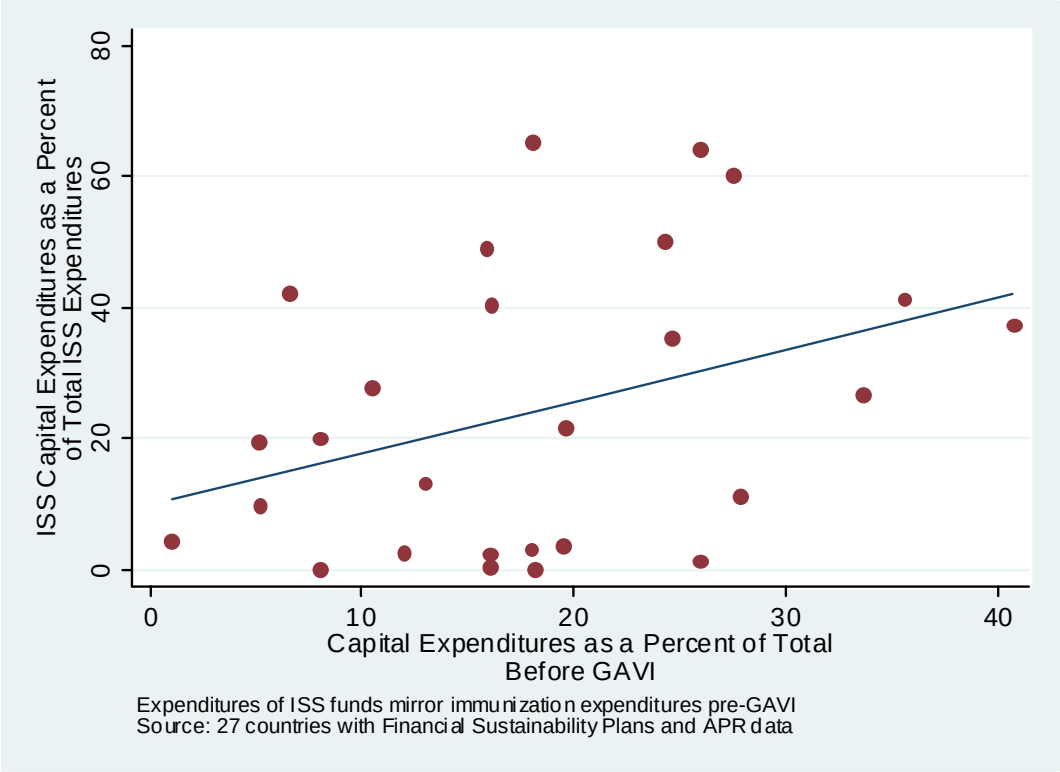
GAVI aims to improve immunization performance not only by providing funds or vaccines to strengthen the system, but by increasing the visibility of immunization, and therefore commitments from other funding sources. This section analyzes the changes to immunization financing since the beginning of GAVI ISS funding flows. All the averages presented in this section are based on unweighted averages across the countries with available data.

3.2.1 Use of ISS Funds to Fill Gaps

One of the findings from case study countries in the 2004 evaluation was that ISS funds are used to fill gaps in funding, and in some cases to maintain a functioning immunization system during crisis. We hoped to test this finding using expenditure data from all countries compared with FSP data of their expenditures prior to ISS funding. However, given the limitations of the FSP data, we were only able to compare differences in expenditures using two categories – recurrent and capital expenditures for routine

immunization. If ISS funds were used to fill gaps, we thought there would be a negative relationship between ISS expenditures and pre-GAVI expenditures in each of the two categories. However, the data we had for 27 countries with disaggregated capital and recurrent expenditures, showed that ISS expenditures generally reflected pre-GAVI expenditures, as shown in Figure 4. The upward slope of the line in this graph indicates a positive relationship between ISS expenditures and pre-GAVI expenditures, although there were individual countries that showed differences in expenditures.

Figure 4: Capital Expenditures as Percent of Total Expenditures, pre-GAVI & during GAVI Phase 1



As a further step to find evidence of ISS being used to fill funding gaps, we tested whether any of the individual expenditure items reported in the APRs was positively or negatively correlated with capital expenditures pre-GAVI, and found no evidence of a correlation.

Although the data from APRs was not conclusive on this point, the research at country level strongly supports the earlier finding that ISS funds are used to fill gaps in NIP funding. Informants in all countries, except Tanzania, indicated that ISS funds filled gaps in donor and government funding – ie, ISS funds items that would otherwise be unfunded. The responses were generally made in a positive context, in that the flexibility of ISS allowed it to be used for expenses that were an important part of the NIP. It may be possible that informants in Tanzania did not focus on ISS filling funding gaps, because funding gaps are not as acute as in other countries where critical immunization inputs (outreach, supervision, etc) were often unfunded or underfunded.

In most cases, the expenditures were programmed as part of the NIP annual plan, with the NIP targeting ISS funds toward under-funded districts or activities. Except in Tanzania, the study countries reported a similar process for allocating ISS funds. An NIP workplan and budget was first developed, and various sources of funding were applied against the specific workplan activities. Any unfunded

activities were then funded by ISS funds, as resources allowed. This type of process allowed NIP technical teams to implement problem-solving strategies they deemed important, regardless of whether immediate donor or government funding was available.

In a few cases, a mid-year decision was made to use ISS funds for unforeseen expenses that could not be funded from other sources. One example was in Cambodia where ISS funds were used to construct housings (previously unbudgeted) for incinerators. Another example of such use occurred in Guinea where ISS funds were used to cover vaccine shortages that resulted from unexpectedly high wastage during campaigns. In all cases, we cannot be certain whether in the absence of ISS, other sources of funding would have been found.

3.2.2 Significance of ISS Funds Relative to Total Financing for Routine Immunization

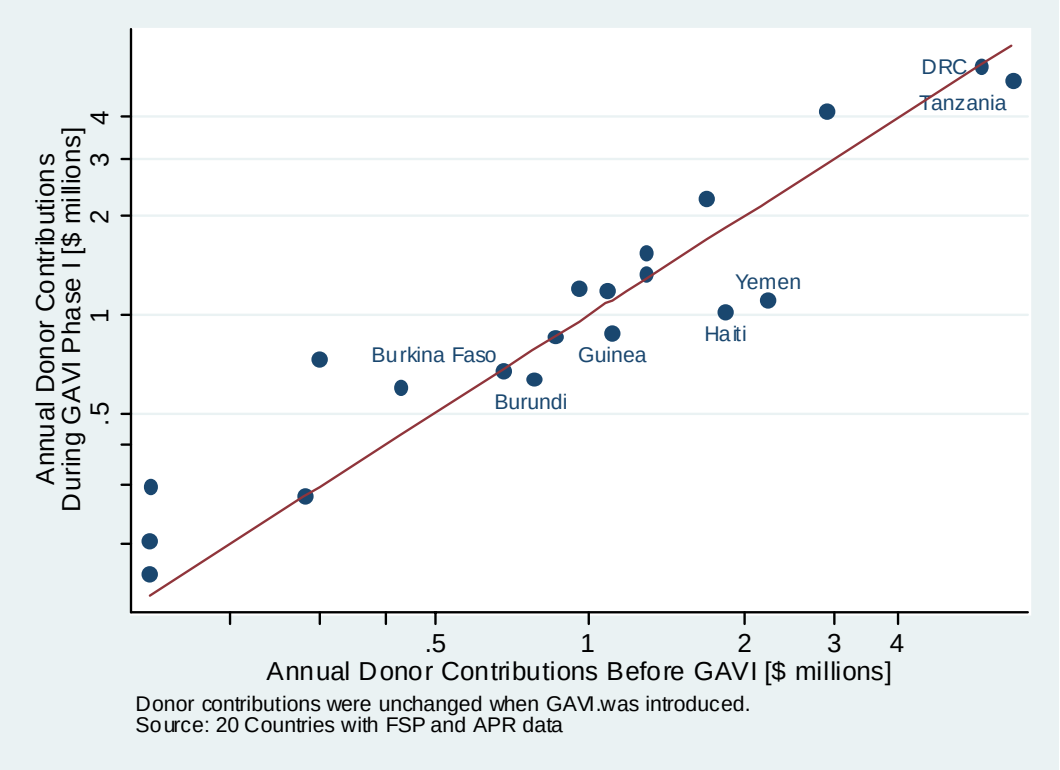
We examined data from FSPs submitted to GAVI to see whether there were any changes to financing for routine immunization. Many of the earlier FSPs did not use the current GAVI format for reporting on immunization program financing, which disaggregates routine and supplementary immunization activities, and donor and government funding. Among the 26 countries with sufficient data in the Financial Sustainability Plans to allow this analysis, ISS funds represented an increment of 15% over the total immunization funds spent prior to GAVI. Half of the countries received increments ranging from 11% to 44% (a quarter received more, a quarter less).

ISS funding represented 15% (median) of total government expenditure for immunization in pre-GAVI years (for the 21 countries with available data). The range among countries was quite large, with the middle 50% ranging from 9% to 72%. The average across countries is less meaningful here as it shows ISS funding to be 296% of total government expenditure for immunization in pre-GAVI years because of two outliers on the high end, where ISS represented 14 times, and 36 times, pre-GAVI government expenditure.

3.2.3 Changes in Government and Other Donor Funding

We wanted to see whether ISS funding affected non-GAVI sources of funding or the overall level of immunization funding. For the 20 countries with available data, we compared donor funding before GAVI and donor funding two years after GAVI funding, as shown in Figure 5. Donor contributions comprise about 55% of total routine immunization expenditure for ISS countries in the period prior to GAVI funding. Half of the countries available for this analysis received between 35% and 75% of their total routine immunization funding from donors (a quarter received less, and a quarter received more). In the aggregate, donor contributions two years after GAVI funding began were essentially the same as they had been pre-GAVI, decreasing by a non-significant two percent. Five countries (Burundi, Guinea, Haiti, Tanzania, and Yemen) experienced lower donor contributions. Changes in donor contributions were not significantly related to the level of ISS funding.

Figure 5: Donor Contributions pre-GAVI and During GAVI Phase 1



Since all expenditures for ISS countries are funded by donor or government sources, no change in the share of total funding from donors means that government funding, as a percent of total immunization funding, also remained essentially the same.

In addition to the composition of immunization financing, which did not change significantly, we also analyzed changes to total expenditures on routine immunization, and increases in government expenditure. For the 26 countries with data for this calculation, total expenditures for routine immunization increased 52%, on average, based on FSP data of expenditures in the year before and two years after GAVI funding. Although government funding did not change significantly as a percent of total funding, the amount of government funding in each country increased 10% on average pre- and during-GAVI.[31] Of the 20 countries for which this data was available, government funding increased in 12 of them.

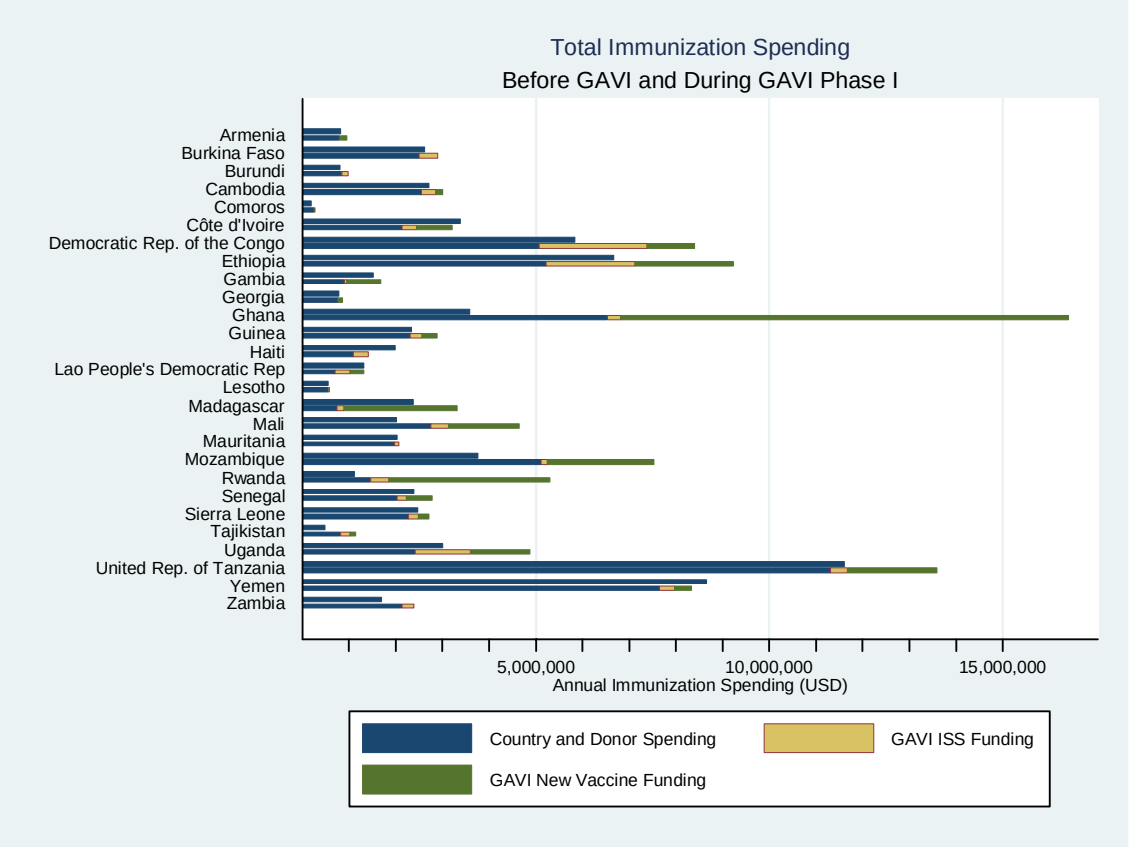
3.2.4 ISS Displacement of Other Sources of Funding

We analyzed data from Financial Sustainability Plans to see how ISS expenditure was related to total immunization expenditures. There were 26 countries with data available for this analysis, comparing total immunization expenditures one year before the introduction of ISS funding with expenditures two years after ISS funding commenced.

[31] Mauritania was excluded from this calculation because its increase of 400% skewed the average. The average increase including Mauritania is 30%.

In all but three countries (Haiti, Cote d'Ivoire, Yemen) total immunization spending was greater during the ISS period. Half of the increases were between 5% and 29%, with a quarter above that range and a quarter below. The median increase was 11%. In 19 countries (73%) the increase exceeded the annual average ISS expenditure.[32] Figure 6 shows the annual immunization expenditures pre-GAVI, average annual additional ISS expenditures, and total immunization expenditures during GAVI. For each country, the top bar shows total immunization expenditures pre-GAVI, while the lower bar shows total immunization expenditures during GAVI, with disaggregation of GAVI new vaccine funding and GAVI ISS funding. For most countries, the lower bar is longer than the top one, indicating that total expenditures during GAVI were higher than pre-GAVI.

Figure 6: Annual Immunization Expenditures pre- and during-GAVI

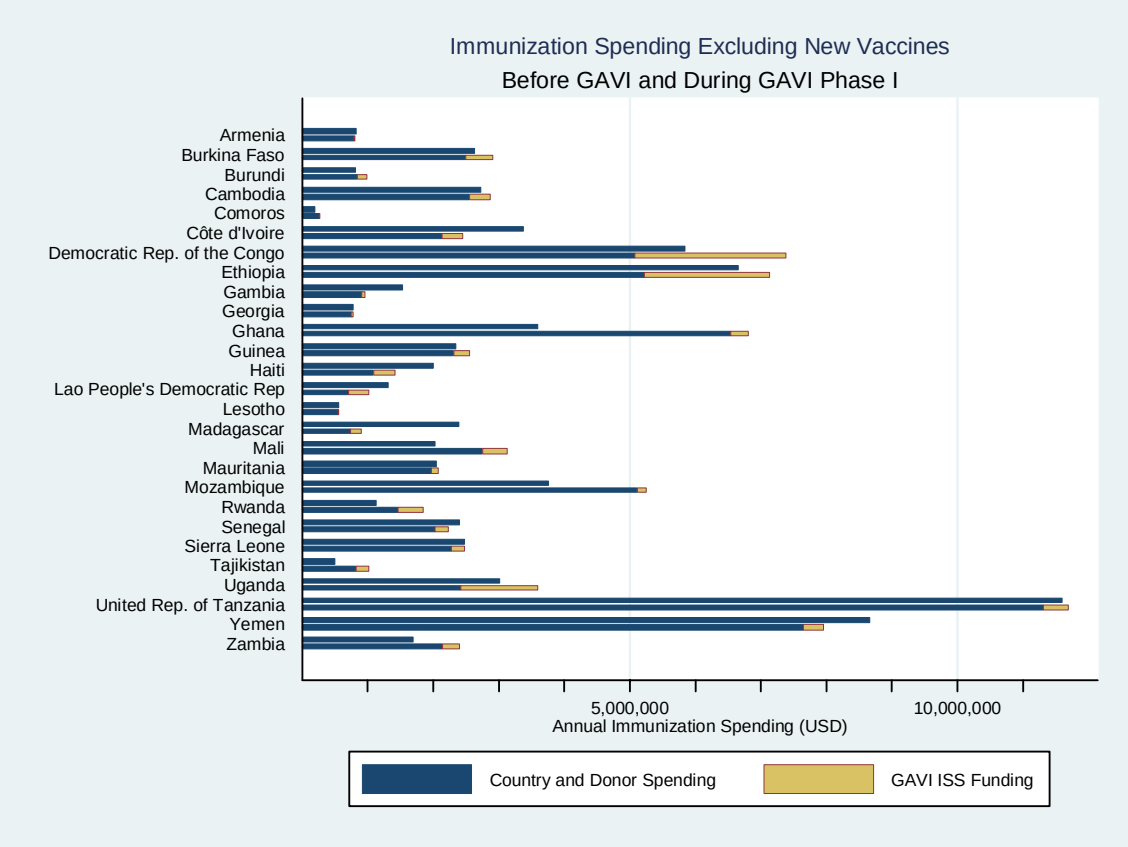


Source: Annual Progress Reports and Financial Sustainability Plans.

The country studies, however, led us to focus more on changes in non-vaccine expenditures, as that may have more direct effect on immunization coverage than introducing a new vaccine, and because increases in vaccine expenditures were so closely linked to GAVI. We conducted the same analysis, excluding expenditures on new vaccines. Total non-vaccine immunization expenditures increased during the GAVI period – the median increase was 4%. Once ISS expenditures are excluded, however, we find that spending decreased pre- and during-GAVI – the median change was a decrease of 4%. As shown in Figure 7, excluding new vaccines and GAVI ISS funding, immunization expenditures decreased in 20 out of 27 countries – that is, the bottom bar, excluding the lighter portion representing ISS expenditures, is shorter than the top bar. Although these changes are not statistically significant, it is possible that ISS funding has displaced other sources of funding.

[32] That is, total expenditure one year after ISS was greater than the sum of pre-ISS spending plus ISS contributions.

Figure 7: Annual Immunization Expenditures (excluding new vaccines) pre- and during-GAVI



Given these findings, we used data collected from the in-depth study countries to examine this question further. Although the analysis is limited to five countries[33], we have data that is more current than that included in FSPs. We compared current non-vaccine expenditures for routine immunization, net of ISS funding, with non-vaccine immunization expenditures at baseline. Using data from in-depth study countries, as shown in Table 7, we find that after removing ISS funds, non-vaccine expenditures for routine immunization has increased in all study countries.

[33] Tanzania is excluded due to insufficient data.

Table 7: Total Non-vaccine Expenditures for Routine Immunization (including ISS)

	Cambodia	Laos	Zambia	DRC	Guinea
(A) Current non-vaccine expenditures for routine immunization	2,301,716 (2005)	1,782,336 (2005)	8,302,080 (2005)	28,613,027 (2005)	2,229,349 (2004)
(B) Baseline non-vaccine expenditures for routine immunization	648,605 (1999)	1,131,973 (1999)	826,436 (2000)	11,907,069 (2002)	1,792,035 (2001)
(C) = (A) – (B) Change in non-vaccine expenditures	1,653,111	650,363	7,475,644	16,705,958	437,314
(D) ISS expenditures in current year	266,000	441,000	527,116	3,715,711	206,972
(E) = (C) – (D) Change in non-ISS non-vaccine funding	**1,387,111**	**209,363**	**6,948,528**	**12,990,247**	**230,342**

Although our analysis at the global level included many more countries (27), the data is somewhat outdated. Given the conflicting results of these two analyses, we cannot make a firm conclusion regarding whether ISS funding has displaced other donor funding.

3.3 Impact of ISS Funds on Performance of Immunization Programs

This section presents our findings on the impact of ISS funding on immunization performance. We use the DTP3 coverage rate as the indicator of immunization performance, but also explore the impact on measles coverage rate, particularly to see whether there has been any negative impact on routine measles coverage. Lastly, we also investigate whether ISS funding has had any impact on geographic equity of coverage, and on consistency of coverage.

3.3.1 Impact on DTP3 Coverage

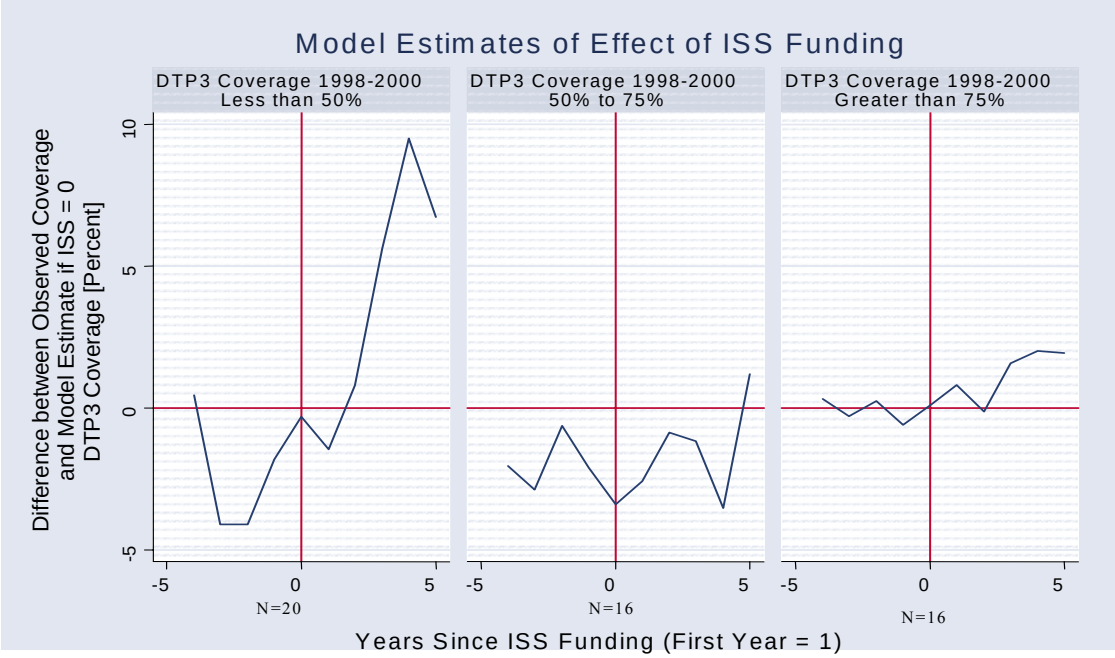
To analyze the impact of ISS funding on immunization coverage, we fit a regression model to the DTP3 coverage rates in 52 countries that received ISS funding between 2000 and 2005. This model used the logistic transformation of WHO/UNICEF Estimates for the DTP3 coverage rate as the dependent variable. Included as independent variables were ISS expenditures per surviving infant in the year of the coverage measurement, plus ISS expenditure in the year prior to coverage measurement. Contextual variables included were GDP per capita, IBRD Political Stability Index, and average DTP3 coverage rate from 1998-2000.

