Global Alliance for Vaccines and Immunisation, Health System Support, Ethiopia, 2006-2012 Final Evaluation

GAVI Alliance

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Executive Summary

Introduction

In 2005, the GAVI Alliance created a funding window to assist developing countries to strengthen weak health systems in a strategic effort to advance its immunization agenda. Subsequently, Ethiopia was awarded $76.5 million for Health Systems Strengthening to be disbursed between 2006 and 2010. In May 2014, the GAVI Secretariat commissioned a final evaluation of the HSS application design, implementation activities and achievement of the plans and objectives set out in the country application.

Context

Ethiopia is a country of diverse topography with a population of 91.729 million (83% of the population resides in rural areas). In an effort to improve the range of basic health services and extend universal primary health coverage to rural households, the government of Ethiopia established the Health Sector Development Plan III (HSDP III) in 2005 along with the Health Extension Plan (HEP).

The core HSS strategy was aligned by design with HSDP III objectives and addressed three thematic areas;

1. Health workforce mobilization, distribution and motivation;
2. Supply, distribution and maintenance systems for Primary Health Care (PHC drugs), equipment and infrastructure;
3. Organization and management of health services at district level and below.

Study objectives

This evaluation is designed to assess the contribution of GAVI Health System Support (HSS) in improving the health system in Ethiopia over the 2007-2012 financing period. In addition, the evaluation will attempt to complement and build upon findings from previous evaluations of GAVI HSS in Ethiopia. The findings of this assessment will be used to guide the implementation of future similar grants in Ethiopia.

Methods and materials

A cross-sectional study design was employed to collect the final evaluation data using qualitative and quantitative techniques. The quantitative assessment included a facility based

study conducted across selected health facilities (health centres and health posts) in 5 regions of Ethiopia (SNNP, Amhara, Oromiya, Tigray, and Benshangul-Gumuz). In addition, a retrospective review was conducted obtaining information from immunization services records, documents, cards and/or registration books of children immunized in selected health facilities for the previous year. The qualitative assessment included interviews with partners, government bodies at various levels of administration across the country and other key stakeholders. Data were collected using standardized checklists, desk review guides and health facility assessment tools. Data collectors were trained on the principles and processes of data collection. Data quality assurance was an integral part of the evaluation process and the data were checked for completeness and accuracy.

The following major programme areas were assessed (i) contribution of the GAVI health system strengthening (HSS) in Ethiopia over the 2007-2012 period (ii) GAVI-HSS programme design and implementation in response to the specific evaluation questions identified in the TOR, furthermore, (iii) implementation of past recommendations whilst exploring areas not covered in the past evaluations (iv) grant utilization.

Findings

The findings of this assessment are described broadly under the key programmatic areas of design, implementation effectiveness, monitoring and reporting, efficiency, results, sustainability and equity.

Design of the proposal

The GAVI HSS country proposal was designed within the context of a strong institutional framework that closely aligned HSS objectives with country priorities. Although a participatory process was employed among key stakeholders, the lack of involvement of community representatives and district level officials was a missed opportunity to gain local perspectives. In our view, the absence of a situational analysis and lack of clear guidelines from GAVI for proposal formulation, prevented valuable insights from GAVI expertise and experience in other countries to guide system level interventions.

Implementation

The evaluation of the HSS implementation process included an assessment of the proposal's financial arrangements and the program achievements are measured against planned activities over the period of 2006/7 to 2012.

The proposal utilised the same budgeting assumptions and scenarios of the HSDP III, aligning with the budgeting and financial mechanisms of the country. The Millennium Development Goal Pooled Fund (MDG-PF), a Sector-Wide Approach (SWAp) like arrangement was set up to coordinate and channel external resources for HSS.

The investment of GAVI HSS funds across the three thematic areas specified in the proposal contributed to the establishment of a network of primary health care units providing a platform for the expansion of the Health Extension Package (HEP).

The achievements of GAVI HSS contributed to 107% of HSS construction targets but also led to shortfalls in targets achieved for workforce training. Consequently, capacity building of WorHO management teams, health centre staff and HEWs was negatively affected, potentially weakening the referral system, (18 pp XVIII) a key element of the HEP. Although the HEP deployed 30,950 HEWs in 2008/9, the uneven skill mix of the health workforce across regions (15 pp 41) is an issue that needs to be addressed with innovative strategies to retain trained high- and middle-level skilled workers in the rural areas.

GAVI HSS placed emphasis on providing targeted support for the Health Commodities Supply System (HCSS). The cold chain system was found to be inadequately managed and maintained, compromising immunisation coverage and effectiveness. The evaluation of the supply chain system was carried out with a focus on immunisation and identified issues with procurement at national level and planning and distribution at regional levels leading to stock-outs in health facilities.

Monitoring and reporting

The assessment team found that the quality of data monitoring at all levels provided challenges for tracking and linking activities to outputs. The GAVI HSS proposal lacked indicator definition, baseline data and information on the frequency of data collection and reporting. The Health Management Information System (HMIS) does not capture information from the private service providers which will need to be integrated into the national system in future. The absence of service quality and equity indicators was also noted at district level. Data quality remains a concern and is exemplified by the discordance between HMIS data and survey data noted in the results section of this summary.

Efficiency

Improved coordination among partners has helped to minimize the operational cost of the programmes through joint use of resources reducing duplication of efforts. Active participation of the local administrative authorities and community groups in the woredas has also been shown to increase the efficiency of the GAVI HSS program. On the other hand however, the failure to maintain and manage the cold chain system resulted in wastage, potency issues and inefficient use of human and material resources. Contextual factors reducing the efficiency of the program included inflationary pressures on building costs, low utilisation of services despite the expanded geographical reach of the HEP, high staff turnover and a lack of commitment from district and kebele level to support HEWs and HDAs in linking communities to health facilities.

Results

The under 5 mortality rate (U5MR) has declined by 28.5%from 123/1000 live births in 2006 to 88/1000 live births in 2011 with Ethiopia achieving the MDG4 target of reducing U5MR rate by two thirds between 1990 and 2015 (67/1000 live births in 2014).Maternal mortality remains high with little change from 673/100,000 live births in 2005 to 676/100,000 live births in 2011with low utilisation of maternal health services especially in the rural areas. Immunization coverage rates rose steadily from 2006 to 2008 but showed a declining trend from 2008 to 2012 onwards. The WHO/UNICEF JRF report estimates a decline in DPT 3 coverage from 69% in 2006 to 65% in 2012. Official Administrative reports however diverge from these estimates showing coverage for DPT 3 rising from 69% to 85% over the same period. The number of districts with over 80% DPT 3 coverage rose from 32% in 2007 to 54% in 2012 and those with over 95% measles coverage rose from 13% in 2008 to 15% in 2012. Drop-out rates are high nationally at 26.5% in 2012 (EPI Cluster survey 2012) further confirming low coverage estimates. As a result there have been increasing occurrences of vaccine preventable diseases and measles epidemics since 2009/10. (31)

Sustainability

GAVI HSS has contributed to the financial and programmatic sustainability of the achievements made during the grant period by facilitating country ownership of the immunization program, improving health sector development and building the capacity of stakeholders. Government expenditure on health as a percentage of the GDP has fallen from 4.2% in 2006 to 4.1% in 2011 and 3.8% in 2013 even though per capita spending on health in absolute terms has increased

from USD $28.9 in 2006 to USD $43.7 in 2012 and out-of-pocket expenditure remains high (33.76% in 2011).

Equity

Disparities exist in access, utilisation and health status across geographical areas and along the socio-economic gradient. The Developing Regions (DRS) lag behind the national coverage rates in basic vaccination coverage, DPT 3 and measles vaccination coverage and infant and under-five mortality rates. However, government plans are in place to allocate extra resources and address area-specific issues such as road infrastructure and skilled health worker shortages.

Conclusions

GAVI's initiative to further the immunization agenda in Ethiopia through health system strengthening has been catalytic in two fundamental ways. Firstly, it attracted funds from other donors towards a common pool that could be used flexibly and effectively. Secondly, it supported a country-led approach to respond to local needs.

The presence of an in-country representative from GAVI would have provided closer oversight of the program and could have led to better coordination between partners, donors and the FMoH. GAVI secretariat should have given more consideration to reprogramming decisions and the implications for health workforce skills and service delivery.

Despite measurable progress made toward achieving the stated objectives, not all targets outlined in the Ethiopia HSS proposal have been met.Although the geographical reach of the HEP has dramatically increased over the HSS period through infrastructure investment, there has been little improvement in the quality and span of services.

Substantial progress has been made in U5MR leading to the achievement of the MDG 4 target in 2013 (67/1000 live births). The impact of HSS funding on other services such as antenatal care, skilled birth attendance and HIV treatment may have contributed more to the U5MR than increased immunization coverage. This finding indicates that there is an opportunity to further decrease child morbidity and mortality through improved immunization strategies.

Utilization of services is a major indicator of how well health systems function in creating demand and providing quality services. We find that maternal and child health services are under-utilized especially in rural areas despite the increase in primary health coverage. We

conclude that a focus on demand creation to address low service utilization and improving quality of care for maternal health services should by extension improve child health.

Equity in health still remains a concern with disparities along geographical boundaries. A possible unintended consequence of the HSS has been to increase disparities in DPT 3 coverage along the socioeconomic gradient.

GAVI's added value has been its catalytic role in mobilizing external funds and country commitment to the overall improvement of the healthcare infrastructure.

Lessons for the future

This evaluation acknowledges the fundamental and innovative approach GAVI has taken in supporting country efforts to strengthen its health system. The important partnership between the Government of Ethiopia and GAVI has facilitated and enabled HSS improvement and it is to GAVI' credit that not only was the HSS grant awarded to Ethiopia under special circumstances, but also for allowing time for system change to take place with a second grant. The gaps delineated in this evaluation are highlighted to inform future initiatives and the decision to commission this evaluation signals a commitment to learn and improve future efforts

Key strengths and weaknesses of GAVI HSS

- The key strengths of the GAVI HSS program were: alignment with government systems in planning, budgeting and management; harmonisation of funding through the MDG-PF; flexibility of funding arrangements allowing reprogramming of funding and resources; targeted leveraging with other donors to jointly support programs; investment in the key areas of health system including, primary health care coverage and the commodity supply system.
- The key weaknesses of the GAVI HSS program were: absence of clear guidelines from GAVI for country proposal formulation; lack of involvement of district-level stakeholders; system-level impact of reprogramming decisions; no strategies to retain health workers resulting in high attrition rates; no strategies to effectively address previously identified cold chain issues; inappropriate calculations of target population numbers and resource allocation; poor management of service delivery especially in low coverage areas; lack of provision for inflationary pressures on inputs such as construction materials; delays in disbursement of funds from the FMoH to CSOs and regions and delays in liquidation of funds; supply chain weaknesses including

procurement, storage and distribution of supplies leading to stock-outs of new and traditional vaccines; constraints in data quality management, reporting, archiving and analysis; inadequate supportive supervision; low community demand for services; disparities in health status across regions increasing for some indicators.

.

Acronyms and abbreviations

APR	Annual Progress Report
BCG	Bacillus Calmette-Guérin
CJSC	Core Joint Steering Committee
CSO	Civil Society Organization
CCRDA	Consortium of Christian Relief and Development Associations
DRS	Developing Regions
EDHS	Ethiopian Demographic and Health Survey
EHNRI	Ethiopian Health and Nutrition Research Institute
EPS	Ethiopian Pediatrics Society
FMoH	Federal Ministry of Health
HCSS	Health Commodities Supply System
HDA	Health Development Army
HEWs	Health Extension Workers
HMIS	Health Management Information System
HP	Health Post
HSDP	Health Sector Development Program
ICC	Inter-agency Coordination Committee
IRT	Integrated Refresher Training
ISS	Immunization Service Support
JCCC	Joint Core Coordinating Committee
JFA	Joint Financing Arrangement
MDG-PF	Millennium Development Goal Performance Fund
MoFED	Ministry of Finance and Economic Development
OPV	Oral Polio Vaccine
PCV	Pneumococcal Conjugate Vaccine
PFSA	Pharmaceutical Fund and Supplies Agency
PHCU	Primary Health care Unit
RED	Reaching Every District
SIAs	Supplemental Immunization Activities
SNNPR	Southern Nation Nationalities and Peoples Region
TT	Tetanus Toxoid

1 INTRODUCTION

1.1 Evaluation Scope, Purpose and Objectives:

This evaluation was requested by the GAVI Alliance to assess the contribution of the GAVI HSS grant towards improving the health system in Ethiopia. This evaluation covers the 2007-2012 financing period and is intended to complement and build upon findings from previous evaluations of GAVI HSS in Ethiopia (1)(2).

The results will be used to guide implementation of the 2012-2015 GAVI HSS grant in Ethiopia and lessons learned will help improve the design and implementation of future support to countries.

The overall objectives of the evaluation are to assess the following major programme areas (i) contribution of the GAVI health system strengthening (HSS) in Ethiopia over the 2007-2012 period (ii) GAVI-HSS programme design and implementation in response to the specific evaluation questions identified in the TOR, furthermore, (iii) implementation of past recommendations whilst exploring areas not covered in the past evaluations (iv) grant utilization.

The main specific evaluation objectives are as follows:

1. Assess the design and implementation of Ethiopia HSS application for the 2007-12 financing period;
2. Identify the extent to which activities, resources and results were appropriately monitored and reported;
3. Assess the extent to which results from previous evaluations were used to inform actions at country level;
4. Assess whether the Ethiopia GAVI HSS funds were used efficiently and as planned;
5. Assess the extent to which the programme achieved the objectives and targets outlined in Ethiopia's HSS proposal;
6. Assess the added value of GAVI HSS support in reaching targets as compared to other types of funding;
7. Evaluate the extent to which GAVI's HSS funds were catalytic and complementary to other funding sources;
8. Assess unintended effects (positive and negative) encountered during implementation of Ethiopia GAVI HSS;

9. Assess how sustainable the Ethiopia GAVI HSS achievements have been in financial and programmatic terms;
10. Identify the main lessons that can inform improvements to future design, implementation and monitoring of HSS programmes in Ethiopia and elsewhere

1.2 Ethiopia Country Background

Ethiopia faces the challenge of providing equitable health services across a highly dispersed population. The country is home to approximately 92 million people (3) who occupy 1.1 million square kilometres of diverse topography (4). Ethiopia's per capita income at $470 is substantially lower than the regional average. Despite challenges related to drought and civil unrest, Ethiopia in recent years has achieved and sustained declines in maternal and child mortality and gains in education, as well as in its gross domestic product (GDP) (Table 1).

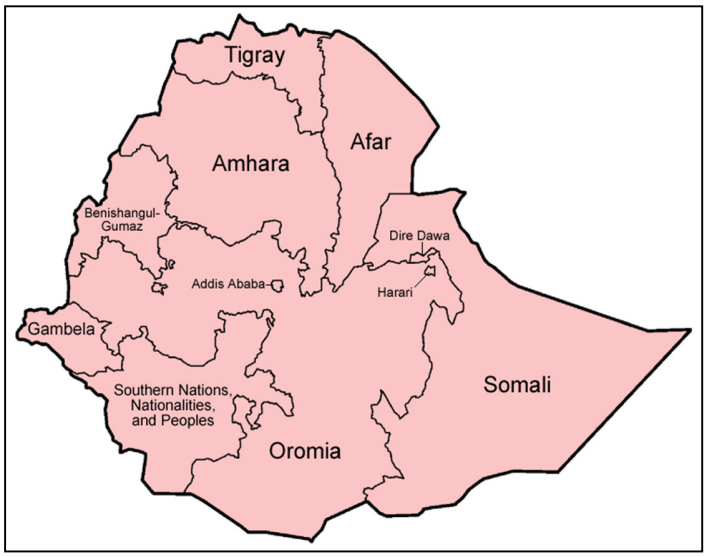
Table 1: Ethiopia country profile (WHO, 2012)

Indicator/Statistic	Value
Total Population	91,729,000
Population Median Age (years)	17.93
Gross National Income Per Capita (PPP International $)	1110
Life expectancy at birth m/f (years)	62/65
Population Living in Urban Areas (%)	17
Under Five mortality (per 1000 live births)	68
Probability of dying between 15 and 60 years m/f (per 1000 population)	250/212
Total expenditure on health per capita (Intl $)	44
Total expenditure on health as % of GDP	3.8

Source: Global Health Observatory Data Repository, 2012
Website: http://apps.who.int/gho/data/node.country.country-ETH

Ethiopia is divided into nine ethnically based administrative states and subdivided into 103 zones. It is further subdivided into approximately 800 districts and 15,000 kebeles (the lowest administrative level).

Figure 1: Ethiopia map of administrative regions



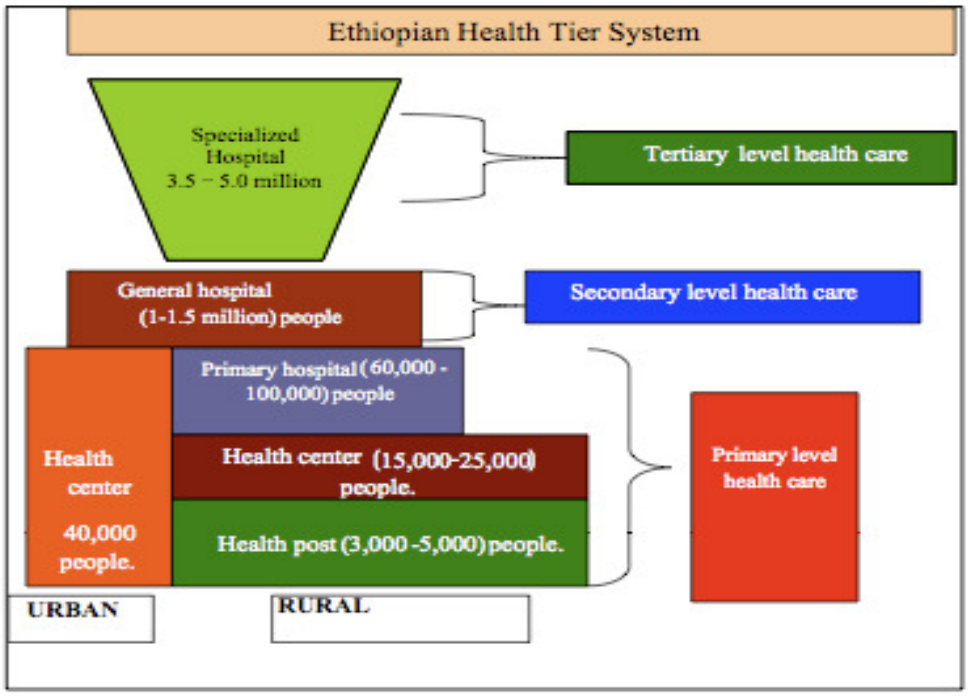
In 2010, Ethiopia launched a five-year Growth and Transformation Plan (GTP) designed to support continued economic growth (5). One of the main targets included in this plan was to reduce the number of Ethiopians living in extreme poverty from 47% to 22.2% by 2014-2015. Ethiopia has numerous health challenges, particularly related to communicable diseases caused by poor sanitation, malnutrition, and food insecurity. Infant and maternal mortality rates remain high. The 2011 Ethiopia Demographic and Health Survey reported maternal mortality rates for Ethiopia as 676 per 100,000 live births, with neonatal mortality estimated at 37 deaths per 1,000 live births(6).

1.3 The Health System in Ethiopia

Organization of health service delivery

The Health Sector Development Program (through the Business Process Reengineering) introduced a three-tier health care delivery system (Figure 2): level one includes a Woreda/District health system comprised of primary hospitals (to cover 60,000-100,000 people), health centres (1/15,000-25,000 population) and their satellite health posts (1/3,000-5,000 population) connected to each other by a referral system. The primary hospital, health centre and health posts together form a Primary Health Care Unit (PHCU). The second level includes general hospitals covering a population of 1-1.5 million people; and level three includes Specialized Hospitals covering a population of 3.5-5 million people(7).

Figure 2: Ethiopian Health Tier System



Source: Ethiopian Health Tier System (7)

The Ethiopian Health Extension Programme

The Health Extension Programme (HEP) is an innovative community based health service delivery programme that aims to provide universal coverage of primary health care. The programme gives priority to the prevention and control of communicable disease emphasising active community participation, with the goal of providing equitable access to health services. The programme is based on expanding physical health infrastructure and developing a cadre of Health Extension Workers (HEWs) who will provide basic curative and preventive health services in every rural community.

The Ethiopian Health Extension Program package for health services delivery consists of 16 health interventions organized under four major categories (Table 2): disease prevention and control; maternal and child health; hygiene and environmental sanitation; and health education. These services are provided free of charge. The government covers most of the salary and recurrent costs. The contributions of development partners are used to supply the program with equipment, commodities, and supplies, and continued capacity building of the HEWs (8).

Table 2: Package of HEP Interventions

I. Disease Prevention and Control	**III. Hygiene and Environmental Sanitation**
1. HIV/AIDS and other sexually transmitted infections prevention and control	10. Excreta disposal
2. Tuberculosis prevention and control	11. Solid and liquid waste disposal
3. Malaria prevention and control	12. Water supply and safety measures
4. First-aid emergency measures	13. Food hygiene and safety measures
5. Family health	14. Healthy home environment
	15. Personal hygiene
II. Maternal and Child Health	16. Rodent control
6. Family planning	**IV. Health Education and Communication**
7. Immunization	
8. Nutrition	
9. Adolescent reproductive health	

Source: UNICO Studies Series 10: The World Bank, 2013**(8)**.

Health Service Management

In 2012, the government continued to promote decentralization of leadership in the health system and encouraged meaningful participation of the population in local development programmes.

The Federal Ministry of Health (FMoH) is responsible for health policy and regulation. The Ethiopian health policy focuses on prevention and promotion of health services, which comprises approximately 30% of the total amount of budget allocated for the health sector. Monitoring and evaluation of activities is overseen by the Policy and Planning Department (PPD), which receives quarterly progress data on health indicators from the different regions and prepares a report based on 50-60 (46%-56%) indicators from the total 108 HMIS indicators.

Management of health service delivery falls under the responsibility of the Regional Health Bureaus (RHBs). Each region prepares an annual plan in collaboration with Zonal Health Department representatives.

The Zonal Health Departments (ZHDs) support both the RHBs and the Woreda Health Offices (WorHO) in the management of health service delivery. The ZHD oversees the operational and

technical activities of the different sections (e.g. regulatory, prevention, reproductive health, and maternal and child health). Though the ZHD is involved in planning the regional and woreda level health programmes, actual planning at the zonal level appears to be minimal.

Woredas have authority over their own budget for appropriate allocation to the different sectors (e.g. health, education and agriculture). Woreda-level planning aims to meet the local health needs within the context of national targets.

1.4 GAVI HSS Support to Ethiopia

GAVI has approved a total of USD $651,318,021 for Health Activities in Ethiopia covering the period from 2001-2020 (See Table 3 below) (9).

Table 3: Approved Funds in dollars ($) GAVI Support for Health Activities in Ethiopia

Type of Support	Approvals 2001- 2020 (30th June 2014)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Civil Society Organization (CSO)	**$3,320,000**								■		■					
Health Systems Strengthening (HSS) 1	**$76,493,935**						■		■							
Health Systems Strengthening (HSS) 2	**$38,607,774**											■	■	■	■	
Injection Safety Support (INS)	**$2,696,697**	■	■	■												
Immunization Service Support (ISS)	**$23,445,320**	■	■	■	■	■	■	■	■		■					
NVS (New Vaccine Support)	**$4,477,000**												■			
	$30,692,000												■	■	■	
	$202,039,194						■	■	■	■	■	■	■	■	■	
	$205,739,319										■	■	■	■		
	$1,448,500														■	■
	$20,583,281												■	■	■	
Operational Costs (OPC)	**$7,606,000**												■			
	$28,182,000												■	■	■	
Vaccine Introduction Grant (VIG)	**$5,987,000**					■				■		■			■	
Total	**$651,318,021**															

The yellow line on the table indicates duration of time for which funds were approved from GAVI
Source: GAVI Support for Ethiopia (9)

The first GAVI HSS grant in Ethiopia covered the period from 2006/7 to 2009/10. Following the submission of the final proposal in 2006, the GAVI board awarded a total of USD $76.49 million to be disbursed from 2007-2010. However, due to the carry-over of funds, some activities continued until 2012. A second GAVI HSS grant was approved for the period 2012-2015.

The initial 2006 HSS application (10)was developed by the Ethiopian government in collaboration with relevant development partners, together forming the Joint Core Coordinating Committee (JCCC). The application was based on the existing Health Sector Development Plan (HSDP III) and recommendations provided by a comprehensive literature review of previous HSS-related evaluation and academic materials (11).

The 2006/07 GAVIHSS objectives:

1. Improve coverage of immunisation and other primary health care services that will reduce morbidity and mortality among children and mothers.
2. Improve access and utilisation of health services by rehabilitating and expanding existing facilities and ensuring they are staffed by appropriately trained and motivated personnel who have regular supplies of vaccines and drugs, and effective technical and administrative support.
3. Resolving health systems barriers that are known to impede the demand for and delivery of immunization and other child and maternal health services, increasing the level of equity in access to services and strengthening civil society engagement in the health sector.

2 METHODOLOGY

The evaluation methodology is outlined below and includes details of the evaluation framework and the assessment methods and limitations.

Evaluation Framework

The evaluation framework developed by Jarco (Table 4) focuses on following four domains: 1) system inputs, 2) processes, 3) outputs and 4) outcomes.

Table 4: Evaluation Study Framework for GAVI-HSS health systems strengthening Ethiopia, 2014

Level	Inputs and Processes	Outputs	Outcomes	Impact/result
Indicator domain	• Governance • Financing • Construction materials • Health work force • Essential health commodities (vaccines, contraceptives, bed-nets)	• Work force trained • Medical equipment and drugs supplied • Maintenance of health care system Infrastructure (new and rehabilitated) • Immunization quality, safety and efficiency	• Immunization and other health care service coverage • Quality of service provision	• Reduction in under five child mortality • Reduction in morbidity and mortality due to other primary health care problems
Data collection	• Administrative data sources • Financial tracking systems • HR • HMIS • Equipment • Supply and policy data	• Facility assessments • Secondary document review • Key Informant Interviews	• EDHS and other health service provision assessment reports • Previous GAVI HSS reports • Health facility assessment	• Vital Registration or EDHS • Other health service provision reports • HSS previous surveys
Data Analysis and synthesis	Descriptive analyses were applied using SPSS for the quantitative data qualitative information was combined in the analysis phase to triangulate and facilitate the interpretation of the quantitative data sets.			

Evaluation Design and period:

The GAVI HSS final evaluation was conducted from January to May 2014 and data collection took place from April to May 2014. A cross sectional study design was followed using a mixed methods approach. The evaluation included a literature review, quantitative and qualitative data collection and structured questionnaires (health facility questionnaires, record review guidelines and client exit interview questionnaires).

The country-wide evaluation included quantitative data collection from five regions. Amhara, Oromia, SNNP and Tigray regions were purposively selected based on population size and amount of funding received from the GAVI HSS programme. Benshangul-Gumuz region was selected to represent the Developing Regions (DRS) and for its innovative approach during implementation of immunization programmes. The JaRco research team, together with experts from the RHB selected two zones in each region, and one district in each zone. Within each district, two health centres and two of its satellite health posts were selected for the study. The zones, districts and health facilities were selected based on Penta3 vaccination coverage. Within each region a high coverage and a low coverage zone were selected. The process was repeated to select the districts and the health facilities within each zone. The rationale for selecting zones according to coverage was to provide insight into what factors were positively and/or negatively influencing the Expanded Program on Immunization (EPI) outcomes in those areas.

Areas Covered and study population:

A team of two experts assigned for each region collected data through document and record reviews, key informant interviews, and semi-structured interviews with health facility staff. The evaluation team visited 5 regions, 10 zones, 20 districts, 20 health centres and 19 health posts.

The team spent one week in each selected district. The study participants included: FMoH, Regional Health Bureau and Zonal Health Department EPI focal persons, Woreda Health Office heads and EPI experts, Health Centre heads and EPI/immunization service providers, health extension workers working at health post level and clients found at the health facilities receiving immunization services during the evaluation period. Across the five regions more than 120 individuals were interviewed (62 KIIs, 39 Health Facility assessment interviews and 20 client exit interviews) at various levels, and there was a high response rate of over 90% at zonal and district levels and over 95% for health facility level assessments and key informant interviews.

The response rate at the regional level was lower compared to the zonal and district levels and it was difficult to arrange interviews at both the federal and regional level.

Tool development

During the inception period, a literature review was conducted in order to guide tool design. The evaluation questions identified by GAVI have been elaborated into a series of further questions to collect primary and secondary data relevant to each information source. The tools include:

1. Key Informant Interviews (KIIs) semi-structured guide

- Higher level officials(GAVI Alliance, FMoH, JCCC, RHB) and CSOs
- Zone and Woreda Health Office
- Health Centre head and HEW
- Client Exit Interview

2. Health Facility Data collection (structured questionnaires) designed for health centres and health posts.

The data collection tools were pre-tested before the actual survey. Pre-testing the tools provided an opportunity to gauge the length of time required for interviews as well as identify any problems in the formatting of the tool. Minor changes were made to the instruments to improve the flow of questioning and data recording.

Data Collection

The team collected data at national, regional, zonal, woreda, and health centre and health post level.

