



AFRICA ROUTINE IMMUNIZATION SYSTEM ESSENTIALS

August 2012

A STUDY OF THE DRIVERS OF ROUTINE IMMUNIZATION SYSTEM PERFORMANCE IN ETHIOPIA





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ACRONYMS/ABBREVIATIONS

ARISE	Africa Routine Immunization System Essentials
BCG	Bacillus Calmette-Guerin Vaccine
CHV	Community Health Volunteer
cMYP	comprehensive Multi Year Plan
DTP	Diphtheria-Tetanus-Pertussis Vaccine
DTPI	Diphtheria-Tetanus-Pertussis Vaccine, First Dose
DTP3	Diphtheria-Tetanus-Pertussis Vaccine, Third Dose
EDHS	Ethiopia Demography and Health Survey
EFY	Ethiopian Fiscal Year
EOS	Enhanced Outreach Strategy
EPI	Expanded Program on Immunization
ERIA	Enhanced Routine Immunization Activity
FMoH	Federal Ministry of Health
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
HC	Health Center
HepB	Hepatitis B Vaccine
HEP	Health Extension Program
HEW	Health Extension Worker
Hib	Haemophilus Influenza Type B Vaccine
HRH	Human Resources for Health
HSDP	Health Sector Development Program
HSS	Health Systems Strengthening
ICC	Inter-agency Coordinating Committee
JSI	JSI Research & Training Institute, Inc.
MCH	Maternal and Child Health
MDG	Millennium Development Goals
MNCH	Maternal, Newborn, and Child Health
NGO	Nongovernmental Organization
OECD	Organization for Economic Co-operation and Development
OPV	Oral Polio Vaccine

Penta3	Pentavalent Vaccine, third dose
PHC	Primary Health Care
PIRI	Periodic Intensity of Routine Immunization
RED	Reaching Every District Strategy
RHB	Regional Health Bureau
RI	Routine Immunization
SWAp	Sector-wide Approach
TT	Tetanus Toxoid Vaccine
UNICEF	United Nations Children's Fund
WHO	World Health Organization
WoHO	Woreda Health Office
ZHD	Zonal Health Department

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EXECUTIVE SUMMARY

BACKGROUND

The foundation of national immunization programs is routine immunization (RI)—the provision of consistent, timely protection from common diseases to all children through vaccination. Without an effective system to deliver RI, coverage rates cannot be increased, gains from special vaccination campaigns cannot be sustained, and new vaccines cannot be introduced. The Africa Routine Immunization System Essentials (ARISE) project was created in late 2009 to consolidate experience and learn about what drives improvement in RI coverage in Africa. ARISE aims to learn from African experience with RI, particularly from countries whose RI systems are performing well and explain why some RI systems achieve improvements in immunization performance and others do not. The project will translate these findings into actions to improve African RI systems whose performance continues to falter.

During the first stage of the project, in 2010, ARISE interviewed implementers and technical and development partners and completed a systematic review of published and grey literature on the drivers of RI system performance in Africa (Performance is defined for the purpose of this study as DTP3/Penta3 coverage). A preliminary set of policies, procedures, and investments driving RI system performance emerged. To investigate these and other possible drivers of coverage improvement in depth, and to better understand how they work in practice, ARISE conducted a study of the drivers of RI performance in four districts in Ethiopia. The research was part of a larger study that extends to Cameroon and Ghana as well.

METHODS

The ARISE research in Ethiopia used a mixed-methods multiple-case-study design, enabling investigators to identify and explore:

- which drivers are critical to improving woreda-level RI system performance, as measured by coverage with the third dose of pentavalent vaccine (penta3)
- how these drivers influence performance
- the contextual factors impeding or promoting a driver's effectiveness
- the relationships among the drivers

The units of analysis were individual districts (hereinafter, we will use a transcription of the Amharic word for “district”: woreda). For the purpose of the project, a RI performance driver is defined as a structure, resources or process that works on or through the immunization system to make the system perform effectively or to improve its performance. The methodology was iterative; the focus of inquiry expanded, narrowed and shifted as information saturation and convergence was reached and as new relationships and factors emerged. Case selection was primarily based on trends in coverage from 2007 to 2009, as well as on geographic and other standard criteria. The study team selected three woredas where penta3 coverage had improved and, for comparison, one “steady” woreda that showed little change in coverage during the same period. The study woredas are listed on the following page.