The data showed that ISS expenditure had a significant positive impact on immunization coverage. Although immunization coverage had been generally improving in the years prior to ISS funding, the rate of improvement increased with ISS funding. Political stability and historical coverage were also important predictors of immunization coverage.

We used the model to estimate what coverage in each country would have been without ISS funding. We did this by resetting the expenditure level to zero, and then applying the model equation. During the years before ISS funding became available (shown as years prior to 0 along the x-axis) the differences between observed and predicted values are the residuals of the model, consisting of random error plus the effect of all unspecified covariates. During GAVI Phase 1, the difference is the residual plus the model's estimate of the effect of ISS. These residuals for each country are shown in Annex H.

Figure 8 summarizes the residuals by: 1) translating them from logit to percentages; and, 2) averaging these percent differences across countries. The residuals in the pre-GAVI years differ from zero by an amount consistent with random error. The slope of the GAVI Phase 1 years is steeper in countries with pre-GAVI coverage levels below 50 percent than in countries with higher coverage. This implies that the cost of immunizing an additional child is higher in high-coverage countries. We chose to model this non-linear cost structure by transforming the dependent variable. Equivalently, one could introduce terms in the regression equation to reflect the differences, or even fit separate models. We found that the transformed variable adequately represented the data over the entire range of coverage, and that no further adjustments or separate models were required by the data.

Figure 8: Actual DTP3 Coverage Rates (WHO/UNICEF Estimates) Compared with Model Estimated Coverage without ISS

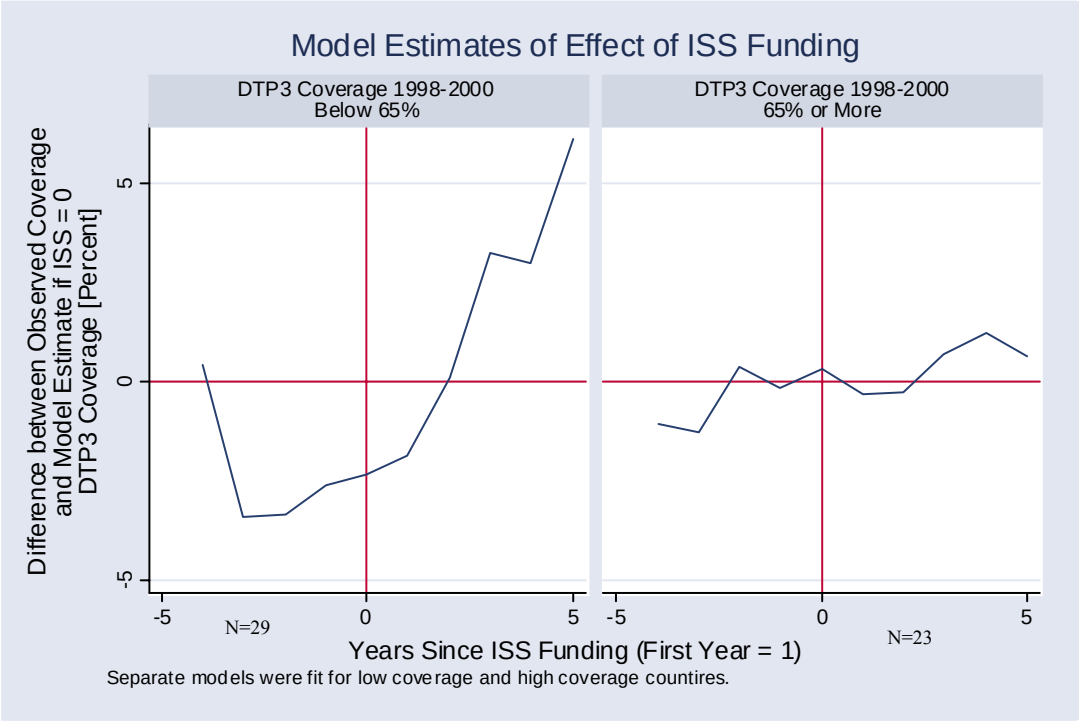


As the figure shows, ISS funding has had a positive effect on DTP3 coverage. This increase in coverage is more obvious for countries with relatively lower and higher coverage rates at baseline, compared with the countries with baseline DTP3 coverage of 50% to 75%. However, the differences between the results at different baseline coverage levels are not statistically significant. The regression results for this model are shown in Annex I.

To further explore possible differences in ISS effect, we fit two separate models, one for the 29 countries with DTP3 immunization rates below 65% in 1998-2000, and one for the remaining 23

countries. Because the number of cases was smaller, the standard errors in these estimates are larger than the errors of models based on all 52 countries. Nevertheless, we found a positive and statistically significant effect of ISS funding in both groups of countries. In countries with high initial coverage, the odds of coverage (the ratio of the number of immunized children to the number of non-immunized children) increased by 19% (with a 90% confidence interval of 3 to 34 percent). In countries with low initial coverage, the odds increased by 14 percent (with a 90% confidence interval of 0 to 30 percent). While the percent of children immunized was higher in lower coverage countries, there was nonetheless a statistically significant effect in higher coverage countries as well. The odds of coverage increase in both groups – the difference in the percent of children immunized in the two groups is attributed to the higher cost of immunizing additional children at higher coverage rates. Figure 9 shows the results for high and low coverage countries.

Figure 9: Actual DTP3 Coverage Rates (WHO/UNICEF Estimates) Compared with Model Estimated Coverage without ISS, Countries below and above 65% DTP3 Coverage from 1998-2000



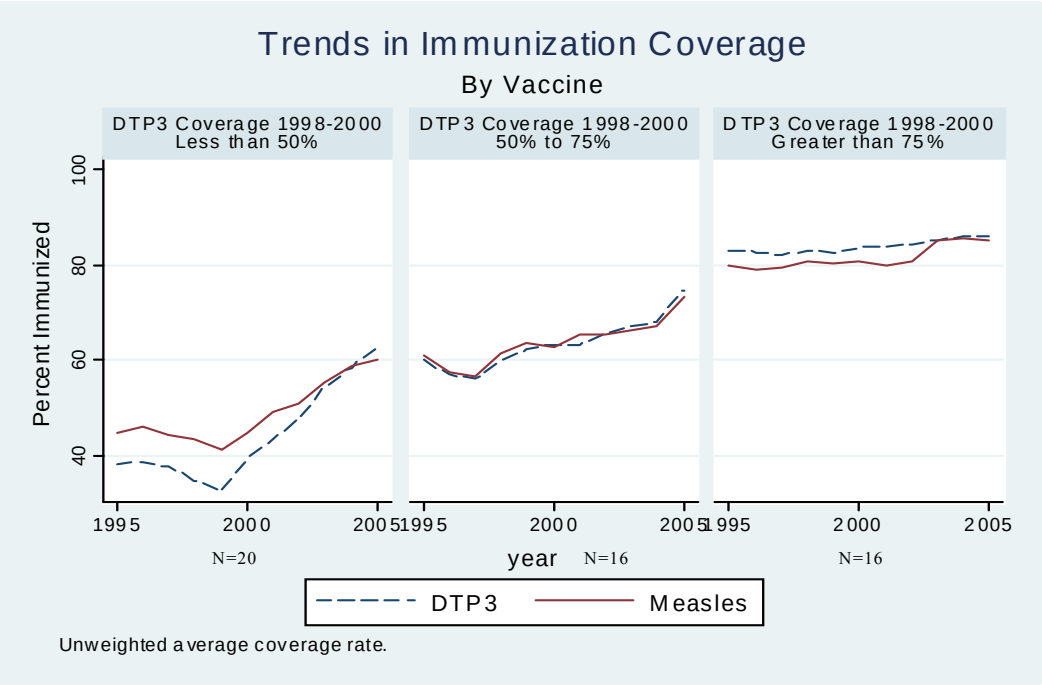
Based on comments from the Steering Committee, we also tested the sensitivity of our results with 36 alternative models of the effect of ISS funding, using both the entire sample of 52 countries, and the 23 countries whose DTPs coverage rate in 1998-2000 exceeded 65 percent. All models found statistically significant increases in DTP3 coverage resulting from the expenditure of ISS funds. The size of these effects varied with different model specifications. All of the models found significant increases in cost at higher coverage levels. With the logit model, this is implicit in the specification. The other models included a significant negative interaction of expenditures with baseline coverage, meaning that fewer children were immunized per dollar in countries with higher baseline coverage.

All of the logit and log models find the effects significant in the high-coverage countries as well. Four of the six models based on untransformed coverage rates find effects significant at the 95% (two-sided) level. One falls between 90% and 95%, and one is just below 90%. The detailed results are shown in Annex J.

3.3.2 DTP3 vs. Measles Coverage Rates

Since the inception of GAVI ISS, there has been concern that GAVI's focus on the DTP3 indicator may produce purposeful neglect of other antigens, since DTP3 is the indicator linked to reward funding. We found no evidence of any negative impact on routine measles coverage during the ISS period. We ran our basic model using measles instead of DTP3 as the dependent variable, and found essentially the same results. To illustrate the trend, Figure 10 shows the coverage of DTP3 and measles from 1995-2005.

Figure 10: DTP3 and Measles Coverage Rates 1995-2000 (WHO/UNICEF Estimates)



It should be noted that the DTP3 coverage rate caught up with the measles coverage rate in lower performing countries. In the weakest countries, measles coverage was traditionally higher than DTP3 coverage.

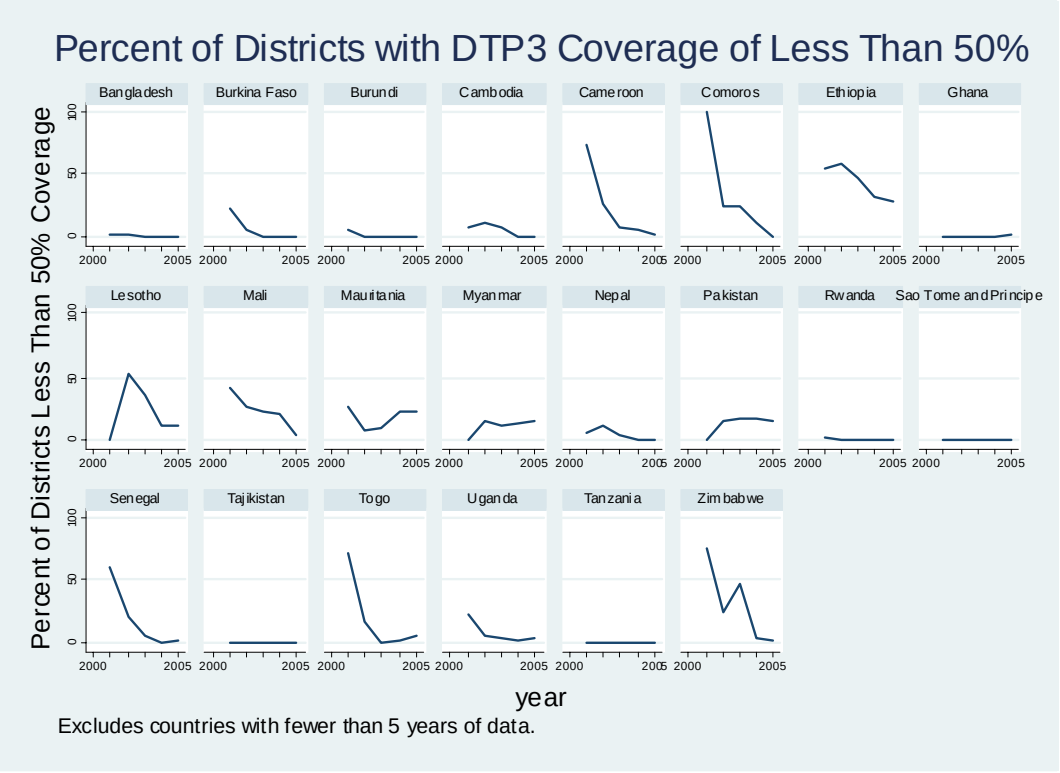
3.3.3 Impact on Geographic Equity of Coverage

To see whether GAVI ISS funding had any impact on the geographic equity of immunization coverage, we analyzed official country reports[34] of the percent of districts with DTP3 coverage below

[34] Country official estimates reported on the WHO/UNICEF Joint Reporting Forms are the only source of data on geographic distribution of coverage.

50%[35] for the period 2001 through 2005. We restricted the analysis to the 22 countries that provided five years of complete and consistent data.[36] In most countries, there were fewer such districts in 2005 than in 2001, as shown in Figure 11.

Figure 11: Percent of Districts with DTP3 Coverage Rates Below 50%



Source: Country Official Estimates

The number of low-coverage districts is negatively related to the overall national coverage rate. As discussed earlier, we found that ISS funding was associated with increased DTP3 coverage at the national level. And, as national immunization coverage improves, one would expect some districts to move from below 50% coverage to above 50%. The purpose of this analysis is to determine whether ISS funding had any effect on equity beyond that achieved by general increases in coverage.

We performed a regression analysis of the geographic equity of coverage and ISS funding. For this analysis our dependent variable was the logit of the percent of districts with coverage below 50%.[37] The independent variable was ISS expenditures. We included three covariates in the model: the year, the average DTP3 coverage during 1998-2000, and the logit of DTP3 coverage in the current year. We included the current coverage because we wanted to test whether ISS funds had any effect on geographic equity beyond that implicit in the general increase in national coverage levels.

Baseline coverage levels and the annual trend are significantly correlated with this measure of geographic equity, as is the level of current coverage. Given these, there is no statistically significant

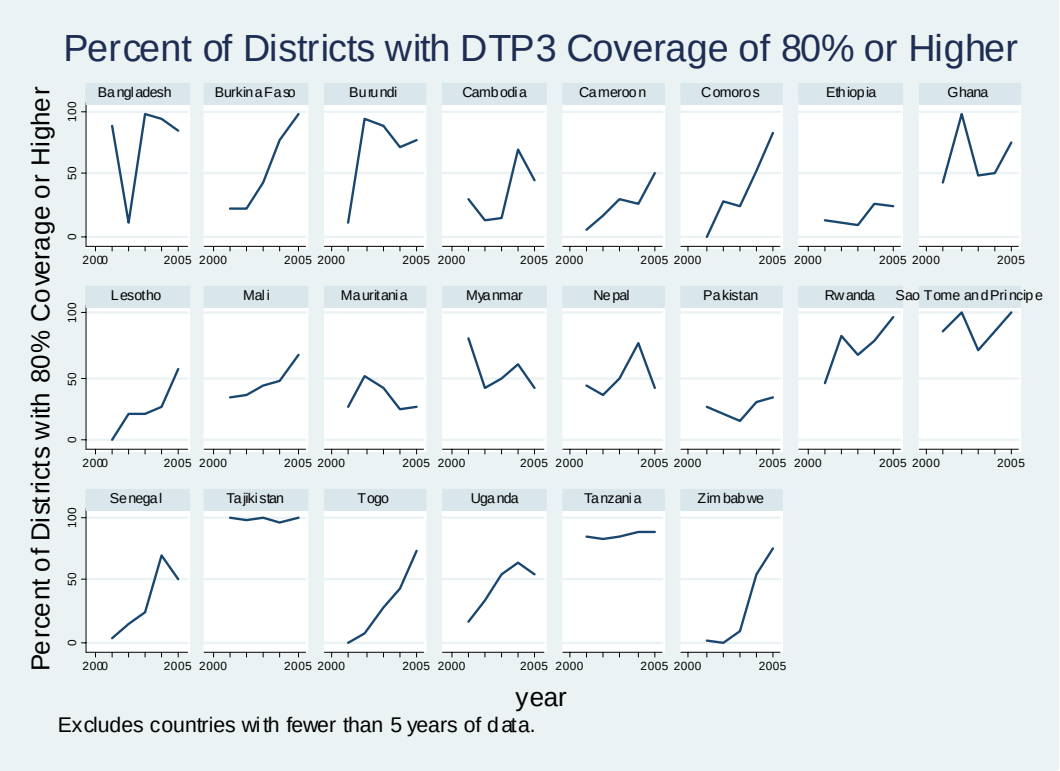
[35] The use of district coverage rates measures geographic equity only. This analysis does not describe changes in socio-economic equity, but only measures inequality in coverage across districts.

[36] We excluded countries where there were apparent reporting errors. For example, countries which reported an overall national coverage rate below 50%, but no districts below 50%, were excluded. In addition, countries where the sum of indicators that should add up to 100% was less than 90% or more than 110%.

[37] The logit is undefined at 0% and 100%. We treated these as 1% and 99%, respectively.

additional effect of ISS funding. So while ISS funding is shown to improve national level coverage, and higher national level coverage is correlated with fewer districts with under 50% coverage, we find no association between improvements in geographic equity and ISS funding. We tested similar models for the percent of districts with coverage between 50% to 80%, and above 80% with substantially identical results. While we cannot attribute improved equity to ISS funding, we can see that geographic equity has improved over the period of ISS. The graphs showing percent of districts with over 80% DTP3 coverage in each country are shown in Figure 12.

Figure 12: Percent of Districts with DTP3 Coverage Rates Above 80%



Source: Country Official Estimates

3.3.4 Impact on Consistency of Coverage

We investigated the impact of ISS funding on the stability or consistency of coverage rates. Although the overall trend in immunization coverage is upward, we invariably see fluctuations from year to year (see Annex C of DTP3 coverage rates for ISS recipients). Sometimes there are small declines in coverage over 1-2 years, followed by a reversal of the trend to a positive one. In other cases, there are multi-year declines of 20%-30% before the trend reverses.

There is no widely-used indicator of coverage consistency, so we created an indicator for the purpose of this analysis. By coverage consistency, we were actually only concerned with ISS effect on coverage declines. We did not want coverage increases to be part of our measure of "inconsistency." We created a variable represented by any decrease in coverage from the previous year to represent consistency of coverage. We performed a regression of the effect of ISS funding on any decreases in DTP3 coverage from the previous year, and found ISS funding had no effect on reducing the number of decreases. We also performed a regression of the effect of ISS funding on the magnitude of DTP3 coverage decreases, and again found no correlation. Future analysis of this effect would be valuable to see whether additional

data demonstrates the correlation, or to understand how ISS could be more effective in preventing coverage declines.

3.4 Factors Correlated with Differences in Performance

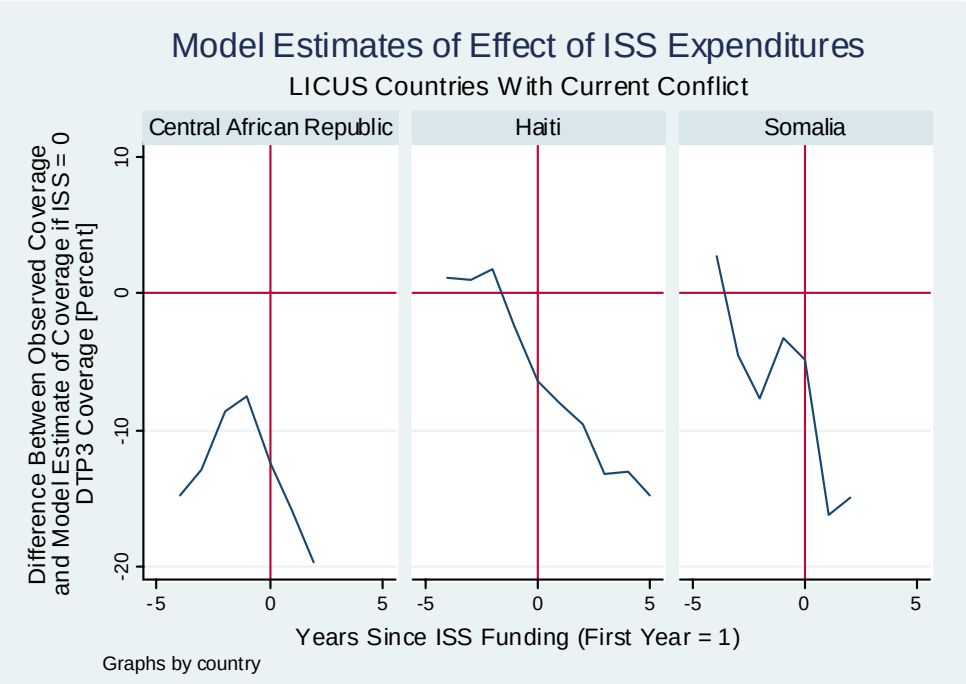
Given our finding in the previous section that ISS funding has a positive effect on immunization rates, we investigated various factors that might magnify or dilute that effect. This section describes the analyses conducted, and presents the data from key variables that had significant impacts.

3.4.1 External Factors

We investigated the effect of a number of external factors that might impact immunization performance and the ISS effect. The external factors we analyzed included national income, governance and political stability, and government health expenditures. We hypothesized that national income (represented by GDP per capita) may influence the ISS effect because it may be more costly to immunize additional children in higher income countries, although ISS funding per child is the same regardless of the level of per capita income. This effect is statistically significant at the 0.05 level (one-sided test).

We also analyzed the effect of governance and stability using two measures – a country's designation as a LICUS (Low Income Countries Under Stress) country, and the IBRD Political Stability Index. Both instability and designation as a LICUS country had a strong adverse effect on the level of coverage. Because the two indicators measure somewhat different conditions, LICUS countries have lower coverage rates than non-LICUS countries with similar levels of political stability. In addition, ISS expenditures were less effective in LICUS countries than in other countries. In the countries with current conflicts (Central African Republic, Haiti, Somalia), ISS expenditures had essentially no effect on DTP3 coverage. Figure 13 shows the impact of ISS funding in these three countries.

Figure 13: Impact of ISS Funding in Countries with Current Conflict



Excluding the countries currently in conflict (CAR, Haiti, Somalia), coverage rates in LICUS countries are lower than elsewhere and lowest in those LICUS countries with a past conflict. ISS funding is associated with greater coverage improvement in LICUS countries with a past conflict than in other LICUS countries – however, we cannot rule out the possibility that the improvement is caused by the end of conflict, rather than ISS funding. Similarly, political stability, as measured by the IBRD Political Stability Index, is associated with a larger ISS effect. That is, the improvement in coverage per dollar of additional ISS funding is relatively greater in stable countries than those with instability, as measured by the IBRD Political Stability Index or LICUS designation.

We also tested for the effects of health policy and funding, unrelated to immunization. Analysis of government health expenditures found a significant positive association between government health expenditures and DTP3 coverage. However, inclusion of government health expenditures in the analysis did not influence the estimated ISS impact. We also tested the impact of other global health initiatives, with the hypothesis that other health priorities may divert resources and attention from immunization. Using disbursement data from the Global Fund for AIDS, Tuberculosis and Malaria (GFATM)[38], we tested whether this funding had any impact on immunization coverage or the ISS effect. We found no significant effect on immunization performance, nor on the estimated ISS impact.