Literature review:

The literature review was conducted to provide an in-depth understanding of the HSS programme and its implementation since receipt of the first tranche of funding in 2007. During the literature review the indicators and targets outlined in the 2007-2012 country proposal (10)were compared to the HSS programme periodic output reports and other documents such as the national Demographic Health Survey (DHS) (6)and immunization coverage and administrative reports measuring progress since 2007. While reviewing the literature the team also assessed the accuracy and quality of reported output data using the standard WHO

procedure for Data Quality Assurance (DQA) by verifying data through the review of registers and records. Furthermore, documents on incidence of outbreaks for vaccine preventable diseases (Tuberculosis, Neonatal Tetanus, Pertussis, Diphtheria, Measles, and Poliomyelitis, Hepatitis B infection, Haemophilus influenza, and Streptococcal Pneumonia and Diarrhoeal diseases) over the past six years were reviewed from Regional Health Bureau registers in addition to morbidity and mortality indicators.

Key Informant Interviews (KIIs):

Key informant interview guides included a series of open-ended questions for different groups of informants and a wide range of stakeholders were interviewed, including: Federal Ministry of Health, GAVI Alliance representatives, EPI and public health department experts, CJSC/JCCC members, implementing partners (GTZ, UNICEF, EMA, EOC, CRDA, ODA, APDA) Regional Health Bureaus, Zonal Health Departments, Woreda Health Offices, local level health service providers (Health Centre Heads/ EPI focal persons and HEWs). In addition, some exit interviews were conducted for clients receiving immunization services at health centres and health posts.

Health Facility data collection:

Health facilities were purposively selected in collaboration with RHB and ZHD staff based on recent Pentavalent3 coverage (health facilities from high coverage woredas and low coverage woredas were selected). The evaluation team conducted structured interviews with health centre heads, EPI focal persons and HEWs. At the health post level, secondary document reviews were conducted along with an assessment of the functionality of medical/vaccine equipment using the checklists prepared for the purpose.

Quality Assurance

Throughout the data collection process, the evaluation team ensured data quality though pre-testing the tools, assessing the accuracy, reliability and completeness of reviewed documents and records, back-checking collected data and triangulating information when possible.

The quality of data was considered throughout the data collection process, including:

- Data collection instrument development
- Survey team selection
- Survey team training
- Pre-testing

- Conducting the interviews, observations, review of documents and discussions
- Data entry and analysis

Survey team selection

JaRco research assistants with previous experience in conducting health related surveys were deployed as quantitative data collectors for this evaluation and regional coordinators with monitoring and evaluation experience in public health were assigned as qualitative researchers. The regional coordinators conducted qualitative interviews at the regional, zonal, district and health facility level and also oversaw the overall data collection process throughout the survey period.

Survey team training

The training for the survey team involved a 2-day practical training programme followed by a 1-day data collection pre-test and feedback (3 days in total). The training sessions covered the following key topics related to the study:

- The objectives of the survey
- Organization of the study team and division of responsibilities
- Procedures of data collection
- Ensuring the quality of collected data
- Procedures of managing study logistics
- Lines of communication within the JaRco office and the core survey team and other partners during the fieldwork

The training workshop was also used to review and fine tune the data collection questionnaires. At the end of the training, the data collection team was taken out to a nearby health facility to pre-test the questionnaires. The team helped to identify problems with the tools and adapted the questionnaires to the local context in order to maximize the validity and reliability of questions.

The survey team training is a vital step in the study process - accurate, meaningful information can be collected only if all interviewers thoroughly understand their field instructions and the procedures.

Ethical Considerations

All standard ethical procedures were followed during the GAVI HSS evaluation. As such, the research team invested considerable efforts to foster an environment in which participants could freely discuss the health service provision in general and EPI in particular with guaranteed confidentiality. All data collectors were trained on standard ethical procedures, particularly on the need to debrief participants both before and after interviews, the need to obtain verbal informed consent and to notify participants of their participatory rights.

Before commencing data collection, the evaluation team obtained letters of cooperation from the Regional Health Bureaus which were produced based on a letter of support from the FMoH with a detailed explanation of the purpose of the study. Once the letter of cooperation was presented, the team members received verbal consent from head of each Zonal Health Department, district health offices and selected facility participants, after clear explanation of the purpose of the study. All of the survey participants were briefed on the purposes and content of the survey in a non-threatening and culturally acceptable manner, having had the opportunity to ask questions and give consent for participation. The study team was also trained to maintain a non-judgmental and impartial stance while conducting the data collection and interacting with respondents and stakeholders.

Data Analysis

The quantitative and qualitative data sets were treated separately. Descriptive analyses were produced using SPSS for the quantitative data sets. This allowed for comparisons to be made across variables to identify common trends and significant correlations. The qualitative data obtained was included in the analysis phase to triangulate and facilitate the interpretation of the quantitative data.

There was a large amount of qualitative information gathered from the KIIs. Preliminary analysis of the qualitative results commenced in the field when the interviewers reviewed their findings. This was done to ensure that the questions being asked were and remained relevant, and (where appropriate) continued to explore the matter in more depth. The qualitative information was cleaned, edited and analysed to ensure the validity of the information being collected.

Quantitative data analysis (Literature review / secondary data)

On the basis of the tabulation plan agreed upon with GAVI, the information from the secondary data and health facility assessments were studied and interpreted. There were three main stages to undertake for this process:

1. The first stage of the analysis involved the identification of relevant documentation from the literature review and any other reports gathered from GAVI and the FMoH. Relevant sources were defined as those that include collection or reporting on relevant HSS indicators since early 2007.
2. The second stage involved data quality screening of relevant information collected. This entailed an in-depth review of methodology and sampling procedures to ensure that the data reported is accurate and/or comparable with other sources. Where data reported on indicators was found to be skewed or inaccurate, the data was not used in the quantitative assessment.
3. The third stage involved the comparison of data on selected indicators and an analysis of progress towards achieving set targets. This was only carried out for data collected from the identified regions and health facilities, so that the information could later be triangulated with data collected from the qualitative interviews.

2.1 Evaluation Limitations

- The assessment attempted to determine the contribution of GAVI HSS to the major outcome indicators specified in the proposal (under-5 mortality and DPT 3 coverage). However, determination of attribution as a measure of change due to the GAVI HSS grant has not been possible due to the complex and interlinked determinants of child mortality including safe water, sanitation, nutrition, childhood immunisation etc and the many complementary programmes that contribute to reduction in child mortality and immunisation coverage

- Data quality concerns: Qualitative data could not always be triangulated with quantitative data as data was incomplete or missing at some health facilities, WoHo and RHB levels. Non-reporting of data relating to activities that are linked to program outputs has an impact on trend analysis and the measures used to track the program's effectiveness. Data generated at the health facility level is the first and critical step for the routine reporting system (HMIS) to function appropriately. Incomplete and low

quality data at this level had implications for the larger outcome level measures at country level.

- There might be potential sources of biases present. These include social desirability bias, where respondents may provide information they believe is "expected" or "correct," recall bias due to the delayed time frame between the evaluation study and the implementation of the grant activities. The assessment was carried out in 2014, eight years after the commencement of the HSS grant period of 2006/7to 2012 potentially introducing bias in the retrospective recall of details and possibly distorting the data collected. However, attempts were made to reduce potential biases through proper design and implementation of the evaluation in order to obtain accurate information by explaining the purpose of the survey to respondents, triangulation of quantitative findings with qualitative findings and interviewing key informants. Additionally high staff turnover in the health facilities, within major donor offices, implementation partners and the FMoH presented challenges for collection of accurate information relating to the relevant GAVI HSS period (2006-2012). The design period of 2006/7 proved especially challenging as the team was only to locate one key informant who had been present at the design stage of the proposal.

- Another limitation is that the small sample size of 39 visited facilities is not representative of all health facilities in Ethiopia. There are a total of 1102 health centres and 15,668 health posts all over the country. Therefore an attempt was made to cover all regions with the exception of the four Developing Regions (DRS), which were represented by Benshangul–Gumuz at the suggestion of the FMoH. Each region was asked to identify a high performing district and a low performing district for Pentavalent 3 coverage (an outcome indicator specified in the HSS proposal) in order to provide a balanced view of the challenges and the realities in different areas within each zone. Additionally several interviews were conducted at national level involving key informants with overall knowledge of the health system. The findings should be interpreted as a snapshot view of the overall state of the health system.

- Lastly, at the request of Jarco, the FMoH suggested Benshangul Gumuz as a region that could be considered as representative of the DRS. In addition this region was using an innovative approach to implementation of immunization services. Even though some

bias may have been introduced due to this, we believe there are important similarities between the regions for the purpose of this study. These include the pastoralist livelihoods of inhabitants, geographical locations at the extreme borders of the country and the delayed rollout of the Health Extension Program in the DRS.

3 EVALUATION FINDINGS

3.1 Design of the programme

Key Findings

- The absence of guidelines from GAVI presented a challenge for the country proposal writers
- The HSS program was closely aligned with the existing Health Sector Development Plan (HSDP III) priorities and strategies and articulated clear linkages with immunisation outcomes within its objectives
- The design process was participatory for major partners and stakeholders but the non- involvement of stakeholders at district level in the design proposal was a missed opportunity for valuable insights into ground level realities
- Reprogramming decisions were suggested by the FMOH, agreed upon by JCCC and although approval came from GAVI secretariat, guidance on the resulting system level impact from GAVI was not evident
- The proposal lacked a robust monitoring and evaluation framework.
- The assumption of Ethiopia's technical expertise and capability to design measurement indicators and monitor activities is a major weakness in the approval process of the proposal
- Despite the fact that the GAVI HSS proposal was based on the comprehensive situational analysis done before preparation of HSDP III, the absence of an independent situational analysis did not provide the opportunity for input in the design from GAVI's expertise and experience elsewhere
- The absence of an in-country representative from the GAVI secretariat results in a gap in the flow of information between implementing partners including the government, donors to the MDG PF and CSOs at ground level

The GAVI HSS proposal was formulated in the context of national policies, plans (Health Sector Development Plan III) and strategies, adopting global policies and initiatives. The HSDP III had clear priorities and strategies that were aligned with the UN Millennium Development Goals (MDGs 4, 5 and 6 in particular). The design of the GAVI HSS proposal considered the following criteria (11):

- Alignment with Ethiopia's on-going health sector development plan
- Stakeholder involvement at national level

3.1.1 GAVI HSS alignment with country plans and priorities

The main focus of health policy in Ethiopia has been on decentralisation of the health system over the last two decades, capacity building, social mobilisation, universal access to primary health care, development of preventive components of the health service (Health Extension Plan) and harmonisation. The HSDP III focused on child health, maternal health, HIV, Tuberculosis and malaria (MDG goals 4, 5 and 6) (11). The main vehicles for providing maternal and child health services were through the Health Extension program (HEP) initiated in 2003 and the expansion of primary health care facilities to achieve universal health care access. Maternal and child health were targeted through increased vaccination coverage and through the HEP. The HEP provided a basic package of promotive, preventive and curative services at health post level supported by higher level obstetric care at health centre and district hospital level.

The overall objectives of the HSDP III were to implement the HEP through the necessary inputs for human resource development; an efficient pharmaceutical and other commodities supply system; information, education and communication; a functioning Health Management Information System and Monitoring and Evaluation; adequate health care financing.

Key evaluation question: To what extent, and in what ways, did Ethiopia's HSS application demonstrate clear linkages to immunisation outcomes?

The objectives of GAVI HSS were aligned with the country priorities adopting a top down approach of policy/structural changes (increased access and services through HEP) but also the bottom up approach of increasing demand and equity through increased utilisation of services.

The HSS proposal showed clear linkages with immunisation outcomes within its objectives:

1 Improve coverage of immunisation and other primary health care services that would reduce morbidity and mortality among children and mothers. The key outcome indicators were related to DPT 3 and measles immunisation coverage.
2 Improve access and utilisation of health services by rehabilitating and expanding existing facilities and ensuring they are staffed by appropriately trained and motivated personnel who have regular supplies of vaccines and drugs, and effective technical and administrative support.
3 Resolving health systems barriers that are known to impede the demand for and delivery of immunization and other child and maternal health services, increasing the level of equity in access to services and strengthening civil society engagement in the health sector.

Key evaluation question: To what extent, were the HSS strategies realistic, relevant and aligned with the HSDP strategies?

The key challenges for the HSDP III included high turnover of skilled personnel, an ineffective HMIS, weak logistic and medical equipment management system and an underfunded health system (11).

The HSS areas of support listed below focussed on but were not exclusive to strengthening health system functions at district level and below.

- Health workforce mobilisation, distribution and motivation
- Supply, distribution and maintenance systems and infrastructure for PHC
- Organisation and management of health services at the district level and below

These critical gaps were therefore to be filled with GAVI support and the strategies described above are relevant to the challenges faced in the implementation of the HSDP III.

However, this assessment finds that an independent situation analysis during the country proposal consideration would have drawn attention to issues within and outside the domain of the health sector and the FMoH. These include power, telecommunications, poor road infrastructure and the feasibility of maintaining the cold chain for immunization as well as

regional differences in socio-demographic characteristics. Important issues such as community acceptance of services, knowledge and awareness of the benefits of immunization, PMTCT or antenatal care or shortage of transportation and road access could have been highlighted. Importantly, a situation analysis would have elicited an understanding of the information architecture and the technical capacities for health information gathering in the country for monitoring purposes. These perspectives would have allowed input into the proposal design from GAVI drawing from its experience in other countries. Information garnered in this way could have provided a health/donor map for the regions to allow coordination with other programmes/actors and sectors to address the broader issues of the health system. For planning purposes such an analysis would have been useful for priority setting.

Key evaluation question: To what extent, were the HSS activities relevant and among the ones planned for in the HSDP?

The activities described under Themes 1,2 and 3 of the HSS proposal were designed to fill in the gaps that were identified in the HSDP III planned activities as summarised below:

Workforce training: The HSDP III policy objective to decentralise health sector management to district level required capacity building for Woreda and health centre management teams. Complementary inputs were needed to ensure adequately skilled HEWs were linked to supporting staff at health centre and Woreda level through an effective referral system. To this end, the HSDP planned to train 30,000 HEWs and 5,000 Health Officers.
GAVI HSS funds were intended to support:

- The training and improvement of skills at all 3 levels of care: Between 2006/7 and 2010, it was planned that refresher training would be provided to 25,050 HEWs and 5,400 trained nurses / health officers at Health centre level; It was also planned that support apprenticeship training would be provided to12,600 HEWs.
- 7,440 staff from 310 rural WorHOs and HCs to participate in Integrated Refresher Training (IRT).

Facility construction and equipping for HEP expansion: The HSDP planned to upgrade 1,457 health stations to health centres. GAVI HSS funds were allocated to upgrade 212 (15%) of the total to be upgraded. GAVI HSS funds were also allocated to provide materials for the construction of 100 of the 15,000 health posts planned in the HSDP III.

M&E: One of the challenges noted in the HSDP III in relation to HMIS was the shortage of skilled human resources and lack of national guidelines. The timeliness and completeness of HMIS reporting was noted as being poor, with delays contributing to the failure at all levels to use data as the basis for informed decision-making in planning and management. HSS funds were planned to be used to support the roll-out of the new HMIS system through training workshops, distribution of guidelines and supervision, providing new equipment and support for HEP review meetings.

Strengthening the Supply and distribution of pharmaceuticals: A core component of the HSDP III was the re-structuring of the logistics system for the supply of commodities. This measure was designed to meet the increased demand for regular supplies of vaccines and other pharmaceuticals for the HEP expansion strategy. GAVI HSS activities included supporting the implementation of the Health Commodities Supply System (HCSS) for the first year.

3.1.2 Stakeholders involvement in the design

According to the evaluation of the HSS programme in Ethiopia conducted by HSLP in 2009(1), there were no significant problems encountered during the design of the proposal at country level. For the 2006 proposal, GAVI and other major stakeholders coordinated a joint mission to Ethiopia to assess the potential for scaling up health services and a team was assembled to draft the HSS proposal submitted in November 2006(10). The fact that GAVI did not provide any proposal guidelines was a challenge for the writing team.

Government and partners' involvement in HSS programme design:
Most of the key informants at the federal level appreciated the participatory approach of the design process, at least at the national level. However, one donor commented that "*The needs, challenges and responses will be very different between regions. The design of the programme and decision making processes should take place closer to where services are delivered.*" Partners' views were particularly challenging to explore as most personnel from partner organisations who had been present at the design phase had left. Attempts to interview JCCC members were equally problematic and only one JCCC member present during the design phase was available to comment. The design process described at the interview confirmed the participatory nature of discussions between the relevant government departments, WHO, World Bank, UNICEF, USAID, CIDA and Save the Children (US). The role of the JCCC was clarified

during this interview as being one of technical direction and approval of financial disbursement including reprogramming approval.

Our assessment finds that despite the involvement of several high level stakeholders in the HSS proposal design, there were no contributions from lower levels of Government (ZHD, WorHO and health facilities) or community levels. RHBs however did have some input according to a senior FMoH official. The importance of district level input is further explained below.

The HEP was a core component of the health sector policy of decentralisation and expansion of the health program through community based interventions. Therefore it would have been useful to have had input from community representatives to provide insights for the socio-behavioural determinants of health seeking behaviour that impact on utilisation of services such as maternal health and immunisation. Unlike western models of healthcare, models of healthcare delivery in other settings should take into account the cultural logic of care seeking, how illness is viewed and the role of traditional methods in resolving health issues. Knowledge, attitudes and perceptions of immunisation and traditional practices involved in childbirth have been found to be strong predictors of healthcare service utilisation. The emphasis on primary health care to increase access to basic services makes it imperative to consider health seeking behaviour as a determinant for coverage outcomes. One example is the low utilisation of skilled birth attendant services in Ethiopia (12%) due to a preference for traditional methods of birthing practices in some areas. According to the EDHS 2014, 45% of women who chose not to give birth in health facilities felt that it was not necessary or not customary(12).

Key evaluation question: To what extent were Civil Society Organisations (CSOs) actively involved in the design of the application?

There are multiple partners involved in the implementation and support of the immunization programme in Ethiopia. Our interview with an official from the Consortium of Christian Development Association (CCRDA), the umbrella organisation for CSOs, revealed that Civil Society Organizations (CSOs) are recognized as important stakeholders in the health system of Ethiopia at all levels. CSOs typically provide complementary services to support the government's Expanded Program on Immunization (EPI), including training of health workers, community mobilization, technical assistance, surveillance etc. Since the implementation of GAVI's HSS programme in Ethiopia, GAVI funding for CSOs has reached close to USD $1,660,000 per year (provided through multiple funding windows) (Table 3). Additionally, the FMoH has

been working through the Ethiopian Paediatric Society (EPS) to execute training on integrated management of neonatal and childhood illness (IMNCI), which was completed but with a shortfall of 73% (see Figure 5).

An evaluation conducted in 2009 (1) reported that the involvement of NGOs and civil society during HSS proposal development was very limited. Only one NGO (Save the Children, USA) was involved in the development of the proposal and the Consortium of Christian Relief and Development Association (CCRDA, an umbrella organisation representing CSOs working in the different regions) was also included in Central Joint Steering Committee (CJSC) decision-making process.

An informant from the CCRDA explained their involvement; "*We have been actively involved in the design, implementation and evaluation process of GAVI HSS country proposal from its inception to today*."

3.1.3 Changes to the design of the HSS programme

Key evaluation question: To what extent, if at all were planned activities reprogrammed? What process was followed for this reprogramming?

The design of the program underwent changes over the course of the grant period. Escalating building costs required extra funds to be redirected from the workforce training component (Theme 1 in the HSS proposal) to construction costs for health posts and upgrading of health centres (Theme 2 in the proposal). The justification for this change appears relevant given the emphasis on the expansion of the HEP in the HSDP III (11) to provide improved access to rural communities through the Reach Every District Plan. However, it needed careful consideration of the impact on training skills and management capacity at district level and below to cope with the potential increased demand on quality services from the HEP expansion. This point is further elaborated in section 3.4. A JCCC committee member noted in our interview that reprogramming applications were forwarded to the JCCC for technical advice and relayed to the GAVI Secretariat for approval. However the final decision to reprogram rested with the FMoH and it is not clear whether the reprogramming applications underwent close scrutiny by GAVI.
The assessment finds that the lack of input from GAVI regarding the impact of reprogramming decisions on the overall health system may have had a negative effect on capacity building of health worker skills as explained under section 3.1.3.

3.1.4 GAVI HSS application for 2012-15

Key evaluation question: To what extent were the findings/recommendations from previous evaluations and assessments, including those commissioned by the GAVI Alliance, helpful and used to inform actions at the country level, including the preparation of Ethiopia's HSS application for the 2012-15 period?

JSI GAVI HSS Tracking Study 2009 recommendations

The recommendations outlined in the JSI tracking study conducted in 2009 (2)were concrete and directed to all stakeholders involved in HSS program implementation. As shown in Table 5 below, each of the recommendations has been comprehensively addressed within the most recent GAVI HSS application for 2012-15.

Table 5: JSI tracking study recommendations 2009 and inclusion within GAVI HSS application 2012

Recommendation	How recommendation has been addressed in Ethiopia's HSS application for 2012-15
1. Country policy and program decision makers	
Sustain the participatory process and ensure the involvement of stakeholders not included previously at the national and regional levels	SDA 2.1: Implement strategy to respond to the needs of number of low performing and hard to reach areas through CSO participation
Make further efforts to strengthen the coordination and management capacity of the health system at the regional and lower levels	SDA 2.2: Facilitate overall involvement and collaboration of CSOs working in the immunization and child health
Continue efforts to strengthen supportive supervision	HEW supervisors will be trained on supportive supervision on cold chain management
Provide continuous refresher training and reference materials to health workers	GAVI will provide IRT to HEP focal persons, supervisors and health centre staff, and health extension workers. Copies of reference materials will be printed
Give priority attention to the monitoring and evaluation of the HEP	The M&E system of the health sector utilizes routine administrative reporting, performance

	monitoring & reviews, supportive supervision, inspection and evaluation of programs.
2. Stakeholders in-country	
Multilateral and bilateral development partners should negotiate common ground with the FMoH	Sub-recipients (CSOs/NGOs) will sign a bilateral agreement (MoU) with the FMOH to define clear roles and responsibilities
NGOs, CSOs, and the private sector should be proactive in the health sector development process	SDA 2.2: Strengthening Health Forum to facilitate overall involvement and collaboration of CSOs working in the immunization and child health
3. GAVI Alliance	
Sustain support and closely work with the FMoH	GAVI HSS support will be channeled to the MDG PF, which is a pooled funding mechanism managed by the FMOH
Support the FMoH in promoting integrated approaches to donor funding based on the actual achievements	The budgeting of the GAVI funding request is linked with the HSDP costing. Costing of HSDP IV was conducted using the Marginal Budgeting for Bottlenecks (MBB) method, which is a result based planning and budgeting tool
4. Other global actors in health systems strengthening	
Support the system approach to health development to create a unified health care system	HSS interventions prioritize addressing health systems bottlenecks; The funding request aims to strengthen the health system and integrated child health service delivery
Ensure that resources are used to fill identified gaps rather than duplicating or disrupting existing efforts	Evidence based interventions to fill in gaps in the areas of cold chain management, strengthening health workforce, involving CSOs and initiating mHealth to reach unreached communities

HLSP GAVI HSS support evaluation 2009 recommendations

The HLSP evaluation conducted in 2009 (1)provided a few overarching recommendations which appear to have been taken into consideration during design of the most recent GAVI HSS proposal (2012-15).

Table 6: HLSP evaluation recommendations 2009 and inclusion within GAVI HSS application 2012

Recommendation	How recommendation has been addressed in Ethiopia's HSS application for 2012-15
1. Country policy and program decision makers	
The use of sector annual performance and JRM reports instead of the GAVI APR will not only strengthen the country systems but also will reduce transaction costs.	The monitoring and evaluation mechanism for this grant will be made to align with the jointly agreed upon 'One M & E Framework' in the health sector.
GAVI should work towards bringing all the three funding arrangements together and form a wider health systems funding modality	During proposal development, emphasis was given to integrate EPI and other child health services and ensure the iterative nature of activities funded between the earlier and current phases of GAVI
The application process should reduce as much as possible the competition for funds and assist countries to meet the gaps in their strategic plans	Evidence based interventions to fill in gaps in the areas of cold chain management, strengthening health workforce, involving CSOs and initiating mHealth to reach unreached communities
The use of government preferred aid modalities should be respected.	GAVI HSS support will be channeled to the MDG PF, which is a pooled funding mechanism managed by the FMOH

3.2 Implementation

Key Findings

- The program utilized the same budgeting assumptions and scenarios as the HSDP-III by channeling funds through the nascent MDG-PF.
- No clear exit strategy was articulated in the HSS proposal
- The presence of an in-country representative from GAVI would have allowed better coordination between partners
- There is inequitable distribution of health workforce numbers and skills across geographical areas
- The overall five-year achievement from 2007-2012 of the health centre construction and upgrading against the plan was found to be 107% (14) with GAVI HSS contributing to more than half (52%) of all health centres constructed/upgraded
- There were regional variations in numbers of health centres constructed in 2012, so that not all areas had the necessary health posts for the HEP to be fully implemented.
- GAVI HSS period achievement of the IMNCI training was 27% (14) of planned targets, well under expected levels due to reprogramming
- IRT training was provided to half (52%) of the HEWs targeted in the initial proposal and inadequate resource allocation to HEW training has been identified in previous evaluations as a challenge
- During the GAVI HSS period, primary health care coverage rose from 72% in 2005 to 92.9% in 2012.
- Despite allocation of GAVI HSS funds to the improvement of the national Health Commodities Supply System (HCSS), supply, storage and warehousing have continued to be issues relating to stock outs at health facility level
- Cold chain management remains a bottleneck for improved immunisation services. Lack of adequate transport results in over 50% of vaccines being delivered on foot by HEWs
- The routine monitoring and reporting system needs to be strengthened to report on HEP indicators and to improve data quality to address the differences between survey data and data collected through the routine HIS

3.2.1 Financial and Programmatic Management of the HSS

Key evaluation question: To what extent were activities, resources and results appropriately managed and coordinated

Financial management

In Ethiopia, financial management standards are set by the Federal Government despite a significant degree of autonomy held by Regional Government in most of the aspects of fiscal decentralization. The overall responsibility for the management of public funds including federal subsidies is the mandate of Ministry of Finance and Economic Development, (MoFED). Expenditure reporting from the Regional Governments is also made according to the formats and times specified by MoFED.

GAVI HSS support is channelled to the MDG Performance Fund (MDG-PF), which is the government's preferred modality for scaling up Development Partners assistance in support of the HSDP.

The MDG-PF is a pooled funding mechanism managed by the FMoH. According to the Joint Financing Arrangement (JFA), the FMoH is the budget holder for the MDG Fund and delegates the procurement of goods to the Pharmaceutical Fund & Supply Agency (PFSA). Periodic reports are produced and annual financial and physical reports are prepared by the Resource Mobilization and Project Coordination Directorate of FMoH including consolidated reports from other implementers of GAVI HSS funding.

The accounting and reporting of transactions for the HSS grant were therefore in line with government's procedures.

The GAVI HSS funding was allocated under three main thematic areas: health workforce mobilization, increased access to health services, and organization and management of health services.

***The GAVI HSS fund was channelled as follows*:**

Once the funds arrived in the Health MDG Designated Pooled Account, the money was distributed as follows:

- A fund for upgrading health stations to heath enters(25% of total HSS budget) has gone to the German Agency for Technical Cooperation (GTZ) in accordance with the contract between FMoH and GTZ;
- A fund allocated for health post construction (8% of the total HSS budget) was transferred to RHB and then to selected woredas;
- Funds for federal level procurement of equipment (35% of the total HSS budget) were channelled through the current PFSA. While a new PFSA was being set up, some of the medical equipment procurement (Procurement of medical equipment for HP)was outsourced to UN agencies (UNICEF)
- Funds for training for HEWs, woreda health office and health centre staff as well as for implementation of the health commodities supply system (27% of the total HSS budget) were channelled to the relevant institutions by FMoH, RHB and partners. IMNCI (Integrated Management of Neonatal and Childhood Illness) training was provided by the Ethiopian Paediatrics Society. Management of the transfer of funds to regional and sub-regional levels for this component was outsourced to UNICEF.

Coordination and oversight

According to the FMoH, the role of the JCCC during implementation was to provide technical support to the HSS programme. Any decisions regarding financial requests or reallocation of funding required input from the GAVI secretariat. The perceived role of GAVI during implementation was to guide the design of the programme, respond to reprogramming requests, approve and transfer funds each year and review annual performance reports.