Seven Ethiopian and international researchers with experience in case study methodology, expertise in qualitative research and RI programs, and knowledge of the local context implemented the study in February 2011. The research team conducted 104 interviews, collecting data in two stages at the national, regional/zonal, woreda, facility, and community levels, with greater emphasis on the latter three. Researchers also reviewed national and district documentation and administrative records, and conducted a woreda-level RI situation analysis to understand how the system was supplied, organized, and managed and how it delivered services.

Data analysis leading to the identification and exploration of performance drivers took place in stages. As the researchers progressed from woreda to woreda, they developed and then tested theories of driver-to-performance pathways through review of interview notes, team discussions, pathway diagrams, and cross referencing interview data with data collected from the RI situation analysis and from observation at service delivery sites. The study team compared the experience of each woreda where coverage improved to find common or contrasting patterns related to resource management, partnering, and data use. The researchers then analyzed data from the woreda where coverage had not improved—the “steady” woreda—to determine whether patterns observed at the other woredas were present or absent. Draft findings were presented at a stakeholder workshop in July 2011, where representatives of the four woredas reviewed results. After the workshop, the researchers conducted another round of interviews in the woredas to verify findings and fill data gaps.

NATIONAL CONTEXT

The Ethiopian health sector has undergone significant reforms over the past two decades, beginning with a new health policy introduced in 1993—the first such change in over 50 years. The government decentralized authority in the health system to the regional level in 1996, and further decentralized authority to the woreda level in 2002 (El-Saharty et al, 2009). In 2012, the government continues to promote decentralization of leadership in the health system and meaningful participation of the population in local development programs. Publicly funded health services are administered through a Regional Health Bureau (RHB) at the regional level, a Zonal Health Department (ZHD) at the zonal level (with the exception of some regions, such as Tigray), and Woreda Health Offices (WoHO) (El-Saharty et al., 2009). While governance and responsibility for service delivery is decentralized to the regions and woredas, all levels of the health sector continue to rely on some centralized policy, planning, and budget decisions and on the national supply chain for vaccines and other health commodities.

In 2003, the Federal Ministry of Health launched a new health care plan, called Accelerated Expansion of Primary Health Care Coverage, as part of a comprehensive Health Extension Program (HEP). The HEP represented an innovative, community-driven approach to health

Ethiopia study woredas

Woredas with improved coverage:

- Alage, Tigray Region
- Toke Kutaye, Oromia Region
- Sekota Zuria, Amhara Region

Woreda with steady coverage:

- Tikur Incini, Oromia Region

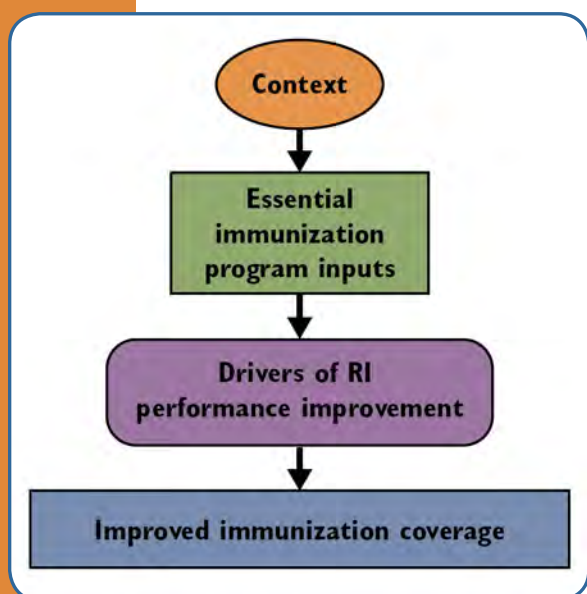
service delivery, and it was designed with the goal of providing universal primary health care coverage. The program plans to ensure that there are five HCs in each woreda, with one HC to serve a total of 25,000 population. As part of this effort, the government introduced a new cadre of community-based health worker: the health extension worker (HEW). By the end of 2009, a total of 33,819 HEWs had been trained and deployed. The HEWs are government employees and are paid from the government budget. They receive one year of training at the Technical and Vocational Training and Education Centers.