3.4.2 Immunization Program Factors

We analyzed immunization program factors other than the influx of GAVI ISS funds. We analyzed the effect of differences within immunization programs, including frequency of measles and polio campaigns, as well as implementation of the RED (Reaching Every District) strategy.

Over the last five years, polio has reemerged in certain parts of the world triggering sub-national immunization days in many countries. The Measles Partnership embarked on an ambitious task of reducing measles mortality and morbidity by launching catch-up campaigns in most of the countries receiving GAVI ISS funds. We tested for the effect of polio and measles campaigns by including a variable to indicate whether a country had any supplementary immunization activity in each year (yes/no). This variable did not take into account the size of the campaign (number of children targeted), nor the time lapse between campaigns, as such detailed information was not readily available. Both these factors limited the reliability of our analysis. Using only the occurrence of polio and measles campaigns in each country each year, we found no discernable effect on DTP3 coverage rates. We also tested whether there may be detrimental effects of campaigns concentrated in lower coverage countries by testing an interaction variable represented by the product of the coefficient of the coverage level and the coefficient of polio campaigns. Again, we found no significant correlation.

To improve routine immunization, WHO and UNICEF have been promoting the Reaching Every District (RED) strategy over the last several years. This strategy affects how national immunization programs plan activities and prioritize districts. The RED strategy has five operational components:

1. Planning and management of resources - better management of human and financial resources
2. Supportive supervision – on-site training by supervisors
3. Re-establishment of outreach services - regular outreach for communities with poor access
4. Community links with service delivery - regular meetings between community and health staff
5. Monitoring and use of data for action - chart doses, map population in each health facility

[38] Data on GFATM disbursements to countries was available for February 2003 to June 2005

Some countries specify the use of ISS funds to implement RED strategies while others only mention activities which might be classified as parts of the RED strategy. We were not able to assess any differences based on whether or not countries implemented RED for several reasons: 1) based on information from the WHO website, nearly all of the ISS countries began implementing RED strategies at the same time (2004/2005)[39], so there are not enough non-RED countries to conduct a reasonable comparison, nor sufficient time lapse to see a change in trend; 2) since RED is only implemented in selected districts in most countries, the effect on national level coverage data may be limited; and, 3) we did not have detailed information on the scope or scale of RED activities (the type of activities and the population of target districts) in each country.

WHO/AFRO is currently conducting an evaluation of the RED strategy by obtaining information on district-level coverage rates and districts prioritized for the RED strategy. Given the in-depth evaluation already underway, and that five of the six study countries introduced RED during the study period (with Laos being the exception), we did not focus much attention on differences in the effect of the RED strategy on immunization performance.

It was notable that in all three of the high performing study countries (Cambodia, Tanzania, and DRC) many informants cited social mobilization as one of the most important factors in improving immunization performance. Although all study countries conducted at least some social mobilization efforts as a component of the RED strategy, it was not mentioned very prominently in other countries. In Tanzania and Cambodia, community mobilization was one of the more prominent components of RED, possibly because other components of RED were already being implemented regularly. Informants may also be more likely to see visible results from community socialization efforts, in the form of positive community feedback, than from other RED activities such as planning or supervision. DRC also implemented the RED strategy, integrating IEC and social mobilization into annual workplans.

Technical capacity within the NIP and the broader technical team varied across study countries, and seemed to be associated with better performance. In Cambodia and Tanzania, there was strong capacity within the NIP team, strong technical support from partners, and collaborative working relationships. Cambodia's experience during the ISS period coincided with the entry of an international NGO providing significant technical assistance and funding. Tanzania historically has had strong capacity within MOH, and good support from core donors. By contrast, technical capacity was very limited in Laos, and some respondents expressed concern over the oversight and quality of the technical team in Guinea. In Laos, for example, there was no UNICEF EPI Officer until 2005, and the WHO EPI Officer position was vacant at the time of the evaluation team visit in 2007. This limited outside assistance coupled with low technical capacity within the NIP seemed to prevent them from implementing innovative activities or strategies.

In contrast to our conclusion in 2004 that strong ICCs were an important factor to success, we now disaggregated the coordination and oversight functions to three key functions most relevant to our evaluation – political advocacy and awareness raising, technical oversight and strategic planning, and monitoring and financial oversight. In all countries, the ICC's primary responsibility remains advocacy, while other functions are assigned to different groups. But, it appeared that the role of advocacy and fundraising for routine immunization is no longer taken very seriously in many of the study countries.

For improving immunization performance, the most important of the three functions appeared to be strong technical oversight and strategic planning. We found strong technical management and planning co-existed with weak ICCs (Tanzania and Cambodia). Laos and Zambia both had active ICCs, but Laos

[39] More up-to-date, though still incomplete, unpublished data from WHO staff gathering data for an evaluation of the RED strategy show that many countries began implementation earlier.

did not have the technical capacity, nor was their ICC very effective at increasing donor or government funding despite the involvement of senior level officials. In contrast, Zambia's ICC was more effective at raising funding and active in technical oversight. It was supported by a strong technical committee, as well as various ad hoc working groups that worked with the NIP to design appropriate strategies and activities. DRC's ICC and technical committee has been among the strongest in Africa in terms of partner coordination and technical support, although they have played a less active role since 2004 in financial oversight. Guinea's ICC was not notable, although it was successful in generating partner commitment to support the implementation of the RED strategy.

Based on experiences in the in-depth study countries, there did not appear to be any relationship between how ISS funds were monitored and immunization performance. Cambodia and DRC (since 2005) had weak financial monitoring procedures, with expenses reconciled within the NIP and no external auditing procedures, but both were strong performers. The other four study countries all used established accounting and reconciliation procedures (MOH or WHO procedures) to manage and reconcile ISS expenditures. Laos probably had the most stringent review procedures, with oversight by senior level MOH officials, but this did not have a positive effect on performance.

During the country studies, it became more apparent that alongside the introduction of ISS funding, other donor inputs to strengthen immunization programs were very important – the quantitative data shows that ISS funding represented 15% of immunization funding on average.[40] In Cambodia, Zambia and DRC, we saw that in addition to ISS funding, other donors were also investing significant funding in core components of the immunization program, including strengthening the cold chain, providing technical assistance, and expanding service delivery. The country visits pointed to the importance of isolating changes in non-vaccine costs as a better way to estimate the level of investment into strengthening the immunization system in ways that would improve coverage.

We compared changes in total funding for non-vaccine expenditures for routine immunization pre-GAVI and for 2005, in the five study countries for which there was available data. We then calculated the increase in expenditures once GAVI ISS funding was deducted. As shown in Table 8, Laos and Guinea, countries in which non-vaccine, non-ISS expenditures increased relatively less (18% and 13%, respectively), were lower performers. In Cambodia and DRC, the higher performers, other donor and government expenditures increased significantly (214% and 109%, respectively) to complement ISS investments. The data from Zambia do not follow this pattern, as its non-ISS non-vaccine routine immunization expenditures also increased significantly, and yet it only achieved a small coverage increase. Although the pattern is inconsistent, the expenditure data weakly supports the in-country finding that higher performance is more likely where non-GAVI spending on immunization increased alongside GAVI funding.

[40] This average is calculated across the 26 countries with sufficient financial data.

Table 8: Change in Non-vaccine Expenditures for Routine Immunization (excluding ISS)

	Cambodia	Laos	Zambia	DRC	Guinea
Change in DTP3 Coverage Rate Baseline to 2005	17%	-7%	5%	42%	12%
Baseline non-vaccine expend. for routine immunization	648,605 (1999)	1,131,973 (1999)	826,436 (2000)	11,907,069 (2002)	1,792,035 (2001)
Current non-vaccine expend. for routine immunization (including ISS)	2,301,716 (2005)	1,782,336 (2005)	8,302,080 (2005)	28,613,027 (2005)	2,229,349 (2004)
Increase in non-vaccine expend. for routine immunization	1,653,111	650,363	7,475,644	16,705,958	437,314
Current ISS expenditures	266,000	441,000	527,116	3,715,711	206,972
Increase in non-vaccine non-ISS expenditures	1,387,111	209,363	6,948,528	12,990,247	230,342
Percent Increase in non-ISS Expenditures	214%	18%	841%	109%	13%

3.4.3 Management and Planning of ISS funds

As detailed in Section 3.1.1, in our review of the 2005 APRs, we used four characteristics to describe management of ISS funds:

- ICC reviews or influences use of ISS funds
- Districts must reconcile expenditures
- Planning and budgeting is district driven
- ISS funds are held in a GAVI-specific account

For two of the four characteristics, there was little difference among countries (ICCs influence use of funds in 48 out of 53 countries), or insufficient information in many countries to draw conclusions (34 out of 53 countries did not specify whether expenditures must be reconciled before additional disbursements). For the two characteristics where there were sufficient differences (whether planning and budgeting was centrally or district-driven, and whether GAVI funds were maintained in a GAVI-specific or co-mingled account), we analyzed whether these procedures had impact on immunization coverage. We found no association with either of these management characteristics and the ISS effect.

Our in-depth country research found varied approaches to management and planning of ISS funds in the study countries, however, there were no practices obviously associated with better or worse outcomes. Even in the areas where there were more interesting differences between countries, there was no clear association with outcomes. For example, in Cambodia and DRC, monitoring the use of ISS funds was less strict than in other countries, with reconciliations conducted within the NIP. In Cambodia, partners expressed no concerns with this arrangement, however, in DRC there were indications of mismanagement of funds as a result. Both Cambodia and DRC were high performers. In contrast, Laos, Tanzania, Zambia and Guinea had much more formal procedures for auditing use of funds, following WHO or MOH regulations, and/or formally appointing senior officials (WHO Representative or Deputy General Staff within MOH) to oversee the process. Of these countries, Tanzania also made impressive gains in coverage rates, while Guinea and Zambia made moderate improvements, and Laos saw no improvement.

In all study countries, decisions regarding allocation of ISS funding among districts was made by the NIP, but district level authority to program ISS funding as needed varied. There was no association between performance and district- or centrally-led programming for ISS funds. Tanzania and Guinea allowed the sub-national levels more input in programming their allocated funds, but provided central level support to develop the plan. Districts in Zambia also programmed their allocated ISS funding locally, but did not receive their funding reliably. In Cambodia and Laos, districts were told to use funding for outreach or community mobilization, which they then allocated among facilities. In DRC, decisions were more centralized, with central level procuring commodities and equipment and sending them to districts – little cash was distributed to districts for operational costs such as outreach or community mobilization. There is no commonality among the higher performing countries (Cambodia, Tanzania, DRC) regarding the level of the health system that planned the use of ISS funds.

3.4.4 Use of ISS Funds

We were also interested in whether the way a country used its ISS funding affected DTP3 coverage. Using data from the Annual Progress Reports, we analyzed the effect of differences in the use of ISS funds on immunization performance, by testing the effect of the following variables:

- Capital expenditures as percent of total expenditures
- Central-level expenditures as percent of total expenditures
- Per diem/fuel/outreach expenditures as percent of total expenditures
- Supervision/training/monitoring and evaluation expenditures as percent of total expenditures

None of these variables showed a statistically significant effect on immunization performance or the ISS effect. We found no correlation between the way countries spend their ISS funding and their immunization performance. We also tested the effect of each of the reported expenditure items on the APR, expressed as a percent of total expenditures, and as expenditures per surviving infant. Again, we found no effect on immunization performance or the ISS effect.

Our findings at country level regarding how countries program and allocate ISS funding lead us to conclude that due to the way most countries program ISS funds, we should not expect to see correlation between use of funds and immunization performance. Across study countries, we find repeatedly that ISS funds are used to fill gaps in overall funding. Most countries develop an annual plan, identify funding sources for various expenses, then use ISS to fund those expenses which other donors and government did not fund. Depending on the funding available and the priorities that year, ISS may be used to fund basic service delivery (fuel and per diem), capital investments (motorbikes), or a media campaign to promote immunization. We should not expect to see any patterns related to the most effective uses of ISS funds – programming decisions are different in every country, every year. More important is that a strong technical team is strategically making those programming decisions.

Based on the findings from the country visits emphasizing the importance of social mobilization, we re-analyzed the statistical effect of ISS spending on IEC/social mobilization on immunization performance. We also did not find any correlation between this type of ISS spending and immunization performance.

3.5 Impact of ISS Design and Structure on Immunization Performance

As part of our mandate was not only to evaluate the impact of ISS funding, but also to provide recommendations on how to revise the design of the ISS scheme to improve outcomes, we investigated factors in ISS design and structure that affect performance. The two key features of ISS design we were most interested in are: 1) flexibility in use of funds; and, 2) reward-based funding. The range of possible analyses is limited, given the limited data at this time for these investigations.

3.5.1 Flexibility in Use of ISS Funds

To analyze the effect of country level flexibility in use of funds, we created a variable to represent the flexibility in use of funds. The variable measures the variability in spending on given expenditure categories (e.g. personnel, vehicles), calculated as: (standard deviation of expenditures/mean of expenditures). Although this variable only captures annual changes in funding allocation, it was the best representation of programming flexibility given our data. Further, given that many traditional immunization donors program funds on a multi-year basis, with little room for revision midstream, this measurement provides an indication of flexibility. We tested this variance indicator for three types of expenditures:

- Per diem/fuel/outreach expenditures
- Supervision/training/monitoring and evaluation expenditures
- Capital expenditures

If flexibility was an important factor in improving performance, then we expected to see increased variability in spending associated with improved performance. We found that there was no significant effect from variability in any of these expenditure categories. However, this indicator is very crude as a measure of programming flexibility.

Across all study countries, informants were quick to note the benefits of the flexibility of ISS funds – NIP could program funding based on country priorities, and unused funding could be saved for later years for potentially urgent needs. Flexibility was important in funding parts of the NIP plan which would have been unfunded, as well as funding unforeseen expenses that arose in the middle of a planning cycle. Selected examples that illustrate the funding flexibility are:

- **Democratic Republic of Congo**. Given the low government salaries and support from the central government, ISS funds were used as part of an incentive program to motivate staff at different level with bonus payments based on their job performance.
- **Cambodia**. ISS flexibility allowed the NIP to fill a gap in outreach funding in 2003 that resulted from a change in government outreach policy. While ISS continued to be used for outreach in later years, it allowed time to identify other funds to partially cover costs of this activity.
- **Guinea**. ISS funds were used to cover an unforeseen shortage of OPV resulting from unexpectedly high wastage during a campaign in 2003.
- **Tanzania**. ISS flexibility allowed districts to decide priorities, which may include both implementation of new strategies, and small items that allow smoother operations. In one district visited, ISS funded a comprehensive process of community sensitization and

advocacy for immunization, providing bicycles for outreach, fixing refrigerators, as well as purchasing calculators to improve data quality.

- **Zambia**. ISS funding was used to support implementation of RED, which no other donor was funding. Also ISS funds were used to supplement funding for Child Health Weeks.

These examples show the importance of ISS flexibility in allowing NIPs to pursue new strategies, and to resolve sudden and ongoing problems. By most assessments, measles vaccine shortage, or service delivery disruptions, would have substantial negative affect on immunization rates. But beyond allowing NIPs to function under duress, it is even more important that ISS funding allows countries to operationalize internationally-recognized strategies for improving immunization coverage.

While these activities are undoubtedly important to strong immunization performance, what is not possible to determine is whether in the absence of ISS funding, another funding source would have come forward. This question, considered together with analysis of the changes in donor and government funding, is important in assessing the impact from the programming flexibility feature of ISS funding. However, our data does not allow a more rigorous analysis of the benefits because we cannot quantify flexibility well and so cannot capture its effects statistically, nor can we know the outcomes in the absence of ISS funding.

The discussions of flexibility were also notable in Laos and Tanzania – both countries noted self-imposed restrictions governing the use of ISS funds. In Laos, it was reported that TWG approval is required for even the smallest expenditures, particularly if they were not part of the annual plan – examples given were to buy printer toner or paper for the central office. It was also documented that ISS funds were used to print new EPI registers, a cost which had not been budgeted into the annual plan. It is unclear whether the use of ISS funding is actually very rigid, or whether a more accurate description of the situation is that the cumbersome approval process limits the potential benefits of ISS' flexibility. In Tanzania, there was a perception among NIP staff that GAVI requires at least 70% of ISS expenditures be made at district level. Other informants revealed that this concern may have resulted from the GAVI evaluation conducted in 2004-2005 that was critical of the high proportion of ISS expenditures at central level. This perceived GAVI rule led to restrictions over the use of ISS funds for supervision from central to regional/district level, and is considered problematic.

The flexibility of ISS allows countries not only to decide *how* to spend ISS funding, but also *when* to make the expenditures. Given that ISS expenditures are correlated with performance, we wanted to examine whether higher expenditure rates would lead to better performance. To test this, we examined whether the amount of ISS funding received and unspent had any impact on DTP3 performance, and found no correlation. Thus, spending more ISS funds does not lead to better performance.

3.5.2 Reward-based Funding

The effect of the reward as an incentive, and its impact on performance, is difficult to analyze. The design of the reward incentive is such that several factors, other than immunization performance, can be potentially important determinants of whether a country received reward funding. We used statistical analysis to identify the key factors determining whether a country receives rewards, and to analyze whether receiving rewards affect future performance. Information from in-depth study countries was used to analyze country response to the reward incentive. After the country visits, we revisited our statistical analysis to see whether the quantitative data supported one of our in-country findings.

Findings from Statistical Analysis

Using the quantitative data, we analyzed the impact of the reward system in several ways. First, we analyzed the countries which were more likely to receive rewards, or be approved for rewards. Secondly, we tested whether the countries that received rewards also achieved higher "quality" coverage, as indicated by more geographically equitable coverage or more consistent coverage. Third, we tested whether the relative size of the reward impacted performance. Lastly, we investigated differences in performance between countries eligible for rewards that received rewards and countries that did not, in the year following their eligibility.

Countries are eligible for rewards three years after approval (or beginning with their fourth year of funding). Countries receive rewards only if they have immunized additional children with DTP3, and can verify the number of children immunized through passing a Data Quality Audit (DQA). Failure to immunize additional children, or to achieve an 80% verification factor in a DQA means that a country would not receive rewards. Of the countries eligible for rewards, only one factor, the population growth rate, was significantly related to the *approval* of reward funding. Of the 14 countries that reported fewer target children in 2006 than 2000, five received reward funds. In contrast, 10 of the 11 countries with annual population growth rates above 3% received reward funds. The population growth rate alone correctly predicts whether a country is approved for rewards in 76% of the countries. Detailed information on reward status for all countries is shown in Annex K. We did not find other background characteristics of the countries (such as GDP, political stability, LICUS status, pre-ISS DTP3 coverage rate, or year-to-year variance in coverage rates) that explained any of the remaining variation in reward status.

The above analysis was conducted using data of countries that have been approved for reward funding. Thirty-six countries have been approved for reward funding, of which 26 have actually received reward funding[41]. Analysis using data of countries actually disbursed reward funds found **two** factors related to disbursement of reward funds – population growth rate and baseline DTP3 coverage rate. Together these two factors correctly predict whether a country received rewards in 78% of the countries.

To test whether rewards were associated with higher geographic equity or more stable coverage, we compared eligible countries receiving rewards with those not receiving rewards to see whether there was any impact on geographic equity or stability of coverage. We found no correlation between rewards and geographic equity or stability of coverage.

We tested whether the relative size of the reward affected performance by testing whether total immunization expenditure per child pre-ISS influenced the ISS affect. Given this variable is only available for 27 countries for one year, we were not able to see any conclusive results. We also tested the size of the reward relative to government health expenditures and found no effect.

Lastly, we considered analyzing whether receiving a reward or not affected a country's performance in the following year. However, the data are insufficient to draw any conclusive findings. The first reward funds were disbursed to nine countries in calendar year 2004. Eight of these countries, plus 12 others, received rewards in 2005. However, we cannot analyze the impact of 2005 rewards across all GAVI-recipient countries because we do not have 2006 DTP3 coverage data. Thus, there are only nine data points on which to base a conclusion about the effect of rewards on the next year's performance. We find no effect, either in the year of disbursement or in the following year. Because of the limited number of observations, however, no firm conclusion should be drawn from this finding. The in-depth country

[41] Data on approved rewards to countries was provided by the GAVI Secretariat. Data on actual disbursements to countries was obtained from UNICEF records of all monetary transfers to countries.

studies provided another possible explanation for the quantitative findings, and additional information on the impact of reward funding.

Findings from In-depth Study Countries

Four of the six study countries received reward funding, with Cambodia and Laos being the countries that did not receive rewards. Tanzania first received reward funding in 2004, Zambia and DRC in 2005, and Guinea in 2006. After the country visits, it became clear that a likely reason for the lack of correlation between reward funding and coverage rates may be that countries do not necessarily spend all (or even much) of the reward funding in the year it is received, nor in the following year. In all four countries, the reward funding received was quite substantial compared to prior years' ISS funding and to total immunization program expenditures.[42] Except in DRC, the increase in ISS expenditures was much smaller than the amount of the reward. In Tanzania, there was no change in the ISS spending trend after rewards were received. In Zambia, ISS spending nearly doubled in 2006, but still represented a small portion of ISS funds on hand. In Tanzania and Zambia, partners strategically decided to save some of the ISS money for later years or in case of future "emergencies" – this approach was not specific to reward funding, but was true for management of ISS funding in general in many countries. Guinea only received its reward shares in 2006, so we do not know the effect on spending. DRC is the only country that spent nearly all of its reward funds in the year it was received. Although effective absorption capacity was not discussed during the country visits, it may be an issue worth further investigation.

Countries seemed to be more aware of the reward mechanism now than in our 2004 study. In Zambia, informants responded that staff at all levels were told of the reward mechanism, and how important it was to improve immunization performance in order to continue receiving support. In DRC, management staff at all levels were provided incentives based on performance, although this was not linked to immunization rates (and there are concerns over the transparency of these incentives). An incentive scheme was also piloted in Cambodia, under which health staff received a reward per fully immunized child, but this pilot was never expanded. Countries generally pursued strategies to improve overall coverage, but few seemed to directly link that goal with increases in GAVI funding or continuity of funding, prior to disbursement of rewards in 2004 and 2005. Even today, while most of the countries visited are pursuing appropriate strategies to improve coverage, many likely do not know the number of children required to qualify for next year's reward funding, or how their previous rewards were calculated. Countries generally directed ISS funding toward lower coverage or under-funded districts, which were not necessarily the easiest places to immunize more children.

Country reactions to not receiving rewards were mixed. There was little partner response in Cambodia and Laos, the two in-depth study countries that have not received reward funding. Especially in Laos, the end of GAVI funding was seen as the end of a donor project, rather than as a failure. In Cambodia, there was awareness that lack of rewards were related to unreliable population estimates used in their GAVI application, but no sense of unfairness about the lack of rewards given that their performance is actually improving, or any coordinated effort from partners to contest GAVI's regulations. In contrast, Guinea did focus on ways to increase the number of children immunize in order to receive rewards.