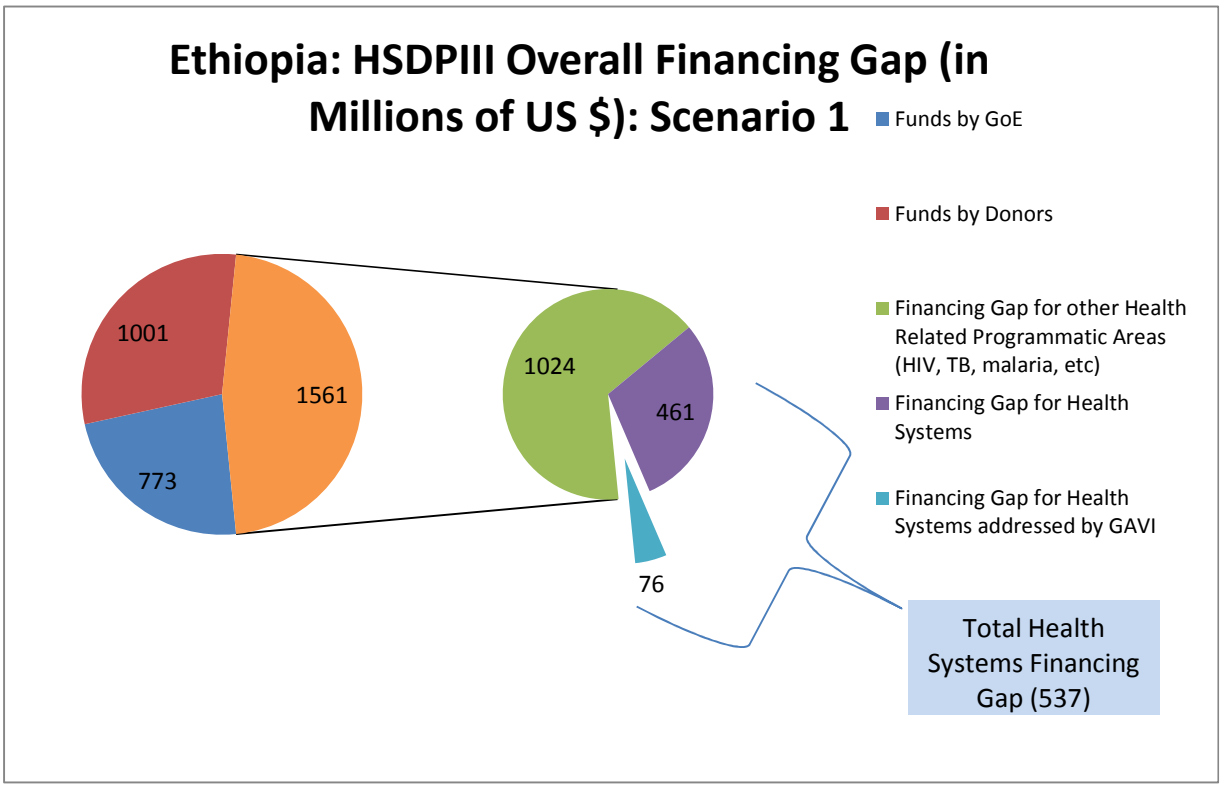
The FMoH aggregated reprogramming requests from each region and presented them to the JCCC during a weekly meeting. Minutes from each meeting with details of reprogramming were sent to the secretariat and approval from GAVI was issued in response.

Donor inputs to the health sector were highly fragmented before 2006, with many different bank accounts at FMoH and multiple disbursement channels. However, FMoH and partners were committed to improving harmonisation and alignment of donor support, as evidenced by

the signing of a Code of Conduct. The new mechanisms for pooling of funds that the FMoH and partners devised jointly such as the MDG-PF are an example of how the commitment to harmonisation was put into practice.

The overall budgeting plan for HSDP III (11)was estimated at USD $3.3 billion (Scenario 1) with allocations to several programmatic areas including health system strengthening. Several bilateral and multilateral donors committed to USD $1.001 billion with the federal government funding amounting to USD$773 million resulting in a shortfall of USD $1.561 billion. Health systems claimed the largest portion of the shortfall at USD$537 million, GAVI's contribution to this shortfall amounted to USD $76.5 million (11)(Figure3).

Figure 3: GAVI contribution to HSS funding



Source: Adapted from Health Care Financing Plan (11)

Health system strengthening was a critical aspect of the Health Care Financing Plan for a number of reasons. The expansion of the HEP was strategic to the success of the HSDP III (11)as it targeted rural areas where 83% of the population lives, addressing the vast disparity between rural and urban areas. Pastoralist areas are particularly vulnerable and the HSDP had targeted these areas for special funding to promote equity. Continued external funding will be essential for sustainability of the HSDP and no clear exit strategy has been articulated in the HSS proposal. In our interview with a representative of the GAVI secretariat, it was explained that the health sector is still heavily dependent on external funding and it would be premature to consider an exit strategy at this stage of the HSDP in Ethiopia. However new funding sources will need to be identified and funding schemes including social health insurance for formal sector employees and community based health insurance plans were part of the HSDPIII and the current HSDP IV(7).

The presence of an in-country representative from GAVI would have allowed better coordination between partners and as well as providing a link between other donors to the

MDG-PF and the government. The 2012 Annual Performance Report (7)noted that the support of partners involved in implementing the health infrastructure and resources for achieving universal primary health care was uncoordinated.

In our interviews with other donors, there was an expressed need for GAVI to have a presence in the country to provide more frequent reporting and general oversight of its investment in the programme. At federal, regional, zonal and woreda level, most of the respondents associated the flexibility and importance of the GAVI alliance with immunization service support (ISS) without differentiating it from HSS. These views reflected the integrated and complementary nature of the HSS with other programs.

3.2.2 Implementation of planned activities

Key evaluation question: To what extent were the activities set out in the HSS application implemented as planned (quality, quantity, ways and means)?

The GAVI HSS grant was implemented in Ethiopia for five years (2007 to 2012) with funding being directed to the health system under three thematic headings: 1) health workforce, increased access to health services, and organization and management of health services, 2) supply, distribution and maintenance system for primary health care drugs, equipment and Infrastructure and 3) organization and management of health services at district level and below (10). Annex 1 illustrates indicators for key achievements against plans in the GAVI HSS proposal.

Theme 1: Health workforce mobilization, distribution, and motivation for provision of quality health services

Activities included in HSS programme under Theme 1:

- 1a) Integrated Refresher Training courses for HEWs
- 1b) Support for HEWs apprenticeship
- 1c) Training of Health Centre staff in Integrated Management of Neonatal and Childhood Illness (IMNCI)
- 1d) Integrated Refresher Training of Woreda and Health Centre Management Teams

Table 7: Activities included in HSS programme under Theme 1

Activities	Inputs	Outputs	Indicators
1a) IRT courses for HEWs	• % of woredas receiving timely funding for undertaking HEWs refresher course	• HEWs trained	• # of HEWs who have received one / two sessions of refresher courses
1b) Support for HEWs apprenticeship	• % of TVET schools provided with resources for apprenticeship	• Effectively supervised apprenticeship for HEWs' Trainees	• Ratio of trainees/tutor during apprenticeship • % of HEWs' trainees having completed all key immunization /cold chain maintenance tasks on apprenticeship check list
1c) Training of Health Centre staff in IMNCI		• HC staff trained with IMNCI	• # of Health Workers (HC level) trained in IMNCI
1d) IRT of Woreda and Health Centre Management Teams		• Woreda Health team members trained with the IRT	• # of Woreda health team members trained on IRT

Theme 1: Activity 1a) Integrated Refresher Training courses for HEWs

Integrated Refresher Training courses for HEWs were included as part of the HSS proposal to address knowledge and skill gaps in the health workforce. HSS funding was allocated to train over 25,000 HEWs from 2006 – 2010 with each HEW receiving 12 days of training provided by WorHO personnel under close supervision of an RHB-based quality assurance team(10). Due to reprogramming decisions approved by the JCCC and the GAVI secretariat, these targets may have been revised. Outputs of the HSS grant should therefore be assessed considering that the initial targets included in the original proposal may have been revised.

Table 8: Number of HEWs trained on IRT

	Year	**2006/07**	**2007/08**	**2008/09**	**2009 - 2012**	**Total(2012)**
Planned	**Number HEWs**	4,950	13,250	3,425	3,425	**25,050**
Achieved	**Number HEWs**	8,941	4,471			**13,412**

Planned Cost in US$	1,546,875	4,140,625	1,070,313	1,070,313	**7,828,126**
Actual Cost in US$	No available information on actual cost per activity				

Between the year 2007 and 2012, a total of 13,412 HEWs from all the regions received IRT (Integrated Refresher Training). The achievement of this activity compared against the original target set for the GAVI HSS period is 53.5%, with much of the budget allocated for training subsequently reallocated for construction.

During our facility visits, knowledge and skill gaps of HEWs were identified, firstly due to reduced frequency of training and secondly because high turnover of trained staff both having a negative impact on cold chain management as well as maternal and child health services.

Inadequate resource allocation has been an on-going challenge for IRT. The 2012 HDSP-IV Annual Performance Report (13) noted that the regions have found it difficult to upgrade HEW training to improve the extent and quality of HEP services and of the 1,367 trainees planned for 2012, 208 had completed training. The challenges noted by the APR 2011/12 report(13) included inadequate resource allocation by regions, inability to utilise financial support for capacity building activities and lack of regular monitoring and training activities by regions.

Theme 1: Activity 1b) Support for HEWs apprenticeship

HEW trainees are required to complete a two-month apprenticeship as part of their pre-service training. In order to improve the quality of these apprenticeships, HSS funding was allocated to cover subsistence allowance for trainees, transport from schools to apprenticeship sites, and per diem for the tutors (10).

Table 9: Number of HEW Apprenticeships Supported

	Year	**2006/07**	**2007/08**	**2008/09**	**2009 - 2012**	**Total (2012)**
Planned	**No. students**	0	5,750	3,425	3,425	**12,600**
Achieved	**No. students**	5,750	2,775			**8,525**
Planned Cost in US$		0	1,023,500	609,650	609,650	2,242,500
Actual Cost in US$		No available information on actual cost per activity				

A total of 8,525 HEW apprenticeships were supported through GAVI HSS funding between 2007 and 2012. For this activity 67.7% of the 12,600 apprenticeships planned in the original proposal were completed by 2012.

Theme 1: Activity 1c) Training of Health Centre staff in Integrated Management of Neonatal and Childhood Illness (IMNCI)

In order to complement the steps already taken by MoH to accelerate training of Health Officers and nurses, HSS funding was allocated to provide IMNCI training to an additional 5400 health workers in IMNCI, bringing the proportion of HCs with staff trained to 70% and enabling HCs to play their first-level referral role more effectively. GAVI HSS funds were provided to train 1350 additional nurses per year for four years from 2006 to 2010, using the new six-day IMNCI[1] training package which incorporates neonatal health (10).

Table 10: Number of HWs trained in IMNCI

	Year	2006/07	2007/08	2008/09	2009 - 2012	Total (2012)
Planned	**No. of trainees**	1,350	1,350	1,350	1,350	**5,400**
Achieved	**No. of trainees**	719	754			**1,473**
Planned Cost in US$		360,000	360,000	360,000	360,000	**1,440,000**
Actual Cost in US$		No available information on actual cost per activity				

A total of 1,473 health workers were trained on IMNCI case management financed by GAVI HSS funds between 2007 and 2012. In addition, post-training follow-up of the trainees by the trainers was conducted at 220 sites using GAVI HSS funds. The overall GAVI HSS period achievement of the IMNCI training against the original plan was 27% (14). The main reason as noted earlier for the underperformance of the target in IMNCI training set out in the country proposal was due to re-programming and channelling of funds from the training budget into health facility construction/renovation activities.

[1]IMNCI is the strategy to improve the quality of management of childhood illnesses, linking preventive and curative services so that programs, such as immunization, nutrition, and control of malaria and other infectious diseases are implemented in an integrated manner. The IMNCI training is outsourced to the Ethiopian Paediatric society.

Theme 1: 1d) Integrated Refresher Training of Woreda and Health Centre Management Teams

To improve the ability of woreda health office personnel to manage health service delivery and secure funding for continued health service expansion, an IRT course was developed by FMOH in collaboration with development partners. It has already been conducted for 499 woreda health office and health centre staff. GAVI HSS funds were allocated to enable 7,440 staff from 310 rural woreda health offices and health centres to participate in a two-week modular IRT course. The estimated cost of a two-week training session is USD$14,190 per group of 40 participants (10).

Table 11: Number of WorHO personnel trained on IRT:

	Year	2006/07	2007/08	2008/09	2009 - 2012	Total (2012)
Planned	**No. of trainees**	1,860	1,860	1,860	1,860	**7,440**
Achieved	**No. of trainees**	3,893	1,974			**5,867**
Planned Cost in US$		659,835	659,835	659,835	659,835	**2,639,340**
Actual Cost in US$		No available information on actual cost per activity				

A total of 5,867 Woreda health office personnel were trained on IRT through GAVI HSS funding between 2007 and 2012. For this activity 78.9% of the 7,440 trainees planned in the original proposal received IRT by 2012.

Assessment: Investing in the health workforce

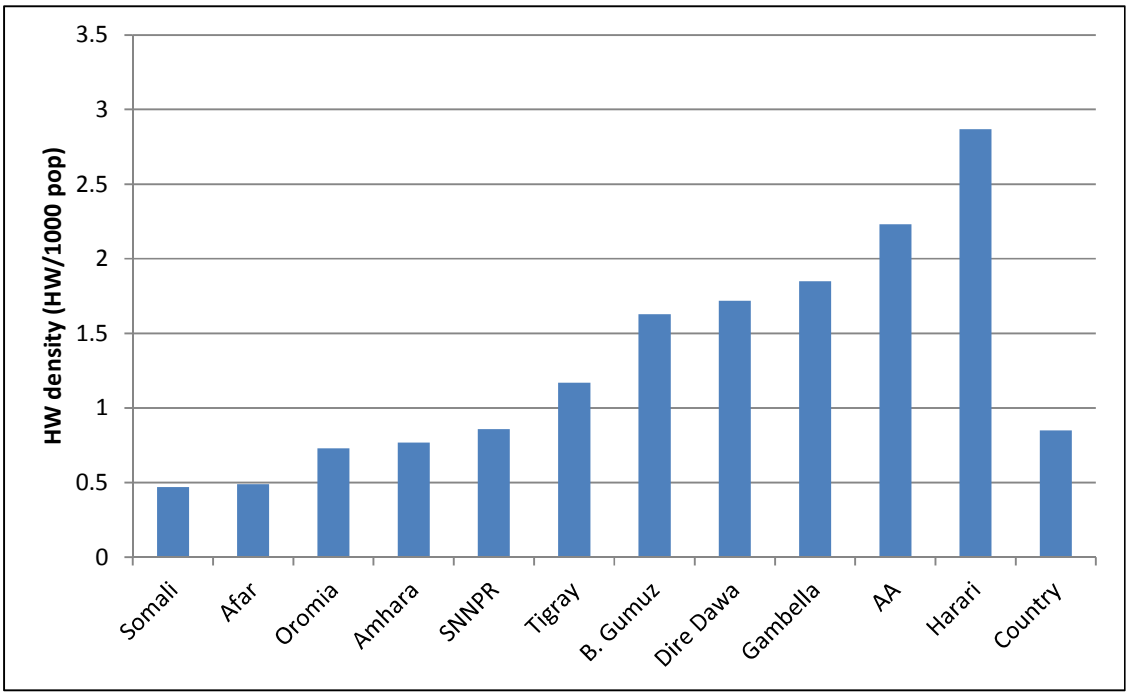
HEW skills, support and management are all critical to the successful implementation of the HEP which relies on health worker skills to provide basic services and support through an effective referral system.

Human resources in health are a critical consideration in health system strengthening efforts. Approximately 85% of the Ethiopian population lives in rural areas, some of which are severely underserved. The WHO standard for developing countries is 1 physician per 10,000 people and in 2012 the ratio for Ethiopia was 1 to 36,158(15). A total of 66,314 health workers are currently in service in Ethiopia. The health worker ratio is 0.84 per 1000 population which is well below the WHO standard of 2.3/1000. Furthermore, density varies across regions with the highest in Harari region (2.8/1000) to the lowest in Somali region (0.47/1000). Oromia, Amhara

and SNNPR have a ratio less than the national average (2.3/10,000). Although the density of health workers has grown during from 0.64/1000 (2003-2004) to 0.84/1000 in 2008-2009, there is disparity between regions and high attrition especially at higher levels (15).

The HSDP III planned to increase the training of low level and mid-level health cadres to match the increase in the planned number of health centers and health posts (11). The health workforce increased in number by 77% from 37,397 in 2005 to 66,314 in 2009. Health officers increased from 776 to 1606 and HEWs increased from 2737 in 2004 to 30,950 in 2009. The HEP 2008-2009 saw in its implementation the successful deployment of 30,950 HEWs exceeding the target of 30,000. However, the health workforce suffers from migration of mid and high level health workers into urban areas resulting in an uneven skill mix and geographical imbalances in health worker distributions across regions. 46% of all physicians and 28% of all nurses work in Addis Ababa city administration, with 15%, 18% and 16.7% of physicians choosing to work in the most populous areas of Amhara, Oromia and SNNP respectively. The majority of physicians serve the urban areas and nearly five times the number of nurses, physicians and pharmacists work in urban areas than in rural areas (15) (Annex 3).

Figure 4: Health worker density per 1000 / population by region 2009



Source: Africa Health Workforce Observatory **(15)**

Theme 2: Supply, Distribution and Maintenance System for PHC drugs, equipment and Infrastructure

The HSDP III targeted construction of 3,200 health centres in order to increase the access of services for the population. Expanding, equipping, furnishing, maintaining and managing health facilities were priority areas of HSDPIII (11). One of the major target areas for the GAVI HSS fund was the construction and equipment of health facilities. The single largest activity under these categories was the upgrading of health stations to health centres, and equipping health posts. These two components together accounted for 50% of all HSS grant funds (10). In order to accelerate the implementation of health centre construction, a special project management unit was established in FMoH. The project management unit was staffed with qualified professionals who monitored all construction sites. Furthermore RHBs assigned focal persons to facilitate the coordination of health centre construction.

Activities included in HSS programme under Theme 2:

- 2a) Upgrading of 212 Health Stations to Health Centres and equipment of 300 Health Centres
- 2b) Materials for construction of 100 Health Posts
- 2c) Equipment for 7340 Health Posts

Table 12: Activities included in HSS programme under Theme 2

Activities	Inputs	Outputs	Indicators
2a) Upgrading of 212 Health Stations to Health Centres and equipment of 300 Health Centres	• % of contracts signed for renovation/expansion of Health Stations • # of procurement actions initiated	• Health Stations upgraded • Health Centres equipped	• # of Health Stations upgraded • # of Health Centres equipped
2b) Materials for construction of 100 Health Posts			
2c) Equipment for 7340 Health Posts		• Heath Posts equipped	• # of Health Posts equipped

Theme 2: Activity 2a) Upgrading of 212 Health Stations to Health Centers and equipment of 300 Health Centers

The HSS proposal allocated funding for 15% of the upgrading of health stations to health centres (HC) that was included as part of the HSDP III (i.e. 212 out of a total of 1,457 health stations budgeted for in HSDP III). 182 health stations were planned for upgrading to Type B HCs and 30 to Type A HCs. The costs of expansion were estimated at USD$92,000 per HC and equipment costs were estimated at USD$36,500 for HC Type A and USD$21,483 for HC Type B (10).

Table 13: Number of Health Stations upgraded to Health Centres

	Year	2006/07	2007/08	2008/09	2009 – 2012	Total (2012)
Planned	**No. HS to HC**	35	71	71	35	**212**
Achieved	**No. HS to HC**	46	70	111		**227**
Planned Cost in US$		3,250,000	6,500,000	6,500,000	3,250,000	**19,500,000**
Actual Cost in US$		No available information on actual cost per activity				

Table 14: Number of HC Type A to be equipped

	Year	2006/07	2007/08	2008/09	2009 – 2012	Total (2012)
Planned	**HC Type A**	10	10	10	00	**30**
Achieved	**HC Type A**			30		
Planned Cost in US$		362,000	362,000	362,000	00	**1,086,000**
Actual Cost in US$		No available information on actual cost per activity				

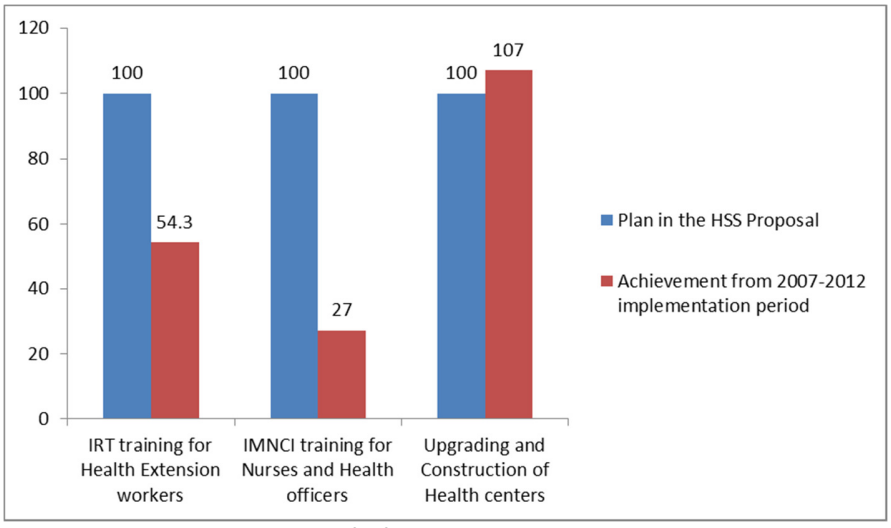
Table 15: Number of HC Type B to be equipped

	Year	2006/07	2007/08	2008/09	2009 – 2012	Total (2012)
Planned	**HC Type B**	45	90	90	45	**270**
Achieved	**HC Type B**			270		
Planned Cost in US$		970,315	1,940,630	1,940,630	948,832	**5,800,407**
Actual Cost in US$		No available information on actual cost per activity				

During the GAVI HSS period 2007-2012, a total of 227 health centres were constructed by GAVI HSS funds. The overall five-year achievement of the health centre construction and upgrading against the plan was found to be 107%(16)making the contribution of GAVI HSS in HC construction to more than half (52%) of all health centres constructed/upgraded in the same year in Ethiopia (see Figure 5). This shows the significant contribution GAVI HSS has made in the Ethiopia's health sector development.

Figure 5 illustrates the lower than expected IRT and IMNCI training achievements (according to initial targets) and the higher than expected achievement for the construction or upgrading of health centres. As noted above, the differences in the achievement against the plan were a result of reprogramming of activities during the GAVI HSS period (16)due to unforeseen price escalation for construction materials for health centers and health posts. Consequently, some activities (IRT and IMNCI trainings) were financed by other partners. The flexibility of the GAVI HSS funding arrangements allowed the reprogramming of activities at FMoH level to be a relatively simple process requiring JCCC approval after referral to the GAVI Secretariat. In contrast, for the implementers at regional level and below, reprogramming of activities followed a much more bureaucratic process.

Figure 5: Percentage of planned activities achieved in GAVI HSS support to Ethiopia 2007-2012



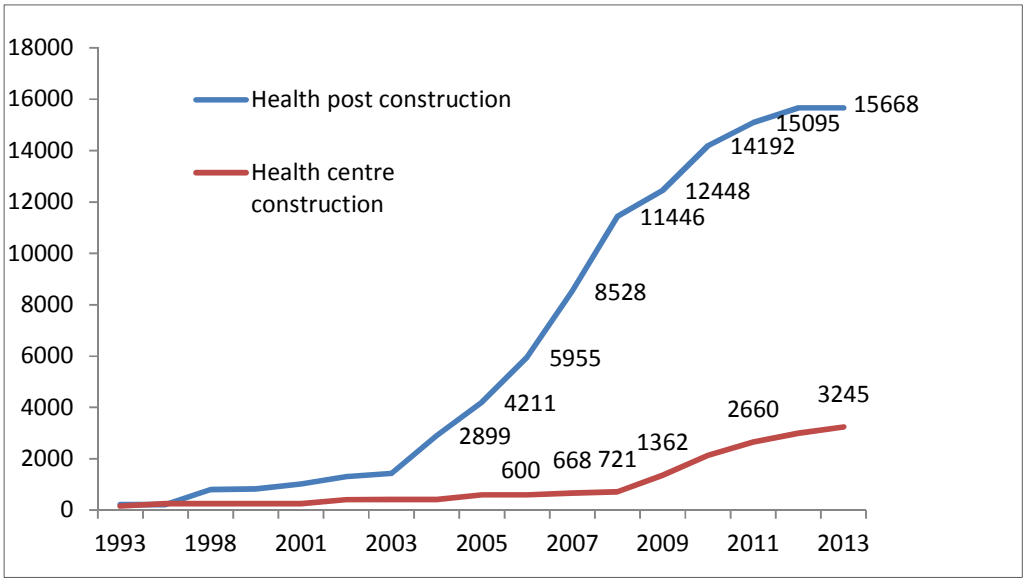
Source: GAVI HSS APR 2008-2012**(16)**

Theme 2: Activity 2b) Materials for construction of 100 Health Posts

HSS funds were allocated to support regions and woredas experiencing difficulties in funding health post construction. At an estimated cost of USD$7,500 per health post for industrial materials, the total requested for 100 health posts was USD$750,000, all of which was required in the first 18 months of the HSS funding period (10). In total, 92 health posts were eventually constructed using HSS funding.

There was a steady but slow increase in number of health facilities constructed from 1993 – 2003. A more rapid increase was seen from 2003 – 2013 during the period of GAVI HSS support (17)(See Figure 6). One possible explanation for this increased investment in health system infrastructure could be the fact that GAVI HSS health facility construction/renovation facilitated a matching health facility agreement by federal and regional governments. This indicates GAVI's significant contribution in terms of increasing access through funding and playing an important role in the expansion of health services in Ethiopia. As a result of an agreement between FMoH and RHBs, every FMoH constructed health centre was matched by a RHB-financed health centre.

Figure 6: Cumulative number of health post and health centres constructed from 1993 – 2012 under implementation

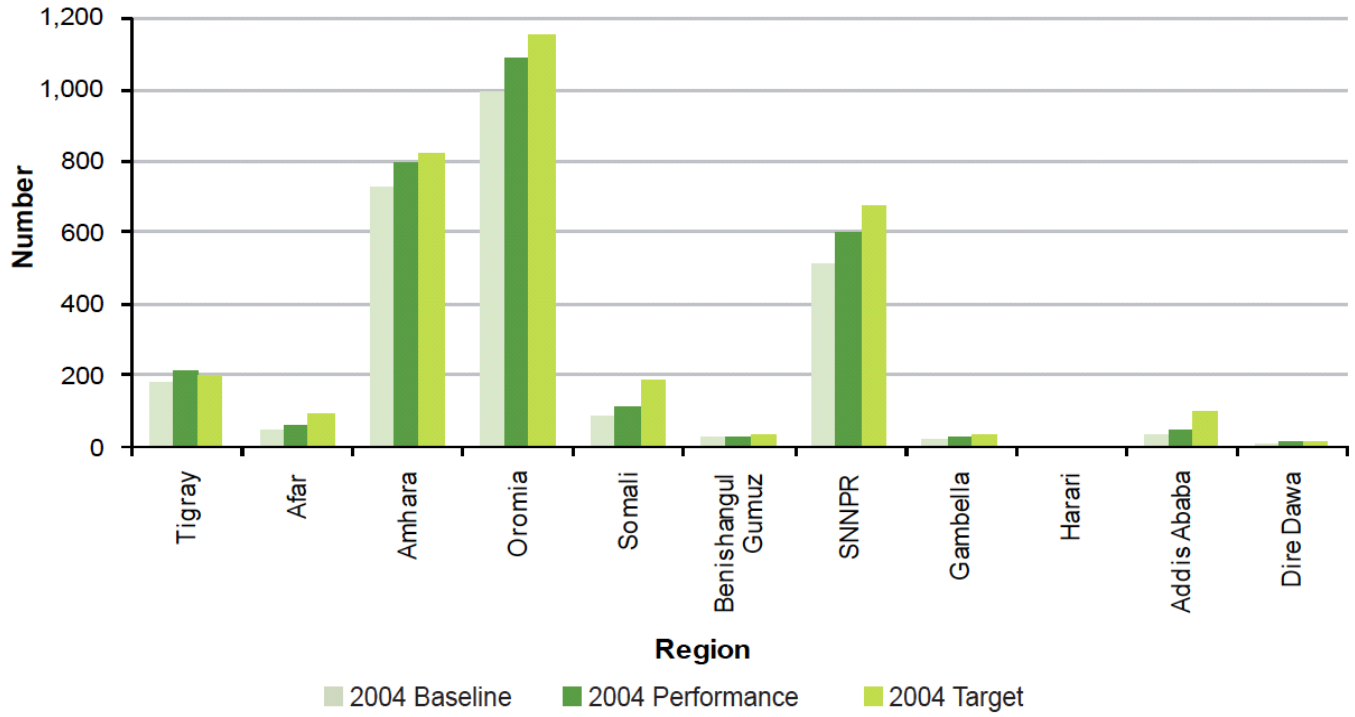


Source: Federal Ministry of Health, Visioning Ethiopia's Path, 2014**(17)**

The match of health centres constructed/renovated by FMoH and regional government was clearly seen in some regions (Tigray, Amhara, Gambella, Harari and Dire Dawa) and resulted in doubling the number of health centres in these regions.

Two points are worth noting in terms of this assessment. Firstly, there were regional variations in primary health care constructions (Table 16) in 2012, so that not all areas had the necessary health posts for the HEP to be fully implemented at the end of 2012. Secondly, even though each health post is meant to serve 3000-5000 people, differences in topography and geographical distances can make access difficult for dispersed populations in rural areas. These two considerations can have an impact on utility of services.