In Ethiopia, as in many resource-poor countries, massive external financial and technical support was invested during the 1980s in pursuit of a global goal of achieving universal childhood immunization by 1990. As a result, vaccination coverage increased rapidly, to 50% for DTP3 by 1990 from less than 5% in 1980. After 1990, external donors withdrew much of their funding, and coverage dropped precipitously. After several years, coverage once again rose quickly to 1990 levels and beyond, then stagnated for several years before beginning a slow and steady rising trajectory during the past seven to eight years. As of 2010, DTP3 coverage had reached 87%, according to WHO/UNICEF estimates.

FINDINGS

In the three woredas where coverage improved, penta3 coverage rose to 87% or above in 2009 from percentages in the low to middle 70s in 2006. In the steady woreda, the coverage remained in the mid-60s during that period, only increasing in 2010 to 73%. The identification and analysis of the drivers of coverage improvement explain the difference between the woredas where coverage improved and the woreda where improvement was limited.

Figure ES I. Elements of the Pathway to Routine Immunization Performance



Framing RI performance improvement

The anticipated outcome of a national or woreda-level routine immunization system—improved penta3 coverage, in the case of this study—is a product of the context in which routine immunization services are delivered, the availability of essential program inputs, and key performance improvement drivers. Figure ES I presents the performance improvement pathway. While these pathways, in practice, are rarely perfectly linear, this simple diagram shows broad steps on the way to improved coverage. To qualify as a driver, a policy, resource, action, or process had to be present in some form in the woredas that had experienced recent gains in immunization coverage and to be absent or weak in the steady coverage woreda. In addition, key informants must have identified the importance of the driver, and the driver had to have a logical link to improved coverage by either improving the supply or use of immunization services during the period under study. The drivers

identified in this study are not meant to represent a comprehensive list of what is required for a successful RI program. Instead, they are drivers of the positive change that occurred in the case study woredas in recent years. Inputs or processes that did not drive recent improvement are not included, even though such factors may be key drivers in other districts or different countries.

National and subnational context of RI performance improvement

The context of RI can influence the effectiveness of the service and may be as important as any strategy chosen to improve performance. In Ethiopia, some aspects of the context of woreda-level RI created conditions that supported the introduction and effective implementation of performance drivers. They include: 1) high level political commitment to improving RI services and immunization coverage, expressed in terms of policies, funding streams for immunization and primary health care, and the adoption of specific strategies in response to reports of large numbers of unvaccinated Ethiopian children. An important example of political commitment is the Health Extension Program (HEP) whose introduction and rapid expansion marked a period of intense investment in basic health services that set the stage for the success of RI in the study woredas. The HEP's main intent has been to improve access to health services in rural areas which yielded remarkable progress in geographical as well as social access to health care (mainly preventive, though curative care is also part of the service package). These decisions created positive conditions for immunization coverage improvement between 2006 and 2010 in the ARISE study woredas. 2) A second aspect of the supportive context for improved coverage is the strong emphasis placed on measuring and openly reporting on progress in health care, including immunization, which is part of the government's emphasis on public sector accountability as well as reflected in global and national health policy goals.

Essential immunization inputs

Through the woreda RI situation analysis, the ARISE research team assessed the basic capacity of each woreda in routine immunization from 2006 through 2010 in terms of the availability of essential inputs for delivering a basic immunization service. The study found that all four study woredas had a reliable supply of vaccines, few cold chain disruptions, and sufficient and trained human resources. Where shortages or challenges emerged, woreda health staff was able to address the problem by, for example, borrowing a vehicle to collect vaccines or by moving vaccines to adequate cold storage. All four woredas experienced a marked increase in the community-level health workforce under HEP. From 2006 through 2010, in two of the three woredas where coverage improved, the number of HEWs increased tenfold. Alongside this boom in the health workforce, each woreda gained health posts (ranging from three to 28) and experienced large increases in the number of outreach vaccination sites. The increases in the number of health posts and outreach vaccination sites were less dramatic in the steady woreda than in the other three. However, in most cases, the availability of essential inputs for RI did not differ greatly among the four woredas. Table ESI compares several characteristics, including basic EPI capacity, of the woredas.