It is interesting that failure to receive an 80% DQA verification factor seemed more likely to elicit coordinated a response from partners. In Laos, Tanzania, Zambia, and Guinea, low DQA verification

[42] Lack of data prevents us providing exact percentages for comparison, but using approximate data (from the previous year or budgeted rather than actual expenditures), we estimate that the rewards represented approximately 15% to 35% of the non-vaccine costs for routine immunization in Zambia, DRC and Guinea. Data was not available to conduct this analysis in Tanzania.

factors prompted investments in reporting mechanisms, supervision, and staff training.[43] WHO and UNICEF generally led these efforts. Both Tanzania and Guinea participated as pilot DQA countries in 2001 – with resulting verification factors of 57%. This low result prompted a series of training and related activities to upgrade the quality of recording and reporting of data in both countries, with impressive results. Tanzania's verification factor on its DQA conducted the next year was 90%, and Guinea's verification factor was 95% two years later. In Laos, the reaction was much slower, but there have recently been changes to the birth registers to allow more accurate data collection. The reaction in Zambia was also slow, but problems identified with the tally sheets were eventually addressed.

Effect of First Year Projections

Cambodia and Laos were important study countries because both did not receive rewards because they did not immunize additional children – in addition, Laos also did not achieve an 80% verification factor on its DQA. The "number" that must be exceeded to qualify for rewards is the **projected** number of children immunized with DTP3 in the first year (which is the basis for ISS investment funds in the first three years). Thus, qualifying for reward funding not only depends on the number of children immunized, but also on the number of children initially projected to be immunized in the first year. Projecting a high number of children to be immunized the first year ensures that a country receives large amounts of funding up front regardless of the eventual outcomes, but also makes it harder to qualify for reward funds. On the other hand, if a country projects a lower first year outcome, then it must prove increasing numbers of children immunized to receive funding in later years. This design could encourage countries to manipulate their projections to ensure funding is received upfront as investment shares.

Laos and Cambodia used quite different targets for first year coverage, which affected the amount of ISS investment funding received. Cambodia projected a modest increase in DTP3 coverage from 65% at baseline to 70%, while Laos projected an increase from 56% to 80% over two years. As a result, Laos received significantly more funding on a per capita basis compared with Cambodia. Table 9 shows the baseline figures presented in the ISS application, the first year target for number of children immunized with DTP3, and the actual ISS investment funding received.

Table 9: Calculation of ISS Investment Funding

	Cambodia	Laos
Baseline number of children immunized with DTP3 in 2000	252,390	101,515
Projected DTP3 coverage rate in 2002	70%	80%
Projected number of children immunized with DTP3 in 2002	319,250	173,075
Total ISS investment funding received	$1,337,200	$1,431,200
ISS funds per targeted child in 2002 (based on application data)	$2.93	$6.61
Actual number of children immunized with DTP3 in 2006 (NIP records)	301,965	105,592

Based on this finding, we revisited the quantitative analysis to investigate whether the projected increase in the number of children immunized in the first year was a predictor of reward funding. This variable by itself was significantly related to countries receiving rewards, but once combined with population growth rate and baseline DTP3 coverage rate, it added no predictive value. Countries with

[43] Zambia was allowed to pass its DQA with a score of 78%, but the DQA score did seem to precipitate greater attention to data quality.

low baseline coverage rates generally projected higher targets and were less likely to receive rewards, so we cannot conclude that high targets decrease the likelihood of receiving rewards, although this may be true.

Effect of Changes in Population Estimates

WHO-UNICEF Estimates of Cambodia's DPT3 coverage rate in 2005 was 82%, an increase of 17 percentage points over its baseline rate of 65%. This increase is generally confirmed by DHS data, which found the DTP3 coverage rate to be 78%. However, Cambodia did not immunize a higher number of children with DTP3 in 2006 compared with its projected first year target (319,250), primarily because the number of children under one was much lower than originally projected. Downward revisions to population estimates affected both Cambodia and Laos, but only the data from Cambodia is discussed here because internal disagreements in Laos on the correct target population further complicate the issue.

As shown in Table 10, Cambodia immunized almost 50,000 more children with DTP3 in 2005, compared with 2000, its baseline year. It has also immunized more children than it did in 2002, the year used to calculate investment funds. However, because the target population dropped 25% from the original estimates in the ISS application, it will be difficult to increase the *number* of children immunized to qualify for reward funds. For example, it would have had to immunize 87% of its children in 2005 (319,250/367,445) to reach the minimum threshold for rewards – an increase of 22 percentage points over its baseline DTP3 coverage rate. Cambodia and Laos are illustrative of the issues related to relying on the *number* of children immunized with DTP3 as the sole determinant for reward funding in countries with declining birth rates.

Table 10: Changes in Target Population in Cambodia

Year	Target population in application[1]	Actual target population used by NIP[2]	Number of children immunized with DTP3
2000	N/A	N/A	252,390[1]
2001	445,382	409,548	289,952[3]
2002	456,071	411,961	275,109[3]
2003	467,017	422,674	300,252[3]
2004	478,225	358,494	305,933[3]
2005	489,703	367,445	299,606[3]

Source: [1]ISS application; [2]NIP records; [3]WHO-UNICEF JRF

4. DISCUSSION AND RECOMMENDATIONS

This evaluation provides many interesting findings to guide the future of ISS funding. This section presents a discussion of these findings and their implications for GAVI ISS policies and immunization program performance.

4.1 Discussion of Findings

4.1.1 Experience of the ISS Scheme

There was insufficient data to analyze whether GAVI processing procedures, measured by time lapsed between approvals and funding disbursements, had improved since 2004. Data on dates of funding approvals and disbursements was not easily available. Maintaining ready-access to this type of data would be useful for future monitoring and evaluation efforts.

Based on information from the APRs, the vast majority of countries report that ICCs are involved in programming and oversight of ISS funds, 10 out of 25 countries reported that planning is district-driven, and 21 out of 29 countries reported that funds are held in a GAVI-only account. The majority of funds were used for recurrent expenses (83%), and at subnational level (77%). The expenditure patterns generally reflect earlier findings.

Much more detail on management of funds was found during the in-depth country studies. In all countries, the effectiveness of the ICC in political advocacy and fundraising for routine immunization has waned. The role of technical input is assigned to a Technical Working Group (TWG) or ICC sub-committee. The technical capacity of this technical team, and degree of oversight provided by the ICC, varied significantly. At least in recent years, many of the countries visited view the ICC more as a formality than a coordinating mechanism for routine immunization.

In all countries visited, the central level was responsible for overall allocation of ISS funds – either by activity or by district. Countries tended to allocate funds to underperforming districts and/or underfunded districts. The degree to which districts then programmed their allocated funds varied – most countries directed districts to conduct specific activities with the funding, such as outreach or social mobilization.

In all in-depth study countries, ISS was well-integrated within the NIP. Harmonization across health programs and across administrative levels was much more challenging. The countries were very different in their relative strengths and weaknesses – for example, one NIP was very effective at coordinating donors at subnational levels through careful donor mapping, but the NIP failed to inform their districts of the planned measles campaign until four months prior to the campaign, well after workplans had been finalized. The findings seemed to reflect the general level of harmonization within the health system – issues cited by key informants were not specific to ISS, but were indicative of the difficulties in developing integrated health services. Of all in-depth study countries, Tanzania had the most advanced systems for coordination both horizontally and vertically. There did not seem to be any patterns related to the degree of health system harmonization and immunization performance. Based on the proposed

procedures for managing HSS funding in Cambodia and DRC, countries plan to integrate HSS funding into the broader health system more so than with ISS funding, and planned HSS activities will not only focus on immunization.

Lastly, we observed that LICUS countries tended to apply for GAVI ISS funding much later than other countries, and were less likely to receive rewards. More information on the reasons behind these differences may allow GAVI to adapt its design to better address the needs and limitations in these countries. This finding poses a question regarding the strategic vision for GAVI ISS funding – if ISS funding remains a primarily performance-based funding mechanism, funding by definition will go primarily to better performers, which are unlikely to be countries under stress. Another mechanism may be more suitable for improving immunization performance in LICUS countries. Four of our in-depth study countries were LICUS countries with two earlier applicants (Cambodia and Laos), and two countries that received rewards (DRC and Guinea). No generalizations specific to LICUS countries can be made from these four countries.

4.1.2 Impact of ISS Funds on Overall Immunization Financing

The findings related to the effect of ISS funds on overall immunization financing are generally as expected. GAVI funding – including ISS and other funding – has increased total funding for routine immunization. The proportion of government and donor funding for routine immunization remains largely the same as pre-GAVI. Our quantitative analysis did not show that ISS funding was used to fill gaps in immunization funding, but our data for this analysis was limited. Informants' direct responses, as well as descriptions of the NIP and ISS planning processes, in the in-depth study countries strongly supports the finding that ISS was used to fill gaps.

Because of conflicting results from different analyses, it is unclear whether ISS funding has displaced other sources of immunization funding. Using FSP data, we find that total immunization funding increased in all but three of 27 countries, with a median increase of 11%. In 19 of 27 countries, the increase was greater than the additional ISS funding. Excluding new vaccine expenditures and ISS funding, however, we find that expenditures decreased in 20 of 27 countries. Analysis of more current data from five in-depth study countries shows that non-vaccine immunization expenditures, after removing ISS funding, increased in all countries. Our evaluation is inconclusive on whether ISS funding has displaced other funding sources, however, we urge future attention to this issue. Further analysis conducted with updated data from CMYPs, as well as data on funding at the global level, to ensure continued funding commitment to immunization is important to achieving GAVI's objectives.

4.1.3 Impact of ISS Funds on Performance of the Immunization Program

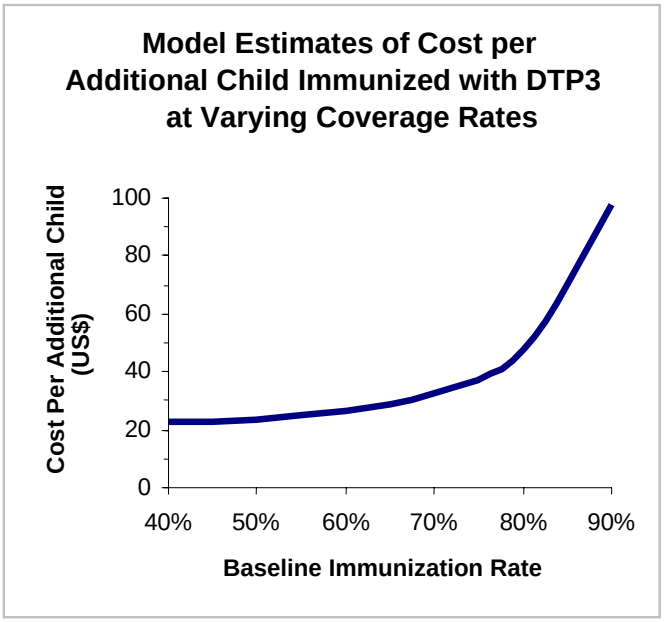
Our data shows that ISS had a significant positive impact on DTP3 coverage rates from 2001-2005. A $1 influx of ISS funding per surviving infant increases the odds of immunization by approximately 10% in the year funding is received, and by another 10% in the next year. Our analysis does not confirm the finding by Lu *et al.* (*The Lancet* 2006) that ISS funding has no effect in countries with baseline coverage above 65%. The different findings arise from these data differences, not from modeling differences, as we tested our data with the Lu *et al*. modeling specifications (and others) and found the same results

There are two key differences in the data we used and the data used by Lu *et al*, which explain our different findings. First, Lu *et al*. had one fewer year of post-GAVI immunization data available for their analysis – our analysis included 2005 immunization coverage rates. Second, our key independent

variable was actual ISS expenditures, in contrast with the Lu *et al*. study, which used ISS disbursements to countries as the main independent variable.

Our model found that the cost of increasing coverage is higher in countries with higher baseline coverage rates, as shown in Figure 14. If our model is correct, the imputed cost of immunizing an additional child is approximately $23 at the lowest coverage rates. However, once coverage rates are above approximately 60% to 70%, the cost per additional child immunized increases significantly.

Figure 14: Model Estimates of Cost per Additional Child Immunized at Varying Coverage Rates



This finding is similar across various model specifications tested. Figure 15 shows the cost per additional child immunized as estimated by each of the 36 models shown in Annex J. Estimates are shown for baseline coverage rates of 50% to 80% for those models including all countries, and for 70% and 80% baseline coverage rates for models that included only those countries with baseline coverage rates above 65%. Generally, costs are in the range of $20 to $50 for countries with 50% baseline coverage, and rise exponentially (the graphs are drawn with a logarithmic scale) with higher baseline coverage rates. The estimates vary from one model to another, but are generally equally dispersed at each coverage level and for each choice of functional form for the dependent variable. Approximately half of the estimates are within about 25% of the median in each set of points.

The logarithmic transformation, which fits the data poorly and has least theoretical justification, produces the highest cost estimates, while the logistic transformation produces the lowest. The logistic model used for the detailed results in this report, shown by a line in Figure 15, is near the center of the logistic models, and falls below most models based on the logarithmic transformation, and above most untransformed models. When interaction terms are included in the models, cost estimates for high coverage countries tend to be somewhat lower when based on models restricted to countries with baseline coverage of 65% or higher, than when based on extrapolations from all countries.

Figure 15: Alternate Estimates of Cost per Additional Child Immunized at Varying Coverage Rates

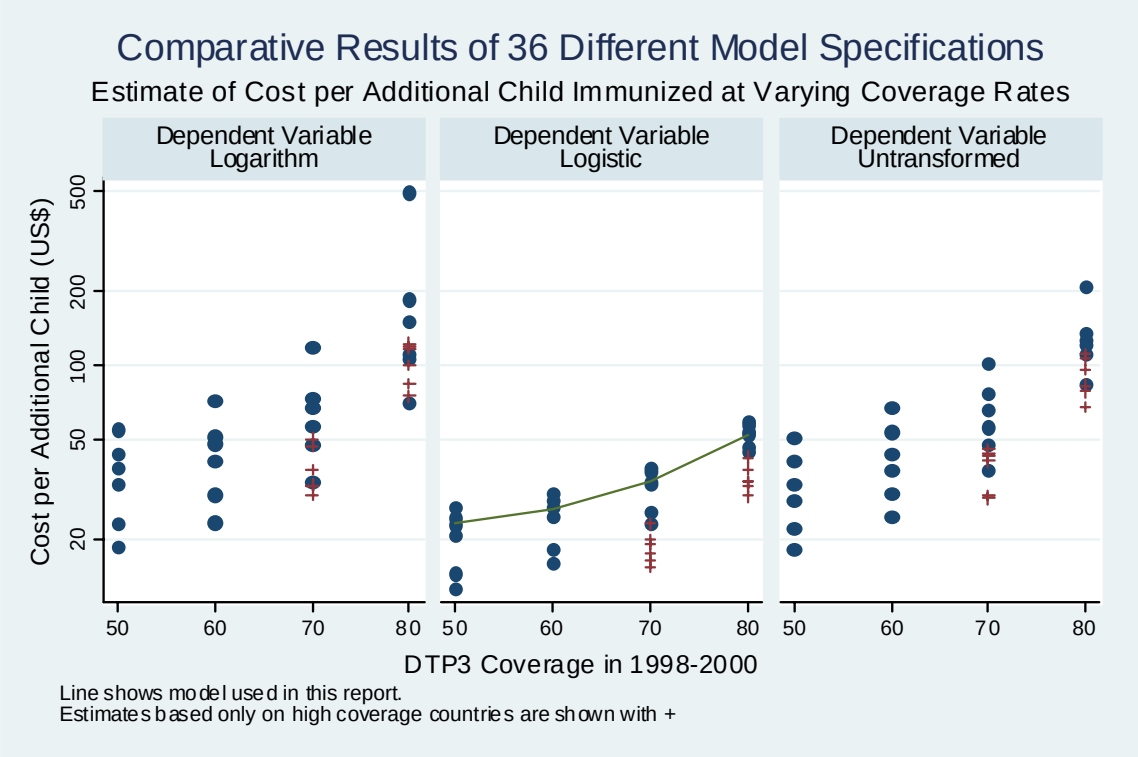


Figure 14 also suggests that the degree of uncertainty related to the cost per additional child immunized increases approximately in proportion to the estimated cost. While at 50% baseline coverage rate, the middle half of the models show that cost per additional child immunized is $21 to $38, at 80% baseline coverage rate, the middle half of the models show cost per additional child immunized is $53 to $117. The actual margin of error is greater than this, because the costs are calculated from estimated (rather than exact) models. However, the important policy implication is that **all** models show the imputed cost per additional child immunized to be substantially above $20 at 80% coverage. At 80% coverage, the model used throughout this report estimates cost per additional child immunized to be $53.

We confirmed that GAVI's focus on DTP3 did not negatively affect measles coverage. Measles coverage rates generally mirrored DTP3 coverage rates, and our model showed no statistical difference in these two indicators.

We were not able to demonstrate a correlation between ISS funding and improved consistency of coverage, which we defined as decreases in coverage declines. We had anticipated that access to a funding stream that had the flexibility of ISS would allow countries to prevent sudden declines in coverage due to emergencies that the NIP and donors could not react to quickly. Although the quantitative data found no correlation, during the country visits (both under this evaluation and in 2004) countries gave examples of such uses of ISS during crisis. Examples include using ISS to fund operational costs when all government funding had stopped during political crisis, or using ISS to fund vaccines during a stockout. Both these situations are ones where ISS funding helped to prevent a decline in the coverage rate. Future analysis in this area would be valuable to see whether additional years of data demonstrates a positive effect, or to understand how ISS could be more effective in preventing coverage declines.

Lastly, while we do not find any statistical correlation between GAVI ISS funding and improvements in equity of coverage, we do see that geographic equity improves with increasing national coverage rates, and ISS funding improves national level coverage. Based on the observation of geographic equity trends, and from country-level information regarding how countries allocate ISS funding, it does not appear that ISS funding is creating more inequity by motivating countries to immunize the easiest-to-reach children, one of the concerns regarding the reward incentive.

4.1.4 Factors Correlated with Differences in Performance

We tested a variety of variables that we hypothesized would have impact on immunization performance and the ISS effect, including macroeconomic and political factors, health funding and other health priorities, immunization program activities, ISS management and planning, and use of ISS funds. The variables that proved statistically significant in influencing the ISS effect included GDP (negative effect), political stability (positive effect) and the presence of a current conflict (negative effect). The importance of political stability confirms Lu *et al*.'s findings (*The Lancet* 2006), and highlights the challenges of working in many of the ISS recipient countries. Other variables, such as national health expenditures, are correlated with higher coverage rates, but did not change the estimated effect of ISS funding.

We did not find any correlation between immunization performance and variables representing specific immunization program activities, ISS planning and management, or ISS expenditures by category. The lack of correlation highlights several issues. First, our data was fairly limited for several of these analyses. More precise data on immunization activities such as implementation of RED strategy or SIAs may show more conclusive results. Similarly, more precise data on ISS planning and management, particularly more detail on the role of the ICC, or the nature of district involvement in planning, would greatly add to our analysis. Secondly, the lack of a statistically significant correlation does not rule out the possibility that there is an effect – while we do not see a correlation, we cannot show statistically that there is no correlation.

Findings from the in-depth study countries pointed to three factors that seemed common in higher performing countries – more emphasis on social mobilization, higher technical capacity within the NIP and more technical inputs from its partners, and increased expenditures on immunization from sources other than GAVI. Although community mobilization is a core component of RED, the high performing countries placed more emphasis on these activities, and perceived it to be an important factor in achieving coverage gains. Whereas our 2004 evaluation focused on strengthening ICCs to improve outcomes, our findings here point to the level of technical input (through a TWG, ICC sub-committee, or in another forum) as the more critical factor to success. ICCs seem to have become less effective as advocates, and although that function may not have been as critical during Phase 1, finding ways to improve their effectiveness in this role may be very important to sustaining performance gains. Lastly, the country visits showed that ISS funding is most effective when it is supported by additional investments from governments and other donors. This finding further supports the importance of ICCs and GAVI taking an active advocacy role to ensure sufficient support for immunization.

The lack of an effect based on ISS expenditures by category should be considered carefully in many ways. Our data on ISS expenditures was available for all countries over a 3-5 year period, depending on when the country first received GAVI support. We are less inclined here to accept that our findings were due to data limitations. The introduction of ISS funding represents a relatively small change to immunization program funding (increasing total funding 15% from pre-GAVI levels). Bearing this in mind, it is understandable that whether a country spends 10% or 20% of ISS funds on training (representing 1.5% or 3.0% of total immunization expenditures) may have little impact on performance.

However, despite representing a relatively small amount of incremental funding, ISS funding does improve performance. These results lead us to believe that the specific items on which each country spends its ISS funding to produce a positive effect are not the same across countries – what matters is that the funding is being used to meet immunization program priorities. The lack of correlation between specific types of expenditures and immunization performance suggests that, from its global perspective, it would be extremely difficult for GAVI to direct ISS expenditures toward relatively more effective uses, as individual country priorities differ.

4.1.5 Impact of ISS Design and Structure on Immunization Performance

We had only limited data to test design features of the ISS scheme – specifically programming flexibility and the reward system. We hypothesized that larger variances in line item expenditures from year to year at country level, indicating quick adaptation and planning flexibility, may be correlated with higher performance. The data do not confirm this hypothesis, although our indicator provided only a very crude measure of flexibility. We would argue, however, that the lack of correlation observed between use of ISS funds and immunization performance supports the hypothesis that programming flexibility adds to the value of ISS funding. Even though there is no expenditure pattern associated with higher performance, most countries seem to be programming ISS funds in ways that lead to better performance. Further, the finding that the amount of unspent ISS funding has no effect on performance also supports the principle of allowing countries the flexibility to program ISS funds both *how* and *when* appropriate.

Across all study countries, informants were quick to note the benefits of the flexibility of ISS funds – NIP could program funding based on country priorities, and unused funding could be saved for later years for potentially urgent needs. ISS' funding flexibility allowed NIPs to function under duress (e.g., funding an unforeseen OPV vaccine shortage in Guinea) and to operationalize internationally-recognized strategies for improving immunization coverage (funding RED implementation in Zambia in the absence of other donor support). While these activities are undoubtedly important to strong immunization performance, what is not possible to determine is whether in the absence of ISS funding, another funding source would have come forward. This question, considered together with further analysis of the changes in donor and government funding, is important in assessing the impact from the programming flexibility feature of ISS funding. However, our data does not allow a more rigorous analysis of the benefits because we cannot quantify flexibility well and so cannot capture its effects statistically, nor can we know the outcomes in the absence of ISS funding.

Our analysis of reward funding leads us to many additional questions. We found that countries with higher population growth rates were much more likely to have been approved for rewards than countries with lower population growth. GAVI's focus on *number* of children immunized rewards countries with higher population growth, potentially even those countries in which the DTP3 coverage rate is decreasing. Examining countries that actually received reward shares found that higher baseline DTP3 coverage rates were also a strong predictor of receiving rewards. Our interpretation is that countries with better managed immunization programs pre-GAVI are the ones with higher capacity to manage and program the ISS funds and other resources effectively to improve DTP3 coverage. Our finding that the population growth rate alone explains 76% of whether a country receives rewards is cause for further examination of the reward system.

NIP stakeholders seemed more aware of the reward structure during country visits than in 2004. While most of the study countries are pursuing appropriate strategies to improve coverage, none seemed to directly tie their objectives to the reward funding. Based on the quantitative analysis, receiving rewards has little effect on performance, perhaps in part because much of the funding is not immediately used (based on findings from in-depth study countries). It also may have little effect because field staff

implementing activities are not made aware of it, nor do they see any personal or immediate benefits. Nonetheless, at the national level, it may serve to remind senior officials of the importance of improving coverage. Only one of the three in-depth study countries that did not receive rewards when eligible, seemed to actively focus on ways to increase the number of children immunized. It is also interesting that partners seemed to respond more actively to DQA failures.