Figure 7: Comparison of baseline, performance and target of the cumulative number of health centres available by region 2012 (EFY 2004)



Source: Annual Performance Report, Federal Ministry of Health, Ethiopia (2011/12) **(18 p. 71)**

Table 16: Cumulative numbers of health centers constructed by FMoH and RHBs in 2012

Regions	FMoH financed construction of HC		RHB financed construction of HC		Cumulative number of HPs 2012
	No. of HCs including those under construction 2012	No. of HCs completed 2012	No. of HCs including those under construction 2012	No. of HCs completed 2012	
Tigray	86	85	87	87	589
Afar	42	41	20	6	272
Amhara	309	296	321	309	3267
Oromiya	471	450	611	443	6320
Somali	87	80	54	18	952
Ben-Gumuz	15	15	6	1	372
SNNPR	249	234	309	204	3707
Gambella	15	15	7	5	132
Harari	5	5	1	1	23
Addis Ababa	0	0	75	26	-
Dire Dawa	8	8	2	2	34
National	1287	1229	1493	1102	15,668

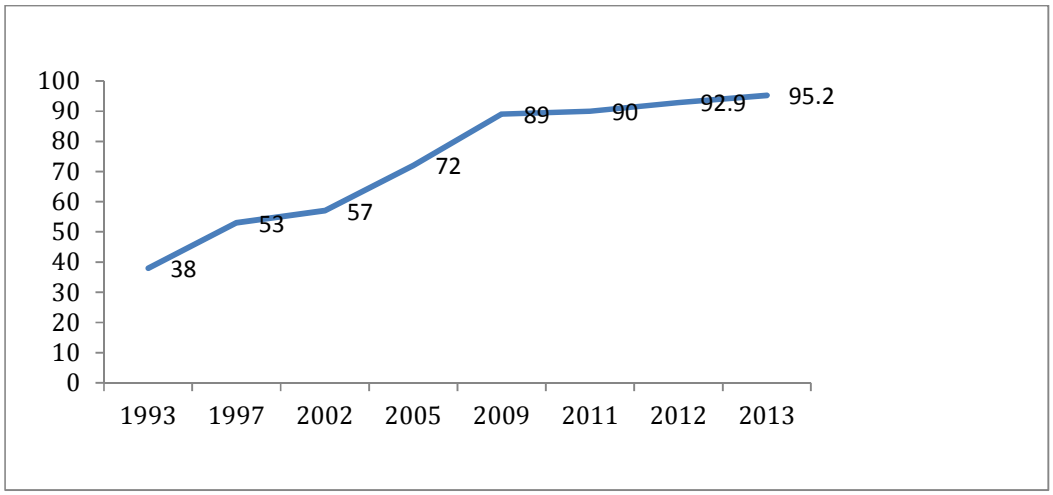
Source: Health and Health related indicators 2012, FMoH (19)

As Figure 7 illustrates, 8 regions performed below their target for the year 2012 including all four of the developing regions of Afar, Somali, Benshangul-Gumuz and Gambella. Oromia has the highest number of health centres, followed by Amhara and SNNPR. These three regions are the three most populous regions in Ethiopia. The highest number of health posts is also found in these regions with Oromia accounting for 40% of the health posts. A total of 2,268 health posts and 395 health centres were supplied with equipment to realize functionality and provide services under the HEP (13 p. 72).

Health care service coverage

Primary health care service coverage increased from 38% in 1993 to 95.2% in 2013 (17) (see Figure 8 below) as a result of corresponding increases in health facility construction. During the GAVI HSS period, primary health care coverage rose from 72% in 2005 to 92.9% in 2012. This increase in infrastructure set the stage for the implementation of the HEP and the 'reach every district' approach.

Figure 8: Primary Health Service Coverage from 1993-2011 in Ethiopia



Source: Federal Ministry of Health, Visioning Ethiopia's Path, 2011(17)

Theme 2: Activity 2c) Equipment for 7340 Health Posts

The HSS proposal allocated funding for the equipment of 7,340 health posts. Type A HPs (35% of HPs) were to be equipped with RCW50EK refrigerators while Type B HPs (65%) would be provided with an RCW15 cold box. The unit cost of HPA equipment was USD$4,263 while that of HPB equipment was USD $2,262. The total cost for 7,340 HPs was estimated at USD $20,154,600. Procurement was planned to be completed in the first 18 months of the HSS programme period, as equipment was urgently needed for HPs where HEWs were already deployed (10).

Figures obtained from the FMoH confirmed that 7,340 HPs were equipped at a cost of USD 21,105,050between 2007 and 2009 (Annex 4). The detailed breakdown of the equipment type and numbers were not available to our team for examination.

Cold chain equipment and functionality was highlighted as a problem in various interviews indicating that the majority of the health centres have no direct source of power, service delivery is impaired and critical equipment such as refrigerators for vaccine storage do not function resulting in a serious compromise in quality of immunization services provided.

The 2012 National EPI cluster survey indicated that 45.2% of health posts and 2.1% of health centres have no vaccine refrigerators. The majority (71.8%) of the health posts and half (54.4%)

of the health centres use kerosene as source of energy for the refrigerators (20). The same survey also indicated regional variations. In Addis Ababa, Dire Dawa and Harari, there were no facilities without a refrigerator but in other regions the percentage of facilities without a refrigerator varied from 2.7% in Afar to 34.7% in Oromiya (20).

Based on qualitative interviews, the main reasons for non-functionality of refrigerators included a lack of budget for kerosene, lack or interruption of electrical power supply, broken refrigerators, lack of spare parts to repair them and an absence of technicians to maintain the refrigerators.

Theme 3: Organization and management of Health services at district level and below

During the 2007-2009 period, woredas with the greatest need were identified by the regional and zonal health bureaus. Accordingly, 109 woredas were selected for greater support through GAVI HSS funds, which include provision of vehicles and IT equipment. The healthcare delivery system in all regions benefited from the fund through the improvement of supplies and training that were implemented sector wide (2).

To strengthen the organizational and managerial functions of the health system, the GAVI HSS funds supported the new HMIS roll-out, supportive supervision at health facilities and the purchase of IT equipment and vehicles. The HMIS team in the Policy and Planning Directorate managed the funds allocated for strengthening the monitoring and evaluation system. A total of 180 woredas received IT equipment and 134 vehicles (109 4x4 vehicles for woreda health offices and 25 Automobiles for Department Heads in the FMoH) (14).

Activities included in HSS programme under Theme 3:

- 3a) Strengthening Monitoring and Evaluation
- 3b) Vehicles for 109 WorHOs
- 3c) Support to initiate implementation of the Health Commodities Supply System

Table 17: Activities included in HSS programme under Theme 3

Activities	Inputs	Outputs	Indicators
3a) Strengthening Monitoring and Evaluation			

3b) Vehicles for 109 WorHOs	• # of vehicles procured		
3c) Support to initiate implementation of the Health Commodities Supply System	• # of regions supported for introduction of HCSS	• HCSS MP implementation initiated	• # of regions with annual work plan for implementation of the new HCSS Master Plan • % of HPs set up in a cluster system for vaccine storage • # of regional hubs handling cold chain equipment, cold chain

Theme 3: Activity 3a) Strengthening Monitoring and Evaluation

GAVI HSS funds were allocated to cover the cost of i) providing computers, printers, and UPS for 109 Woredas (US$ 300,000); ii) roll-out of the new HMIS at sub-national level through training workshops, printing and distribution of guidelines and supervision; and iii) annual regional HEP review meetings to discuss progress as documented by HMIS, verify implementation of recommendations, and update the HEP database (10).

Table 18: Cost of Strengthening M&E

	Planned					**Achieved**
Year	**2006/07**	**2007/08**	**2008/09**	**2009 - 12**	**Total (2012)**	**2012**
HMIS support cost in US$	890,018	861,768	860,018	851,751	3,463,555	**Unknown**
HEP Review meetings, cost in US$	86,750	115,000	116,750	125,017	443,551	**Unknown**
IT Equipment	300,000	-	-	-	300,000	**Unknown**

It was very difficult to confirm whether planned investments towards strengthening the national M&E system were implemented especially following reprogramming of HSS funds (see Annex 4 for GAVI HSS fund allocation and utilization). An assessment of the monitoring and evaluation system is provided in section 3.2.3 below.

Theme 3: Activity 3b) Vehicles for 109 WorHOs

While many WorHO had received support for transport from other sources, a significant gap remained. Regions identified 109 Woredas most in need of a vehicle and HSS funding was used

for the procurement of 36 vehicles in the first year and 73 in the second year at a total cost of US$ 2,507,000.

Theme 3: Activity 3c) Support to initiate implementation of the Health Commodities Supply System

HCSS was designed to ensure the availability of drugs, vaccines and consumables at health facility level. HCSS implementation required a full overhaul of the national logistics system for health commodities and GAVI HSS funds were allocated to cover Year 1 costs, thereby ensuring progress in: national policy and standard setting; establishment of regional Essential Health Commodities Units; establishment of New PHARMID as a procurement and distribution agency with a warehousing network at regional level: recruitment of technical assistance for HCSS support team; roll-out of the Logistics Management Information System; and provision of capacity development workshops on Procurement, Selection and Quantification at all levels(10).

The shortage of supplies and commodities was one of the logistical challenges addressed through GAVI HSS funding. Accordingly, a substantial amount of the budget was allocated for improving the Health Commodities Supply System (HCSS). GAVI-HSS has contributed towards the establishment of a commodities supply system overseen by PFSA (See Annex 2). Investment in the supply chain infrastructure resulted in the construction of a network of storage facilities and strengthening the storage capacity of PFSA by financing the construction of warehouses. This assessment found that storage and warehousing has continued to be an issue relating to stock outs at health facility level according to one donor. The evaluation of the supply chain system through a focus on immunisation under this theme was guided by two rationales. Firstly, strengthening EPI was clearly linked in the HSS proposal application as a strategy to improve child survival and immunisation coverage and specifically Penta 3 was a major outcome indicator for measuring the successful implementation of the HSS program. Secondly, the investigation into storage and supply of vaccines would serve as an indication of the overall efficiency of the HCSS system.

According to the evaluation team's health facility visit reports, stock outs were observed in 22 out of 39 health facilities. In most of these facilities, stock out duration was more than 3 weeks on average over the previous 6 months. The main reasons for stock outs were temporary delays in refilling the stock by health centres, shortage of kerosene and the absence and non-

functionality of refrigerators. These findings support qualitative data where most respondents mentioned the absence and non-functionality of refrigerators as the main problem.

According to the 2012 National EPI cluster survey, 38.6% of health posts and 43.6% of health centres experienced stock-outs for one or more of the antigens during the previous 3 months. Short duration of stock-outs was frequently reported (20).

Most of the vaccines (51.6%) were collected by HEWs on foot from health centres, compromising the quality of vaccines (20). At a regional level, Tigray (71.0%) and Amhara, Oromiya and SNNPR delivered vaccines on foot to more than 50% of the health facilities, whereas <10% of vaccines were delivered to health facilities in Addis Ababa and Dire Dawa on foot(20). Interviews with health facility staff revealed that when vaccine carriage boxes were not available, an umbrella was used as protection from the direct heat of the sun when transporting vaccines on foot.

The lack of a regular supply of the required stock of all vaccines led to stock outs of some types of vaccines. The introduction of the Rotavirus vaccine has been problematic as reported in one interview with a donor, due to the lack of large warehousing facilities at national level. In Benishangul-Gumuz region, many of the interviewees reported that insufficient supplies of certain vaccines were delivered from regional to woreda level. This would likely have resulted in reduced coverage of immunization outreach services and a higher average operational cost per each target beneficiary served.

Below is a summary of planned and achieved HSS outputs from 2006 – 2012. Annex 1 should be referred to for a full list of proposed activities under outputs, outcomes and impact.

Table 19: Activities planned and achieved by 2012 for the GAVI HSS proposal

HSS outputs	2006/7	2007/8	2008/9	2009/10	Achieved by 2012
*# HEWS attending refresher courses per year	>4,900	>13,200	>3,400	>3,400	13,412= 53.65%
% of apprenticeships with 1/15 tutor/trainee	>90 %	>90 %	>90 %	>90 %	67.66%
Training of health workers on IMNCI	1350	1350	1350	1350	27.3%
Capacity building of woreda HMT	7440	*	*	*	78.8%
% of HEWs trainees with EPI complete checklist	>90 %	>90 %	>90 %	>90 %	*

# of upgraded Health Stations (cumulative)	0	106	177	212	227
# of Health Posts equipped (equipment in place, cumulative)	*	3670	7340	*	7340
# of Health Centers equipped (cumulative)	0	155	255	300	300
% of Health Posts in cluster system for cold chain efficiency	20%	40%	60%	70%	*
% of woredas with updated/accurate stock reports	10%	50%	60%	70%	*
% of Health Posts with 10day Kerosene stock	*	50%	75%	80%	*
# of woredas equipped for supportive supervision (max 109)	*	36	73	*	*

***No data available**

3.2.3 Monitoring & Evaluation

Key evaluation question: To what extent were activities, resources and results appropriately monitored and reported by the MOH to GAVI secretariat and Alliance partners?

At the FMoH level, the Resource Mobilization and Project Coordination unit under the Procurement and Finance General Directorate of the FMoH was responsible for providing GAVI with reporting relevant to the HSS grant. Quarterly activity and financial reports of the grant were compiled and submitted to GAVI and an annual HSS Grant performance report was submitted to GAVI annually as part of the annual sector performance report

Quality aspects of the M&E reporting system: This assessment finds that this component remains weak in spite of the implementation of the HMIS reporting system at all levels in the country. Specifically for the GAVI HSS in Ethiopia, input and output indicators with annual target values are presented for each of the three theme areas without data sources being specified. The HSS proposal lacked indicator definition, information on the frequency of data collection and reporting and availability of baseline data. The IRC review of the Ethiopia proposal and previous evaluations noted that the monitoring framework was “slightly weak” with some baselines and data sources missing (2). Further inquiry into data quality assurance was not within the scope of this evaluation and cannot be commented on.

Interviews with the GAVI secretariat confirmed that the reporting of data is not exhaustive nor conforms to the best quality standards but it has improved in the two years since 2012. Whilst recommendations forwarded to the FMoH for increased reporting were being followed, the

lack of capacity in compiling data and the high turnover of staff at all levels has proved problematic for data collection and analysis. Moreover, GAVI HSS indicators were not tracked in the HMIS document of the Tracking report (2) and were not included in that previous proposal package. The recommendations were to adopt these indicators in future reports.

Key evaluation question: What were the challenges associated with monitoring and reporting of the HSS grant?

Our evaluation found it was not possible to verify GAVI HSS related expenditure by specific activities per district or region. High staff turnover at all levels, poor record keeping and frequent changes in the structure of the health system made it difficult to trace disaggregated data indicating a need for improvement in handover procedures, record keeping and archiving This evaluation concurs with previous evaluation findings (1, 2) that the monitoring framework needs further strengthening.

Assessment of country level M&E Activities: The degree and quality of supportive supervision provided to enhance the monitoring function for immunisation related activities was assessed. Additionally, the health information system was assessed according to timeliness of reporting to the next level, data collection quality, periodicity of data collection and disaggregation of data.

Supportive Supervision: Supportive Supervision is evident across all regions and at all levels of health service administration, however the quality and frequency varies between and within woredas. Where gaps or shortfall occur, partner organisations such as the WHO and UNICEF conduct supportive supervision through surveillance and immunization officers assigned for each region. The results of our visits to 38 facilities across the country can be viewed under Annex 5-8. National guidelines for childhood vaccinations were not available in half of the facilities visited and similar numbers had no guidelines of any kind on childhood vaccinations.

Timeliness of reporting: Timeliness of reporting to FMoH is less than satisfactory and according to the 2010 Annual Performance Report from the FMoH, less than 40%of reports arrive in a timely fashion (22). Standardised HMIS reporting formats are used across all reporting levels. The timeliness and completeness of the data from the HP varies, with some HEWs capable of producing complete report but most HEWs lack the skill to prepare a complete report.

A 2007 assessment of the HMIS system in Ethiopia reported staff particularly at the periphery levels lacked adequate skills in data collection and analysis. Parallel reporting systems resulted in redundant and conflicting reports leading to poor data quality of data in terms of accuracy and timeliness. In 2008, the newly reformed HMIS system was launched to streamline the system and address these issues.

A further assessment conducted in SNNPR in August 2011 noted that data accuracy and competencies to analyse, interpret and use HMIS data at WorHO and HF levels were major challenges (26).

This evaluation also noted that at country level, HSS indicator measurements are discordant at times due to different methods of data collection. The APR report (2012) further explains that the overlapping confidence intervals in the EDHS maternal mortality ratio estimates between 2005 (673 CI 548-799) and sampling variability creates uncertainty about the change in MMR between 2005 and 2011 (7). There was also variability in the reported coverage of DPT/Pentavalent 3 from different sources. DPT/Pentavalent 3 coverage in the national survey 2012 was reported as 65.7% (20), in the EDHS 2011 it was 37% (24), whilst FMoH administrative reports from 2011 and 2012 quoted coverage rates of 85%. These differences highlight the gap in the technical capacity within the country for the monitoring and evaluation functions of the HSS program. Inconsistencies in statistics vital for determining the fidelity of programmes point to unjustified assumptions during proposal review, of the country's technical capacities to provide high quality data.

One important point to note is that services provided by private facilities are not captured in the country health information reporting system. This information is however captured through surveys such as the EDHS. Improving the routine monitoring system will require incentivizing the private sector to contribute to the country's routine health information collection.
Additionally, indicators to measure quality of service and equity are absent and can also be helpful at national as well as peripheral level to plan and allocate resources to increase utilisation of services and target the poor.

Key evaluation question: To what extent was the feedback received useful and led to appropriate actions?

Feedback on the annual progress reports of the country was forwarded from the GAVI secretariat identifying several issues. These included: that the Annual Progress Report was signed by most of the JSCC members but did not include CSOs; there were discrepancies between administrative and survey results of coverage data; progress reports lacked detail particularly in activities inputs as well as objectives; numeric values on baseline data were missing and achievements/outputs were not provided; the absence of an overall M&E framework; indicators of progress are provided but there is a lack of consistency in the amount of financial expenditures(23). The recommendation was for the country to re-submit the reports and provide clarifications on the issues raised (16).

Despite these recommendations, several output indicators included in the country proposal relating to the implementation of the HEP have not been reported on through successive annual progress reports during the grant period (see Table 21). Additionally reprogramming of activities did not result in new targets being set to reflect the reallocation of funds. It is therefore problematic for this evaluation to determine whether re-programmed activities met set targets or not. These observations point to a major oversight on the part of the GAVI Secretariat in not triggering corrective action to address the weaknesses in this key function of the health system. Corrective action could have prompted a review of the indicators and support in developing a strong monitoring framework.

The country level representative from the GAVI secretariat noted that although reporting has improved in quality and coverage, it is not exhaustive and recommendations have been forwarded to the FMoH. However, it was explained that the lack of capacity in compiling data and high turnover of staff at all levels creates problems in ensuring good quality data is created. She added that previously GAVI HSS indicators, especially the progress of impact, were not tracked in the HMIS forms but have been included in the present proposal package. We concur with this assessment as documents were often unavailable for examination or incomplete due to changes in staff and document handling issues.

3.3 Efficiency

Key Findings:

- There is a lack of transparency in fund allocation and utilization at local administrative levels
- The efficiency of the programme has been negatively affected by reprogramming in favour of physical infrastructure at the expense of training and capacity building
- The overall efficiency of the programme has been impacted by the lack of consideration (during planning and implementation) of regional differences across Ethiopia
- The level of participation in health promotion and system strengthening activities from district administrations can greatly affect efficiency
- Planning of health facilities according to population served rather than geographical area makes access difficult for widely dispersed communities living in difficult terrain thereby reducing efficiency
- A high level of staff turnover, and limited capacity of frontline health workers has had a negative impact on outcome level cost-effectiveness
- Problems with cold-chain equipment and functionality reduced the efficiency of the vaccine supply chain and delivery. Over 50% of vaccines are delivered on foot by HEWs pointing to inefficient use of human and material resources
- Wastage of vaccines is related to the failure of health facilities to properly maintain the cold chain standards
- Shortages of some types of vaccines and poor immunization supply planning resulted in stock-outs resulted in higher average operational costs for full immunization per beneficiary served
- Joint planning and integration among different actors is evident in many areas
- The use of volunteer community health workers (HDAs) since 2010 has contributed to improved cost-effectiveness of the HSS programme

Key evaluation questions relating to HSS Programme Efficiency:

i. To what extent were the funds used efficiently and as planned?

ii. What contextual factors explain the utilisation rate of the funds received?
iii. What could have been done to improve the efficiency?
iv. To what extent did Ethiopia use GAVI Immunisation Services Support (ISS), CSO and HSS funds in a complementary and coherent manner?

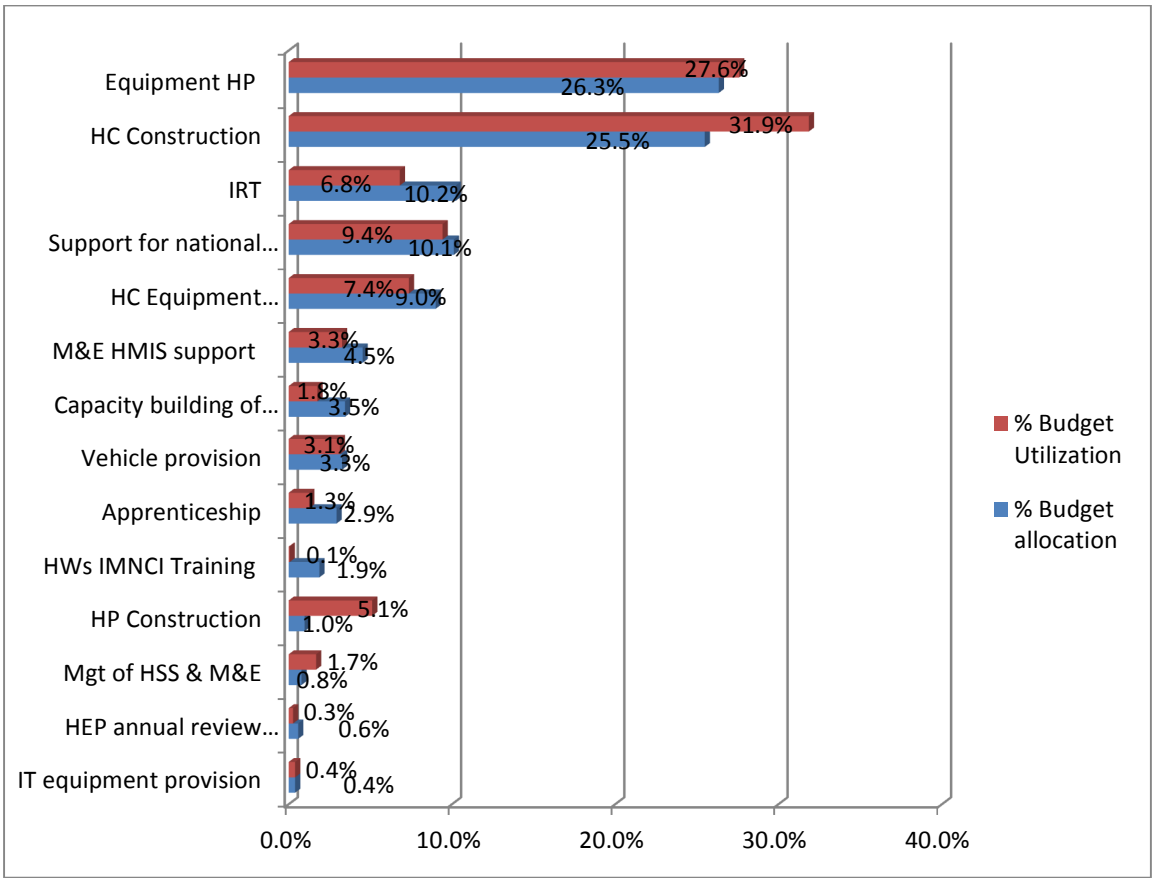
An assessment of programme efficiency helps to determine whether a product or service uses the minimum resources necessary to achieve the desired results. The term efficiency is generally a relative term and its measurement requires a comparison of alternative approaches to achieve the same outputs (27). While this report cannot assess alternative approaches, it will attempt to provide an analysis of how funds were utilised, the contextual factors that influenced utilisation of funds and the experiences of other countries that have achieved efficiency gains in health system strengthening initiatives.

Key evaluation question: To what extent were the funds used efficiently and as planned?

3.3.1 Overall efficiency of the HSS programme

The budget allocation and utilization of GAVI assisted funding illustrated in Figure 10 below can provide insights on how reprogramming decisions may have impacted the overall efficiency of the programme and the efficient use of funds. During the GAVI HSS period, reprogramming by the FMoH required the redirection of funds to meet increased building costs, in turn, impacting funds available for health workforce training. Figure 10 shows that two thirds of the total programme budget was utilised for constructing health centres and health posts and equipping them at the expense of IMNCI, IRT, apprenticeships and capacity building activities where funding was reduced. As such, health facility construction related activities consumed about 37% of the total resources utilized (26.5% was originally allocated) with a further 35% used for provision of HP and HC equipment. This brought the total utilized for physical infrastructure and equipment to 72% of the total budget, up from 61.8% originally allocated. The increase of 10% in budget utilization through reprogramming meant that the budget for training and capacity building activities was reduced by 47%. Thus only 27% of the original IMNCI training target and 53% of the planned IRT training were achieved**.** The table under Annex 4provides further details on planned and actual expenditure.

Figure 10: Pattern of Fund allocation and Utilization for GAVI HSS related activities



Source: FMoH Finance and Procurement Department

With a reduced emphasis on strengthening health worker skills, the quality of services declines; a weak referral system becomes worse as symptom recognition and treatment initiation or referral is delayed and utilisation of services falls as trust in the public system is undermined. The 2011/12 APR report (18) cites inadequate skills on the part of HEWs and health professionals as one of the reasons for low utilisation of maternal health services. Falling immunisation rates also suggest large numbers of unvaccinated children despite the increase in primary health coverage. Moreover, as noted earlier, 36.6% of refrigerators were non-functional; the majority of the health facilities have no direct source of power and critical equipment such as refrigerators are not functioning (20). An additional 45.2% of HPs have no refrigerator, requiring HEWs to collect vaccines from the nearest location in the EPI cold chain cluster system.

"The attention to physical infrastructure has ignored the components of increasing community demand as well as providing quality services. An innovative strategy to address escalating building costs could be the renting of facilities closer to people rather than building new ones as has been tried in other countries" Major donor

We note that resource allocation within health systems requires careful balancing between the different elements that make up the supply side of health care delivery. These elements include improving the skills and numbers within the health workforce, physical access, an adequate health information system, as well as availability and supply of pharmaceuticals. Our assessment finds that reprogramming decisions and subsequent utilisation of funds affected the efficiency and effectiveness of the program.

Other donors have also supported this argument by explaining that in those areas where resources have been utilised for improving quality of services and community mobilisation, there has been a positive impact on coverage, which in turn improved the cost effectiveness of the overall health service delivery.

3.3.2 Budget utilisation and institutional factors affecting efficiency

Although the detailed budget allocation at woreda level was communicated to the head of each woreda health office, this information was not made accessible to the rest of the staff including the EPI focal persons. Consequently, many of the staff interviewed at both facility and woreda levels indicated that they were not aware of the financial resources allocated specifically for HSS activities.

Resource allocation and utilization information for the health sector is maintained at the Finance& Economic Development administrations at different levels. Interviewees further explained that at health facility level, funds were not allocated according to different activities but were entered into a pool for all health related activities. The accounts for the budgets allotted at woreda level were maintained at the woreda Finance & Economic Development Offices.

This assessment acknowledges that health workers do not necessarily require the full details of budget allocations but prioritisation of activities is better carried out by an understanding of HSS and other competing activities if planning is to occur at woreda level. Insights into the

factors affecting efficiency were gained from interviewees who explained that disbursements from the federal level were often delayed leading to sharing of reduced resources for all activities thus impacting efficiency.

Secondly, targets for immunisation are planned at federal level according to CSA population figures. Census figures are not current and depend on the last census. On the other hand, immunisation plans are prepared at woreda level according to the actual numbers of eligible children in the district. This leads to underutilisation of allocated funds or insufficient funds being available for activities. This observation was further reinforced by a donor who noted that the capacity of regions to use resources efficiently varied between regions and even if funds were allocated in an equitable manner, cost effectiveness in service provision depended on institutional capacities for using those resources efficiently. The quarterly health bulletin published by the FMoH would be a useful platform to share experiences of different regions to improve efficiency.

According to several interviewees at woreda level, there were a few instances where the budget allocated to support immunization activities was used for other purposes such as the purchase of stationary and fuel. In order to ensure proper use of resources, efforts were made at zone and woreda level through planning and close follow-up of activity implementation to prevent misuse of funds.

The level of support and commitment from woreda and kebele administrative structures in the regions was one factor that affected both the effectiveness and efficiency of the programme. In woredas and kebeles where the required level of commitment and support was obtained, HSS implementation in general and the immunization programme in particular were cost effective. For example, in the Benshangul-Gumuz region, community members in the woredas with the highest immunization coverage were effectively mobilized to contribute to the construction of HPs through the provision of labour and locally available construction materials.

Other factors impeding the cost-effectiveness of health service delivery and immunization are related to the policy of planning one health post per 5,000 populations. In areas with widely dispersed communities living in difficult terrain and poor road infrastructure, communities find access difficult. Both institutional capacity limitations and poor infrastructure development have reduced the cost effectiveness of health service delivery in general and immunization in particular, by increasing the operational costs of service delivery. The Universal Road Access

Program (URAP) and voluntary resettlements in less developed regions are beginning to make an impact on reducing the operational cost of basic service delivery in these areas.