Table ES I. Characteristics of the Four Study Woredas and Their Routine Immunization Systems

WOREDA	ALAGE	TOKE KUTAYE	SEKOTA ZURIA	TIKUR INCINI
Region	Tigray	Oromia	Amhara	Oromia
Population size	116,263 (2009)	122,582 (2010)	142,728 (2010)	107,536 (2010)
Characteristics of settlement	Rural	Rural/semi-urban	Rural	Rural
Penta3 coverage rates in 2006 and 2009	75%; 87%	78%; 95%	73%*; 93%	61%; 66%
Dropout rates between pental and penta3 in 2006 and 2009	6%*; -1%	7%; 4%	15%*; 3%	9%; 6%
Number of health posts in 2006 and 2010	11; 14	10; 31	5; 33	3; 7
Ratio of health post to population, 2010	1: 8,304	1: 3,954	1: 4,325	1:15,360
Number of outreach sites for vaccination in 2006 and 2010	21; 72	38; 62	Unknown; 132	22; 55
Ratio of outreach sites to population, 2010	1:1,614	1: 1,977	1: 1,081	1:1,955
Estimated share of vaccines delivered by outreach, 2010	60%	70%	85%	80%
Number of 4-wheeled and 2-wheeled working vehicles, 2010	6	2	3	1
Number of health extension workers (HEWs) in 2006 and 2010	22; 35	6; 62	5; 64	7; 39
Ratio of HEW to population, 2010	1:3,321	1: 1,977	1: 2,230	1: 2,757
Number of working refrigerators at health care facilities, 2010	5	9	12	8

*2008 data; **2007 data

WHO/UNICEF coverage estimates for 1980-2010, as of July 2011. Please note that WHO/UNICEF coverage estimates were updated in July 2012. However, all national level coverage estimates used in this report are based on data reported by UNICEF/WHO in 2010 and 2011.

Woreda-level drivers of RI performance improvement

Respondents at the national and woreda levels cited the availability of essential immunization inputs as an important contributor to improved coverage in Ethiopia. However, the presence or absence of resources and infrastructure only partly explains the differences in outcomes between the steady woreda and the woredas whose coverage increased an average of 16 percentage points in three to four years. By comparing and synthesizing the woredas' experiences, the research team identified five common practices or innovative steps that drove positive change in immunization coverage. These drivers of the performance of RI systems were:

- locally-recruited and supported HEWs
- active community participation in RI and health
- partnership between the woreda health team and the local government (woreda and kebele) administrations
- focus on accountability and performance monitoring
- support from development partners

Locally-recruited and supported health extension workers

Health extension workers were central to improvements in RI coverage. In the study woredas where coverage increased, respondents identified the HEWs more frequently than any other factor as the primary force of change. These workers contribute directly to improved immunization coverage, because they deliver immunization services and health messages in the community on a regular basis. The dramatic growth in the size and reach of the community-focused health workforce not only increased geographic access to immunization services; it also established HEWs as focal points in their communities for health generally and immunization specifically. Through their work organizing vaccination sessions and raising awareness, HEWs in the three woredas where coverage improved, built trust and rapport, which encouraged the use of immunization and other primary health services. The workers also established partnerships with community leaders and volunteers, employing mechanisms such as registration of newborns and immunization defaulter tracing to increase the likelihood of mothers initiating immunization and completing it on schedule. The lack of parallel improvement in the steady woreda, despite HEW involvement, can be traced to three factors. First, in the steady woreda, many planned health posts and health centers had not yet been constructed by 2010 and HEWs had no base to live and work. Second, some HEWs were not recruited locally, and were therefore reported to be less effective. Third, the relationships between the HEWs and the local administration were not as strong as those found in the other woredas.