The two in-depth study countries that have never received rewards have both experienced reductions in their target populations due to declining birth rates. As a result, neither reached their projected number of children immunized. Qualifying for reward funding not only depends on the number of children immunized, but also on the number of children initially **projected** to be immunized in the first year, potentially allowing countries to manipulate their projections to ensure funding is received upfront as investment shares. Even with significant increases in the DTP3 coverage rate, based on reliable survey data, reductions in target population make it very difficult for those countries with declining birth rates to receive rewards. Although using the *number* of children immunized is effective in simplifying the reward criteria, alternative indicators or adjustments may be warranted in countries with declining birth rates.

We learned after the in-country research that GAVI has a policy and formula for adjusting the number of children used for calculation of rewards in countries with declining birth rates. This policy had not been applied in Cambodia, a country with improving performance but which did not qualify for rewards because its lower target population made it difficult to immunize more children than originally projected. This policy was not widely disseminated (Cambodia was not aware of it), nor did GAVI management correctly identify Cambodia as a country where this policy should be applied.

4.2 Recommendations

Overall, we would conclude that GAVI ISS funding has been successful in achieving its stated goal of improving access to immunizations. GAVI ISS funding has had a positive effect on DTP3 coverage in recipient countries. The flexibility of GAVI funding is a unique characteristic allowing NIPs unprecedented ability to pursue country-specific priorities, although the ability of each country to use this funding effectively to improve immunization performance depends very much on the available technical capacity. There is room for improvements that focus on refining the reward mechanism to broaden the program objectives and to increase their applicability for higher coverage countries. At the same time, developing ways to support countries that are underperforming, and improving assistance to fragile states, is equally important to achieving the goals of ISS.

Based on both quantitative analysis and in-country findings, we have the following recommendations for GAVI in Phase 2. These recommendations based on our evaluation findings are organized into three broad categories – policy and design of ISS funding scheme, GAVI management, and ongoing monitoring efforts.

4.2.1 Policy and Design Recommendations

1) **GAVI should continue to provide ISS funding, which has had a positive effect on DTP3 coverage rates.** These positive effects can be found across various baseline coverage rates, although there are differences in performance outcomes in individual countries. Countries likely to benefit from the ISS reward system are more stable countries with better managed immunization programs (non-LICUS countries, more politically stable countries, countries with higher baseline DTP3 coverage rates), as well as countries with higher population growth rates. While a reward system will benefit the better performers by definition, other mechanisms may be

required to assist countries with weak management to make improvements, so they can attain rewards as well.

2) **GAVI should continue to use DTP3 as the indicator of immunization program performance. This focus did not appear to have diverted attention from other antigens.** There was no evidence of negative impact on measles coverage rates (an indicator of performance with other antigens) over the GAVI Phase 1 period.

3) **GAVI should continue its approach of allowing countries flexibility in how and when to use ISS funding.** Our statistical analysis showed no correlation between different expenditure items and performance. Nor did we find any correlation between expenditure at different health system levels and performance. Informants noted the benefits of ISS' flexibility in all country visits, allowing the NIP to address acute funding shortfalls, and to implement internationally-recognized strategies for improving performance. Further, the lack of statistical correlation between performance, and how ISS funds are used also means we do not have any basis for recommending that countries use funding in any particular manner. Lastly, the rate of expenditure of ISS funding is not correlated with performance, so encouraging countries to spend more of its funding would not improve performance.

4) **GAVI should reconsider how ISS investment funding is calculated, perhaps with a standardized formula, or more critically scrutinize the feasibility of first year projections on which investment funding is based.** The current formula, based solely on self-projected numbers of children to be immunized in the first year, is easily subject to manipulation. This recommendation would not affect the 52 countries already approved for ISS funding, but a revision should be considered for new applicants.

5) **GAVI should reconsider its approach to working with countries that are in conflict or recovering from conflict.** ISS funding was less effective in LICUS countries than other countries. LICUS countries were also less likely to receive reward funding. Although we do not have data on the reasons for these results, it is certainly conceivable that a fragile government responds differently to an incentive-based funding mechanism than a well-functioning, established government. As such, GAVI should investigate alternative approaches for working with fragile governments, including more involvement and up-front assistance (such as the additional "post-conflict investment" suggested by the GAVI task team), different rules and procedures, and a package of technical assistance – ensuring high quality technical support is especially important for this group of countries.

   The finding that LICUS countries applied for GAVI funding later may be an indication that they had a harder time meeting the application procedures. They also were less likely to have a complete FSP. We also found that LICUS countries with a past conflict experienced more improvement than other LICUS countries, suggesting that there may be critical windows when GAVI assistance can have positive results. Given management capacity in a country just emerging from conflict, GAVI's requirements may be too burdensome. While part of the goal of GAVI is to build financially and operationally sustainable immunization programs, this goal may be too ambitious in the weakest countries. Further in-depth research would help GAVI to understand alternatives for structuring its assistance to fragile countries.

6) **GAVI should reconsider its policy of a standard reward of $20 per additional child immunized for all countries, as $20 may not provide sufficient incentive in countries with higher immunization coverage rates.** Our analysis found that it can cost much more than $20 to immunize an additional child. This finding impacts higher coverage countries in two ways.

First, it means that the GAVI investment funds allow higher coverage countries to immunize fewer additional children than lower coverage countries, so the total amount of their rewards will be lower. Secondly, the $20 reward may not be sufficient incentive for higher coverage countries to make the necessary investments to reach additional children, given the high cost of reaching additional children in these countries. Although it may be more cost effective to immunize additional children in lower coverage countries, ignoring the hardest to reach (the last 10% or 20%) violates general public health policies. If GAVI wishes to ensure that the hardest-to-reach children in higher coverage countries are immunized, it may need to increase the reward per child in higher coverage countries.

7) **GAVI should consider additional and/or different measures of immunization performance in higher coverage countries – such as improving equity or coverage consistency.** GAVI's focus on the number of additional children immunized becomes less appropriate in higher coverage countries, as costs of increasing coverage are harder to justify in terms of disease reduction, and the amount of reward funding that countries will receive becomes lower as coverage increases and it becomes harder to immunize *additional* children. Nonetheless, continued vigilance to maintain consistent high coverage and make other immunization program improvements is valuable for public health. With this in mind, GAVI should consider rewards based on criteria other than, or in addition to, the number of children immunized in higher coverage countries.

   Coverage consistency could be measured using the number of children immunized, entitling a country to receive a reward for three consecutive years without any decrease in the number of children immunized (adjusted for birth rates). Countries with intermittent drops in coverage, even if there is an upward trend, would not receive this reward. Such a reward (for example, $3 per child based on the total number of children immunized in the last year), would encourage constant vigilance – ensuring good performance *every* year.

   Measuring equity is much more complex – precise data on immunization rates by income categories would only be available through costly surveys. A crude indicator of equity may be changes in the number of districts with under 50% DTP3 coverage. This is a simple, but not ideal indicator, as it does not capture income differences within districts, and the data is difficult to verify. Testing of proposed indicators at country level is required if GAVI wants to incorporate an equity indicator.

8) **GAVI should revise the ISS investment and reward structure balancing GAVI's internal equity objectives, cost effectiveness of various options, and overall resource limitations.** GAVI must decide how to allocate ISS funds in accordance with its internal investment policies – to support fragile and underperforming countries, to immunize additional children, to improve equity in higher performing countries, or to ensure more consistent year-to-year performance. These decisions must reflect GAVI priorities and are beyond the research scope of this evaluation, but we propose a framework for decision-making.

   As a basis for discussion, below are specific proposals to address the key evaluation recommendations that require additional GAVI ISS funding.

Objective	Proposal
Encourage high coverage countries continue to immunize additional children	For countries with DTP3 coverage rates over 80%, the reward per additional child immunized should be increased to $40
Encourage countries to maintain consistent high performance	An additional reward ($3 per child) should be provided based on demonstrated consistency of performance
Encourage countries to focus on underperforming districts	For countries with DTP3 coverage rates over 80%, an additional reward should be provided for improved coverage equity. A potential formula to consider is to provide a reward per child ($3 per child), based on the percentage point decrease in the number of districts with DTP3 coverage rate under 50% multiplied by the total target population to calculate the number of children
Provide additional support to LICUS countries to maximize their potential for success	Provide more upfront support (GAVI task team proposed "post-conflict investment") and package of technical assistance

Each of these proposed changes should be considered separately, based on its projected cost and estimated health impact, as well as total GAVI ISS resources, and overall allocation of ISS portfolio. Once an initial estimated cost and health impact is calculated, GAVI must prioritize these objectives, and decide which ones to pursue. The most important ones should then be reconsidered to refine the amount of reward and/or the formula for calculation. Once there is consensus on each of the proposed funding or reward mechanisms, then GAVI can then adopt specific proposals.

4.2.2 Management Recommendations

9) **GAVI should increase its advocacy efforts at global and country level**. During country visits, senior level officials in MOH and MOF noted the importance of GAVI visits in promoting national commitment to immunization. While these visits are important for raising awareness and commitment, such efforts tend to have only short-term impact. GAVI should consider other ways to increase commitment at country level – possible activities may include working with media agencies to disseminate comparative data regarding national government contributions to immunization, and benchmarking countries based on their financial contributions.

10) **GAVI should increase its efforts to coordinate support from all GAVI partners at country level, particularly to support ICCs.** It is likely that at least part of the positive ISS effect is due to increased focus on immunization from GAVI partners in-country and at global level. In most countries, it seems that GAVI has generated this increased focus and coordination – ensuring a process for replicating these efforts in still underperforming countries can help to improve the performance in all countries.

    The attention of senior officials on ICCs has waned and must be invigorated in order to ensure renewed attention and funding for immunization. In some cases, senior officials of GAVI's key partner agencies are not attending meetings, which clearly provide inappropriate signals to senior government officials. GAVI must work with its partner agencies at global level to ensure country-level commitment to ICCs. Because ICCs are most active in preparation for high profile events (for example, coordinating a polio campaign or signing the FSP), it may be useful for GAVI to organize relevant events every few years to renew interest and enthusiasm.

11) **GAVI should establish procedures to respond to country-level problems quickly, drawing on support from all GAVI partners in country and at regional levels.** While GAVI has a procedure for rewarding high performers, it does not currently have any mechanism to support underperforming countries. Options to consider include providing direct technical assistance to underperforming countries (as strong technical inputs seem closely linked with improved performance), or facilitating reviews of underperforming countries among key partners at regional and global level to map out new strategies and additional inputs from all partners. These reviews should result in partners committing to specific response plans in target countries.

    Further, GAVI has no procedure to respond to allegations of misuse of funds. Although GAVI's principle of allowing country-level control has been effective, ISS funding must not be seen as a source of funds with little oversight. GAVI must be perceived as capable and interested in ensuring its funds are used appropriately to prevent any abuse. Even where in-country partners suspected misuse, there was not a clear procedure to follow-up on allegations. Similar to the DQA process, GAVI could institute a standard process for auditing use of funds that can be implemented quickly once any allegation is made. To respond quickly, for example, standard Terms of Reference could be drafted, and an international accounting firm retained in advance. Alternatively, GAVI could make external random audits a condition for future funding, selecting 2 – 4 countries each year for external audit.

12) **GAVI should more consistently implement its policy of adjusting the projected number of children immunized with DTP3, used as the basis for reward calculation, in countries with proven reductions in target populations.** Although GAVI has adopted a policy of allowing countries with declining birth rates to adjust their target population used to calculate reward shares, this policy is not widely disseminated, nor does GAVI consistently identify all countries where the adjustment should be applied. Improved dissemination and consistency is needed to ensure that there are appropriate incentives for all countries.

13) **GAVI should include more emphasis on in-country technical review in its standard procedures and reporting**. Just as the initial application included the condition of an established ICC, it may be helpful for GAVI to require that countries have an established technical team. Alternatively, GAVI may consider adding a section to the APRs requesting information on the technical team, such as the name and title of individuals on the technical team, vacancies on the technical team, frequency of meetings, meeting minutes, key strategic decisions over the past year, etc.

4.2.3 Monitoring and Evaluation Recommendations

14) **Total immunization funding, particularly non-vaccine funding, should be closely monitored at global and country level**. The data on whether ISS has displaced government and other donor funding is inconclusive, as it relies on limited information from FSPs, and the six country studies. However, the flexibility of ISS funding often makes it the *easiest* source of funding to meet NIP priorities, compared with more concerted efforts to generate government and other donor support for critical components of immunization programs. More effort must be made to ensure that ISS does not become the funding source of *first* resort. GAVI should also closely monitor total global funding for immunization (compiling country level data, as well as funding directly to GAVI and other global level efforts), as some donors have opted to fund GAVI directly in lieu of country-level funding. In addition to total funding for immunization, it would be useful to monitor funding excluding new vaccines, as new vaccine costs account for a large portion of the global immunization expenditures, and may distort comparisons over time.

15) **GAVI should establish a process for actively following up on information reported in APRs as part of routine monitoring procedures**. Follow-up on reported expenditure and coverage information that do not total correctly or are inconsistent with previous years is encouraged to promote vigilance in data quality. APRs sometimes report specific problems, but there is no mechanism for GAVI follow-up. GAVI should establish a country level monitoring system, documenting all problems identified (including those highlighted by the IRC), tracking country responses and resolution, which could be shared and updated regularly with country partners. Further review of the expenditure categories (as was recommended in 2004) to ensure more accurate reporting would also be useful for monitoring and future evaluation.

16) **GAVI should continue to use in-country data collection to monitor performance at country level.** As this evaluation found, although the global level results are positive, there is significant variation at country level. In-depth country studies are a valuable source of country-specific information, however, they are costly to implement and impose on in-country resources, and so must be used judiciously. In-country data collection is necessary for gathering complex information on management and strategy to supplement understanding of global data – there is no other way to gather and document these important differences in country context.

17) **GAVI should expand its current monitoring efforts, including regular compilation and review of additional data related to internal operations.** Regular analysis of internal performance based on measures such as time elapsed between funding approval and disbursement is important to assess internal administrative procedures.

ANNEX A: EXECUTIVE SUMMARY FROM EVALUATION OF GAVI IMMUNIZATION SERVICES SUPPORT FUNDING (CHEE ET AL, AUGUST 2004)

The Global Alliance for Vaccines and Immunization (GAVI) is an alliance involving multiple partners from the private and public sectors, dedicated to improving health and saving the lives of children through the support of widespread vaccine use. GAVI provides support to immunization programs through the Vaccine Fund (VF) in the form of in-kind support for the introduction of new vaccines, in-kind and cash contributions for injection safety, and cash contributions for immunization services support (ISS). Routine immunization is primarily supported through ISS funding, which is the focus of this study. In order to be eligible for ISS grants, countries must have a per capita gross national income of less than $1,000 (which includes 75 of the world's poorest countries) and DTP3 coverage rates below 80 percent.[44]

ISS funding is an innovative performance-based strategy that makes continued funding conditional upon improved performance and high quality coverage data. This strategy allows countries and governments to spend ISS funds in any manner they deem appropriate, but funding in later years is based on increases in the number of immunized children. Countries are approved for five years of support, usually including new vaccines, safe injection supplies, and ISS funding. While the calculation of funding or in-kind support is based on five year projections, for many countries, the period of support is extended over seven years. ISS funding for the first "year" is paid in installments over three years and is considered investment funds. The final four years is comprised of reward funding. The reward funding is calculated at $20 per additional child[45] receiving DTP3 above the number of children in the baseline year, defined as the year prior to its application year. The reported number of children immunized with DTP3 is verified through a Data Quality Audit (DQA) conducted by GAVI-retained external auditors. Reward funding is contingent upon both increasing the number of children immunized with DTP3 and on achieving a verification factor of 80 percent on the DQA. If a country does not achieve the 80 percent verification factor on its DQA, it may work to improve data quality and becomes eligible for reward shares if it passes a subsequent DQA.

Countries applying for ISS funding in the first round of applications in 2000 became eligible in 2004 for four years of reward share funding, based on the actual number of additional children immunized with DTP3. Countries that failed the DQA were declined reward shares, and those that passed the DQA and increased the number of children immunized began to receive reward shares in 2004.

As of December 2003, US $38 million of ISS funds had been disbursed to 50 countries, with as much as $332 million to be disbursed in the first five-year phase of GAVI. Because of the magnitude of this funding and the innovative, yet untested, performance-based design of this support, the GAVI partners and Board commissioned this study to examine how the ISS mechanism, as it is currently configured, operates in practice and to determine its impact to date. The overall aims of the evaluation are

[44] GAVI has made exceptions for some countries whose coverage exceeds 80 percent.
[45] $20 represents an estimate of the cost of fully vaccinating a child.

to assess the performance-related funding scheme for immunization services support in furthering GAVI's objectives, and to identify ways to improve it.

GAVI established a study Steering Committee including representatives from the GAVI Secretariat, USAID, DfID, WHO, UNICEF, Centers for Disease Control and Prevention (CDC), and the Global Fund for AIDS, Tuberculosis, and Malaria (GFATM) to guide the evaluation of the ISS funding mechanism. Abt Associates carried out the evaluation together with the Academy for Educational Development (AED). The Steering Committee was involved throughout the evaluation process and reviewed a draft version of this report.

The main areas of evaluation are:

1. Implementation and management of ISS funds
2. Use of ISS funds at country level
3. Impact of ISS funds on performance of the immunization program
4. Factors affecting successful implementation of the ISS scheme and improved performance
5. Cost of administering ISS scheme
6. Comparison of GAVI and GFATM application process and impact on the health system

In discussions with the Steering Committee, it was agreed that while the impact on immunization programs should be the focus of evaluation, to the extent possible, evaluation of the similarities and differences between the GAVI and GFATM application processes and their impact on health systems would also be included.

Approach and Methods

The findings of this evaluation are based on a desk review of GAVI documents and in-depth case studies. Countries analyzed in the desk review are the 52 countries that have been approved for ISS funding by December 2003. The six country case studies include countries with early ISS approval, chosen by the Steering Committee in an attempt to gain a cross-section of experiences through diversity in immunization performance and eligibility for ISS reward shares – it includes three countries that were eligible and three that were ineligible for reward shares. The desk review provides an overall picture of country experiences with ISS funding and performance, while the country case studies provide more country contextual information, qualitative information regarding allocation decisions and experiences with ISS funding, and more in-depth analysis of actual impact on immunization program performance.

Of the 52 countries, 33 had received funding as of June 2002. This date is used as the cutoff point for our analysis as earlier analysis using 2002 data (done before 2003 data was available) found that funds cannot be immediately programmed and that meaningful impact cannot be measured within a short time period. Data analyzed in the desk study come from the UNICEF/WHO Joint Reporting Form (JRF), the primary source of data for coverage results, and documents from the GAVI Secretariat, including country applications, Progress Reports, FSPs, DQA reports, and documents recording the dates of country approval, decision letters, receipt of country bank information, and funding transfers. The steering committee agreed to focus on DTP3 coverage and the number of children vaccinated with DTP3 as the principal indicators of performance. In our analyses the baseline year is defined as the year prior to first tranche funding. As coverage reports may vary significantly, the steering committee agreed to use the

official country estimates as reported in the JRF as the basis for analysis in the desk study. The most recent coverage data available at the time this report was written were from 2003, however, these are still provisional figures and are subject to change. Data for measles and, when available, TT2+ and DTP1 are also considered.

The six countries chosen for the case studies were Cambodia, Kenya, Madagascar, Mali, Mozambique, and Tanzania. Two key criteria (among others) in selection of countries were including early ISS recipients and including both countries who will and will not receive reward shares this year. Cambodia, Mali, and Tanzania will be receiving reward shares, while Kenya, Madagascar, and Mozambique will not be receiving reward shares at present. These countries were all in the first round of applicants to GAVI (applying in June 2000), although Cambodia did not apply for ISS funding in its initial application. These countries received their first tranche of ISS funds between November 2000 and February 2002. Data from these countries were collected by a two-person study team composed of a financing expert and an immunization program implementation expert in country for two weeks during the months of April and May 2004.

Discussion of Findings

Through the desk review and the country case studies, we have compiled a substantial body of data regarding management of the ISS mechanism, how ISS funding is being used, its impact on the immunization program, and factors that may be contributing to more effective use of funds. In some cases, the data collected, combined with the study team's judgment and experience, provides a clear direction for moving forward, or for types of analyses or monitoring that would be useful in the future. In other cases, we must recognize that the data are limited and describe a short timeframe, and we must be careful when formulating conclusions. In this section, we discuss the strengths and limitations of our findings, and provide recommendations on how to move forward.

Implementation and Management of ISS Funds

This discussion of the initial stages of implementation must be prefaced with the reminder that the case study countries were all first round GAVI applicants, so they were subject to all of the start-up issues related to sorting out the details of a new funding mechanism. The initial application process was marked, to some extent, by lack of clarity and processing delays. For the most part, that phase of GAVI/ISS is over. In most case study countries, that first set of actors has moved on to other assignments, and the National Immunization Program (NIP) staff and ICC members who currently implement the ISS mechanism were not involved at the initial stages. With the exception of the baseline figures provided in one country's application, there do not seem to be major issues related to ownership of the application process that is affecting current implementation.

The issue of baseline data submitted at the time of application is an important one, as it determines the amount of reward shares, or even whether reward shares will be forthcoming at all. For one case study country, because the baseline year DTP3 estimates came from coverage survey data that greatly exceed routine administrative data, it is unclear that the country will ever be able to receive reward shares. We are unable to determine whether this country was the one exception among GAVI recipients or whether any other countries are in the same situation.

There appears to be good understanding of the mechanism for calculating reward shares within the NIP, and generally among ICC members (although this was not the case in one country). With the exception of one country, this understanding is only at the central level, and there is very limited understanding at subnational levels. Overall, it does not appear that the concept of maximizing reward shares is a high priority in the programming of ISS funds. We can only speculate as to why more attention

has not been paid to the reward shares. There may be insufficient individual incentive to maximize on the reward. Or, perhaps this type of incentive is so unusual within public health that there is not a real grasp of its implications yet. The validity of the latter reason will be tested now that countries have actually received (or been denied) reward shares – the concept should now "sink in." With this in mind, it does not appear that the reward shares have really served as a strong incentive up to now, although it should be noted that in the one case study country with high awareness of the reward system at multiple levels, funds for subnational activities were directed so as to maximize gains in the numbers of children immunized, ie, targeted to relatively populous areas.

There have not been problems accessing ISS funds at central level in country – although in some countries with decentralized management systems, there has been difficulty accessing funds at district level. ISS funding was generally managed outside of the normal government funding mechanisms. Although the MOH was often responsible for managing the funds, their release would be "fast-tracked" by signature of senior officials. Despite lack of specific requirements, most countries have in place adequate financial reconciliation procedures. Full compliance with these procedures is an issue in some countries, although there is no evidence of misuse of funds.

Allocation and Use of Funds at Country Level

Across the case study countries, there was great variety with respect to how ISS funds were allocated. Countries used quite different criteria for allocating funds among districts. Some countries targeted underperforming districts, while others targeted districts with high number of unimmunized children, and yet others provided funds to all districts for political and "fairness" reasons. One country did not allocate cash to districts at all, but purchased commodities that the central level then distributed to districts. In two case study countries, there were no records of ISS disbursements to districts that specified which districts received how much ISS money, and when. Given only six case study countries, and the short timeframe for study, it is not possible to see any association between different allocation procedures or criteria with performance.