The following institutional factors impacted on overall efficiency in implementation of the activities under HSS:

- Effective use of human resources. Our field visits noted that some HEWs did not have adequate skills to maintain the cold chain system. Utilising senior health workers from Health Centres support HEWs in immunization services in developing regions reduced the time that these professionals have available for other health provision activities, and impacting the cost of immunization service delivery

- The use of HEWs and HDAs (Health Development Army) to transport vaccines between woreda or core health facilities and service delivery sites. This practice could be avoided if the cold chain management system introduced at HPs was functional

- Failure of the health system to properly track the use of vaccines and other inputs through standard stock management, recording and reporting practice

- High level of staff turnover (particularly HEWs) after significant resources had been spent on training on EPI and cold chain management. RHBs were forced to invest in training new HEWs to replace those who had left

- Although significant resources were invested in establishing a standard cold chain system in health facilities, most of the Health Posts surveyed faced problems due to the lack of a reliable energy supply and the required equipment for repair and maintenance services. There was a severe shortage of technicians for maintenance and repair, a lack of spare parts and other resources necessary for field maintenance work including vehicles and an operational budget.

- The cold chain management system could be improved if HPs were enabled to store vaccines effectively without relying on HCs for supplies. The present system has two adverse implications on the efficiency of service delivery. Firstly, Health workers spend time collecting vaccines from HCs, and secondly resources are wasted in maintaining the cold chain during transport to the HP level.

Key evaluation questions:
What contextual factors explain the overall efficiency of the HSS programme
What could have been done to improve the efficiency?

This assessment found that the following contextual factors have affected the efficiency of the HSS program and suggests mitigating factors for increasing efficiency:

- The general inflationary trend that impacted on cost estimates and led to reprogramming decisions. It is not clear whether a thorough analysis of past inflationary trends and predictions of future pressures were incorporated into the proposal design. This approach could have minimised the effect of the general inflationary trend on the service delivery capacity of a program of this size.

- The scarcity of industrial construction materials in the market place. Effective planning and prior assessment of the supply chain for important project inputs at the planning stage may help to minimise the adverse effects of the periodic variation in commodity supplies.

- The level and effectiveness of participation of the local administrative authorities and community groups active in the woredas. Effective and sustainable awareness creation and motivation by local authorities is effective in improving performance of the health system functions. During field visits, it was repeatedly observed that immunisation coverage tended to be better in areas where there was strong commitment from local kebele leaders and religious groups working to increase community demand by tracking new birth registrations, tracing drop out cases and fostering strong links between health facilities and the community.

- Level of community awareness and attitude towards immunisation or maternal health services. Awareness creation and sensitisation by local governing bodies in supporting HDA plan would enhance community mobilisation and utilisation of services

- Accessibility and settlement patterns of target communities especially in the pastoralist areas. One strategy to address the barriers to access for pastoralists would be to

planning for activities to be based on actual seasonal variability in the different regions. Supplying necessary inputs during the dry season when accessibility is better is one possibility. Regional differences within Ethiopia require careful and tailored solutions for input supply and a functioning commodity supply chain management system from federal to health facility level. At the time of GAVI HSS, the HCSS was in its infancy and was being implemented concurrent to HSS activities in 2007.

Key evaluation question: To what extent did Ethiopia use GAVI Immunisation Services Support (ISS), CSO and HSS funds in a complementary and coherent manner?

The lack of joint planning and integration among different actors is one factor that has previously had a negative impact on the efficiency of immunization services. There have recently been some positive developments in this regard through coordination of different actors and activities under the health sector. For example in the Benishangul-Gumuz region it is reported that efforts have been made to coordinate the International Rescue Committee immunization programme with other programmes already in progress such as the CGPP (Core Group Polio Program) and ICCM (Integrated Community Case Management). Improved coordination has helped to minimize the operational cost of the programmes through joint use of resources (e.g. human resources, logistics and other operational costs) reducing duplication of efforts. Another good practice related to coordination is the willingness of IFHP to work closely with the government health structures through joint planning and implementation. These strategies for service integration are expected to improve the cost effectiveness of basic health service delivery (including immunization services).

It is not clear whether there is a mechanism in place at the FMoH level or at the GAVI Secretariat (through the IRC) to ensure that duplication of activities under the different funding streams of ISS, HSS and CSO funding is avoided. ISS funding was used for new vaccine introduction and continued vaccine supplies of older vaccines. HSS funding was used to provide health facility construction and equipment.

As shown in Table 20 below, duplication of activities included within proposals for different types of GAVI support (ISS, HSS and CSO) was limited.

Although the training of health workers at various levels has been included as an activity within each country proposal, a wide range of topics have been covered including cold chain

management, logistics, IMNCI, HMIS, immunization practices and MLM. Any repetition of training may have been intentional in order to reinforce health worker knowledge on a particular subject (i.e. cold chain management).

The 2008 country CSO proposal (28) states that compatibility of CSO programmes with the previous 2006 HSS proposal (10)was required for selection of organizations. The programmes were designed by CSOs in order to provide extra technical and human assistance to the ongoing activities included within the HSS.

The FMoH introduced a comprehensive Multi-year Immunization Plan (cMYP) from 2006-2010 (29) to ensure that GAVI funds are used in a complementary and coherent manner. The Inter-agency Coordinating Committee (ICC) for immunization in Ethiopia was also established to coordinate partner's resources for immunization activities.

Table 20: Activities included within Ethiopia country proposals for each type of GAVI support to Ethiopia

	Type of GAVI support to Ethiopia		
Activity	Immunization Service Support (ISS)2001/07(30)	Health Systems Strengthening (HSS) 2006(10)	Civil Society Organization (CSO)2008(28)
Implementation of new national EPI policy	×		
Inventory / mapping of cold chain equipment	×		
Collaboration with NGOs in planning EPI activities	×		
Integrated Refresher Training courses for HEWS	×	×	×
Support for HEWs apprenticeship		×	
Training of Health Centre staff in IMNCI		×	
IRT of Woreda and Health Centre Teams	×	×	×
Upgrading of 212 Health Stations to Health Centers and equipment of 300 Health Centers		×	
Materials for construction of 100 Health Posts		×	
Equipment for 7340 Health Posts		×	
Strengthening Monitoring and Evaluation		×	

Vehicles for 109 WorHOs		×	
Support to initiate implementation of the HCSS		×	
Strengthen static /outreach immunization services			×
increase participation of all stakeholders to create demand for immunization service			×
Launch EPI campaigns to improve EPI coverage			×
Improve child resistance to disease and nutritional status of women and children in target areas			×
Provide health education, TBA training and post/ante-natal monitoring			×
Conduct supportive supervision after training	x		×
Increase community awareness on immunization	x		×

3.3.3 Wastage rate of vaccines

An issue raised in relation to the efficiency of the vaccine stock management is the wastage rate of vaccines. The efficient use of vaccines can be assessed by comparing the actual wastage rate of different antigens with the standard wastage rate expected under normal conditions of immunization service delivery (obtained from the FMoH Annual Performance Reports). The WHO open vial vaccine policy requires that multi dose vaccines such as BCG, measles and PCV should be returned for storage at the recommended temperature (2˚C - 8˚C) in less than 6 hours after opening. Tetanus toxoid and polio may be stored at room temperature up to a period of one month. According to an EPI expert, the time taken for HEWs or HDAs to collect vaccines, transport them back to the health post and conduct outreach services may well exceed the 6 hour limit for storage out of the refrigerator. This practice can have implications on wastage as well as reduced potency of vaccines and unprotected children.

Although the standard wastage rate is 50% for BCG, 25%for Measles, 5% for DPT, and 10% for PCV, OPV, & TT, the actual wastage rates observed in some visited health facilities were higher than these standards. For example the EPI focal person at Debate HC in Benshangul region mentioned that the actual wastage rate for BCG, Measles, OPV and TT was 76%, 43%, 23% and 29%respectively, while the wastage rate for DPT and PCV was 6%.

The difference in wastage rates between the various vaccines is dependent on the number of vaccine doses per vial and the number of children able to access the immunization service at

health facilities or during immunization outreach services. In general the wastage rates of BCG, TT, Measles and OPV are 26%, 19%, 18% and 13% higher than the standard rates, respectively. The wastage of DPT is only 1% above the standard rate and PCV wastage is 4% below the standard. Even though the above rates are not representative of all health facilities in the country due to the very limited number of health facilities assessed, they can be indicative of the current situation and can point to corrective actions to improve the efficiency of the immunization service in the future.

Strategies used by health facilities to preserve potency of vaccines and minimize wastage included following cold chain standards for vaccine transportation and mobilizing HDAs to create awareness. Health Development Armies (HDAs) inform communities on dates of immunization services and mobilize them to attend service delivery centres in order to increase demand and improve efficiency. Despite these strategies to minimize wastage, there were tendencies in some health facilities to overlook this procedure and open vials whenever a single child came to receive the service. This may have been done in order to achieve the coverage targets set by the immunization plan or when there was excess stock available

The main causes of vaccine wastage can be summarised as being due to the failure of health facilities to properly maintain the cold chain standards due to electricity or kerosene shortages or technical failures of refrigerators, absence of the health workers responsible for managing and maintaining the system on regular basis and in a few cases due to negligence of the health workers assigned for cold chain management. Vaccine wastage due to the failure of cold chain is a concern mainly at HP level since most of the HCs have a more reliable power supply (i.e. both kerosene and hydro power energy).

3.4 Results

Key findings

- DPT 3 national coverage rates for the GAVI HSS period indicate declining or at the least stagnant rates of coverage depending on the source of the data. Coverage rates for 2012 vary from 65% (WHO/UNICEF estimate) to 85% (JRF administrative report) depending on the source of the data The EDHS estimate for DPT 3coverage for 2011 was 37% increasing from 32% in 2005.
- National Drop- out rates for DPT 3 were 26.5% in 2012 with only 2 areas (Tigray and Addis Ababa) meeting the acceptable threshold target of <10% drop-out rate for DPT 3
- Key areas associated with declining trends of immunization coverage included programmatic management issues, low utilization of services and service delivery.
- Disparities exist in the major health outcome indicators across regions with developing regions(DRS) lagging behind national averages in basic vaccination coverage and infant and under five mortality rates
- 38.6% of health posts and 43.6% HC had antigen stock-outs in 2012
- Most health centres (94.4%) and health posts (86.4%) provide static immunization services but the majority of the health facilities have no direct source of power
- Problems with cold-chain equipment and functionality reduced the efficiency of the vaccine supply chain and delivery.
- Antenatal coverage for at least one visit rose from 29% in 2006 to 43% in 2012 but was below the target of 80% for 2012
- Several HSS outcome indicators did not achieve the set targets at the end of the HSS period
- The U5MR mortality rate declined from 123/1000 live births in 2006 to 88/1000 live births in 2011. Ethiopia reached its MDG 4 goal of reducing the U5MR by two thirds between 1990 and 2015 ahead of the target date in 2014. The impact of falling immunization coverage rates will only be evident in the results of the EDHS report of 2016
- Maternal mortality ratio has remained unchanged over 2005-2011 at 676/100,000 live births

3.4.1 Assessment of outcome indicators

This section discusses the program outcomes to assess the results of the GAVI HSS grant by selecting a number of outcome indicators specified in the country proposal (Table 21). The country proposal set milestones and targets for the period between 2006 and 2012. The two major impact level indicators are DPT 3 and measles coverage and Under 5 mortality. This assessment will focus primarily on these two indicators. For outcome measurement and in order to establish possible contribution of the HSS program to these outcomes, data for the pre HSS period before 2006 were compared to the post HSS period of 2012 to observe any changes in the trend that may have resulted because of the HSS program.

Table 21: Outcome level indicators planned in the GAVI HSS proposal, 2006 and achievements in 2011/12

Outcomes	2006/7	2007/8	2008/9	2010/11	2011/12 Achievements
% of HPs providing EPI, twice a month (at least)	30%	60%	70%	90%	Not available
% of HEW recording refrigerator temp. twice daily	>50%	>60%	>70%	>90%	Not available
% of women attending at least one ANC	50%	60%	70%	80%	33.9% (EDHS, 2011)
% of HPs providing TT during ANC	60%	70%	75%	75%	Not available
% of rural kebeles with access to full HEP package	30%	40%	60%	70%	Not available
% of HPs with no essential drugs shortage last 3 months	30%	40%	60%	70%	38.6% of health posts and 43.6% HC had antigen stock-outs (2012, EPI cluster survey)
% of pregnant women with access to BEOC	30%	40%	45%	50%	34 % HC provide BEOC(2012, H&HR indicators)
% of HP supervised once in past two months	30%	40%	65%	60%	Not available
Impact on Immunization/MNCH Services					
(DPT3) coverage (from 69% baseline 2005)	70%	75%	80%	85%	85% (2012,JRF Administrative Coverage) 65% (2012, JRF UNICEF/WHO)
Measles coverage (from 59% baseline 2005)	65%	70%	75%	80%	80% (2012, JRF Administrative coverage)
% of children 6-12months having rec. Vitamin A last 6 months	40%	50%	60%	70%	53% (EDHS 2011)

% of children12-59 months rec. Albendazole last 6 months	40%	50%	60%	70%	19.8% (2012, H&HR Indicators)
% of children with Diarrhea receiving ORT/ORS at HP level	25%	40%	50%	65%	30.7% (EDHS 2011)
% of "clean deliveries"	20%	30%	40%	50%	13.2% (2012, APR)
% of children treated with the IMNCI protocol at HC level	25%	30%	40%	50%	% of HCs providing IMNCI services = 68% (2012, H&HR indicators)

Key evaluation question: To what extent did the programme achieve the objectives and targets as described in Ethiopia's HSS proposal?
Indicator: DTP3 and measles coverage

The HSS proposal in Ethiopia (10)**had set the following final objectives and milestones:**

Impact on Immunization/MNCH Services	**2006/7**	**2007/8**	**2008/9**	**2010/11**
(DPT3) coverage (from 69% baseline 2005)	70%	75%	80%	85%
Measles coverage (from 59% baseline 2005)	65%	70%	75%	80%

Table 22 presents immunization coverage rates for DPT 3 and Measles between 2005 and 2012 and milestones achieved for each year according to the FMoH Administrative report of 2013 (20). The Administrative coverage rates reported demonstrate that the milestones have been achieved according to planned targets, however the rate of increase (5% every year) from 2008 to 2012 was not maintained and progress with coverage slowed down between those years.

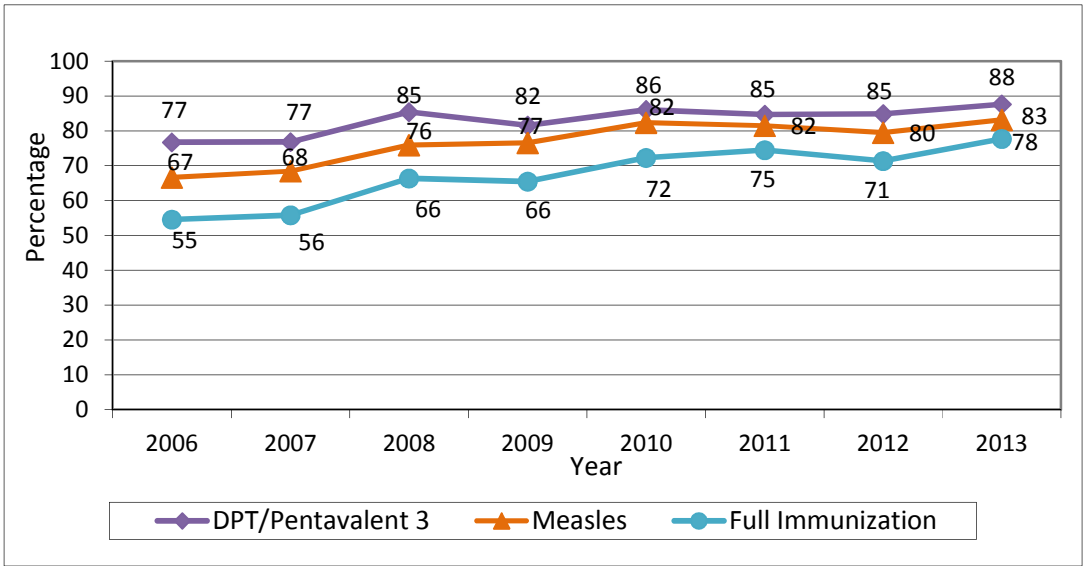
Table 22: Baseline and coverage rates achieved for DPT 3 and Measles 2005 – 2013 (Administrative coverage rates)

Indicators	**Coverage achieved %**								
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**
DPT3 coverage	69	77	77	85	82	86	85	85	88
Measles coverage	59	67	68	76	77	82	82	80	83

Source: FMoH Administrative Report (20)

Figure 11 illustrates coverage rates for the different antigens as reported by the 2013 *Ethiopia Routine Immunization Improvement Plan* report (14). Immunization coverage underwent a slow but gradual increase from 2006 reaching 85% coverage for Pentavalent 3 in 2012 and 80% for measles in the same year.Coverage rates show a stagnant pattern between 2008 and 2012.

Figure 11: Routine EPI coverage (DPT/Pentavalent 3, Measles and Full immunization) 2006 to 2013, Ethiopia



Source: Ethiopian Routine Immunization Plan Report, 2013(14)

Table 23 provides other sources of country immunization coverage [National EPI coverage survey (6), JRF UNICEF/WHO surveys (31), EDHS 2011(24)] showing discordance with the above administrative coverage rates (Table 22) and indicates a declining or stagnant trend from 2005 to 2012.

Table 23: Summary of GAVI HSS Coverage indicators, 2005 to 2013

Coverage Indicators									
	DPT/Penta 3 (%)					Measles (%)	BCG (%)	OPV3 (%)	Districts DPT/Penta 3 > 80%
	JRF admin. coverage	National EPI coverage	JRF Official est.	JRF WHO/ UNICEF	EDHS 2005/ 2011	FMoH	FMoH	JRF administrative coverage	
2005/ 2006	69	66	69	69	32	59	67	66	*
2010	86	*	86	56	*	82	84	86	55
2011	85	*	87	63	37	82	78	85	52
2012	85	65.7	83	65	*	80	80	85	54
2013	88	*	82	61	*	83	80	88	50

It is acknowledged that experience in many countries with evolving information systems indicates that discrepancies between administrative and survey coverage data are common. Data quality is in fact an issue in Ethiopia according to a DQA study conducted in 2010(32)that pointed out important issues in relation to reporting and accuracy of reported data. The same study noted that a tendency to over-report for the indicators especially DPT 3 and measles coverage was a common finding in nearly all of the reporting levels in the national HMIS system. The level of data accuracy was over-reported from service delivery sites to intermediate reporting at district and regional level and under-reported at M&E national level.

As anticipated, data from surveys do not confirm administrative coverage rates (see Table 23) as further explained below:

- The National EPI coverage survey conducted in 2012 reported DTP3 coverage of 65.7% with regional variations ranging from 14.1% in Afar to 94.2% in Addis Ababa(6). For the same year the administrative coverage was 85%, a difference of 20% (20). This is a much larger difference than the one observed in 2006 before GAVI support started: 66% (EPI survey) against 69% (administrative report) a difference of 3%. Therefore depending on the source of information, the HSS program has either contributed to increasing DPT 3 coverage or did not have any impact
- The DHS surveys conducted in 2006 and 2011 (24)have shown much lower DTP3 coverage than the national administrative coverage 32% vs. 69% in 2006 and 37% vs. 85% in 2011(6). This indicates an overestimation on the part of the administrative

coverage reports and that the increase (if any) in DTP3 coverage during the HSS period is not as high as indicated by the administrative data. On the other hand, it should be noted that household surveys such as the DHS rely on documented history on cards or recall by mothers suggesting some recall bias in estimated figures.

Our conclusion that DPT 3 coverage rates are stagnant or show a relatively small increase between 2006 and 2012 is confirmed by additional comparative analysis:

- The JRF WHO/UNICEF best estimates show coverage rates fell from 69% in 2005/6 to 65% in 2012(31)
- The country DHS survey estimates for DTP3 show a relatively small increase from 32% in 2005 to 37% in 2011(24)

Moreover, according to the JRF WHO/ UNICEF country official estimate in 2013, 17% of districts reported more than 80% DPT3 coverage,31% of districts reported 50-79% coverage, 19% reported less than 50% coverage and 33%did not report DPT3 coverage(31). Measles coverage of more than 95% has only been achieved in 14% of districts falling from already low numbers (22%) in 2012. Drop-out rates have been increasing between DPT 1 and DPT 3 as well as MCV1 and MCV 2 (see Annex 10 and 11). These findings raise further questions on whether herd immunity has been achieved in the majority of districts and are confirmed by the increasing number of measles outbreaks especially since 2009/10. Increasing incidence of vaccine preventable diseases and epidemic outbreaks indicate low coverage and the presence of large numbers of unvaccinated or inadequately protected individuals in communities. Therefore, In addition to assessing DPT 3 and measles coverage, the evaluation team attempted to investigate the occurrence of vaccine preventable disease and epidemic outbreaks.

Incidence of vaccine preventable diseases

The occurrence of epidemic prone diseases under surveillance according to the quarterly health bulletin of FMoH 2013(33)include 596 Acute Watery Diarrhoea cases (CFR=0.8%); 12,422 suspected measles cases(CFR=0.3%); 443,579 suspected dysentery cases (CFR=0.001%); 933 suspected meningococcal meningitis cases (CFR=2.5%); and 1,281 suspected anthrax cases (CFR=2.7%) with Acute Flaccid Paralysis non-polio rate being estimated at 2.8 per 100,000 children under 15 years above the WHO standard reported in 2012.There were 23 recorded deaths from meningitis and 40 deaths from measles in 2012 (Table 24).

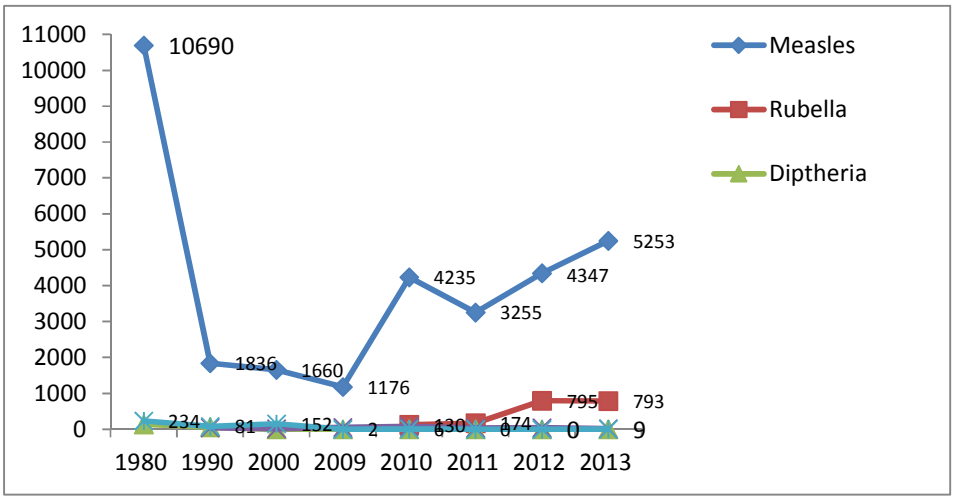
Table 24: Annual Reported cases and deaths of Vaccine preventable Diseases 2012

Regions	AFP	Neonatal Tetanus	Meningitis		Measles	
	Cases	Cases	Cases	Deaths	Cases	Deaths
Tigray	58	6	9	1	216	2
Afar	22	0	11	0	55	1
Amhara	229	41	151	1	1,015	5
Oromiya	446	39	272	16	3132	26
Somali	52	1	38	1	17	0
Ben-Gumuz	11	1	40	1	153	0
SNNPR	296	58	351	3	7217	6
Gambella	7	1	39	0	28	0
Harari	4	0	3	0	34	0
Addis Ababa	27	1	16	0	542	0
Dire Dawa	6	0	3	0	13	0
National	1158	148	933	23	12,422	40

Source: Health and health-related indicators 2012, FMoH (19)

The WHO/UNICEF JRF country report for2014 (31)indicated that the number of cases for measles and rubella were dramatically increasing in Ethiopia (See Figure 12).

Figure 12: Trends in vaccine preventable diseases in Ethiopia WHO/UNICEF JRF Report, 2014



Source: WHO/UNICEF JRF, 2014(31)

Occurrence of epidemics

Epidemics have been reported, especially the occurrence of measles outbreaks in some regions. The 2011-12 Health and Health related indicators report from the FMoH indicates that of the 12,422 measles cases, over 50% occurred in SNNPR which also had the highest number of meningitis cases (351) out of a total of (933) meningitis cases.

The measles coverage rate for 2010 according to the JRF UNICEF/WHO was the lowest for the period 2005-2012(31) (Table 23) coinciding with a spike in the number of reported measles cases (Figure 12). Figure 12 shows a steady decline of reported cases of measles from 2000 to 2008 as a newly developed WHO/UNICEF global strategy was initiated to combat measles with 2 doses through routine and Supplementary Immunization Activities (SIAs). However, during 2009 and 2010 Ethiopia experienced a large outbreak of measles reporting 4,235 cases primarily associated with low MCV 1 coverage. Investigations into the outbreaks in Ethiopia reported that despite high reported coverage there were suboptimal or delayed SIAs. The gaps in population immunity, program weaknesses and underserved populations were addressed in Ethiopia with the formulation of best practices for SIAs(34). The increasing trend of measles cases since 2010 indicates large numbers of unvaccinated children and confirms our conclusion of declining immunisation coverage.

In our health facility interviews, respondents perceived that the ongoing occurrence of outbreaks in some areas may be due to poor quality in cold chain management, some perceived that this may be due to lack of detail in the integrated supportive supervision (HEWs were repeatedly making errors in targeting the correct age for measles vaccination, inaccurate reporting of coverage and inappropriate administration of vaccines). Interviews from SNNPR revealed that although HEWs are expected to know the exact number of unvaccinated children in their community, there is no established recording mechanism to identify unvaccinated children. Consequently, high dropout rates for measles occur resulting in gaps in population immunity and measles outbreaks despite high reported coverage rates (SNNPR).

The occurrence of outbreaks, the number of districts with less than 50% reported coverage as well as drop-out rates between the first and subsequent doses for measles and DPT 3 support our conclusion of stagnant or declining coverage and concurs with JRF WHO/UNICEF estimates for the period 2006 to 2012(31).

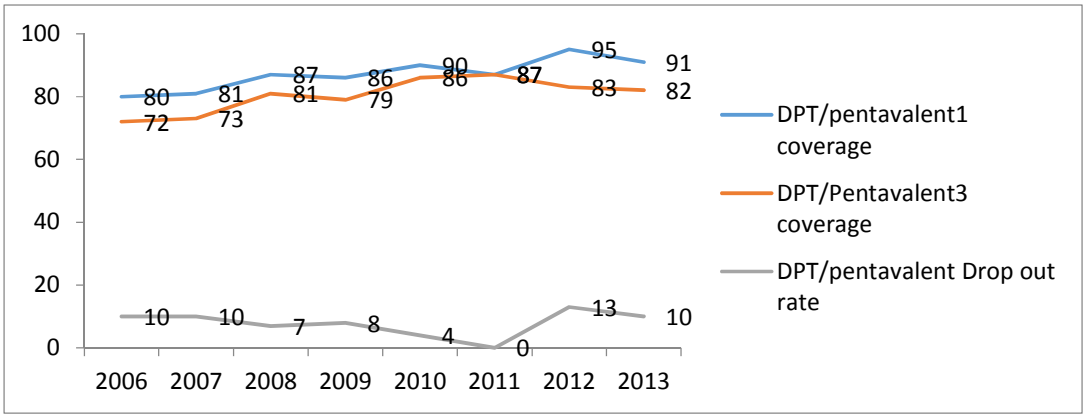
Many reasons might explain why the overall objective of substantially increasing DPT 3 coverage has not been achieved.

The key areas identified in this report contributing to the less than satisfactory coverage can be grouped under the following categories: low demand for services characterized by high drop-out rates; issues in programmatic management including vaccination strategy and service delivery; governance; finance. These key functions of health systems are associated with vaccination coverage outcomes and are further analysed below.

Demand: High drop-out rates for DPT 3

- The 2012 EPI cluster survey reported a high drop-out rate in the immunization program. The total unadjusted dropout rate (card verification and history) for DPT-HepB-Hib1-3 was 25.6 nationally, ranging from 2.6% (Addis Ababa) to 63.8% (Somali). Only Tigray and Addis Ababa regions met the acceptable threshold target of ≤10% DPT-HepB-Hib1-3 dropout rate (20).
- The results from the above mentioned survey are also confirmed by other country estimates. The country's official estimate in 2013 (6)indicated that the Pentavalent coverage showed an increasing trend from 2006 to 2011 but declined from 2012 onwards. Correspondingly, the dropout rate for Pentavalent 3 was insignificant in 2011 and increased to 13% in 2012 (See Figure 13 below).

Figure 13: Official country estimate of trends in Pentavalent 3 coverage and dropout rate 2006 to 2013, Ethiopia



Drop-out rates are influenced by a number of factors and are listed below:

- Drop-out rates between the first and subsequent doses in immunisation schedules can result from lack of knowledge and education level of mothers/carers, insufficient access (subject to seasonal variation in many areas and the extent of outreach services) and low utilisation of services
- Some areas did not have effective tracing mechanisms. Drop-out rates are particularly high in the pastoralist regions for obvious reasons and require tailored strategies to address the issues of mobile populations
- Low use of maternal health services. Studies indicate that predictors of defaulter children include low use of post natal care services by mothers
- Missed opportunities for vaccination of children attending health facilities for other reasons not effectively addressed.
- With competing priorities for HEWS to provide different services, less time is available to trace eligible children and drop-out cases. The critical link between the communities and the newly constructed health facilities were the HDAs and this initiative was only rolled out in 2010 starting in Tigray and not yet implemented in all regions by 2012. Additionally, our assessment of high coverage areas noted strong links between woreda health offices, health facilities and kebele leaders which led to coordinated efforts for identifying unreached communities

Management of health services at district level

Several management issues were identified during our visits to low and high performing zones. Interviewees noted that although inputs were the same within each region, the differences in achievement of coverage were driven by a number of factors related to the ability of zonal/district level offices to manage resources effectively.