Active community participation in routine immunization and health

In the woredas where coverage improved, the HEWs and the community, including local government (woreda and kebele administrations), local networks of volunteers, teachers, and religious leaders formed a solid team that committed time and human and material resources

to raising awareness of health needs and interventions, organizing outreach vaccination, and setting high expectations in the community for meeting health service targets. In the woreda where coverage remained steady, the overall number of volunteers was low throughout the study period, many volunteer roles were unclear, volunteers complained that incentives given during campaigns and by NGOs were not available for routine services, and few volunteers were involved in tracing defaulters.

Partnership between health and local government administration

Coordination and collaboration between local government and health offices and workers distinguished the three woredas where coverage improved from the woreda where coverage was steady. Administrative and health offices worked closely together in annual planning, on supervision, and in supporting the HEWs to raise the profile of health and health workers in the community. Respondents viewed the interpersonal relationships between the woreda administration and the woreda health office as crucial for the improved performance of the health system in general and, by extension, for immunization.

A focus on accountability and performance

At the woreda and community level, program performance review takes the form of quarterly meetings of woreda health and administrative staff and regular supervision. At the community level, HEWs, kebele representatives, and community members meet to review progress and trace defaulters, guided by reports of children who are behind in their vaccinations or who have not been vaccinated at all. Ranking health facilities and woredas based on coverage and other indicators is also common. In addition to ensuring accountability, these practices are used to recognize achievement, promote learning, and focus stakeholders on a common goal. What makes these simple management tasks effective are their regularity and the managers' commitment to following up on reports with specific actions to rectify poor performance. The health workers also reported a direct benefit from this peer learning approach and from the public recognition of achievement, which they said motivated them and gave them credibility in their communities.

Support from development partners

Development partners acted more as enablers than direct drivers of improvement in RI system performance. Major international agencies guided policy and technical issues, and supported construction, training, assessments, and the development of guidelines. From the woreda perspective, however, respondents were more likely to identify the contribution of NGOs to improvements in immunization coverage than to attribute the improvements to major funders or advisors. In the three woredas where coverage improved, NGOs provided equipment, training, fuel, vehicles, and technical assistance. They also helped to build capacity by providing training on all 16 HEP interventions to woreda health administrators, health care providers, and HEWs. In contrast, there was no equivalent support from NGOs in the woreda with steady coverage, and health managers considered this an obstacle to improving RI system performance.

IMPLICATIONS

To improve and sustain RI coverage, woredas need a supportive political and policy context, as well as essential immunization infrastructure. The national Health Extension Program provided the impetus and the resources to bring about a dramatic improvement in geographic access to immunization (and other health interventions). Longstanding national commitment to RI and the support of development partners ensures the availability of vaccines and equipment. In the three woredas where coverage improved, the relatively consistent availability of these essential inputs provided the foundation on which the five routine immunization performance drivers were able to move penta3 coverage from around 75 percent to as high as 94 percent.

The ARISE exploration of district level RI reveals, however, that it is the way in which each improving woreda implemented RI that triggered coverage improvements. Comparing the woredas, there was not much difference in terms of health infrastructure. Rather, woreda experience differed in relation to the choices that woreda health teams made in managing their resources and the shared commitment of the health system, the local government, and the community to improving immunization coverage. Such positive relationships and enhanced coordination motivated a range of community members (for example, volunteers, religious leaders, and school personnel) as well as health workers to promote RI. In the steady coverage woreda, many of these performance drivers – performance review, HEWs' work in defaulter tracing, and raising community awareness – were either very recently instituted, present but not functioning as effectively as they were in the improving woredas, or missing altogether.

Investing in improved RI performance

The results of the study of drivers of improvements in RI system performance in four woredas in Ethiopia may have a number of practical policy implications for other sub-Saharan African districts.

First, Ethiopia's success with taking vaccination into the hearts of communities through Health Extension Workers suggests that a community-focused, community-based health workforce may catalyze immunization service uptake and completion of vaccination schedules. Closer physical proximity to services and the trust built from regular interaction with HEWs worked together to increase the availability of RI and the commitment of community members to take their children for vaccination.