In most countries, the allocation process appears systematic and strategic. Countries used funds to address specific obstacles identified and to implement coverage improvement strategies. Where allocation processes seemed less thoughtful and transparent, the country ICCs seemed less coherent and functional. Although ICCs were not always involved in the actual design of the allocation process – even in countries with strategic allocation – they were aware of, and supported, the process. This finding is important because GAVI has not directed ICC involvement in management of ISS funds in the same manner as they have directed ICC involvement in developing the application or the Financial Sustainability Plan (FSP), although the ICCs sign Progress Reports indicating some involvement in monitoring the use of funds.

Aggregate data across the subset of 33 early recipients indicate that ISS funding is largely used for recurrent expenses (81 percent of expenses), and at subnational levels (68 percent of expenses). The highest expenditure categories were training (21 percent), monitoring and surveillance (11 percent) and vehicles (9 percent). While the information contained in progress reports suggests that outreach is not a major category for use of ISS funds, the experience from country case studies shows that the purchase of vehicles and payment of per diems, both of which constitute major categories of use, are applied largely to the provision of outreach services. Across the desk study countries, 62 percent of ISS funding disbursed has been spent.

One of the unique and most valued characteristics of ISS funding is the complete flexibility and discretion given to NIPs regarding how and when to program funding. The true value-added of ISS funding would be significantly diminished if GAVI were to prescribe to countries how to use this funding, or required funds to be disbursed within a specified time period.

While experience varied across countries, the use of ISS funds seems to reflect the under-funding of some critical areas, which previously hindered the implementation of performance improvement strategies. To the extent that ISS funding has been able to fill gaps in funding or to allow the immunization program to function in times of crisis, it does support the immunization program and contributes to coverage, when funds are available. At the same time, immunization programs risk becoming dependent on ISS funding for some expenditures, rather than addressing systemic issues causing funding shortfalls that compromise coverage. This point is particularly important given the limited implementation of FSPs to date – sustainable financing is critical to maintaining the progress made with current ISS funding.

Impact of ISS Funds on Immunization Program Performance

The picture that emerges regarding changes in coverage is somewhat mixed. Overall, 23 of 33 earlier recipient countries in the desk review showed positive trends in numbers of children immunized with DTP3 between their baseline year and 2003, while 23 of 33 countries showed increased numbers of children immunized against measles from baseline year to 2003. To eliminate the impact of increases in the number of children immunized that result solely from population growth, the number of children immunized in 2003 is adjusted based on the population growth rate. Adjusting for population growth, these numbers are slightly deflated, with 17 countries showing any improvement in the number of children vaccinated with DTP3 and 18 showing improvement in doses of measles administered. The picture is similar for DTP1-3 dropout rates – out of 23 countries for which changes over time could be analyzed, 14 showed a decrease while nine showed an increase in dropout rates. The ISS indicator of number of children immunized with DTP3 does not appear to be adversely affecting performance of other antigens. GAVI's focus on DTP3 does not appear to have diverted attention away from other antigens administered to children, but seems to be relatively unrelated to trends in TT2+ coverage.

Immunization data quality and completeness were a major problem in most of the case studies, further complicating any conclusions regarding changes in performance. The problems with data quality are country specific, with irreconcilable data from different sources, and often no clear indication of which source is most reliable. In this regard, ISS funding and the structure of reward shares is having impact, as some countries that failed their DQAs are making substantial efforts to improve the quality of their immunization data.

With the exception of Cambodia, case study countries did not allocate funds in order to reach the highest number of children or maximize reward shares. As discussed earlier, the full implication of reward shares may not have been truly understood until this year when the first reward payments were made. Even so, those countries that were declined reward shares may experience little change at field level in the near term as they are stretching out their ISS disbursements, while those receiving reward shares have little reason to become more preoccupied with this indicator. Case study countries generally did not undertake any special effort to target the "hard to reach," except to the extent that a significant portion of funding supported outreach efforts. Although the ISS reward has the potential to serve as a disincentive to investing funds to reach small disadvantaged populations, countries for the most part did not strategically plan either to ignore, or reach out to, the hard to reach.

Introduction of new vaccines did not seem to adversely affect program performance in case study countries, except in Kenya. Shortages of pentavalent vaccine there affected not only ability to reach ISS targets, but also reportedly eroded community confidence in immunization services because of frequent stockouts that disrupted services.

There have been several positive changes related to financing of immunization programs – total funding for immunization has increased, total amount of government funding for immunization has

increased, and ISS funds have not replaced other funding in most countries. All three of these findings mean that the trend in financing is moving in the right direction, but large gaps are expected once VF support ends. The limited implementation of FSPs, and in some countries, the decline in ICC engagement in immunization activities, are reasons for concern.

Overall, the results are inconclusive when comparing the performance of ISS recipients with a convenient similar group of countries. We also attempted to compare performance for recipient and non-recipient districts in three case study countries, but the analysis was extremely limited and difficult to interpret due to lack of complete data. Further, it is not possible to attribute changes in performance of recipient countries to ISS funding. However, on a country by country basis, we see that ISS funds appear to be related to modest improvements in performance, but again specific attribution is not possible because other funding may have been forthcoming in the absence of ISS funds.

Factors Affecting Successful Implementation and Improved Performance

Several key factors emerged that contribute to successful implementation of ISS funding. The presence of a coherent ICC and strong technical capability within or easily available to the NIP appeared to be the key factors determining strategic allocation of funds. From the country case studies, the use of ISS funds appears most promising where they provide the financial means to implement locally-appropriate technical strategies to strengthen routine immunization – the ISS funds transform a plan into reality. The accessibility of funds depended mostly on whether funds were held in NIP accounts, or accounts specifically set up for GAVI provided funds. Monitoring of funds was generally stronger where the central level programmed the funding, with or without district input.

Some differences emerged when analyzing the characteristics of countries with improving and declining performance. Countries receiving funding earlier were more likely to show performance improvements, which suggests that it requires some time for performance improvements to occur at a level that is measurable. Across the 33 desk review countries, those with improved performance spent more of their ISS funds on transport, IE&C, and vehicles, relative to countries with declining performance, who spent more on maintenance and overhead, personnel and cold chain. Countries with improved performance also spent more at subnational level, and had larger increases in government contribution. Countries with declining performance spent a larger portion of their ISS funding. In each of these instances, however, it is not possible to describe what other changes occurred, independent of the expenditure of ISS funds, nor what other funding was available and how it was used.

While these findings are valuable, and provide insight on best practices, it is not advised to use them for developing prescriptions for countries. These findings do not mean that if countries were given more ISS funding, and if the NIP controlled the funds, and spent money on transport and vehicles, performance would improve. Within the appropriate context, these findings do highlight better ways to manage ISS funding and to allocate it to produce more immediate outcomes.

Cost of Implementing the ISS Scheme

Countries did not view the cost associated with managing the ISS scheme to be burdensome. The cost of ongoing administration is minimal, particularly because GAVI has almost no requirements for financial reporting. To-date, the two costliest activities are related to preparation of the FSP and conduct of the DQA, although the cost of the FSP is not specific to ISS funding but is required for all GAVI support and the cost of the DQA is borne by GAVI. Given the minimal reporting requirements imposed by GAVI, future work to analyze the cost effectiveness of this funding mechanism compared with other donor funding targeted toward immunization would be valuable to inform immunization financing policy.

Comparison of GAVI and GFATM Application Process and Impact on Health System

ISS and the GFATM funding share certain common characteristics and requirements, such as a performance-based calculation of awards and country coordinating committees. While there may be similarities in the structure of the funding processes, the scope of the GFATM is much broader, leading to more complex processes and the involvement of a much wider range of organizations. It is not surprising that GAVI ISS processes were perceived as being a bit more manageable, even though both applications required a great deal of effort and coordination. We do not have data to analyze the impact on the health system of these two funding schemes, but it seems likely that the impact of GAVI on the overall health system is relatively insignificant given the magnitude of funding, compared with the GFATM funding, which in some cases is greater than the public health budget.

Recommendations

Based on the data presented, we provide our recommendations below, grouped into those that have broad design and evaluation implications, and those targeting implementation improvements.

Recommendations Related to Design, Impact, and Evaluation

1. **GAVI should continue to provide ISS funding, but ongoing monitoring and evaluation is needed**. In most of the countries visited, ISS funding shows signs of having the effect that GAVI sought – countries are spending funds in response to identified needs, targeting areas in need of support. There is a complex pathway between getting additional funding and realizing improvements in outcomes. More time is needed to see whether there will be broad positive impact on NIP performance. There are some indications of performance improvements and countries appear well-positioned for further improvements, which would support continuation of ISS funding. However, future evaluation is recommended to confirm or re-assess findings.
2. **GAVI should continue its current approach toward ISS funding that provides flexibility**. The complete flexibility of GAVI funds is its most valuable characteristic. It allows NIPs to use funds when and where they are most needed – to operationalize locally-appropriate strategies for improving performance and in response to acute problems. ISS funding allows strategic plans to become a reality. Overall, funding allocations and expenditures seem appropriate to address obstacles identified. Efforts to direct the use of funds would erode a unique and valuable characteristic of ISS funding.
3. ***Additional* financial monitoring at global level is unnecessary, but support to improve monitoring at country level may be useful**. Countries have established reasonable procedures for disbursing and monitoring funds. There was no evidence of misuse of funds in case study countries. This evaluation did find incomplete financial reporting from subnational to national level in two countries. Nonetheless, additional financial monitoring at global level does not appear necessary at this time and may not be cost-effective, but support to improve monitoring at the country level may be useful in some countries.
4. **GAVI should monitor any changes in the use of funding, particularly now that rewards are a reality and countries may become overly focused on maximizing the reward, rather than the overall program**. There was no evidence of countries inflating DTP3 figures or strategically ignoring the "hard-to-reach" – two inherent risks of the ISS incentive structure. While there was good understanding of the reward structure at central level, there was little awareness at subnational levels. In the one country where there was awareness of the reward structure at all levels, funds were targeted toward the most populous areas. Now that the reward shares are a reality, countries may become more focused on this incentive. Diligent monitoring of the use of funds is particularly important to ensure that countries do not focus on the DTP3

indicator to the detriment of the overall program – ie, ignoring hard to reach populations or long-term training needs.

5. **ISS funds have been additive to overall funding and government contribution is increasing, but ongoing monitoring is necessary**. Overall trends have been positive, although they cannot be attributed to ISS funding or GAVI. Nonetheless, ongoing monitoring is necessary to track these trends over time.
6. **Support for the implementation of FSPs should be given high priority – it is critical not only to sustain new vaccine, but also for routine immunization**. Country reliance on ISS funding to support operational costs of routine immunization has important implications for long-term sustainability. ISS funding allows countries in the medium term to circumvent systemic problems causing funding shortfalls that compromise coverage. Over the long term, however, support to implement FSPs at the country level, coupled with changes in global level financing policies, are required to sustain improvements achieved. It is recommended that GAVI continue to support efforts to ensure the implementation of FSPs – the gains in immunization performance that may be attained in the short or medium term with ISS funds can only be sustained over the long term with a secure funding base.
7. **GAVI should support efforts to improve data quality, taking advantage of the current focus and momentum on this issue**. The DQA appears to have had significant impact in motivating countries to address the problem of data quality, which has long been recognized but the subject of little action. Although NIPs are highly motivated to make improvements, technical assistance is necessary. It is recommended that GAVI partners provide follow-up technical support to countries, not only to improve data quality but also to increase the capacity to use data for management. It is also recommended that GAVI partners actively document, evaluate, and promote the exchange of experiences of different countries in addressing this problem.
8. **GAVI should evaluate the cost-effectiveness of the ISS funding scheme**. The ISS funding mechanism has low administrative costs. In addition, funding flexibility contributes to the value of this funding, which may ultimately translate into impact. The cost effectiveness of this model for donor funding has not been evaluated, although it had already been adopted by other global funds. Analysis of the cost-effectiveness of ISS funding, particularly in comparison with other models for donor funding, is recommended both to inform GAVI policy as well as for potential use in advocacy.

Recommendations Related to Implementation

9. **GAVI should provide opportunities for the discussion of varied country experiences, including dissemination of findings from this study**. Allocation and use of ISS funds has varied widely, with some countries targeting low performing areas while others focused on equity in distribution of funding. Some countries have been more strategic in their planning than others. It is recommended that GAVI support discussion of country experiences, cross-country learning and application of best practices.
10. **GAVI should establish a mechanism for strengthening ICCs**. Countries that had more strategic allocation of funds tended to have more coherent ICCs. Although ICCs were not closely involved in the allocation process, they were aware of and supported the process in more strategic countries. Stronger ICCs also support better communication and planning. GAVI should encourage more ICC involvement in managing ISS funds, and establish a mechanism for providing external support to strengthen their capacity and role in countries with weak ICCs.
11. **GAVI should improve its communication of procedures and policies – including communication in multiple languages and broadening the group of individuals who receive communications at country level**. Communication to the operational level within GAVI partners and among the ICC members was sometime insufficient. Staff turnover is high so there is little institutional memory. There were also some misunderstandings that resulted from

language issues, and from the lack of clear descriptions of ISS policies. The study team also found that in one country, the impact of pentavalent shortage was not reflected to global level. We recommend ongoing communication of its procedures and policies related to ISS funding to countries and WHO and UNICEF regional offices, preparing clear and concise explanations of procedures in multiple languages, broadening the number of ICC members to whom GAVI communications are sent – copying more ICC members in communications, including communications regarding anticipated funding, transfer of funds, etc.

12. **Without increasing GAVI reporting requirements, GAVI should encourage countries to monitor appropriate process indicators that describe progress toward longer term objectives**. GAVI seeks data from countries only on financial inputs, performance outcomes, and data quality. Because the path between financial inputs and performance outcomes is complex and varies by country, careful evaluation and management of the intermediate steps can improve outcomes. It is recommended that GAVI encourage countries to monitor process indicators that measure progress toward country specific objectives – eg, increases in supervision visits, number of outreach sessions, or timeliness of district reporting.
13. **GAVI should consider revising the format of the Progress Reports to allows easier monitoring of some key areas**. The team does not wish to increase the reporting requirements of countries to GAVI, but at the same time realizes that information in progress reports is limited and that the categories for expenditures in the current reporting format is a mix of inputs and activities. This can lead to such things as underestimation of funding to support outreach, as it appears both as outreach and sometimes as personnel or transport. Also, the line items do not provide any insight on the strategies pursued. It is suggested that GAVI consider developing and field testing alternative designs to the reporting format.
14. **Consider implementing a formal appeals process related to awarding reward shares**. An appeals process would allow countries who dispute baseline values (established by their predecessors) or who have demonstrated significant progress (in ways that are not captured in the number of children immunized with DTP3) to qualify for reward shares. It would also improve the transparency related to decisions made to reward countries that do not "technically" qualify for reward shares.

ANNEX B: TERMS OF REFERENCE IN GAVI ISSUED RFP

Terms of Reference for the
Evaluation of ISS Scheme in GAVI Phase 1

Introduction:

The Global Alliance for Vaccines and Immunization (GAVI) is an alliance involving multiple partners from the private and public sectors, dedicated to improving health and saving the lives of children through the support of widespread vaccine use. In Phase I (2000-2005), GAVI provided support to immunization programs through the GAVI Fund (VF) in the form of in-kind support for the introduction of new vaccines, in-kind and cash contributions for injection safety, and cash contributions for immunization services support (ISS). Routine immunization is primarily supported through ISS funding, which is the focus of this study. In order to be eligible for ISS grants during 2000-2005, countries must have a per capita gross national income of less than $1,000 (which included 75 of the world's poorest countries for 2000-2005) and DTP3 coverage rates below 80 percent.

ISS funding is an innovative performance-based strategy that makes continued funding conditional upon improved performance and high quality coverage data. This strategy allows countries and governments to spend ISS funds in any manner they deem appropriate, but funding in later years is based on increases in the number of immunized children. Countries are approved for five years of support, usually including new vaccines, safe injection supplies, and ISS funding. While the calculation of funding or in-kind support is based on five year projections, for many countries, the period of support is extended over seven years. ISS funding for the first "year" is paid in installments over three years and is considered investment funds. The final four years is comprised of reward funding. The reward funding is calculated at $20 per additional child[46] receiving DTP3 above the number of children in the baseline year, defined as the year prior to its application year. The accuracy of the procedures used to report the number of children immunized with DTP3 is verified through a Data Quality Audit (DQA) conducted by GAVI-retained external auditors. Reward funding is contingent upon both increasing the number of children immunized with DTP3 and on achieving a verification factor of 80 percent on the DQA. If a country does not achieve the 80 percent verification factor on its DQA, it may work to improve data quality and become eligible for reward shares if it passes a subsequent DQA.

Countries that were granted ISS funding began to become eligible in 2004 for four years of reward share funding, based on the actual number of additional children immunized with DTP3. Countries that failed the DQA were declined reward shares, and those that passed the DQA and increased the number of children immunized began to receive reward shares in 2004.

As of December 2005, US $126 million of ISS funds had been disbursed to 53 countries. WHO/GAVI projections estimated that by end 2005, in countries receiving ISS support, 8.3 million additional children had been vaccinated with DTP3, and by end 2008, this number will reach nearly 33 million.

[46] $20 represents an estimate of the cost of fully vaccinating a child.

In August 2004, Abt Associates submitted to the GAVI Board a report "Evaluation of GAVI Immunization Services Support Funding". This was originally the first of an envisioned 2-part study series. The first study (Study A) was aimed to review the use of ISS (Immunization Services Support) funding and assess the contribution that ISS funds made towards improving immunization programme performance in recipient countries. The second study (Part B) was originally intended to be a qualitative study to examine how the funding scheme affects the incentives and behaviour of staff in recipient countries.

The major findings and recommendations of the first study are the following:

1. 62% of the ISS funds have been disbursed
2. Overall, it does not appear that the concept of maximizing reward shares is a high priority in the programming of ISS funds.
3. Countries used quite different criteria for allocating funds across districts. In most countries, the allocation process appears systematic and strategic
    1. the presence of a coherent ICC (inter-Agency Coordination Committee) appeared to be the key factor determining strategic allocation of funds
    2. There have been difficulty accessing funds at district level
    3. ISS funding is largely used for recurrent cost (82%)
    4. GAVI should continue to provide ISS funds, but ongoing monitoring and evaluation are needed
    5. Immunization data quality and completeness were a major problem in most of the case studies, further complicating any conclusion regarding changes in performance
    6. Because of the delays in the receipt of ISS funds and the relatively short time in which they were in use in many recipient countries, the statistical findings of the study were limited in nature, particularly regarding the impact of ISS funds on raising coverage.
    7. The quantitative desk review portion of the evaluation of the ISS funding mechanism should be repeated, with an aim towards gaining a better understanding of the impact of ISS funding.

Aims and objectives of the evaluation (part B):

The overall aims of the evaluation are:

(i) To assess the performance-related funding scheme for immunization services strengthening (ISS)
(ii)To identify ways to improve it (if appropriate).

The findings of the evaluation are expected to inform the Board's decision on whether to introduce changes in the present scheme.

Specific Objectives:

1) To assess the experience of the ISS scheme in Phase 1:
    a. Number of countries provided with investment funds,
    b. Number of countries receiving reward payments,
    c. Amount of resources allocated for investment,
    d. Amount of resources allocated for reward payments,
    e. Amount of resources expended,
    f. Who controls funding at country level, account signatories,
    g. Role of the ICC,
    h. Planning for the use of ISS resources

2) To assess the application of ISS funding at country level and its relation to overall immunization financing
    a. What have been the main uses of ISS funds?

b. What proportion of ISS funds has been used to improve surveillance, monitoring and evaluation?
c. Total funding by category of expenditure ,
d. Have ISS funds been used for recurrent/ operating expenses?
e. Have ISS funds been additional to national resources for immunization or have they replaced exiting government or partners funding

3) To identify the relationship between the allocation of ISS funding and immunization coverage rates (DTP3)

Methodology

It is suggested that the methodology of the review includes he following:

1) Desk review using but not limited to the following sources of information:
   a. Country annual progress reports
   b. WHO-UNICEF Joint Reporting Forms
   c. Financial Sustainability Plans
   d. The World Bank World Development Indicators (WDI) database
   e. The United Nations Population Division database
   f. The UNICEF child information database
   g. Other publicly available key health indicators.

   Where necessary, GAVI Alliance members such as WHO, UNICEF, and the World Bank will facilitate access to the required data for the selected contractor.

   The desk review will be composed of a descriptive analysis and will aim to generate the following information:
   - Breakdown in ISS funding as reported in progress reports
   - Utilisation rates of ISS funds
   - Trends and patterns in coverage figures (as reported in both the JRF and by the WHO-UNICEF coverage estimates) - including DTP3, MCV, dropout rates, etc.
   - Trends in sources of immunization programme funding (according to FSP/progress reports)
   - Patterns of resource implementation and use (according to progress reports), including looking at who controls the funds, at what levels the funds are used, etc, and ISS fund usage as percentage of fixed and recurrent costs.
   - Repeat of the general descriptive analyses produced in the Annex tables to Study A.

   In addition to the largely descriptive analyses described above, it is expected that the investigators will use a variety of multivariate data analysis techniques (e.g. principal components, k-means clustering, classification and regression trees, multivariate regression, and others as appropriate), to explore the trends and patterns in immunization performance and financing with a goal towards creating classifications of countries which have received ISS funding. The work done by the World Bank on immunization benchmarking should be used as a guide towards the types of outputs that might be expected from this analysis. Key factors to examine in developing a classification of countries include immunization coverage, health expenditures and ISS support received, but other indicators may help define natural groupings of countries that seem to have had similar experiences.
   Expected outcomes from this will be
   a. Further descriptive analyses of trends in key indicators among recipients of ISS support, broken down by achievement levels

b. Classification or benchmarking of countries into similar groups of performance. This should yield somewhere between 4 and 9 country groupings.
c. Recommendations on what data elements appear to be missing from such an analysis, and how such data might be obtained.
d. An assessment of the relative quality of different indicators used in the analysis.

2) Country Case studies including but not limited to those countries visited in the first evaluation (Kenya, Cambodia, Mali, Mozambique, Tanzania and Madagascar) to determine whether there have been any changes (positive/negative) given the longer time frame for using ISS funds. The selection of countries to be visited will have also to take into account a balance between the different regions, performances. These country case studies will also be used to complement the desk review

3) Telephone interview for further investigation of the use of ISS funds at the country level and to better understand the determinants of coverage. The contractor will interview national officials as well as major stakeholders such as WHO and UNICEF country representatives.

Deliverables:

The report of the evaluation will include the findings in order to share the lessons learned from this innovative approach and make recommendations for the next steps with ISS. The prime audience for this report is the GAVI Board and the GAVI Alliance constituencies at large.

Because of the broad diversity in country situations and since the number of actual country reviews will be limited; it will be difficult to generalize findings across all countries. Therefore, the results for this part of the study will be presented as country case studies.

However, the desk review will cover the total sample of all 53 countries that have been approved for ISS funding, and hence findings should be generalizable.