- Human resource management: HEW skills were inadequate due to high turnover of staff. Training and supportive supervision was not consistent.
- Information Management: Establishing and fulfilling district level plans based on knowledge of target populations. A number of facilities we visited did not fulfil their immunisation targets due to different eligible population target numbers at central and local level,
- Vaccine management: Inadequate forecasting and inventory management. Facilities experienced stock-outs of one or more antigens in the last 6 months. Rotavirus was particularly affected. Transport for cold chain maintenance was another issue with most HEWS transporting vaccines on foot

- Cold chain equipment breakdown at facilities prevented stocks from being available at health facilities at all times.

Governance:

- Availability of immunisation micro-plans in all regions was not evident
- Feedback from central information systems on monitoring of key indicators such as DPT 3 coverage and measles for action at local levels was lacking.

Financing:

- Predictable and timely disbursement of funds to regions and districts was not always carried out causing interruption of immunisation activities especially for CSOs.

In an effort to improve immunisation coverage, Ethiopia's routine immunization improvement plan was developed by revising the programme activities through a situational analysis to strengthen the immunization programme at all levels for the coming two years (2014 and 2015). The two year plan includes targets to reach DPT 3 coverage of 90% and 95% in 2014 and 2015 respectively and the identification of high priority zones every six months for support to sustainably improve EPI performance(35)(14). The major activities are also grouped under increasing leadership and effective programme implementation. Therefore, the FMoH has established the Ministerial Delivery Unit to support and monitor key priorities including EPI (14). The unit will support implementation of improvement activities by preparing monthly reports to the Minister monitoring progress and ensuring that EPI continues as a standing agenda in the Joint Steering committee meetings and any other important forums. These strategic changes through the improvement plan will hopefully sustain quality immunization services and improve coverage of immunization.

Key evaluation question: To what extent did the programme achieve the objectives and targets as described in Ethiopia's HSS proposal?
Indicator : % of HPs providing EPI, twice a month

Vaccine strategy is an important function associated with improved coverage. The optimal balance between static and outreach services and the level of effort extended to each delivery strategy impacts coverage rates.

The 2012 national EPI cluster survey revealed that 51.4% of the health centres provide daily sessions and 75.7% of health posts provide immunization services on a monthly basis (20).

These figures suggest that by 2011, the target set for 90% of HPs to provide twice monthly EPI services was not met. Cold chain issues, staff shortages and efforts to reduce vaccine wastage may be some of the reasons that could explain the shortfall in target achievement. The 2012 EPI cluster survey reported that at national level, 48.0% of the health facilities provide the EPI service monthly. 93% of health facilities in Addis Ababa provide the EPI services daily; while most of the health facilities (85.5%) in Tigray provide the EPI service on a monthly basis.

Our survey results suggest that in most of the health facilities, EPI services are provided on specific days of a week rather than on a daily basis. The average number of days spent to provide all types of antigen through mobile or outreach sites is only 2 days per month in Benshangul, 9 days in Amhara and 5 days per month in SNNPR, Oromia and Tigray regions.

Reports from Ministry of Health indicated that mobile outreach although limited to some areas such as the Somali region, benefit communities in very hard to reach areas by providing immunization services and other health packages through 26 mobile teams (14).

Visits to health facilities confirmed that the majority of visited facilities have immunization plans. Of 39 study health facilities, 28% provide immunization services daily (including weekends), 25.6% on weekdays, 9.8% once a week, 9.8% twice a month, 2.9% three times per month, and 23% once a month. Our facility visits noted that 82% facilities were providing outreach/mobile immunization services, of these, 56.4% had achieved their outreach plan, whereas 25.6% facilities were unable to achieve their plan, because of supply shortage and work load. The remaining 7 facilities (17.9%) do not provide outreach immunization services due to easy accessibility to the static sites. All of the visited health facilities reported that they had a system for tracing defaulter of immunization services. The defaulter tracing system includes use of family folders, the defaulter tracing box and community-based data to locate defaulters.

The average time spent for EPI services in visited facilities was comparatively lower than for other services suggesting competing priorities for other HEP services. On average 4.9% to 7.7% of the time (total staff person hours available) was spent for immunization services per week (Annex 14).During our qualitative surveys, almost all informants reported EPI was a priority service but also one that competes with other major priorities such as birthing and ANC services. Health centres often provided immunisation services only on specific days notably market days to reduce vaccine wastage and improve efficiency.

There may be a correlation between the priority facilities are able to give to immunization services and vaccination coverage. With less time allowed for tracing defaulters and follow up on eligible children as well as lost opportunities for vaccinations, considerable numbers of children remain unvaccinated (Annex 13). However more research is required to support this observation.

Key evaluation question: To what extent did the programme achieve the objectives and targets as described in Ethiopia's HSS proposal?
Indicator : % of women attending at least one ANC

Table 25 below shows the utilisation of antenatal care services in the 2005-2011period. Antenatal coverage for at least one visit improved from 29% in 2005 to 43% in 2011achieving just over 50% of the target level of 80% set for 2011.

Table 25: Maternal health services utilization 2005 – 2012

Indicators	Coverage achieved %			
	2005	2010	2011	2012
Antenatal care- at least 1 visit	29		43	
Antenatal care - at least 4 visits	12		19	

The overall proportion of pregnant women attending four antenatal care visits in 2011 was 19%, suggesting that over half of these women did not return after the first visit. Life threatening complications can often develop and be detected in the later months of pregnancy and the low utilisation of antenatal services needs to be addressed through HEW skills enhancement for detecting symptoms that need referral to health centres for higher level care. The number of births attended by skilled birth attendants according to the EDHS 2011 remained very low in Ethiopia at 10% (24) and is a major determinant of maternal and neonatal deaths. The 2012 APR however reports the number of skilled attendant deliveries increased from 16.6% in 2006 to 20.4% in 2012 below the target of 37.7% set for that year (18). There are wide variations across regions with 8.4% skilled attendant deliveries in Benshangul to 67.1% in Harrari. The 2012 APR reported that the barriers and bottlenecks to utilisation of maternal health services are being addressed through several measures including improving human resource skills, HDA mobilisation, ongoing efforts for transport provision to facilities and free services at hospital level (18).

Key evaluation question: To what extent did the programme achieve the objectives and targets as described in Ethiopia's HSS proposal?
Indicator : % of HPs with no essential drugs shortage last 3 months

Specific data for this indicator were not available. However, we provide data for vaccine supply and stock maintenance at health facilities as a proxy indicator for the performance of the Health Commodities Supply System.

The results from the National EPI cluster survey 2012 revealed that 92.1% of health posts and 77.9%of health centres received vaccines at least once a month (20). However, interviews with health facility staff revealed that not all antigens were available at all times.
Table 26 illustrates that half the facilities we visited reported stock-outs in the last 6 months. Annex 12 illustrates that during our facility visits, for each type of vaccine, only half the facilities had the specific vaccine available. It should be noted that not all facilities routinely stock each type of vaccine due to non-functioning refrigerators or absence of refrigerators and this requires the collection of vaccines by HEWs for planned vaccination days.

Table 26: Observed Health facilities with no stock-out of vaccines during observation period by region

Region	% of health facilities with all vaccines available	Total No. of Facilities
Amhara	37.5	8
SNNPR	50	8
Oromiya	57.1	7
Tigray	50	8
Benishangul-Gumuz	25	8

More than half of the facilities visited had viable (unexpired) vaccines available. The most widely available vaccine was DPT in 61% of health facilities followed by PCV (58%). The least widely available vaccine during health facility visits was the Rotavirus vaccine. This finding is consistent with the qualitative findings that the most common reported vaccine shortage was Rotavirus vaccine in most of the visited health facilities. The introduction of rotavirus vaccine

has been problematic as one donor reported in an interview due to the lack of large warehouse facilities at national level.

Shortages of PCV, Rotavirus and BCG were commonly observed while the supply of measles vaccine was excessive in most cases. Due to vaccine shortages, children were not fully immunized despite the fact that outreach activities were conducted. The lower number of beneficiaries per immunization outreach service translates to higher average operational cost per each target individual served. The above observations are worth noting when donors introduce new vaccines like the rotavirus vaccine in the context of as yet unfinished agendas for traditional vaccines and the preparedness of the countries to implement new vaccine introduction.

Another factor contributing to inefficiencies in vaccine distribution rested with immunization services supply planning. The target numbers for the eligible population were supplied through centrally based planning. Health workers explained that the immunization service delivery plan was based on estimated population figures (Central Statistics Agency figures) rather than facility level information on target populations. This planning approach resulted in oversupplying some facilities and undersupplying others with vaccines. In both cases the efficiency of the immunization service was undermined either due to the need to return excess supplies of vaccines or through a reduction in vaccine coverage.

Key evaluation question: To what extent did the programme achieve the objectives and targets as described in Ethiopia's HSS proposal?
Indicator: % of HEW recording refrigerator temperature. twice daily

Specific data for this indicator were not available. Our assessment attempted to provide some indication of the practices related to vaccine storage and management at health facility level. The National EPI cluster survey reported that 36.4% of health posts and 96.9% of health centres store vaccines overnight or longer in the facility (20). Of these facilities, 95.4% of health centres and 75.9% health posts made use of refrigerators to store the available vaccines. With regard to Vaccine Vial Monitor (VVM) status, about 29.8% health posts and 16.9% of health centres had vaccines in the refrigerator with VVM at stage 3 or 4 status. According to the WHO standard guidelines for regular monitoring of the cold chain and vaccine viability, no vaccine should be left in the cold chain at VVM stage 3 or 4 for more than 24 hours.

Some of the main problems regarding efficiency of stock management identified in the situational analysis as part of the Vaccine Stock Management Assessment conducted by Ethiopian Health and Nutrition Research Institute) and synthesis of survey findings include inadequate temperature monitoring activities and absence of a maintenance programme for cold chain infrastructure(20). These findings were consistent with challenges and difficulties described by implementers during our facility visits, informant interviews and literature reviewed in the final evaluation.

Based on the findings from previous evaluations (1), corrective measures were taken, including procurement and distribution of 415 Iceland refrigerators to increase the capacity of all zones. More than 5000 vaccine carriers and a number of cold boxes were procured and distributed before the Meningococcal vaccination campaign. National cascaded cold chain maintenance training was conducted within the country and a plan to employ one cold chain technician for every district to address all issues of cold chain and vaccine distribution activities in their respective woredas is being implemented. Despite these actions, a declining trend in performance was noted in both the administrative reports and the EHNRI 2012 coverage survey prompting the FMoH and partners to prepare an improvement plan (20).

3.4.2 Assessment of HSS Programme Impact

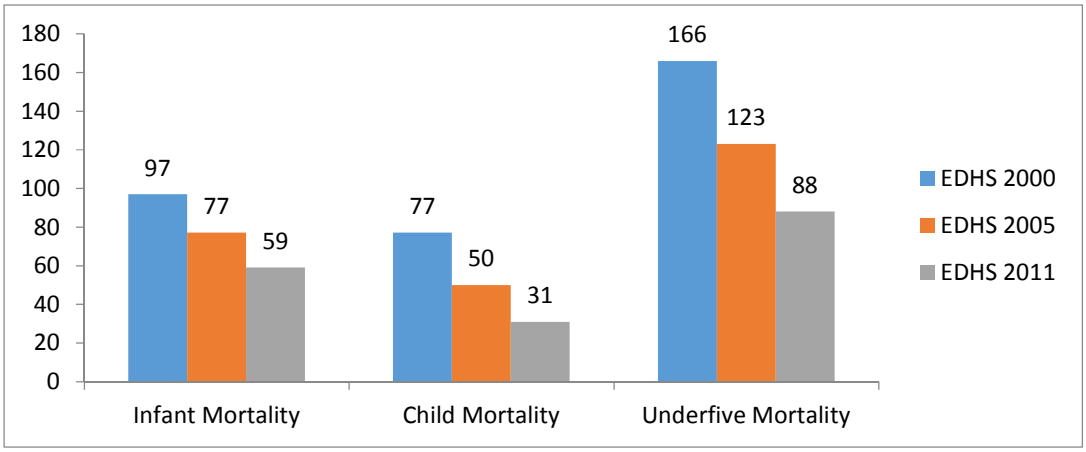
The major focus of the assessment of the impact of the HSS grant will be its contribution to country achievements towards reduction in under-five mortality over the period 2006 to 2012.

Key evaluation question: To what extent did the HSS programme contribute to observed trends in Under-five child mortality?
Indicator: Under-five mortality rate, 2012

The under-five mortality rate (U5MR) in Ethiopia has shown a decreasing trend over the last several years. According to the 2011 EDHS, under-five mortality rate declined from 123 per 1000 live births in 2005 to 88 per 1000 live births in 2011, a 28% reduction.(36)(See Figure14 below). The infant mortality rate (IMR)declined by 23% from 77deaths per 1000 live births in 2005 to 59 per 1000 live births in 2011. Based on the 2013 UNICEF report(37), the 4th Millennium Development Goal which seeks to reduce the U5MR by two-thirds between 1990

and 2015 has been achieved in Ethiopia ahead of its targeted date and was estimated to be 67/1000 live births in 2013 (from 217/1000 live births in 1990).

Figure 14: Trends in infant, children and under-five mortalities in Ethiopia, 2000-2011



Source: Ethiopian Demographic and Health Survey (EDHS), 2000, 2005, 2011(24)

There are regional disparities in the deaths of under-five children with the highest rate observed in Benshangul-Gumuz region. A child in Benshangul is more than three times more likely to die before the age of five (169/1000 live births) than a child in Addis Ababa (53/1000 live birth) (See Table 27 below). Moreover, neonatal mortality accounts for 42% of the under-five deaths and follows similar regional disparities besides showing an increase over the HSS period across all regions. However, it should be noted that the EDHS is a sample survey and wide overlapping confidence intervals exist for the U5MR values between regions thus introducing uncertainty in the actual differences(24).

Table27: Neonatal, Post-neonatal, infant, child and under-five mortality rates for the 10 year period preceding the survey, by background characteristic, Ethiopia (2005, 2011)

Background Characteristic	Neonatal Mortality (NN)		Post neonatal Mortality (PNN)		Infant Mortality ($_1q_0$)		Under-five Mortality ($_3q_0$)	
Year	2000-2005	2005-2011	2000-2005	2005-2011	2000-2005	2005-2011	2000-2005	2005-2011
Residence								
Urban	35	41	32	19	66	59	98	83
Rural	41	43	40	33	81	76	135	114

Region								
Tigray	40	44	26	20	67	64	106	85
Afar	33	33	28	30	61	64	123	127
Amhara	50	54	44	23	94	76	154	108
Oromiya	40	40	36	32	76	73	122	112
Somali	27	34	30	36	57	71	93	122
Benishangul-Gumuz	44	62	40	39	84	101	157	169
SNNP	36	38	49	41	85	78	142	116
Gambela	42	39	51	36	92	76	156	123
Harari	35	35	30	29	66	64	103	94
Addis Ababa	23	21	22	19	45	40	72	53
Dire Dawa	29	30	42	30	71	60	136	97

Source: Adapted from EDHS 2005, 2011**(24)**

In qualitative interviews including those with high-ranking officials at FMOH, the impact of GAVI HSS towards reduction of under-five mortality and morbidities from vaccine preventable disease was acknowledged by almost all of the interviewees at all levels. Interviewees expressed that in the past epidemics of meningitis and measles was common and recently the occurrence of these diseases is very rare (Benshangul-Gumuzregion). Some regions that monitor the impacts using HMIS data perceived that GAVI HSS had an impact not only on reduction of mortality, but also on decreased morbidity due to vaccine preventable diseases (SNNPR).

> *"In the past 7 years the disease measles named "Ankeles" in the locality was not only known by its mortality and morbidity but also the most feared disease, communities perform different cultural practices like calling its name as "alekoche ""alemoche" etc., to protect themselves from its attack. Now immunization program contributed for the reduction of mortality and morbidity from the disease and created awareness on the importance of immunization among community members (HEW)."*

Our assessment finds that GAVI ISS support for the immunization programme linked with GAVI HSS in Ethiopia was believed to be an effective strategy towards reducing child mortality in Ethiopia. However we argue that although the geographical reach of the HEP has been dramatically increased over the GAVI HSS period, the quality and span of services has not kept pace due to a number of reasons identified in this report. As noted earlier in this document,

immunisation coverage using DPT 3 as an indicator is uneven across regions (Annex 10-11) and similarly, heterogeneity in U5MR and IMR (Table 27) masks the contribution made by the GAVI HSS grant. In areas where the immunisation coverage was high, GAVI HSS would have contributed to U5MR. Progress in improvement of health status is uneven between the geographical areas and along the socioeconomic gradient and even a modest increase in overall EPI including coverage of new vaccines introduced in the later part of the HSS period will have contributed to the U5MR. Other areas supported by health system improvements should be considered for their impact on health status. The availability of HEWs as the first point of contact for family planning services has impacted positively on contraceptive prevalence and unmet family planning needs. The increases in skilled birth attendance and antenatal services although small would likely have had an impact on the U5MR. The HSDP IV (7)also reported increased coverage of ART and successes in treatment of malaria through the expanded HEP.

Despite some gains, the low utilisation of services remains a principal concern in many areas and has been addressed in the HSDP IV (ref). Low utilisation of post-natal services (12%) and low skilled attendant births (10%) in 2011(24)and 14.5% in 2014 are reflected in high neonatal mortality which has its major direct causes of sepsis, birth asphyxia, and pre-term delivery and can be addressed through the provision of quality delivery services to all mothers coupled with essential new-born care provision to all newborn children. Seventy-five per cent of new-born deaths occur within the first week of life, when even modest delays in receiving effective care can be deadly. A relative gap in service outlets exists at hospital level with the majority of the expected 800 district hospitals (one per each woreda) still under construction or not yet begun. At present, just over 120 hospitals are providing CEmONC services for the entire population of the country (31).

Indicator: Maternal mortality

Progress with maternal mortality has remained slow and the MDG target of 267/1000 live births is unlikely to be achieved by 2015. 2011 EDHS figures for MMR were 676/100,000 live births fractionally higher than 673/100,000in 2005(38). The high maternal mortality ratio is a major concern remaining unchanged in the six years of GAVI HSS (38). In light of studies that link maternal health services to better utilization of child services, this finding has major implications for GAVI and country priorities. New proposals should therefore aggressively target maternal health in order to improve child health.

3.5 Equity

Key Findings:

- Disparities exist in health status across geographical areas and along the socio economic gradient
- DPT 3 coverage rates have increased in all areas between 2000 and 2005. Some of those gains were lost during 2005 to 2011 for the lower wealth quintiles with the disparities showing a worsening trend between 2005 and 2011.
- Access to and utilisation of health services for vaccination, maternal and reproductive health services is varied depending on wealth, educational status and place of residence (urban/rural).
- Government plans are in place to allocate extra resources and promote equity, quality and efficiency in the health system.
- 50% of districts had more than 80% of DPT3 coverage and 14% had more than 95% measles coverage by 2012

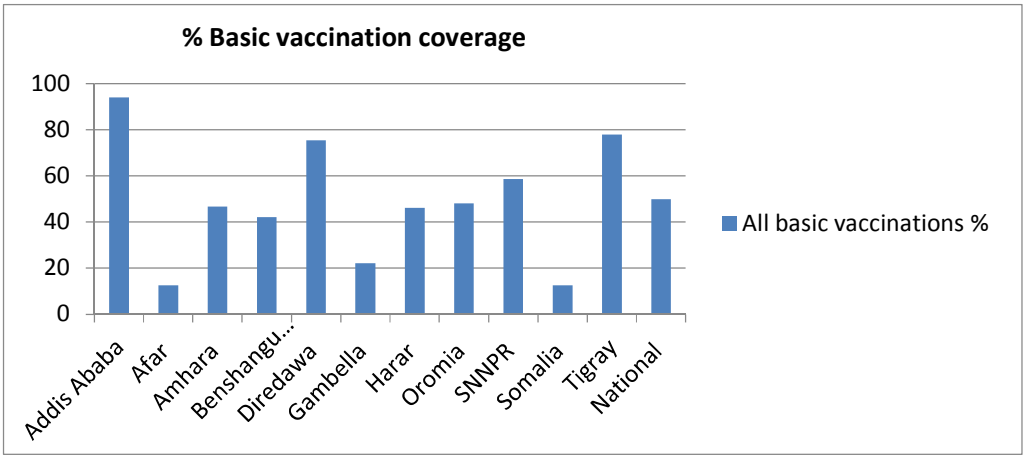
Equity in health is an issue common to most countries. The Ethiopian government has tried to address it in its Health sector policy through prioritized support of pastoralist, low coverage and hard to reach areas. Four developing regions (DRS) were prioritized for special support. The DRS present unique challenges for health service delivery and health system development. These regions are characterized by poor infrastructure, harsh environmental conditions, and pastoral or semi-pastoral populations. HSDP I, II and III emphasized the need for regionally tailored approaches and support to improve health service coverage and reduce mortality rates to levels more comparable with national averages.

GAVI HSS funds have been used to address some equity-related issues. The HSS country proposal included in its plan, the construction of 100 health posts in the four low socio-economic DRS. Twenty-five new health posts were due to be constructed using GAVI HSS funds in each of the four regions. However, due to escalating construction costs, these targets were revised downwards from a total of 100 posts to a total of 30 posts. At the end of the project in 2012, 30 health posts were constructed with GAVI HSS funds (10 in Gambella, 14 in Benishangul-Gumuz and 6 in Somali)(16).

In addition to constructing health posts, HSS funds were used to provide IT equipment to 109 woredas and vehicles for transport to those areas most in need. Collectively these actions would indirectly lead to reducing disparities and address equity.

Figures 15 and 16 demonstrate the disparity in vaccination coverage across regions reflecting corresponding disparities in the major health indicators, especially for the four DRS regions. DRS utilisation of services is low indicating the presence of large numbers of unimmunized children. These regions also have high infant and under-five mortality well above national averages. A child in Benshangul is three times more likely to die before reaching the age of five than one in Addis Ababa.

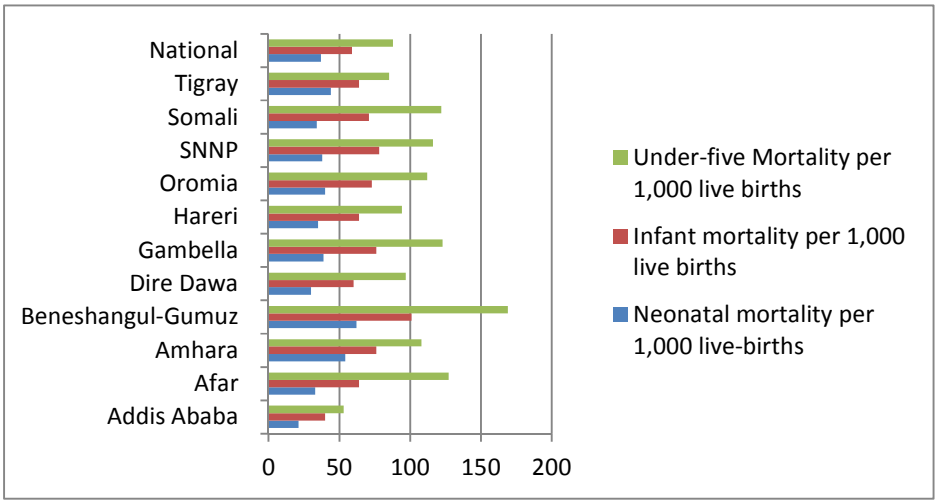
Figure 15: Basic vaccination coverage by region in Ethiopia



Source: EPI Cluster survey, 2012(20)

The 2012 EPI cluster survey revealed the coverage for all antigens tends to be higher in children of caregivers with higher educational attainment, higher wealth index, and those residing in urban areas (20). The main reason reported by caregivers for refusing to immunize children was child illness (52.8%), which is highest in Benishangul-Gumuz region (78.9%)(20).

Figure 16: Neonatal, infant and under-five mortality rates by region 2011, Ethiopia



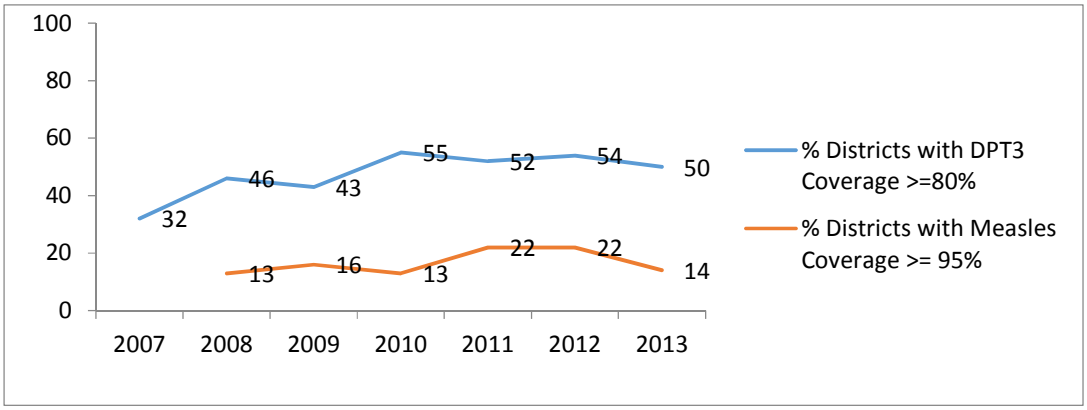
Source: EDHS, 2011(24)
Note: Wide and overlapping confidence intervals make actual disparities difficult to determine

To address these challenges and mobilize adequate resources for the health sector, different activities have been implemented by the Ethiopian government including: (i) revenue retention by health facilities for quality improvement; (ii) implementation of fee waiver system for enhanced equity; (iii) establishment of private wings and outsourcing for better efficiency; and (iv) piloting of community based and social insurance schemes for improved financial access to health services thereby removing the need for payment at the point of care delivery. The emphasis on improving the training and skills of primary health care workers and construction of health facilities should help to ensure that the poorest and least served populations in the pastoralist areas of Ethiopia benefit from the HSS funding.

To assess the contribution of GAVI HSS program addressing equity issues in Ethiopia we will compare some equity indicators related to various health components.

Key evaluation question: To what extent did the HSS programme contribute to observed trends in percentage of districts attaining at least 80% DTP3 coverage?

Figure 17: WHO/UNICEF official country estimate of trends in districts with DPT/3 coverage of more than 80% 2006 to 2013, Ethiopia



Source: WHO and UNICEF JRF (31)

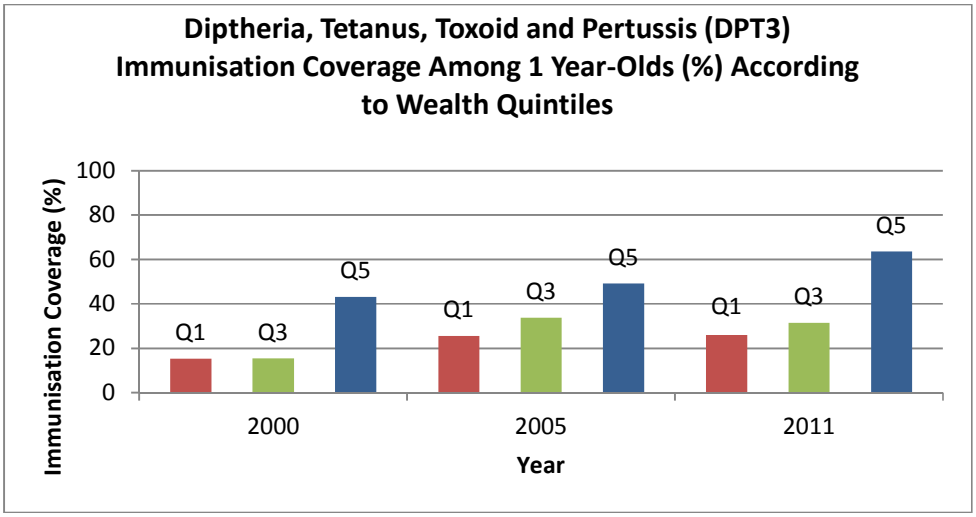
According to the WHO/UNICEF JRF official estimate for 2012(31), out of the total number of 817 districts in the country, only 54% (411) of districts reported DPT3 coverage of more than 80% (Figure 17). In addition the situation has deteriorated since 2012with declining trends in Pentavalent 3 coverage. Moreover measles coverage of more than 95% has only been achieved in 14% of districts falling from already low numbers (22%) in 2012. Vast disparities exist across regions and according to the 2012 National EPI coverage survey (20), DPT 3 coverage in Afar was 23% compared to 96% in Addis Ababa. Six regions had coverage rates below the national average of 65.7% in 2012.

In the country's comprehensive multiyear EPI plan (39), coverage was planned for 95% of districts to report DPT/Pentavalent 3 coverage of more than 80% by 2015. The current trend suggests that this may prove difficult to achieve.