Skills required:

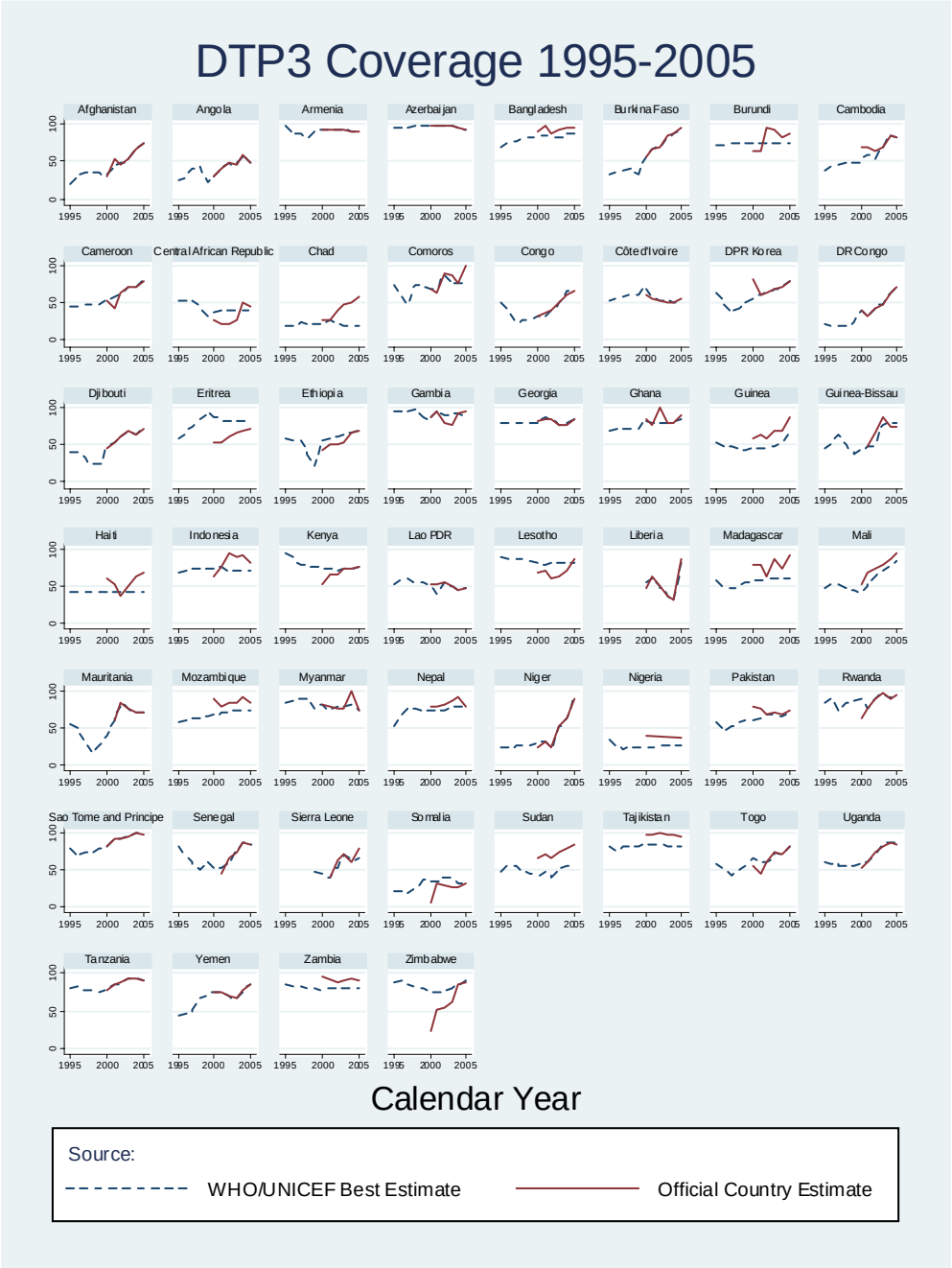
The investigators are expected to have the following skills and experience:

- strong experience and skills in
  - evaluation methodology
  - statistical analysis
  - epidemiology
  - financial analysis
- experience of working in developing countries
- knowledge of performance based schemes
- Expertise in immunization programme implementation and health systems development.

Proposed timeline

- September- November: Study conducted
- November: Preliminary results presented to the board

ANNEX C: WHO/UNICEF ESTIMATES AND OFFICIAL COUNTRY ESTIMATES OF DTP3 COVERAGE RATES



ANNEX D: KEY INFORMANTS IN IN-DEPTH STUDY COUNTRIES

Cambodia

Prof. Sann Chan Soeung, NMCH Center Deputy Director ,NIP Manager, MoH
Dr Svay Sarath, NIP Deputy Director
Mr. Chum Aun, Assistant Project Officer, EPI, UNICEF
Ms. Maryam Bigdeli, Health Care Financing, WHO Cambodia
Dr. Veng Ky, HSSP Secretariat
Mr. Lay Huton, Director of Finance Department, Ministry of Health
Dr. Youk Sambath, Deputy Director General for Administration and Finances, Ministry of Health
Mr. Srey Vuth, Chief of Financial Controller, Ministry of Economic & Finance
Professor Eng Huot, Secretary of State for Health, Director of the HSSP Secretariat
Mr. John Grundy, HSS consultant
Dr Lo Veasna Kiry, Director Department of Planning and Health Information, MoH
Ms. Thazin Oo, Head, Child Survival Programme UNICEF
Dr. Kohei Toda, WHO/EPI Technical Advisor
Mr. Benjamin D. Lane, WHO, Planning Officer
Dr. Hen Sokun Charya, Family Health Team Leader, USAID
Dr. Sek Sopheanarith, Development Assistance Specialist, USAID
Ms Sato Shoho, Project Formulation Advisor, Health Sector, JICA
Ms. Kate Crawford, Director, Office of Public Health, USAID Cambodia
Mr. Jonathan Ross, Deputy Director, Office of Public Health, USAID Cambodia
Dr. Hen Sokun Charya, Family Health Team Leader, Office of Public Health, USAID Cambodia
Dr. Sek Sopheanarith, Development Assistance Specialist, Child Health & Nutrition, USAID Cambodia
Dr. Oum Thom, Kandal Provincial Health Department
Top Ngorn Ly, Prey Svey Health Center
Staff at Koh Thom Operational District
Staff at Koh Thom Ko Health Center
Toch Roeun, EPI Manager, Kampot Provincial Health Department
Staff at Sam Rong Leu Health Center
Staff at Angkor Chey Operational District

Democratic Republic of Congo

Dr Victor Makwenge, Ministre de la Santé
Dr Koumba, Intérimaire du Sécrétaire Général de la Santé
Dr M'BUYA, Directeur du PEV (until May 2007)
Dr Alela Bonanche, EPI Director (acting)
Mr Bwnamdogo Bonaventure, EPI technical staff
Dr Michel Nyembwe, EPI technical staff
Mr Wooto Ferdinand, EPI Administrative and Finance manager (acting)
Mr Tchelu Laurent, Directeur des Services Généraux et des Ressources Humaines
Mr François Mulumba, Gestionnaire du PEV
Dr Jean Baptiste Rungu, Représentant de l'OMS
Dr Blaise Bamouni, Team Leader OMS

Dr Herve Peries, Représentant de l'UNICEF
Dr John Egbe Agbor, UNICEF, EPI officer
Mr Sumaili Bonny, Deputy Immunization Officer, UNICEF
Dr Valenting Mutombo, Rotary-Belge
Mr Raymond Ndudi, Chef de division chargé des synthèses du budget au Ministère du Budget
Dr Yves Mukelenge, Médecin Coordonnateur Provincial PEV
Dr Charles Mayakassi, Médecin Inspecteur Provincial
Dr Fatouma, Médecin Chef de zone de Police
Dr NDONA Jacqueline, Médecin Chef zone de Messina I
Dr Jack Kongolo, Médecin Chef d'Antenne Kinshasa Est
Dr Makongote, Médecin Chef d'Antenne Kinshasa Ouest
Dr Mputu, Médecin Chef d'Antenne Kinshasa Centre
Dr Jacques WANGATA, Directeur, Directeur Coordonnateur du projet PARSS (Banque Mondiale)
Dr Kalambay, Directeur des Etudes et de la Planification du Ministère de la Santé

Guinea

Dr Momo Camara, SG, MoH
Dr Abdoul Karim Diallo, WHO
Ms Bintou Nabe, Ministry Social Affairs
Mr Bah Oury, Minister of Education
Dr Ahmed Tidiane Diallo, UNICEF, Administrator for health projects
Dr Camille Tafsir Soumah, National Coordinator
Dr Djénou Somparé Somparé, EPI Section Head
Representatives from Civil Society Organizations in Guinea
Dr Boubacar Sall, Service Statistiques Études et Information (SSEI), MoH, (Information Surveys and Statistic Service)
Dr Boubacar DIALLO, Head of surveillance of vaccine-preventable diseases
Mr Lamine BARRY, Charge des Statistiques
Dr Hadiatou BALDE, Coordinatrice Nationale Adjointe
Dr Mariama HANN, Head of EPI Communications
Dr Djénou Somparé, EPI Section Head
Mr Marcel Leno, Ministry of Cooperation
Dr Ahmed Tidiane Diallo, UNICEF, Administrator for health projects
Mr Alpha Oumar DIALLO, EPI budget officer
Dr Adama DIA, Chef Section Épidémiologie
Dr Boubacar DIALLO, ,Superviseur National
Dr Samah YOMBOUNO, Superviseur National
Dr Mariame HANN, Superviseur National
Dr Cece Sekou KOUROUMA, Superviseur National
Dr Alpha Souleymane BALDE, Superviseur National
Mr Etieni1e Sewa LELANO, Représentant Décentralisation
Mr Lamine BARRY, Charge des Statistiques
Mr Friki CAMARA, Charge de la gestion du Mat
Mr Yosse KOUROUMA, Charge de la gestion des Outils
Mr Mohamed MAGASSOUBA, Charge de la gestion des Vaccins
Mr David CAMARA, Technicien de la Radio H.F
Mr Amadou CAMARA, Assistant Comptable
Dr Mumadon Asse, Head of Health Section, WHO/Guinea
Dr Papa Malick Sylla , Epidemiologist
Dr Diallo Abdoul Karim, NPO Tuberculosis/HIV
Dr Moussin Koné, Consultant EPI/WHO

Mr Amsoumane Condé, National Director, Management of national debts and investments, MoEF
Mr Ben Moussa Condé, Divison Head, Division Administrative et Financière (Administrative and Financial Division), MoEF
Mr Elhadj Mamadou Aliou Diallo, Head of health section, MoEF
Mr Yagouba Barry, MoEf
Dr Moussa Kémok Diakité, President Rotary Club Guinea and President National Polio Commission
Dr Boubacar Sall, Service Statistiques Études et Information (SSEI), MoH, (Information Surveys and Statistic Service)
Dr Marcel Leno, Head of Division of Management and Technical Assistance, National Management of Partnerships and Aid Coordination, Ministry of Cooperation
Dr Hadja Madina Rachid, Director of the urban Health District (Commune de la Santé de Aixinn)
Director of Macire Health Center and Her team
Dr Mory Togba, Public Health MD, Director of the Forecaraih Health District and his team
Head of Maferinyah Health Center, and his team

Lao PDR

Dr. Somchit Akkhavong, Deputy Director, Department of Hygiene and Prevention, Ministry of Health
Dr. Anonh Xeuatvongsa, Program Manager, National Immunization Program
Dr. Kongxay Phounphenghack, Deputy Program Manager, NIP
Mr. Pankham, Financial and accounting officer, NIP
Mr. Sisuweth, Data manager, NIP
Dr. Bounfrey Phoummalaysith, Deputy Director of Cabinet, MoH
Dr. Somthana Douangmala, (former EPI manager), Secretariat for National Commission of Maternal & Child Health
Dr. Khamphet, Director of Planning and Budget, MoH
Dr. Abou, WHO
Dr. Somphavanh, WHO
Dr. Aboudou Karimou Andele, Health & Nutrition Section Head, UNICEF
Dr. Ingrid Hilman, EPI Project Officer, UNICEF
Dr. Dong-il Ahn, WHO Country Representative
Ms. Bounthay Leuahgrilay, Deputy Director of the Budgeting Department of the Ministry of Finance
Dr. Chanphomma Vonysampham, Deputy Director General, Department of Curative Medicine, MoH
Dr. Kaison Chounramany, Director Maternal Child Health Center, MoH
H.E. Dr Ponmek Dalalay, Minister of Public Health
Mr. Takei Koichi, Deputy Resident Representative, JICA
Ms. Ritsuko Horibe, Project Formulation Officer, JICA
Mr. Khornma Choumany, Khammouane Provincial EPI Manager
HC head, EPI manager & nurse, Niang Niay HC, Seybongfae (Xebangfay) District
Seybongfae District Health Administrator
Seybongfae District EPI manager
HC team: 2 nurse associates & 1 village volunteer, Kamphetay HC, Seybongfae District
District head, EPI manager & Statistician, Boualpha District
Sobpeng “junior government nurse” & volunteer, Sobpeng HC

Tanzania

Ms. Mary Kitambi, EPI Program Manager, Ministry of Health and Social Welfare
Ms. Jean Bomani, EPI Administrator/Budget Officer, Ministry of Health and Social Welfare
Mr. David Manyanga, EPI Surveillance Officer, Ministry of Health and Social Welfare
Mr. Delphinus Mujuni, EPI ICT Officer, Ministry of Health and Social Welfare
Dr. Donan Mbando, Director of Preventive Services, Ministry of Health and Social Welfare
Mr. Maximilian Mapunda, Directorate of Policy and Planning, Ministry of Health and Social Welfare
Mr. Kibadja, Desk Officer for Health, Ministry of Finance
Mr. Hisahiro Ishijima, Health Cooperation Planning Advisor to MOHSW Chief Medical Officer, JICA
Ms. Julie McLaughlin, Lead Health Specialist – Africa Region, World Bank
Ms. Jacqueline Mahon, Regional Health and Poverty Advisor, Swiss Agency for Development and Cooperation
Ms. Cornelia Atsyor, Immunization/Polio Advisor, WHO
Mr. Rwabuyongo, Accountant, WHO
Ms. Sakina Othman, Program Officer/EPI, UNICEF
Mr. Samson Agbo, Head of Health Unit, UNICEF
Ms. Victoria Ludovick, Acting DMO, Kinondoni District
Mr. Lupenza, District Cold Chain Coordinator, Kinondoni District
Dr. Esther Manitumba, Medical Officer in Charge (Magomeni Health Center), Kinondoni District
Dr. Paulina Mukiti, RMO, Dodoma Region
Mr. Edward Ganja, Regional Cold Chain Officer, Dodoma Region
Dr. Ibrahim Katunda, Acting DMO, Mpwapwa District
Fulgence Temu, District Cold Chain Officer/EPI Focal Point, Mpwapwa District
Gabriel Simpoli – SACO, S. Majele – PHN-B, and I.J.Wabu - HO (Mbori Dispensary), Mpwapwa District
Mr. Puse Mbramba – CO, Hadidja Masomo – Health Assistant, Lita Mtanda-Medical, Mpwapwa District Attendant (Chunyu Dispensary), Mpwapwa District

Zambia

Dr. Penelope Kalesha, Child Health Specialist
Mrs. Martha Malenga, Logistics Officer
Mrs. Magdaleine Siame, IMCI Focal Point
Henry Kansembe, Principal Economist, MOH
Vincent Shaw, Health Information Unit, Health Information Systems Programme (HSIP), Christopher Simoonga, Deputy Director, Monitoring and Evaluation (HSIP)
Mr. Vincent Luhana, MOH Finance
Mr. Maswenyeho, MOH Finance
Dr. Ben Chirwa, Director General National HIV/AIDS/STI/TB, formerly Director General of CBOH
Dr. Katepa Bwalya, Pediatrics ARV Programme, formerly CBOH Child Health Specialist responsible for IMCI and immunization
Ms. Lotta R. Sylwander, UNICEF Country Representative
Dr. Tesfaye Shiferaw, UNICEF Chief, Health and Nutrition Section
Dr. Flint Zulu, UNICEF EPI Officer, Health
Dr. Stella Anyangwe, WHO Representative,
Dr. Helen Mutambo, WHO National Professional Officer for Routine Immunization
Mr. Belem Matapo, WHO National Surveillance Officer
Mr. Abraham Mwanamwenge, WHO EPI Logistics Advisor
Taro Kikuchi, JICA Assistant Resident Representative
Festus Libinga, JICA Programme Officer
Dr. Mark Maire, USAID/Lusaka, Sr. Technical Advisor

Mary Lee Kaoma, HSSP Community IMCI/EPI Specialist, managed by Abt Associates
Mr. Dev Babbar, Chairman, Rotary Representative on the MOH ICC
Abdi D. Mohamed, MD, MPH, Country Coordinator,
Dr. Simon Mphuka, MD, MPH, Executive Director CHAZ
Dr. Priscilla Chisha, DHMT since 2002, Chibombo District Health Management Office
Mrs. Angelina Malambo, MCH Coordinator, Registered Midwife, Chibombo District Health Management Office
Mr. Moona Shankanga, Clinical Officer, Manager of Planning and Development, Chibombo District Health Management Office
Mr. Biyala Chileshe, Environmental Health Officer, Chikobo Rural Health Center, Chibombo District
Mrs. Shankanga, nurse, Health Center In-charge, Chikobo Rural Health Center, Chibombo District
Dr. Nanasiku Sujumbiwa, Director DHMT, Mazabuka District Health Management Office
Mrs. Hanguwa, MCH Coordinator, Mazabuka District Health Management Office
George Chibwana, Environmental Health Officer, Magoye Rural Health Center, Mazabuka District
Mrs. Maureen Hamuyuni, Enrolled nurse, Magoye Rural Health Center, Mazabuka District
Mrs. Mtobolo, midwife, Kaonga Urban Health Center, Mazabuka District

ANNEX E: FUNCTIONS OF ICCS AND TECHNICAL TEAMS IN IN-DEPTH STUDY COUNTRIES

	Cambodia	Lao PDR	Tanzania	Zambia	DRC	Guinea
Division of respon-sibilities	ICC responsible for political role, TWG provided all other functions	ICC responsible for political role, TWG provided some of the other functions	ICC has full responsibilities; no formal TWG but EPI works closely with WHO and UNICEF on planning and management	ICC responsible for child health; active technical committee and subcommittees for service delivery, social mobilization, and logistics	ICC with technical, financial, social mobilization and logistics sub-committees	ICC plus sub-committees - technical team, logistics, social mobilization, reports, and "reception"
Political profile	General interest in the ICC has waned over time, fewer and fewer high level officials are involved	Senior officials are involved, but limited results in terms of real funding commitments	ICC less active over time, but government commitment to immunization was strong from the beginning of GAVI	ICC is very active with senior officials of MOH and donors participating regularly. ICC approves annual plans and budgets	ICC approves annual plan and budget and members sign annual MOU, but high-level MOH involvement has declined	Minister of Health and WHO Rep have become less involved over time; ICC did facilitate commitments from donors to support RED strategy
Strategic leadership	TWG very effective in this role with good cooperation among NIP partners	TWG was not very strong in this area, nor was there another cohesive team providing this function	Informal team of EPI, UNICEF, and WHO is very effective for technical and strategic planning	Sub-group designs strategies and ICC closely reviews details of proposals and plans	Technical subcommittee drafts national plan and budget; also meets monthly to review performance and evaluate strategy	Active technical team, but NIP partners felt the adhoc structure of the subcommittees hampered effective planning
Monitoring ISS funds	Reconciliation of expenditures performed by NIP accountant, with no identified problems	TWG closely reviewed requests for funds and reconciliation of expenses	NIP and MOH auditing dept reconciles district expenditures, with final reporting back to WHO (as the custodian of ISS in Tanzania)	Use of funds reconciled through Finance Department of MOH; ICC reviews and monitors expenditure reports	Prior to 2004, Minister of Health and WHO Representative were signatories on bank account. Since 2005, finances managed exclusively by NIP. Recent audit highlights problems with accounting and oversight	Financial subcommittee, led by WHO Representative, audits all expenses; finances are audited annually by an external auditor

ANNEX F: COUNTRIES RECEIVING REWARDS, LICUS AND NON-LICUS COUNTRIES

Country	Baseline DTP3 Coverage (from application)	Average DTP3 Coverage (1998-2000) from WHO-UNICEF Estimates	Ever Approved for Reward (Y/N)	Why No Reward (no add child, DQA)
Non-LICUS Countries				
Armenia	63%	89%	yes	
Azerbaijan	72%	98%	yes	
Bangladesh	67%	82%	yes	
Burkina Faso	42%	44%	yes	
Cameroon	48%	50%	yes	
Chad	32%	23%	yes	
Djibouti	53%	31%	no	no add child
Ethiopia	45%	38%	yes	
Gambia	74%	89%	yes	
Georgia	61%	80%	yes	
Ghana	73%	76%	yes	
Kenya	64%	76%	yes	
Korea DPR	63%	50%	no	no add child
Lesotho	56%	84%	no	DQA
Madagascar	57%	54%	yes	
Mali	45%	44%	yes	
Mauritania	61%	27%	no	DQA
Mozambique	73%	66%	no	DQA
Nepal	72%	74%	yes	
Niger	23%	27%	yes	
Pakistan	58%	60%	yes	
Rwanda	57%	87%	yes	
Sao Tome	79%	77%	no	no add child & DQA
Senegal	52%	54%	yes	
Tajikistan	65%	81%	yes	
Tanzania	74%	78%	yes	
Uganda	54%	55%	yes	
Yemen	73%	72%	yes	
Zambia	75%	80%	yes	

Country	Baseline DTP3 Coverage (from application)	Average DTP3 Coverage (1998-2000) from WHO-UNICEF Estimates	Ever Approved for Reward (Y/N)	Why No Reward (no add child, DQA)
LICUS Countries				
Afghanistan	31%	34%	yes	
Angola	50%	32%	no	pending DQA
Burundi	57%	74%	no	DQA
Cambodia	65%	49%	no	no add child
CAR	23%	39%	yes	
Comoros	67%	73%	no	no add child
Congo DRC	31%	29%	yes	
Congo Republic	50%	28%	yes	
Côte d'Ivoire	56%	65%	no	DQA
Eritrea	61%	88%	yes	
Guinea	57%	45%	yes	
Guinea Bissau	47%	43%	yes	
Haiti	59%	43%	no	No add child & DQA
Lao DPR	56%	55%	no	No add child & DQA
Liberia	23%	55%	yes	
Myanmar	70%	82%	yes	
Nigeria	38%	24%	yes	
Sierra Leone	39%	45%	yes	
Somalia	30%	31%	no	No add child & DQA
Sudan	64%	44%	yes	
Togo	43%	57%	yes	
Zimbabwe	78%	80%	no	No add child & DQA

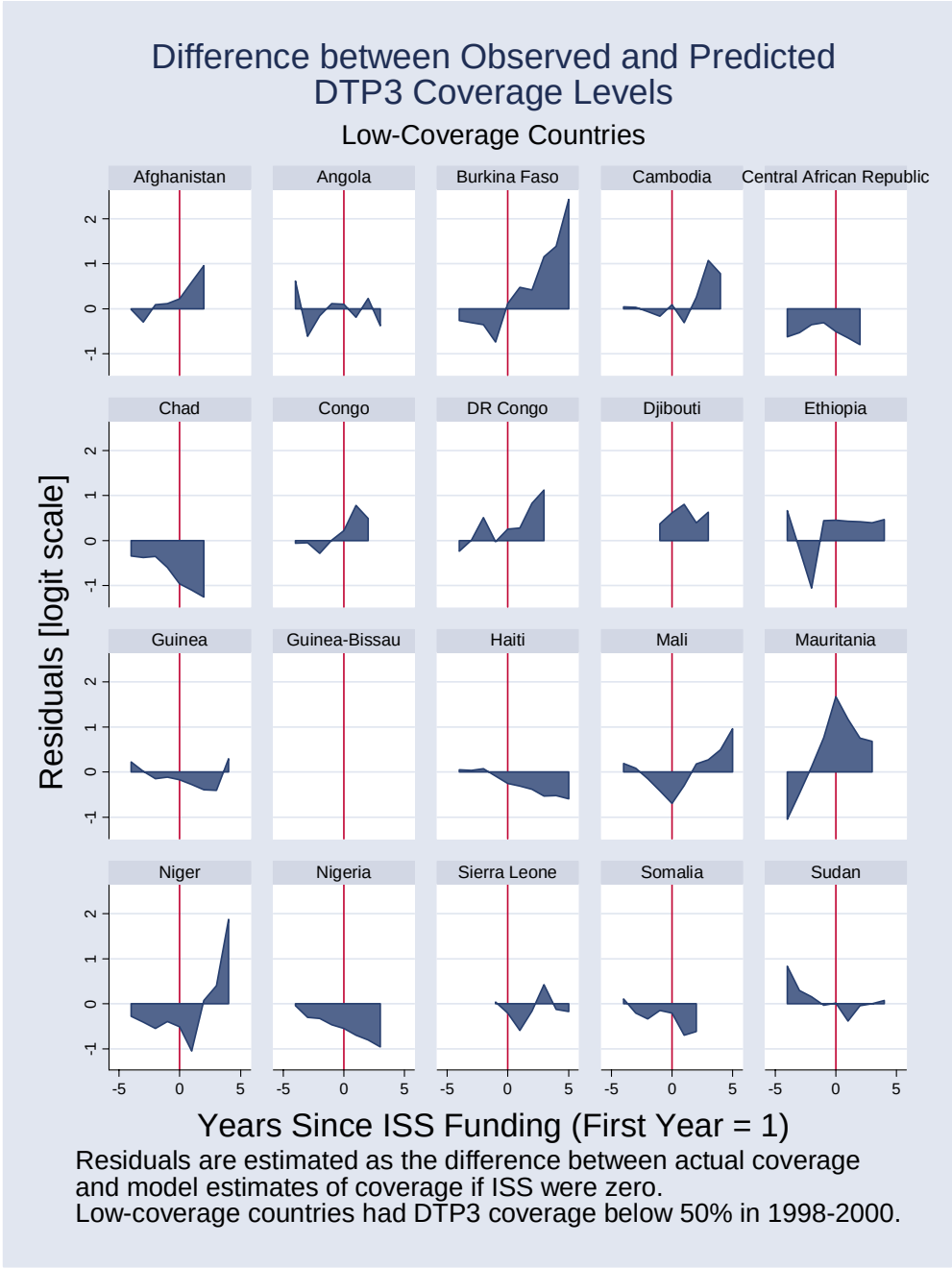
ANNEX G: INTEGRATION OF ISS WITHIN NIP AND HEALTH SYSTEM PLANNING

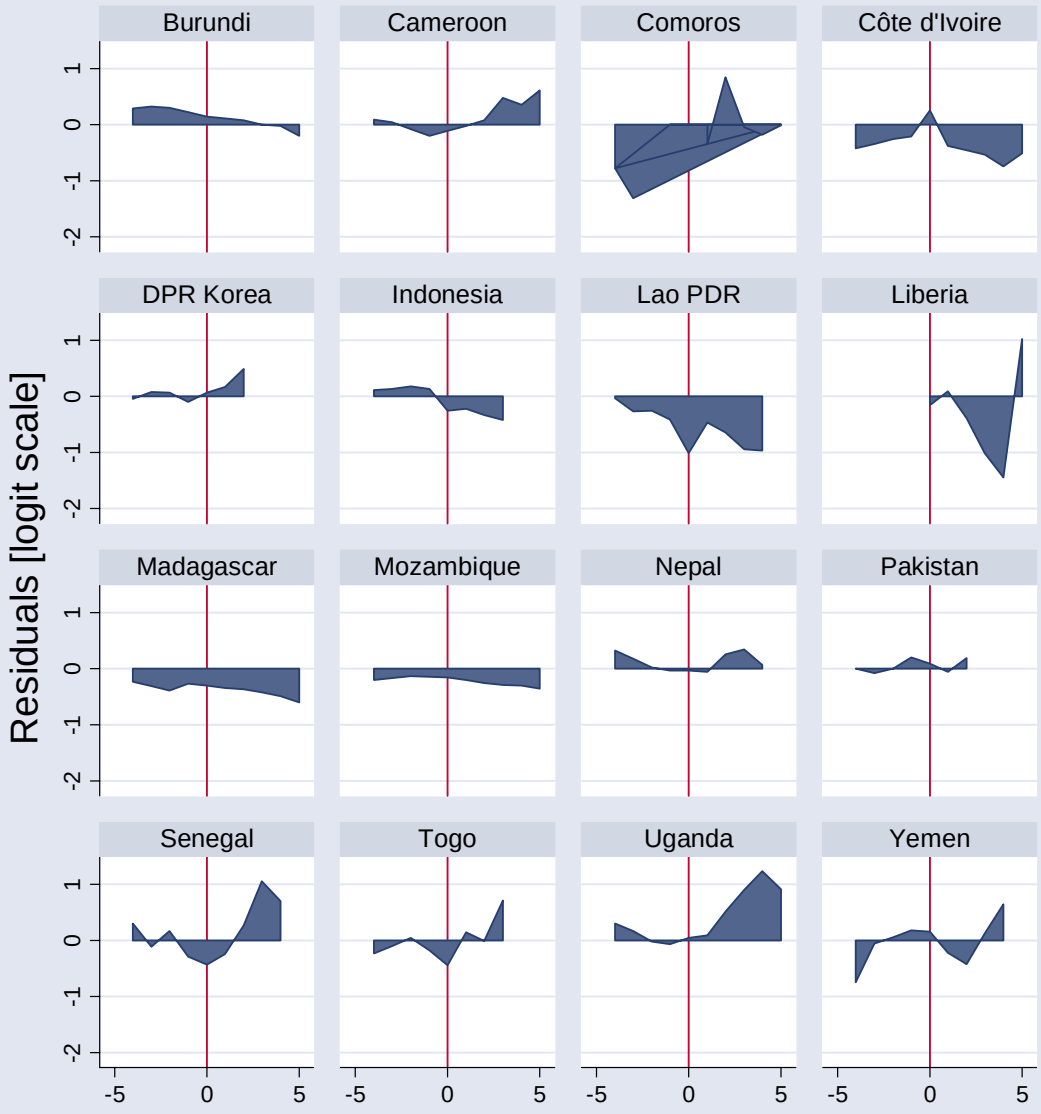
	Cambodia	Lao PDR	Tanzania	Zambia	DRC	Guinea
Integration of ISS within NIP at *national* level	ISS planning fully integrated into NIP planning, funding sources well coordinated	ISS planning fully integrated into NIP planning	ISS funding is "off-budget", but planning fully integrated into NIP planning	ISS planning fully integrated into NIP planning	ISS planning fully integrated into NIP planning	ISS planning fully integrated into NIP planning
Integration of NIP within overall health plan at *national* level	MOH incorporates NIP plan into overall plan, but limited integration of funding or activities	MOH incorporates NIP plan into overall plan, but limited integration of funding or activities	MOH planning at national level incorporates NIP activities	NIP is core program of and part of national Child Health plan; CH plan is part of annual MOH action plan and 3- yr. MTEF	NIP is a priority within the overall health system; NIP Director sits on MOH Board; NIP macroplan is part of annual health plan	EPI is a central pillar of PHC; planning for EPI is a core part of planning for MPA (Minimum Package of Activities)
Integration of ISS within NIP and overall health planning at *sub-national* level	Districts plan for NIP activities, but many activities receive no district budget allocation; NIP conducts donor mapping to ensure sufficient funding for service delivery for all districts	Districts do not include funding for any EPI activities; NIP coordinates funding with UNICEF, but limited coordination with other donors (WB or ABD)	Most immunization activities are included in district budgets; Plans for ISS funding integrated into district health plans	Decentralized health system: District budgets developed separately from NIP plan, but district plans include a mix of activities funded by ISS and district grants	NIP annual macroplan includes ISS; macroplan is used in provinces and zones to develop operational plans and budgets	Using EPI as the delivery platform, all activities are designed to include multiple interventions (such as Vit A and other child health services)
Coordination of NIP between central and sub-national levels	Coordination through annual EPI meeting, supervision visits, and donor mapping, but often sub-nat'l levels are only informed of activities planned	Coordination was limited, since no EPI activities are funded at district level; NIP informs districts, and disburses money for specific activities	NIP selected the districts to receive ISS funds, but then central and sub-nat'l levels worked together to develop workplan;	Coordination could be improved – ISS disbursements sometimes irregular, districts not informed about how much ISS funds they will	Planning is top-down, provincial coordinating units work with districts to develop operational plans; some district needs are unmet; central level	NIP works closely with sub-nat'l levels to develop plans that align national objectives with local priorities Central level procured

	Cambodia	Lao PDR	Tanzania	Zambia	DRC	Guinea
			central level procured equipment for districts	receive, and when[47;] central level procured equipment for districts	procured equipment for districts	equipment/ issued vouchers for districts
Coordination of overall health planning between central and sub-national levels	Limited coordination between bottom-up plans and central level planning; DHOs rely on district budgets, which are not reviewed or controlled by MOH	Limited coordination between bottom-up plans, district funding, and central level budget and plans	High level of donor coordination through SWAP mechanism; districts also use MTEF framework for planning	High level of coordination with use of basket funding, and MTEF framework	Vertical programs coordinate health planning with provincial and zonal health offices. Some integration of immunization and PHC planning occurs at operational level.	Bottom-up plans and central level budget are not well-linked, so district needs are sometimes unfunded

[47] Districts are informed about the amount and date of their ISS disbursement shortly before receiving it.

ANNEX H: DIFFERENCE BETWEEN OBSERVED AND MODEL ESTIMATES OF DTP3 COVERAGE RATE, RESIDUALS BY COUNTRY





Residuals are estimated as the difference between actual coverage and model estimates of coverage if ISS were zero.
Medium-coverage countries had DTP3 coverage below 50% in 1998-2000.


Difference between Observed and Predicted DTP3 Coverage Levels
High-Coverage Countries
Armenia
Azerbaijan
Bangladesh
Eritrea
Gambia
Georgia
Ghana
Kenya
Lesotho
Myanmar
Rwanda
Sao Tome and Principe
Tajikistan
Tanzania
Zambia
Zimbabwe
Residuals [logit scale]
-1
0
1
2
3
-5
0
5
Years Since ISS Funding (First Year = 1)
Residuals are estimated as the difference between actual coverage and model estimates of coverage if ISS were zero.
High-coverage countries had DTP3 coverage above 75% in 1998-2000.

ANNEX I: REGRESSION RESULTS WITH LOGISTIC TRANSFORMATION OF WHO/UNICEF ESTIMATES OF DTP3 COVERAGE AS DEPENDENT VARIABLE

Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable: country		Number of obs	= 504
Time variable: year		Number of groups	= 52
Panels: correlated (unbalanced)		Obs per group: min	= 6
Autocorrelation: common AR(1)		avg	= 9.692308
Sigma computed by casewise selection		max	= 10
Estimated covariances = 1378		R-squared	= 0.6444
Estimated autocorrelations = 1		Wald chi2(6)	= 1203.27
Estimated coefficients = 7		Prob > chi2	= 0.0000

Lcov	Coef.	Panel-corrected Std. Err.	z	P>|z|	[95% Conf.	Interval]
year	.0950591	.0109973	8.64	0.000	.0735048	.1166134
lbasexyear	-.041519	.0081234	-5.11	0.000	-.0574406	-.0255975
ps	.1970409	.046580	4.23	0.000	.1057455	.2883362
loggdp	-.0641829	.0418152	-1.53	0.125	-.1461392	.0177735
expend1	.1498228	.051135	2.93	0.003	.0496	.2500457
lbase3	.8147534	.0319274	25.52	0.000	.7521767	.87733
cons-	189.2538	21.87861	-8.65	0.000	-232.1351	-146.3725
rho	.4887864					

ANNEX J: REGRESSION RESULTS WITH VARIOUS ALTERNATIVE MODEL SPECIFICATIONS

Dependent Variable: logit(DTP3 Coverage)

All Countries	Model Specifications					
				Fixed Effects		
Variable	lag	trend	both	lag	trend	both
ISS Expenditures	0.278	0.176	0.150	0.322	0.195	0.166
	0.056	0.057	0.046	0.050	0.056	0.039
Coverage X Spending Interaction	-0.100	-0.038	-0.027	-0.126	-0.054	-0.041
	0.046	0.035	0.040	0.043	0.036	0.036
Year		0.093	0.052		0.094	0.059
		0.011	0.009		0.011	0.008
Coverage last year	0.641		0.573	0.586		0.490
	0.100		0.105	0.081		0.086
Coverage 1998-2000	0.294	0.826	0.342			
	0.096	0.034	0.095			
Political Stability	0.064	0.204	0.087	0.084	0.221	0.130
	0.026	0.049	0.026	0.054	0.068	0.057
Log(National Income per Capita)	-0.042	-0.079	-0.052	-0.004	-0.168	-0.160
	0.021	0.044	0.022	0.160	0.212	0.179
Coverage X Year Interaction		-0.037	-0.025		-0.035	-0.025
		0.009	0.006		0.008	0.006

The first line for each variable shows the parameter estimate. The second line shows the standard error of the estimate.

Dependent Variable: DTP3 Coverage (in percent)

All Countries	Model Specifications					
				Fixed Effects		
Variable	lag	trend	both	lag	trend	both
ISS Expenditures	10.744	6.684	4.444	12.700	7.806	5.188
	2.826	2.572	2.576	2.395	2.541	1.938
Coverage X Spending Interaction	-0.124	-0.074	-0.050	-0.144	-0.086	-0.056
	0.035	0.032	0.032	0.031	0.033	0.026
Year		3.962	2.212		3.919	2.470
		0.468	0.386		0.421	0.306
Coverage last year	0.733		0.647	0.671		0.547
	0.094		0.099	0.076		0.080
Coverage 1998-2000	0.213	80.962	47.396			
	0.090	11.618	9.104			
Political Stability	0.834	3.514	1.322	1.727	4.696	2.826
	0.431	0.837	0.428	1.052	1.364	1.087
Log(National Income per Capita)	-0.659	-1.115	-0.846	-0.091	-4.390	-3.878
	0.495	0.904	0.517	2.801	3.810	3.208
Coverage X Year Interaction		-0.040	-0.024		-0.038	-0.025
		0.006	0.005		0.005	0.004

The first line for each variable shows the parameter estimate. The second line shows the standard error of the estimate.

Dependent Variable: ln(DTP3 Coverage in percent)

All Countries	Model Specifications					
				Fixed Effects		
Variable	lag	trend	both	lag	trend	both
ISS Expenditures	0.707	0.417	0.312	0.808	0.451	0.317
	0.175	0.154	0.157	0.177	0.152	0.134
Coverage X Spending Interaction	-0.160	-0.094	-0.071	-0.180	-0.100	-0.070
	0.040	0.036	0.036	0.041	0.035	0.031
Year		0.217	0.127		0.217	0.146
		0.022	0.028		0.019	0.022
Coverage last year	0.667		0.579	0.596		0.464
	0.088		0.093	0.070		0.073
Coverage 1998-2000	0.272	94.614	55.690			
	0.087	10.556	12.702			
Political Stability	0.015	0.064	0.025	0.032	0.091	0.056
	0.007	0.014	0.007	0.019	0.024	0.019
Log(National Income per Capita)	-0.013	-0.014	-0.016	-0.006	-0.091	-0.084
	0.010	0.019	0.010	0.052	0.071	0.058
Coverage X Year Interaction		-0.047	-0.028		-0.047	-0.032
		0.005	0.006		0.005	0.005

The first line for each variable shows the parameter estimate. The second line shows the standard error of the estimate.

Dependent Variable: logit(DTP3 Coverage)

Countries with DPT3 coverage above 65% in 1998-2000	Model Specifications					
				Fixed Effects		
Variable	lag	trend	both	lag	trend	both
ISS Expenditures	0.508	0.374	0.429	0.493	0.315	0.388
	0.136	0.188	0.154	0.131	0.168	0.142
Coverage X Spending Interaction	-0.203	-0.127	-0.161	-0.213	-0.115	-0.155
	0.067	0.088	0.077	0.064	0.069	0.066
Year		0.084	0.042		0.087	0.049
		0.027	0.021		0.026	0.021
Coverage last year	0.478		0.452	0.404		0.382
	0.093		0.096	0.099		0.102
Coverage 1998-2000	0.469	0.860	0.488			
	0.095	0.061	0.098			
Political Stability	0.042	0.134	0.051	-0.079	-0.008	-0.072
	0.052	0.069	0.054	0.088	0.110	0.098
Log(National Income per Capita)	-0.025	-0.086	-0.032	0.117	0.107	0.141
	0.058	0.077	0.061	0.212	0.256	0.251
Coverage X Year Interaction		-0.036	-0.021		-0.041	-0.027
		0.019	0.016		0.017	0.015

The first line for each variable shows the parameter estimate. The second line shows the standard error of the estimate.

Dependent Variable: DTP3 Coverage (in percent)

Countries with DPT3 coverage above 65% in 1998-2000	Model Specifications					
				Fixed Effects		
Variable	lag	trend	both	lag	trend	both
ISS Expenditures	16.456	11.160	11.410	18.637	10.864	11.879
	6.635	7.081	6.752	6.660	5.524	6.023
Coverage X Spending Interaction	-0.187	-0.124	-0.130	-0.217	-0.124	-0.137
	0.077	0.082	0.080	0.079	0.064	0.071
Year		5.447	2.531		5.494	2.694
		0.944	0.883		0.966	0.888
Coverage last year	0.572		0.521	0.550		0.492
	0.077		0.084	0.086		0.095
Coverage 1998-2000	0.416	121.561	57.013			
	0.081	23.013	21.347			
Political Stability	0.038	0.954	0.241	-1.356	-0.570	-0.944
	0.545	0.724	0.546	0.904	1.255	1.002
Log(National Income per Capita)	0.063	-0.782	-0.160	2.051	0.511	1.030
	0.596	0.804	0.632	2.035	3.225	2.719
Coverage X Year Interaction		-0.060	-0.028		-0.062	-0.031
		0.012	0.011		0.012	0.011

The first line for each variable shows the parameter estimate. The second line shows the standard error of the estimate.

Dependent Variable: ln(DTP3 Coverage in percent)

Countries with DPT3 coverage above 65% in 1998-2000	Model Specifications					
				Fixed Effects		
Variable	lag	trend	both	lag	trend	both
ISS Expenditures	0.872	1.002	0.885	1.056	0.577	0.649
	0.371	0.452	0.368	0.382	0.291	0.347
Coverage X Spending Interaction	-0.195	-0.226	-0.200	-0.238	-0.129	-0.146
	0.083	0.102	0.083	0.086	0.065	0.078
Year		0.000	0.000		0.346	0.153
		0.000	0.000		0.059	0.051
Coverage last year	0.594		0.556	0.583		0.526
	0.071		0.077	0.079		0.089
Coverage 1998-2000	0.401	-3.099	-1.137			
	0.077	0.662	0.605			
Political Stability	-0.002	0.009	0.001	-0.020	-0.012	-0.015
	0.007	0.010	0.007	0.011	0.016	0.012
Log(National Income per Capita)	0.001	-0.011	-0.002	0.025	0.006	0.013
	0.008	0.011	0.008	0.025	0.040	0.033
Coverage X Year Interaction		0.002	0.001		-0.077	-0.034
		0.000	0.000		0.013	0.012

The first line for each variable shows the parameter estimate. The second line shows the standard error of the estimate.

ANNEX K: COUNTRY REWARD STATUS, SORTED BY DTP3 COVERAGE RATE

Reward Status for all Eligible Countries

Country	LICUS (Y/N)	Baseline DTP3 Coverage (from application)	Average DTP3 Coverage (1998-2000) from WHO-UNICEF Estimates	Ever Approved for Reward (Y/N)	Why No Reward (no add child, DQA)
Chad	N	32%	23%	yes	
Nigeria	Y	38%	24%	yes	
Niger	N	23%	27%	yes	
Mauritania	N	61%	27%	no	DQA
Congo Republic	Y	50%	28%	yes	
Congo DRC	Y	31%	29%	yes	
Djibouti	N	53%	31%	no	no add child
Somalia	Y	30%	31%	no	No add child & DQA
Angola	Y	50%	32%	no	pending DQA
Afghanistan	Y	31%	34%	yes	
Ethiopia	N	45%	38%	yes	
CAR	Y	23%	39%	yes	
Haiti	Y	59%	43%	no	No add child & DQA
Guinea Bissau	Y	47%	43%	yes	
Sudan	Y	64%	44%	yes	
Burkina Faso	N	42%	44%	yes	
Mali	N	45%	44%	yes	
Guinea	Y	57%	45%	yes	
Sierra Leone	Y	39%	45%	yes	
Cambodia	Y	65%	49%	no	no add child
Cameroon	N	48%	50%	yes	
Korea DPR	N	63%	50%	no	no add child
Madagascar	N	57%	54%	yes	
Senegal	N	52%	54%	yes	
Lao DPR	Y	56%	55%	no	No add child & DQA
Liberia	Y	23%	55%	yes	
Uganda	N	54%	55%	yes	
Togo	Y	43%	57%	yes	
Pakistan	N	58%	60%	yes	

Reward Status for all Eligible Countries					
Country	**LICUS (Y/N)**	**Baseline DTP3 Coverage (from application)**	**Average DTP3 Coverage (1998-2000) from WHO-UNICEF Estimates**	**Ever Approved for Reward (Y/N)**	**Why No Reward (no add child, DQA)**
Côte d'Ivoire	Y	56%	65%	no	DQA
Mozambique	N	73%	66%	no	DQA
Yemen	N	73%	72%	yes	
Comoros	Y	67%	73%	no	no add child
Nepal	N	72%	74%	yes	
Burundi	Y	57%	74%	no	DQA
Ghana	N	73%	76%	yes	
Kenya	N	64%	76%	yes	
Sao Tome	N	79%	77%	no	no add child & DQA
Tanzania	N	74%	78%	yes	
Zambia	N	75%	80%	yes	
Zimbabwe	Y	78%	80%	no	No add child & DQA
Georgia	N	61%	80%	yes	
Tajikistan	N	65%	81%	yes	
Bangladesh	N	67%	82%	yes	
Myanmar	Y	70%	82%	yes	
Lesotho	N	56%	84%	no	DQA
Rwanda	N	57%	87%	yes	
Eritrea	Y	61%	88%	yes	
Armenia	N	63%	89%	yes	
Gambia	N	74%	89%	yes	
Azerbaijan	N	72%	98%	yes	

ANNEX L: REFERENCES

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