Disparities exist for other health status indicators in communities along the socio-economic gradient and across geographic areas showing a trend of increasing disparities (Figures 18 and 19). In general, access to and utilisation of health services for vaccination, maternal and reproductive health services varies depending on wealth, educational status and place of residence (urban/rural). Further as noted in section 3.2.2 (pp 49), there is a rural/urban divide in the distribution of human resources (15) that impacts on the quality of services. Less than 3% of women from the three poorest quintiles had skilled attendant assisted deliveries (2006-2012), increasing from 1.1% (1996-2002). For the same periods, deliveries by skilled attendants rose from 25% to 50.4% for the richest quintile. Antenatal care (ANC) coverage for at least one

visit ranged from less than 20% for the poorest quintile, to 80% in the wealthiest quintile. For 4 ANC visits, it ranged from under 10% in the two lowest income quintiles to over 40% in the wealthiest quintile (3).

Figure 18: DPT3 Immunisation Coverage 2000-2011 among 1 Year Olds (%) according to wealth quintiles.

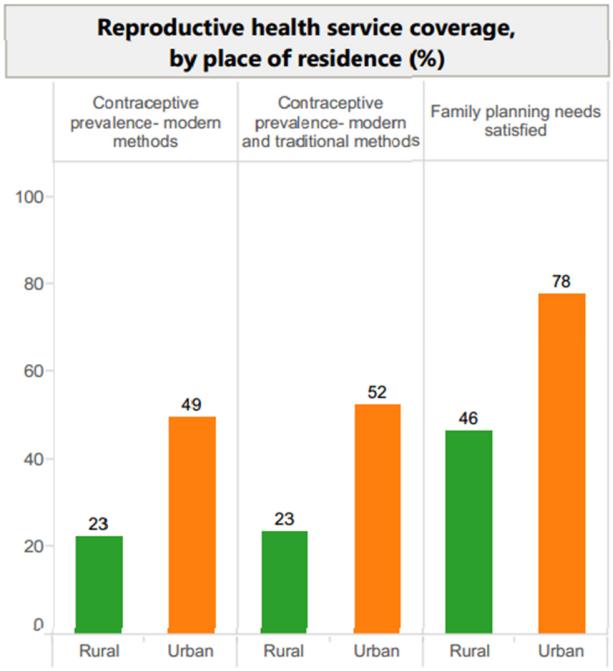


Source: Global Health Observatory Repository Data (3)
Website: http://apps.who.int/gho/data/view.main.94200
Q1: Poorest quintile Q3: middle quintile Q5: Riches quintile

Figure 18 suggests that although DPT 3 coverage rates have increased in all areas between 2000 and 2005. Some of those gains were lost during 2005 to 2011 for the lower wealth quintiles with the disparities showing a worsening trend between 2005 and 2011.

Similar disparities exist between those living in urban areas compared to rural areas for maternal and newborn health services (Figure 19). The burden is greater for the rural population due to poor access and low utilisation of services.

Figure 19: Reproductive health service coverage, by place of residence (%) - 2011



Source: Ethiopia Country Profile – Health Equity World Health Organization (40)
Website: http://www.who.int/gho/health_equity/countries/eth.pdf

3.6 Sustainability

Key findings:

- GAVI HSS has contributed to the financial and programmatic sustainability of the achievements made during the grant period by enabling country ownership of immunization programme, improving health sector development and building capacity/ empowering stakeholders.
- Despite growth in public funding, health financing still relies heavily on external funding sources.
- Out of pocket expenditure remains high and can reduce utilisation of services thereby affecting sustainability of achievements
- Expenditure on health as a percentage of the GDP fell from 4.7% in 2010 to 3.8% in 2012.
- Attrition rates for trained health workers remain high and the health workforce distribution is biased towards urban areas. Rural areas remain underserved in terms of numbers of middle and highly skilled workers.

The sustainability of the achievements of the GAVI HSS programme was assessed in terms of the financial and programmatic performance and capacity building support during the grant period.

Over the last decade, Ethiopia has made great improvements in many health indicators, due in large part to a well-coordinated, extensive effort and intensive investment on the part of the government, partners and the community at large in primary care through the Health Extension Program and expansion of PHCU. Public spending on HP, HC and district hospitals has grown in the GAVI period spurred by the MDG-PF and the HSS program.

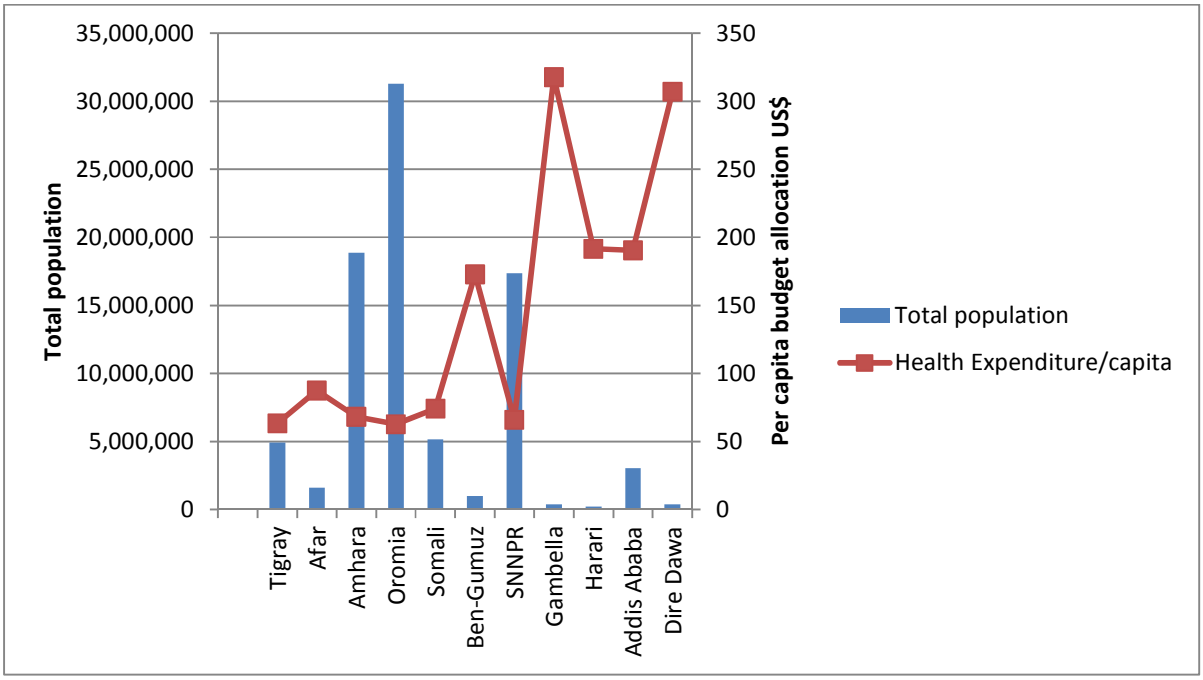
Key evaluation question: To what extent have the various types of investments (capital vs. recurrent) contributed to sustainability at the country level?

To ensure sustainability, GAVI HSS recurrent and capital investments have contributed to increased primary health coverage through capital investments in infrastructure. The operational costs for immunization services in Ethiopia were, to a large extent, financed by development partners such as GAVI through the GAVI ISS grant (30). The grant provided funds for the procurement of cold chain and transport equipment, health workforce mobilization and administrative costs. Our interviews with key informants highlighted the synergies leveraged by GAVI in providing the major source of funding for the country's immunization program as well as supporting the system through the HSS funding.

To ensure financial and programmatic sustainability of the immunisation program, there have recently been encouraging signs of increased commitment from the government. Beginning in 2009, the government allocated a budget to cover the cost of BCG and tetanus vaccines, 50% of measles and 50% of OPV and injection materials for traditional vaccines (14). The necessary preconditions are also being fulfilled to co-finance new and underutilized vaccines such as PCV (Pneumococcal Conjugate Vaccine) and rotavirus vaccine which can prevent the leading causes of child morbidity and mortality in Ethiopia. In addition to the routine vaccines, the Government is budgeting for supplemental activities such as Polio and Measles campaigns. However, as reported by the interviewees, there were problems with budget coding and utilization at lower levels that will need to be addressed to ensure continued allocation from the federal level. Currently, for the routine immunization improvement plan, the funds required for program management of routine immunization activities, supportive supervision and review meetings is largely covered by the Government (14). Also, the percentage of total

budget allocated to the health sector to the regions is increasing and the budget allocated for general government expenditure as a percentage of the total expenditure on health to the regions in 2013 was 9.75%, which was higher than 9.13% in 2012(7). This increased financing and budget allocation points to good progress towards ownership of the program by the Ethiopian government. Furthermore, budget allocation to DRS regions was comparatively high in an effort to improve and sustain gains in coverage of health services. Figure 20 illustrates the comparative per capita budget allocations between regions.

Figure 20: Per capita health budget allocation according to regions in 2012



Source: Adapted from Health and Health related Indicators 2012, FMOH (19)

Despite growth in public funding, health financing still relies heavily on external funding sources (50.3% of total expenditure on health) in 2012 threatening sustainability of the program's achievements. Additionally, out of pocket expenditure is high and can be catastrophic for the poor who would avoid utilising services. Government expenditure on health as a percentage of the GDP rose from 4.2% in 2006 to 4.7% in 2010 but has since fallen to 4.1% in 2011 and 3.8% at the end of the grant period in 2012(3).See Table 28.

Key evaluation question: To what extent has turn-over of trained staff affected sustainability?

The HSS program supported training along three different levels that included IRT, apprenticeships and the IMNCI program. However, the achievements in this area were less than the targeted levels due to reprogramming activities. Training has been integrated into the country's routine health workforce training programmes. However, attrition rates remain high and the health workforce distribution is biased towards urban areas. Rural areas remain underserved in terms of numbers of middle and highly skilled workers. The government will need to consider incentives such as better housing and transport to retain trained health workers in the rural areas.

Table 28: WHO African Region: Ethiopia Statistics Summary (2002-present)

	GAVI HSS Period							
Indicator	2012	2011	2010	2009	2008	2007	2006	2005
Per capita government expenditure on health at average exchange rate (USD)	8.5	6.9	7.8	8.0	7.0	6.5	4.5	4.0
Per capita government expenditure on health (PPP int $)	43.7	42.8	46.0	40.5	36.6	36.8	28.9	25.5
Per capita government expenditure on health (PPP int $)		30.0	26.5	22.6	19.8	21.6	16.4	15.9
External resources for health as a percentage of total expenditure on health	50.3	51.8	37.8	32.5	39.8	38.1	35.5	38.0
Out of pocket expenditure as a percentage of private expenditure on health	79.9	79.9	80.0	80.0	80.0	80.4	80.7	80.6
General government expenditure on health as percentage of total	48.4	50.0	54.9	53.2	51.9	56.7	55.3	60.9

expenditure on health								
Per capita total expenditure on health at average exchange rate (USD)	17.6	13.8	14.3	15.0	13.5	1.4	8.1	6.6
Total expenditure on health as a percentage of GDP	3.8	4.1	4.7	4.5	4.3	4.8	4.2	4.1
General government expenditure on health as a percentage of total government expenditure	11.1	11.1	13.8	13.8	11.9	13.1	10.4	10.9
Private expenditure on health as a percentage of total expenditure on health	51.6	50.0	45.1	46.8	48.1	43.3	44.7	39.1

Source: Global Health Observatory Data Repository (3)

3.6.1 Capacity building/empowerment contributed by GAVI HSS Programme

Key evaluation question: To what extent has the training supported by the HSS programme been integrated into the country's routine health workforce training programmes?

To improve the quality of care and case management practices at health centre level, a comprehensive Integrated Management of Neonatal and Child Illness (IMNCI) training programme was developed for staff funded by GAVI HSS support. This includes evidence-based clinical algorithms, a pictorial counselling guide, and a one-page patient record for identifying and treating the leading causes of child death.

The HEP embodied the objectives of providing community level services that are efficient and meet the needs of individuals and families at household level. Accordingly, integrated refresher training (IRT) of HEWs funded by GAVI HSS support was conducted in order to update and improve the skills and knowledge of HEWs. IRT eventually used standard curricula and learning modules that were prepared based on units of competence and occupational standards developed by FMoH.

The trainings provided by GAVI HSS programme have been integrated into the country's routine health workforce training. Government initiatives to support these activities include

development of guidelines and manuals (National In-service Training, Continuing Professional Development (CPD), National Leadership Management and Governance Training and Health Professional Scope of Work guidelines), assignment of focal persons at regional level, development of action plans and selection of local training institutions for the provision of standardized in-service training. In addition, national in-service data base has been incorporated in the Human Resources Information System (HRIS) (7).

For primary health care units to function as an integral part of the health system, the skills of the health worker is important for recognising and treating simple condition but also for referring patients to the next level of care. The HEP required HEWs to provide a basic package of prevention and curative services and to strengthen the links between health posts and health centres. In order to determine the technical capacities of HEWs including maintaining the cold chain system, we assessed the knowledge of health workers on immunization services. Of the 39 health workers assessed on knowledge of vaccine preventable diseases, 92% were knowledgeable on tuberculosis and polio, 95% on tetanus and measles, 87% on diphtheria, 72% on Hib infection, 66% on hepatitis B and 61.5% on pertussis. An assessment on the knowledge of adverse effects following immunization service indicated that all of the health workers interviewed correctly listed the adverse effects of immunization. About 69.2% of the respondents knew how to reduce missed opportunities. However, in the facilities that we visited, only 20% or less of the health workers had received training in integrated management of childhood illness, diagnosis of diarrhoea and acute respiratory illness in the past 12 months or more (Annex 10).

A major issue reported by most of the interviewees was that of a serious shortage of trained human resources at all levels. The shortage of trained personnel is most acute at regional, zonal, district and health facility level as most have only one officer to cover the immunization programme. The health promotion and disease prevention directorate is supported by WHOand UNICEF EPI Officers at federal and regional level but at the lower level frequent changes in positions and staff turnover was perceived to have affected the immunization programme. In Benshangul-Gumuz, visits confirmed that most of the staff has been stationed there for less than a year and attrition rates were high.

A CSO providing IMNCI training stated that "*considerable number of trained personnel were not actually working in relevant positions after their return because*

> *of inappropriate selection of staff for training, high staff turnover and inappropriate positioning of trained staff in health facilities*" (CSO). EPS

In rural or remote areas, staff retention was highlighted as a major problem:

> *"People leave. Especially trained manpower will leave. On average, they stay 6 months to 8 months – maximum one year. They are leaving because our HC is a little far from the town, their remuneration was low and there was no staff retention mechanism in our Woreda"* (Regional Health Bureau).

The HSS programme provided the impetus for IRT and the development of standard curriculum for competency-based training. However in the absence of established mechanisms for career development and monetary as well as non-monetary based staff retention policies, the attrition rates amongst trained staff is very high especially in remote areas where living conditions can be harsh. As a result, as our visits to areas like Benshangul revealed, often only staff with very basic education were able to be recruited and consequently their knowledge base was limited impacting on quality of service. Strategies to invest in training therefore, should have included a clearly articulated human resource policy considering the above factors in order to retain skilled staff and ensure sustainability.

3.7 Unintended consequences of GAVI HSS support to Ethiopia

Key evaluation question: What were the positive and negative unintended consequences of the HSS programme?

A negative unintended effect not specifically attributed to the HSS grant but to the overall HSS and HSDP III implementation, was that progress in health outcomes through improved services was uneven. The disparity in DPT 3 coverage between the wealth quintiles actually increased (Fig 18) between 2005 and 2011. This could be due to several factors and needs to be investigated further. One explanation could be that although physical access may have improved, confounding factors such as education level of the mother, underutilisation of services and high out of pocket expenses for services affect the poor much more than the rich.

A second unintended negative impact may be the requirement of countries to make co-contributions to HSS, which may compel recipient countries to draw funds away from other more urgent priorities

Thirdly, the requirement to regularly report progress in health indicator status puts extra pressure not only at country level but at the peripheral service delivery levels which are already understaffed and overworked.

Lastly, some interviewees pointed out the negative unintended impact of recipient countries' tendency to depend on external funding. Interviewees perceived this led to seeking external funding rather than devising country driven solutions for resource generation for health care.

3.8 Added value of the GAVI HSS Programme

Key evaluation question: What added value did GAVI HSS support offer compared with other types of financing (both donors and domestic)?

In taking the lead with HSS funding through the MDG-PF, the GAVI HSS grant provided the momentum for joint funding with other development partners to support the Ethiopian government in strengthening the health system.

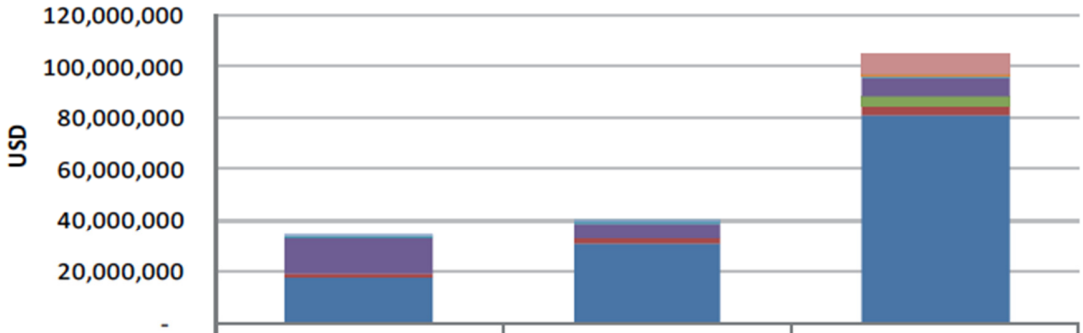
Secondly, donor inputs to the health sector were highly fragmented, with many different bank accounts at FMOH and multiple disbursement channels. The commitment of the FMoH and partners including GAVI to improving harmonisation and alignment of donor support resulted in the signing of a Code of Conduct with new mechanisms for pooling of funds.

One such arrangement is the Health MDG Performance Fund (MDG Fund) created in the HSDP III implementation period. The Health MDG Fund is a federal-level pooled fund to finance priority activities (especially those with the characteristics of public goods), align donor procedures, strengthen the health system, improve service delivery, and reinforce the leadership and accountability of GOE in relation to the health MDGs. Note that the sort of SWAp basket funding arrangements that exist in other countries are not possible in Ethiopia because there is no single sectoral budget for health, but the MDG Fund is the closest thing to a SWAp basket that is compatible with Ethiopian fiscal decentralisation policy.

GAVI HSS aimed to fill the financing gap in HSS and promoted harmonisation by channelling the fund through the establishment of the MDG-PF.

GAVI was the first contributor to the MDG-PF with USD $76.5m in 2006/7 followed by other donors at different points in time. The total amount of funds disbursed by the MDG-PF between 2010 (EFY 2002) and 2012 (EFY 2012) was USD $105,350,853(see Figure 21 below). Figure 21 illustrates the timing and funding inputs from various donors throughout the period 2006 to 2012 after GAVI's contribution.

Figure 21: MDG-PF Pooled Fund Disbursement 2006 to 2012 (EFY 2002, 2003 and 2004)



	2002 EFY	2003 EFY	2004 EFY
AusAID			7,445,900
WHO	634,366	300,969	698,773
UNICEF			500,000
UNFPA	1,000,000	1,000,000	1,000,000
AECID/Spanish Aid	13,690,032	6,416,510	6,846,500
Italian Cooperation			3,797,853
Irish Aid	1,924,669	2,217,960	3,484,285
DFID	17,292,678	30,506,570	81,577,544

Source: Final APR Report, 2011/12(16)

Thirdly, the flexibility of the funding arrangements allowed (unlike other donors) the FMOH to disburse funds according to local needs rather than earmarking them for specific functions within disease based programs.

The attempt to align the financial management system of the programme with the government's existing system was essential to fully empowering local governmental partners to

utilise resources. Moreover, this arrangement enabled the government health system structure at all levels to use programme funds in a flexible and complementary manner with other health related programme funds

Fourthly, health infrastructure improvements, (a core strategy of the HSDP III to improve access and utilisation of health services) would provide an expanded platform for other development partners and NGOs who are implementing programmes such as Vitamin A Supplementation, nutrition and prevention of stunting and maternal health to be delivered through an integrated system rather than a parallel system of vertical programs.

Lastly, multiple partnerships were formed with a range of diverse actors for productive collaboration

3.9 Conclusions

In this section we summarise our assessment in response to the specific questions posed by GAVI for this evaluation.

Q1: To what extent and in what ways did Ethiopia's HSS application demonstrate clear linkages to immunisation outcomes?

Ethiopia's HSS application stated within its overall objectives the Improvement in coverage of immunisation. Key outcome indicators for the HSS were related to DPT 3 and measles immunisation coverage. Immunisation is a major determinant of child mortality and reduction of child mortality and achievement of MDG4 was a key impact indicator for GAVI HSS. A second objective was to resolve health systems barriers that are known to impede the demand for and delivery of immunization and other child and maternal health services.

Q2: To what extent were CSOs actively involved in the design of the application?

The participatory approach towards engaging CSOs through the CCRDA in the proposal design and implementation of the intervention was a good strategy. However, as noted in this report, input from stakeholders including CSOs working at a district level and community representatives would have provided valuable information for strategic design and successful implementation especially since community based health services through the HEP was a core

component of the HSDP III plan. Moreover, we find that with Ethiopia's diverse topography, regional differences were not adequately addressed.

Q3: To what extent were the activities set out in the HSS application implemented as planned (quality, quantity, ways and means)?

This assessment found that although the overall objectives of the HSS proposal remained unchanged throughout the grant period, the planned activities specified under the original proposal underwent reprogramming and subsequently impacted on the overall efficiency and effectiveness of the program. All the reprogramming decisions were discussed at JCCC level and with the GAVI secretariat. The JCCC acted as the technical arm of GAVI HSS and as such left reprogramming decisions to be negotiated between the GAVI secretariat and the FMOH. Our assessment finds that closer consideration by GAVI should have been given to re-programming of activities and the implications for health workforce skills and therefore service delivery. Reprogramming ensured building infrastructure targets were reached but workforce training was affected and original targets were not met. IMNCI training in particular only achieved 27% of the original target. Health workforce issues were further compounded by high attrition rates leaving weakened management capacity and health worker capacity at district level compromising the decentralisation agenda for health services management at district level.

Q4: To what extent were activities, resources and results appropriately coordinated, monitored and reported by the MOH to the GAVI Secretariat and Alliance partners?

The coordination of activities and program implementation rested with the FMOH departments with the CJSC overseeing approval for annual plans and budgets. One member of the JCCC confirmed that reprogramming decisions were ultimately left to the MOH. The assessment therefore concludes that the presence of an in-country representative from GAVI would have provided closer oversight of its investment and could have played a better coordinating and managing role between partners, donors and the FMoH.

This assessment finds that the monitoring and evaluating framework still remains weak and the quality of data monitoring at all levels provides challenges for tracking and linking activities to outputs. This indicates that assumptions were made by GAVI during proposal consideration regarding the technical capacity available for monitoring specified indicators. The proposal lacked indicator definition, no baseline data was available and the continued non-reporting of

specified indicators to the GAVI Secretariat through the APRs prompts questions for GAVI for its inaction in this regard. There is evidence of uniform use of the standardized HMIS reporting at all levels but data quality has been an issue of concern from several assessments including this one. Of particular note is the discordance between different data sources for immunization coverage rates over the GAVI HSS period.

Q5: To what extent were the findings/ recommendations from previous evaluations, including those commissioned by GAVI Alliance helpful and used to inform actions at the country level, including preparation of Ethiopia's HSS application for the 2012-15 period?

Both the recommendations outlined in the JSI tracking study and the HSLP evaluation conducted in 2009(1)(2) have been comprehensively addressed within the most recent GAVI HSS application for 2012-15.

Q6: Efficiency: To what extent were the funds used efficiently and as planned.

As noted in this report the budget was not fully utilized over the original HSS proposal period between 2006/7 to 2010 and a further extension was requested and granted up to 2012. Moreover, an overrun on building costs required channeling of funds from workforce training to construction of health facilities. The high level of staff turnover compounded the shortage of skilled workers and workforce retention schemes were not in place at the time. The quality of training as noted by a senior FMoH official was good, however targets were not reached and training could not be sustained making this activity less cost effective. Further, we note that planning of health facilities according to population numbers rather than geographical area was less efficient for the DRS as they have widely dispersed communities living in difficult terrain making access difficult.

Other issues pertaining to efficiency included management of the cold chain system and vaccine supply. Poor management of the cold-chain system including maintenance of equipment, immunisation planning and the vaccine supply chain reduced the efficiency of the HSS program overall. Shortages of some types of vaccines and poor immunization supply planning resulted in stock-outs resulted in higher average operational costs.

For the above reasons this assessment concludes that the decision to reallocate funds to building costs were relevant but may not have been an efficient use of funds as other functions of the health system received inadequate investment.

Q7: To what extent did the program achieve the objectives and targets as described in Ethiopia's HSS proposal

It is clear that the GAVI HSS program has played an important role in the country's efforts towards health system strengthening. Under-five mortality showed an impressive decline from 123/1000 live births in 2005 to 88/1000 live births in 2011 and achieved the MDG 4 target in 2013 (67/1000 live births).

However this assessment finds thatnot all the objectives and targets outlined in the Ethiopia HSS proposal have been met.Coverage of immunization shows a declining or stagnant trend resulting in an increase in epidemic outbreaks and an increasing trend of drop-out rates for DPT 3 and measles. Targets for districts achieving 80% coverage for DPT 3 as well as antenatal care coverage targets were not met. Many of the indicators specified in the HSS proposal have been difficult to assess as no data was available.

The assessment concludes that the broader impact of HSS on other services such as increases in contraceptive use prevalence, antenatal care; skilled birth attendance and HIV treatment have contributed to the U5MR rather than increased immunization coverage. It should be noted however that a number of new vaccines such as rotavirus and PCV were introduced during the GAVI HSS period and have likely contributed to the U5MR. This finding indicates that there is an opportunity to further decrease child mortality through improved immunization strategies and addressing the barriers identified in this report.

Q8: How sustainable in programmatic and financial terms, are achievements of the HSS program at national, regional, operational levels?

The assessment concludes that although the geographical reach of the HEP has been dramatically increased over the HSS period through infrastructure investment, improvement in the quality and range of services has not been observed due to a number of reasons identified in this report. These factors include: the uneven skill mix of the health workforce across rural and urban areas; high turnover of trained skilled workers and migration skilled workers from rural to urban areas.

In financial terms sustainability of the HSS program will require continued donor funding in the short term in spite of continued commitment by the government to the immunisation program

and to the overall health system strengthening. The imperative remains for the country to find new sources of income in a move towards less dependence on external funding.

3.10 Lessons for the future

Key evaluation question:
What are the major lessons that can inform improvements to future design, implementation and monitoring of HSS programmes in Ethiopia and elsewhere?

GAVI's initiative in furthering the immunization agenda in Ethiopia through health system strengthening has been catalytic in two fundamental ways. Firstly it mobilized funds from other donors to a common pool that could be used flexibly and effectively and secondly it created a shift in the disease focused approach to one of allowing country led approaches that responded to local needs. The lessons learned during this first phase of HSS support are summarized below and may be used to inform future HSS programmes.

Design:

- Absence of clear guidelines from GAVI for country proposal formulation
- An independent situational analysis would have provided an opportunity for GAVI expertise to be applied to proposed interventions and understanding of country capacities
- A GAVI in-country representative would have been beneficial for providing a link between MDF-PF donors, implementing partners and the government and to understand ground realities.
- Financing: The flexibility of the GAVI HSS funding mechanism allowed for efficient and timely disbursements of funds for activities and allowed reprogramming decisions to be carried out without delay
- GAVI's strategy to work within the government financing and health structures has helped reinforce local institutional capacities as well as build management skills for sustainability. Working from this paradigm sets GAVI apart from other donors who often employ vertical programs and earmark funds for specific activities that can constrain government decision-making.

Implementation:

- Effective coordination between kebele leaders, health centers, HEW and HDAs to link with communities were noted in the scale-up of best practices in high-coverage areas.
- The poor maintenance of the cold chain affected coverage and service quality. New cold chain technologies and procedures will improve effectiveness and efficiency
- Transportation issues impacted supply of essential commodities including vaccines
- Regular and strong supportive supervision when evident worked well to improve coverage
- Attrition rates amongst health workers impacted service delivery.
- Updated manuals were not always in place and are essential to address knowledge and skill gaps due to high staff turnover.

Monitoring:

- Strengthening the capacity of managers at woreda level to analyze HMIS data and established feed-back mechanisms from central to peripheral levels would have helped in decision making and implementing changes in local strategies.

3.11 Key contributions of the GAVI HSS program to Ethiopia's health system

Key evaluation question: What were the major strengths and weaknesses of this GAVI HSS grant?

The key contributions of the HSS program are outlined below followed by a summary of the barriers to immunization services and challenges in the implementation of the HSS program as identified by this evaluation.

Key strengths of the GAVI HSS Grant:

The Establishment of MDG-PF: An important step towards harmonization and alignment

The establishment of MDG-PF with GAVI support was a critical step in harmonising financing procedures towards the "One Budget" approach. Resource pooling through this arrangement has helped increase donor investment to finance the priorities under the HSDP-IV.

Flexibility of funding arrangements

The funding arrangements followed a non-bureaucratic process between the GAVI Secretariat, the JCCC and the FMOH. Approvals for specific use including reprogramming decisions were issued without delay allowing use of resources that were responsive to local needs.

Increased Financial and Technical Support from Partners

The GAVI HSS program provided an opportunity for targeted leveraging with other donors to jointly support programs and broadly benefit the health system. GAVI utilised the obvious synergies between GAVI HSS, GAVI Immunization system support (ISS), Civil Society Organization support (CSO) and New Vaccine introduction (NVS) support to reduce child mortality.

Commitment of Government for Health Sector Development

The GAVI HSS initiative has enabled increased political commitment for improvements in the health infrastructure resulting in the expansion of the HEP to the rural areas increasing access to immunization programs and other health packages

Investments in health workforce training

GAVI HSS supported the training of a cadre of lower and middle level health workers to work at community level as part of the HEP in alignment with the country policy of decentralisation of the health sector management to district level.

Improvement in primary health service coverage

Investment in a comprehensive network of PHCU throughout the country linked through a referral system to different levels of care resulted in the rapid scale up of the HEP.

Investment in the Health Commodities Supply System (HCSS)

Investment in HCSS in the first year of GAVI HSS to improve the supply chain infrastructure to resulted in the construction of a network of storage facilities and the establishment of guidelines, manuals, policies and effective networking of all the units.

Key weaknesses of the HSS grant

Design of the proposal

- Lack of attention (during planning and implementation) to regional differences across Ethiopia. Participation of district level stakeholders could have provided complementary insights for the RED approach.
- Gender mainstreaming not considered in the design (gender analysis in HMIS systems not available).
- Reprogramming decisions needed closer consideration of system level impact from reallocating resources
- No incentive mechanisms in the proposal design to retain trained health workforce to sustain delivery of the HEP, a core component of the HSDP III

Addressing cold chain management

- This was a bottleneck identified in earlier assessments of the HSS Grant (1)(2). Overall, cold chain management was explained as the main challenge across the regions and was not addressed adequately

Shortcomings in service delivery strategies and human resource capacity,

- Planning for resource allocation to woredas, including vaccines was based on CSA estimates of target populations. Discrepancies can exist between actual and estimated numbers resulting in oversupply or undersupply of essential health packages.

Threats to immunization supply chain management and logistics

- Inflation of costs for supplies and construction materials not provisioned for in the original proposal
- Delays in disbursement of funds from the FMoH to CSOs and regions and delay in liquidation of funds at regional level.
- Lack of means of transportation, irregular supply of vaccines and absence of storage and carriage for vaccines, irregular/no supply of some newly introduced and traditional vaccines. The use of a single health facility as a centre for vaccine supply to surrounding health posts was a challenge in the Commodities Supply System.

Constraints in data quality management, reporting, archiving and analysis

- The country's technical capacity to measure and track over time the major indicators identified in the proposal was not taken into consideration during proposal review
- Challenges in aligning reports with Ethiopian Fiscal Year.
- The FMoH Annual Performance Reports presented to GAVI were incomplete and unable to reflect GAVI's contribution towards the most important health outcomes

Low Community demand for maternal health and immunization services in rural areas

Increasing inequity in immunization and health service coverage

- Exclusion of equity indicators and service quality indicators at the service delivery level to inform decision making at district levels.

3.12 Recommendations

The following recommendations have been distilled from the findings of this report to provide input for reorientation of program implementation strategies for the present grant period and should be reassessed for future grants.

3.12.1 Recommendations for GAVI:

- Set of clear guidelines to be provided to recipient countries for proposal formulation
- An independent situation analysis would be helpful before proposals are considered to provide input from GAVI's expertise and experience from other countries with similar local contexts.
- Design of the proposal to map activities between the different GAVI funding support channels – CSO, ISS, HSS. Proposal guidelines to include a requirement by applicant countries to check duplication of activities at country level and to be addressed in country application
- Monitoring and Evaluation framework was considered weak in previous assessments. GAVI to provide more guidance on indicators
- More oversight by GAVI in reporting process to ensure indicators specified in the proposal are reported on. Lack of reporting was not followed up by the GAVI Secretariat.
- Reprogramming approvals to be considered by IRC more closely for system level implications and guidance

- An in-country GAVI representative could provide a continuous presence and play an important role in liaising with the other donors/ implementing partners and the government. The role of the representative would be one of sharing in country implementation progress with other donors on a frequent basis and also identify synergies between different donor activities that could link to the GAVI HSS initiative.
- Ensure that major indicators identified in the proposal are able to be measured at country level and there is technical capacity available for information management systems.
- The cold chain system is vulnerable to many factors in this context and GAVI should consider verifying vaccine potency issues. Appropriate technology should be considered when funding equipment for health facilities.
- Increase support to the Health Commodity Supply System (HCSS) to strengthen the supply delivery system

3.12.2 Country level recommendations:

Design/Planning

- Provide space for community involvement in design and planning of services to give voice to civil society and community groups and engagement in prioritization of services as well as to highlight regional differences.
- Supply side interventions of health systems strengthening need to be complemented with demand side approaches to improve service utilization especially in rural areas to improve overall health outcomes. These approaches may include incentives to improve service utilization as well as strategies to provide access to persuasive culturally sensitive health information specifically tailored for the different regions.

Management

- Ensure adequacy of staffing and resources at national level to oversee HSS implementation.
- Strengthen capacity at district and regional levels to manage available resources, setting of priorities, developing strategies and planning services that are responsive to community needs.

Implementation

- There is a potential role for the non- governmental sector including private facilities in managing health service delivery. Public- private partnerships can create synergies to improve service delivery, outreach and demand creation.

Improve Monitoring and Evaluation system at all levels

- Expand and strengthen the routine reporting and monitoring system to improve data quality and to include feasible, valid indicators to measure progress in the health system
- Develop standardised protocol for disseminating information for use at all levels of the health system and by other stakeholders.
- Information management: Build capacity at sub- national level for data collection, reporting, analysis and use of information to guide service delivery

This evaluation acknowledges the fundamental and innovative approach GAVI has taken in supporting country efforts to strengthen its health system. The important partnership between the Government of Ethiopia and GAVI has facilitated and enabled HSS improvement and it is to GAVI's credit that not only was the HSS grant awarded to Ethiopia under special circumstances, but also for allowing time for system change to take place with a second grant. The gaps delineated in this evaluation are highlighted to inform future initiatives and the decision to commission this evaluation signals a commitment to learn and improve future efforts in Ethiopia and elsewhere.

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Annexes

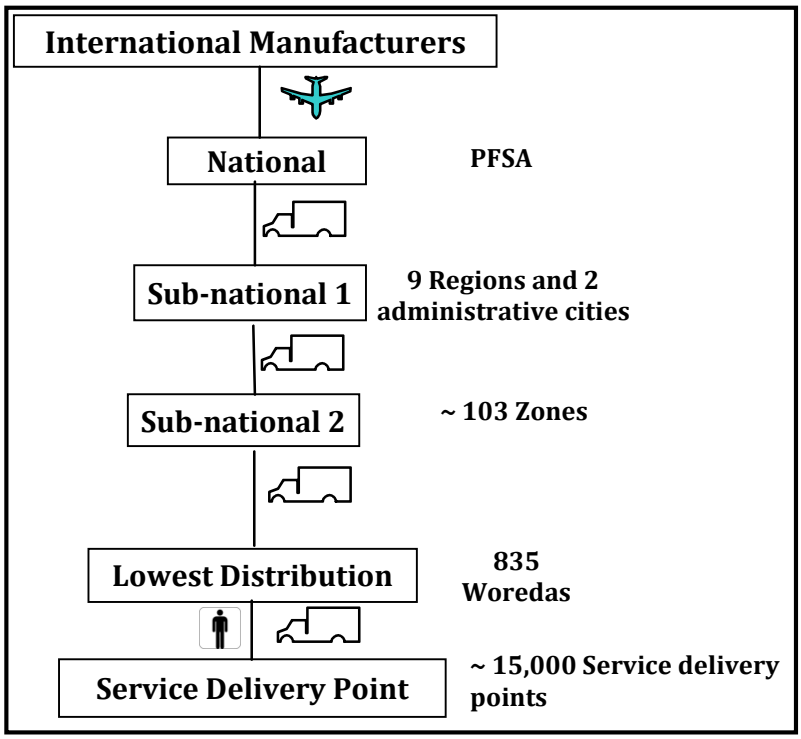
Annex 1: Indicators planned in the GAVI HSS Proposal, 2006

HSS inputs	Targets			
	2006/7	2007/8	2008/9	2009/10
% of woredas with timely funding for HEWs refresher course	95%	95%	95%	95%
% of TVET schools with resources for apprenticeship	100%	100%	100%	100%
# of contracts signed for expansion HS to HC	35	71	71	35
# of regions with AWP for logistics Master Plan	4	7	8	9
HSS outputs				
# HEWS attending refresher courses per year	>4,900	>13,200	>3,400	>3,400
% of apprenticeships with 1/15 tutor/trainee	>90 %	>90 %	>90 %	>90 %
% of HEWs trainees with EPI complete checklist	>90 %	>90 %	>90 %	>90 %
# of upgraded Health Stations (cumulative)	0	106	177	212
# of Health Posts equipped (equipment in place, cumulative)		3670	7340	
# of Health Centres equipped (cumulative)	0	155	255	300
% of Health Posts in cluster system for cold chain efficiency	20%	40%	60%	70%
% of woredas with updated/accurate stock reports	10%	50%	60%	70%
% of Health Posts with 10day Kerosene stock		50%	75%	80%
# of woredas equipped for support supervision (max 109)		36	73	
Outcomes				
% of HPs providing EPI, twice a month (at least)	30%	60%	70%	90%
% of HEW recording refrigerator temp. twice daily	>50%	>60%	>70%	>90%
% of women attending at least one ANC	50%	60%	70%	80%
% of HPs providing TT during ANC	60%	70%	75%	75%
% of rural kebeles with access to full HEP package	30%	40%	60%	70%
% of HPs with no essential drugs shortage last 3 months	30%	40%	60%	70%
% of pregnant women with access to BEOC	30%	40%	45%	50%
% of HP supervised once in past two months	30%	40%	65%	60%
% of HEP review recommendations included in WorHO work plan	>50%	>60%	>65%	>75%
Impact on Immunization/MNCH Services				
(DPT3) coverage (from 69% baseline 2005)	70%	75%	80%	85%
Measles coverage (from 59% baseline 2005)	65%	70%	75%	80%
% of children 6-12months having rec. Vitamin A last 6 months	40%	50%	60%	70%
% of children12-59 months rec. Albendazole last 6 months	40%	50%	60%	70%

% of children with Diarrhea receiving ORT/ORS at HP level	25%	40%	50%	65%
% of "clean deliveries"	20%	30%	40%	50%
% of children treated with the IMNCI protocol at HC level	25%	30%	40%	50%
Impact on child mortality (U5 mortality rate)				85/1000 LB

Source: GAVI HSS Ethiopia proposal, 2006(10)

Annex 2: Supply chain management system, Ethiopia



Annex 3: Urban/rural distribution of health workers

Health occupational category	Health workers(number)	Health workers per 1000 population	
		Urban population	Rural population
General practitioner	1151	0.092	0.018
Specialist	1001	0.080	0.015
Health officer	1606	0.129	0.025
Pharmacist	632	0.051	0.010
Pharmacy technician	2029	0.163	0.031
Nurse	20,109	1.6102	0.306

Midwife	1379	0.1102	0.021
Laboratory technologist	866	0.069	0.013
Laboratory technician	1957	0.157	0.030
Environmental health worker	1246	0.100	0.019
Health assistant	1486	0.119	0.023
Radiographer	169	0.014	0.003
*Health Extension worker	30 950		0.472

*Only applicable to rural areas
Source: Africa Health Workforce Observatory, 2010 **(15)**

Annex 4: Fund allocation and Utilization for GAVI HSS related activities 2007-2012

	Description	**Financial Plan**	**Physical Plan**	**Unit cost of Output (plan)**	**Total Budget Utilization USD**	**Physical achieve -ment**	**Unit Cost (actual)**
Objective 1	**HEALTH WORKFORCE MOBILIZATION, DISTRIBUTION AND MOTIVATION**						
Activity 1.1	Integrated Refresher Training	7,828,126.00	25,050	312.50	5,210,411.90	13,412	388.49
Activity 1.2	Apprenticeship	2,242,800.00	12,600	178.00	962,132.46	8,525	112.86
Activity 1.3	Capacity Building of Woreda HMT	2,639,340.00	7,440	354.75	1,347,740.63	5,867	229.72
Activity 1.4	Training of Health Workers on IMNCI	1,440,000.00	5,400	266.67	47,694.00	1,473	32.38
	Sub Total 1	**14,150,266.00**			**7,567,978.99**		
Objective 2	**SUPPLY, DISTRIBUTION AND MAINTENANCE SYSTEMS FOR PHC DRUGS, EQUIPMENT AND INFRASTRUCTURE**						
Activity 2.1	Upgrading HS to HC complete	19,500,000.00	212	91,981.13	24,375,183.94	227	107,379.66
Activity 2.2	Equipment 300 HC	6,886,407.00	300	22,954.69	5,632,491.84	300	18,774.97
Activity 2.3	Construction of 100 Health Posts	750,000.00	100	7,500.00	3,913,136.88	92	42,534.10
Activity 2.4:	Equipment HP	20,154,600.00	7,340	2,745.86	21,105,050.37	7,340	2,875.35
	Sub Total 2	**47,291,007.00**			**55,025,863.03**		
Objective 3	**ORGANIZATION AND MANAGEMENT OF HEALTH SERVICES AT DISTRICT LEVEL AND BELOW**						
Activity 3.1	4X4 supervision Vehicle to 109 WorHO	*2,505,000.00*	109	22,981.65	2,397,649.00	134	17,892.90
Activity 3.2	IT equipment for 109 WorHO	300,000.00	109	2,752.29	300,000.00	180	1,666.67
Activity 3.3	HEP annual regional review meetings	443,551.00	624	710.82	203,309.06	624	325.82
Activity 3.4	Support for implementation of the	7,740,590.00			7,213,712.68		

	HCSS						
	Sub Total 3	**10,989,141.00**			**10,114,670.74**		
Objective 4	**SUPPORT COST**				-		
Activity 4.1	Management of HSS and M&E	600,000.00	5	120,000.00	1,285,420.24	5	257,084.05
Activity 4.2	M&E HMIS support for 624 woredas	3,463,555.00	624	5,550.57	2,500,036.00	624	4,006.47
	Sub Total 4	**4,063,555.00**			**3,785,456.24**		
	Grand Total	**76,493,969.00**			**76,493,969.00**		

Source: FMoH Finance and Procurement Department

Annex 5: Monitoring and Reporting activities and availability of guidelines

	Amhara	**SNNPR**	**Oromiya**	**Tigray**	**Benshangul**
Do you have the national guidelines for child vaccinations available in this service area today?					
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Yes	2 (25.0)	3 (37.5)	3 (42.9)	8 (100.0)	3 (37.5)
No	6 (75.0)	5 (62.5)	4 (57.1)	0	5 (62.5)
Total	8 (100.0)	8 (100.0)	7 (100.0)	8 (100.0)	8 (100.0)
Do you have any other guidelines for child vaccinations available in this service area today?					
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Yes	3 (37.5)	3 (37.5)	3 (42.9)	4 (50.0)	2 (25.0)
No	5 (62.5)	5 (62.5)	4 (57.1)	4 (50.0)	6 (75.0)
Total	8 (100.0)	8 (100.0)	7 (100.0)	8 (100.0)	8 (100.0)
Blank/unused individual child vaccination cards or booklets					
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**
It was available in the HF and seen	5 (62.5)	8 (37.5)	5 (71.4)	8 (100.0)	5 (62.5)
It was available in the HF but not seen	2 (25)	0	0	0	0
It was not available in the HF	1 (12.5)	0	2 (28.6)	0	3 (37.5)
Total	8 (100.0)	8 (37.5)	7 (100.0)	8 (100.0)	8 (100.0)
Tally sheets vs health facilities					
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**
It was available in the HF and seen	7 (87.5)	6 (75.0)	6 (85.7)	8 (100.0)	5 (62.5)
It was available in the HF but not seen	0	2 (25.0)	0	0	0

It was not available in the HF	1 (12.5)	0	1 (14.3)	0	3 (37.5)
Total	8 (100.0)	8 (100.0)	7 (100.0)	8 (100.0)	8 (100.0)
Does this Health facility routinely store any vaccine?					
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Yes	7 (87.5)	4 (50.0)	4 (57.1)	4 (50.0)	6 (75.0)
No	1 (12.5)	4 (50.0)	3 (42.9)	4 (50.0)	2 (25.0)
Total	8 (100.0)	8 (100.0)	7 (100.0)	8 (100.0)	8 (100.0)
Do you maintain a cold-chain temperature-monitoring?					
	N (%)	**N (%)**	**N (%)**	**N (%)**	**N (%)**
Yes	6 (75)	4 (50.0)	3 (42.9)	4 (50.0)	6 (75.0)
No	1 (12.5)	0	1 (14.3)	0	0
Total	7 (87.5)	4 (50.0)	4 (57.1)	4 (50.0)	6 (75.0)

Annex 6: The supportive supervision facilities received during the survey

Region	**% of supportive supervision facilities**	**Total No. of facilities in a Region**
Amhara	100	8
SNNPR	87.5	8
Oromiya	100	7
Tigray	100	8
BenishangulGumuz	100	8

Annex 7: The frequency of supportive supervision facilities received during the survey

	Regions				
	Amhara	SNNPR	Oromiya	Tigray	Benshangul
	Supportive supervision N (%)	Supportive supervision N (%)	Supportive supervision N (%)	Supportive supervision N (%)	Supportive supervision N (%)
Weekly	1 (12.5)	1 (14.3)	3 (42.9)	0	0
Every 2 weeks	0	2 (28.6)	0	0	2 (25.0)

Monthly	0	2 (28.6)	2 (28.6)	8 (100.0)	5 (62.5)
Quarterly	7 (87.5)	2 (28.6)	2 (28.6)	0	1 (12.5)
Total	8 (100.0)	7 (100.0)	7 (100.0)	8 (100.0)	8 (100.0)

Annex 8: Health facility staff who received any training on topics related to child health or childhood illness by region

Regions	% of Staff who received training	Total No. of Health Facilities
Amhara	87.5	8
SNNPR	100	8
Oromiya	71.4	7
Tigrai	100	8
BenishangulGumuz	62.5	8

Annex 9: Training topics related to child health or childhood illness provided within the last 12 month and in the last 12 months or more by region in facilities visited by the evaluation team.

Training topic	Amhara				SNNPR				Oromiya				Tigrai				Benishangul Gumuz			
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
	Last 12 months		12 months +		Last 12 months		12 months +		Last 12 Months		12 months +		Last 12 months		12 months +		Last 12 months		12 months +	
EPI or cold chain monitoring	3.0	9.7	2.0	10.5	2.0	20.0	4.0	13.3	2.0	15.4	1.0	16.7	2.0	8.0	5.0	33.3	0.0	0.0	5.0	33.3
Integrated management of childhood illnesses	3.0	9.7	3.0	15.8	2.0	20.0	4.0	13.3	2.0	15.4	1.0	16.7	5.0	20.0	3.0	20.0	2.0	40.0	3.0	20.0
Diagnosis of malaria in children	4.0	12.9	2.0	10.5	0.0	0.0	6.0	20.0	1.0	7.7	0.0	0.0	3.0	12.0	2.0	13.3	0.0	0.0	2.0	13.3
How to perform malaria rapid diagnosis test	5.0	16.1	1.0	5.3	1.0	10.0	3.0	10.0	1.0	7.7	0.0	0.0	3.0	12.0	2.0	13.3	0.0	0.0	2..0	13.3
Case management/treatment of malaria in children	4.0	12.9	3.0	15.8	2.0	20.0	2.0	6.7	1.0	7.7	1.0	16.7	3.0	12.0	2.0	13.3	0.0	0.0	2.0	13.3
Diagnosis and/or treatment of acute respirstory infections	4.0	12.9	3.0	15.8	1.0	10.0	2.0	6.7	2.0	15.4	1.0	16.7	4.0	16.0	1.0	6.7	1.0	20.0	1.0	6.7
Diagnosis and/or treatment of diarrhea	4.0	12.9	3.0	15.8	1.0	10.0	4.0	13.3	2.0	15.4	1.0	16.7	4.0	16.0	0.0	0.0	1.0	20.0	0.0	0.0
On the other on child health	4.0	12.9	2.0	10.5	1.0	10.0	5.0	16.7	2.0	15.4	1.0	16.7	1.0	4.0	0.0	0.0	1.0	20.0	0.0	0.0
Total	31.0	100.0	19.0	100.0	10.0	100.0	30.0	100.0	13.0	100.0	6.0	100.0	25.0	100.0	15.0	100.0	5.0	100.0	15.0	100.0

Annex 10. Immunization Coverage rates among surveyed children aged 12-23 months by region (%), 2006 Ethiopia.

Region	Coverage by the time of the survey (card + history)						Coverage by card + history before the age of 1 year						Validly vaccinated before the age of 1 year coverage on card only					
	BCG	DPT_1	DPT_3	OPV_3	Msl*	FIC	BCG	DPT_1	DPT_3	OPV_3	Msl*	FIC	BCG	DPT_1	DPT_3	OPV_3	Msl*	FIC
Tigray	98.5	98.7	93.7	94.0	86.0	84.7	98.2	98.7	91.2	91.4	79.3	76.5	88.2	80.2	72.4	70.9	46.9	38.8
Afar	44.0	49.2	31.4	31.6	33.4	26.1	39.7	44.0	25.7	25.9	27.5	18.4	9.3	10.0	5.6	5.3	3.9	2.5
Amhara	86.5	87.7	72.7	72.4	63.8	60.7	84.0	85.7	68.2	68.4	56.0	51.4	48.8	43.8	35.6	33.7	23.5	16.3
Oromyia	85.7	86.6	63.5	63.4	54.0	49.9	83.6	84.4	58.0	58.1	41.7	38.2	58.0	55.7	36.7	35.5	22.0	15.5
Somali	48.4	43.7	23.3	39.8	52.0	18.3	41.4	36.3	20.8	34.8	29.0	14.4	25.4	20.8	11.8	10.4	7.2	3.9
B/Gumz	70.9	84.1	61.8	59.3	50.6	41.0	68.2	82.3	56.5	54.8	40.0	31.2	43.4	51.0	36.0	31.9	18.0	9.6
SNNPR	93.4	95.5	85.8	86.0	80.3	76.7	91.9	93.3	81.0	81.5	70.4	67.8	72.0	64.9	52.7	51.3	35.4	26.7
Gambella	48.6	54.5	32.2	31.2	31.4	25.0	42.5	42.6	27.4	26.1	21.0	18.3	22.5	22.5	14.8	12.9	12.6	7.8
Harari	95.0	96.8	85.2	85.2	75.2	74.8	94.2	95.8	79.7	79.4	66.4	63.7	80.0	73.6	60.0	57.5	49.3	38.9
Addis A	99.7	99.7	98.8	98.5	95.2	94.6	99.5	99.5	97.4	95.7	92.8	86.8	79.1	73.8	68.9	63.3	66.6	51.2
DireDawa	98.0	98.0	87.3	87.0	78.0	75.3	96.5	96.5	80.7	80.4	64.7	62.6	72.1	64.8	52.7	52.0	38.1	31.3
Weighted	85.6	86.7	70.6	71.4	64.4	59.5	83.4	84.3	66.0	66.8	54.3	49.9	58.2	53.8	41.1	39.5	27.2	19.9

Msl* = measles

Source: EPI Cluster survey 2006, conducted by the EHNRI(20)

Annex 11: Immunization Coverage rates among surveyed children aged 12-23 months by region (%), 2012 Ethiopia

Region	BCG (%)	DPT-HepB-Hib (%)			Polio (%)				Measles (%)	Vit A (%)	All basic vaccinations (%)
		1	2	3	0	1	2	3			
Addis Ababa	99.5	98.8	98.8	*96.4	93.9	99.1	98.9	97.7	96.7	87.5	94.1
Afar	48.0	44.5	29.4	*23.0	13.2	68.2	54.9	42.1	34.1	42.6	12.6
Amhara	76.6	77.1	69.1	*62.2	6.0	86.4	79.9	69.6	65.0	53.1	46.7
BenGumuz	77.7	76.6	66.6	*63.1	10.7	88.1	81.7	68.2	64.5	59.6	42.1
DireDawa	97.5	96.2	92.5	*89.6	42.3	97.8	95.9	92.3	83.5	82.4	75.4
Gambela	80.0	73.9	55.1	*45.6	18.8	91.3	84.8	70.9	57.7	61.7	22.1
Harar	90.1	87.9	74.8	*67.9	33.2	97.0	88.1	72.6	64.0	62.8	46.1
Oromiya	78.8	80.2	67.0	*62.7	6.0	91.9	78.6	65.0	65.0	62.1	48.2
SNNPR	88.2	87.9	80.2	*79.3	7.5	92.3	90.6	82.6	79.1	67.9	58.7
Somalia	49.9	49.6	33.5	*30.7	4.1	79.6	73.3	44.1	46.7	53.7	12.6

Tigray	96.7	95.6	93.6	*88.3	21.0	96.8	95.0	91.4	85.2	69.9	77.9
National	79.6	80.0	69.9	*65.7	9.1	90.1	82.3	70.5	68.2	61.4	49.9

Source: EPI Cluster survey 2012, conducted by the EHNRI(20)

Annex 12: Number of facilities with at least one functional vaccine during visits by region

Vaccine	Region				
	Amhara	SNNPR	Oromiya	Tigray	BenishangulGumuz
DPT3-Hib(pentavalent)	6	4	5	4	5
Oral polio vaccine	5	4	3	4	5
Measlesvaccine and diluents	5	4	5	4	3
BCG vaccine and diluent	6	4	5	4	3
Pneumococcal vaccine	6	4	5	4	4
Rota vaccine	3	4	5	4	4

Annex 13: List of prioritized zones for Routine immunization support based on coverage, number of unvaccinated children and recent history of measles outbreak, Ethiopia, 2014

Province Name	District Name	Population	SI-Annualized	Penta 3 vaccinated	Annualized Coverage (%)*	Unvaccinated children
Afar	Afar 1	561,651	10,108	3,409	33.7%	13,397
Afar	Afar 2	490,241	5,939	1,572	26.5%	8,735
Amhara	Awi	1,159,557	18,200	11,245	61.8%	13,910
Amhara	North Gonder					
Amhara	N Shewa	2,093,354	33,838	27,482	81.2%	12,712
Amhara	S Wello	2,846,490	49,422	37,838	76.6%	23,168
Amhara	W Gojjam	2,382,496	43,640	31,159	71.4%	24,962
BsG	Metekel	395,919	5,622	5,259	93.5%	731
Gambella	Mejenger		1,119	360	32.2%	1,518
Gambella	Nuer		2126	376	18%	619
Oromia	Arsi	3,239,851	52,816	44,752	84.7%	16,128
Oromia	Bale	1,708,910	29186	26428	91%	4994
Oromia	Borena	1,296,373	22144	18245	82%	6425
Oromia	E Shewa	1,894,949	31,878	20,646	64.8%	22,464
Oromia	EWellega	1,483,632	25,916	19,362	74.7%	13,108
Oromia	Guji	1,721,530	29656	25168	85%	7618
Oromia	Illubabor	1,545,815	27,100	19,890	73.4%	14,420
Oromia	Jima	3,014,783	53,286	33,222	62.3%	40,128

Oromia	W Shewa	2,381,079	41,171	15,782	38.3%	50,777
Oromia	W.Harer	2,272,321	39,420	32,129	81.5%	14,582
Oromia	WWellega	1,655,954	28,550	22,467	78.7%	12,166
SNNPR	Bench Maji		13,816	10,617	76.8%	6,398
SNNPR	G/Gofa	1960421	33450	29631	89%	6766
SNNPR	Keffa	1,072,647	18454	15942	86%	4340
SNNPR	Sidama	3,572,813	61,482	48,654	79.1%	25,656
SNNPR	Wolayta	1,851,452	32,032	29,513	92.1%	5,038
Somali	Afder		10,760	30	0.3%	21,460
Somali	Degehabur		9,013	1,229	13.6%	15,568
Somali	Fik		6,561	470	7.2%	12,181
Somali	Gode		8,749	2,270	25.9%	12,958
Somali	Jijiga	1,154,390	15,992	10,162	63.5%	11,661

Annex 14: Average hours per week spent on providing specific services by region based on 2 HEWs per health post

	Amhara	%	SNNPR	%	Oromiya	%	Tigray	%	Ben-Gumuz	%
EPI	31.0	7.7	13.6	5.6	20.6	4.9	24.0	6.8	18.8	5.4
Growth monitoring/nutrition	38.6	9.6	26.0	10.7	21.7	5.2	44.0	12.5	44.0	12.6
Essential new born care	54.0	13.4	38.4	15.8	198.4	47.6	45.7	13.0	44.0	12.6
Pneumonia management	56.0	13.9	29.5	12.2	40.0	9.6	46.9	13.3	48.0	13.7
Malaria management	56.0	13.9	49.3	20.3	34.0	8.2	48.0	13.7	53.7	15.3
Diarrhea management	56.0	13.9	16.6	6.8	34.3	8.2	48.0	13.7	53.7	15.3
Antenatal care	54.0	13.4	29.8	12.3	28.6	6.9	47.0	13.4	44.0	12.6
Post natal care	56.0	13.9	39.5	16.3	38.9	9.3	48.0	13.7	44.0	12.6
Total	**401.6**	**100.0**	**242.7**	**100.0**	**416.4**	**100.0**	**351.6**	**100.0**	**350.2**	**100.0**