Second, without continued attention and investment to sustain the supply of essential EPI elements, no RI program can deliver potent vaccines effectively and build the credibility for RI within a community that is required to sustain acceptance and use of vaccination. As countries gradually introduce new vaccines into the routine system, maintaining these basic service inputs is critically important.

Third, from 2006 onwards, no major changes—positive or negative—in service supply were reported. Respondents instead traced coverage improvement to decisions and actions related to management and the motivation of staff, to the coalitions formed between health and community actors, to the regular use of data, and to learning to focus workers on reaching targets. Many of these performance drivers were not specific to immunization programs

but could be generalized to the basic practices and functions of a health system as a whole. Effective woreda-level RI services benefit from health systems that 1) channel resources and services as close to the community as possible; 2) use data to hold health and community workers accountable for the system's performance and; 3) use program review techniques to motivate workers to stay focused on performance goals. All of these drivers are potentially as important to other basic health services as they are to immunization.

Fourth, in the woredas where coverage improved, no single driver could account for coverage improvement. Rather, drivers tended to work in concert to influence RI system performance. Managers and policy makers are therefore cautioned about looking for one key driver of coverage improvement. In complex systems with limited resources, the use of multiple strategies for achieving better immunization service delivery and increased use of vaccination is needed.

Finally, the responsibility for determining which performance drivers are effective in a particular woreda, and managing resources to apply and adapt performance drivers rests mainly with woreda (or district) level health teams. These teams were effective advocates for strategies that worked, and channeled resources toward effective actions such as use of data for regular performance review and motivation of HEWs.

Local health managers in Africa must work strategically to improve health service capacity and effectiveness and increase the use of health services such as they did with respect to immunization in Ethiopia. To do so they require resources, skills, and the authority to use different strategies and adapt them as needed to the local context to optimize resources and improve the chances of program success.

Table ES 2. How Context, Essential Immunization Infrastructure, and Performance Drivers Work Together to Improve Coverage of Routine Immunization (ARISE Case Studies of Four Ethiopian Woredas)

FOUNDATION AND DRIVERS	MECHANISMS	PATHWAYS TO RI SYSTEM PERFORMANCE IMPROVEMENT
<p>CONTEXT: Political commitment to RI Supportive policies</p>	<ul style="list-style-type: none"> • Policies and funding that: <ul style="list-style-type: none"> – focus on increasing access to care – focus on community-based health – focus on performance measurement and improvement • Regular supply of vaccines and basic inputs for immunization 	<ul style="list-style-type: none"> • Services move closer to the community • Maintain vaccine supply chain • Increase community-focused health workforce • Motivate staff and promote accountability
<p>FOUNDATION: Essential immunization infrastructure in health facilities</p>	<ul style="list-style-type: none"> • National political commitment through HEP & well-functioning immunization program • Cold chain equipment and basic transport at every health facility offering fixed services • Increase in the size of community-focused health workforce 	<ul style="list-style-type: none"> • Maintain the vaccine supply chain • Maintain an adequate number of vaccination providers • Increase opportunities for fixed-site and outreach vaccination
<p>DRIVER: Locally-recruited and supported health extension workers (HEWs)</p>	<ul style="list-style-type: none"> • HEW characteristics: female, from the community, living in the community • HEW partners with kebele administration • HEW teams with extensive volunteer network • Community-based vaccination, defaulter tracing, awareness raising 	<ul style="list-style-type: none"> • Establish personal links between health workers and community • Provide regular vaccination clinics, defaulter tracing, and health education • Increase community and health partnership • Support the credibility of vaccination and HEWs
<p>DRIVER: Active community participation in RI and health</p>	<ul style="list-style-type: none"> • Regular interaction of community health volunteers with RI program • Strong partnership of HEW and kebele administration • Involvement of communities in decisions about service delivery 	<ul style="list-style-type: none"> • Increase capacity to mobilize community support, trace defaulters, and educate communities about health • Increase resources for health service delivery
<p>DRIVER: Partnership between health and government administration</p>	<ul style="list-style-type: none"> • Joint planning and implementation of RI • Regular supervision by woreda, HC, and kebele • HEW sits on kebele cabinet • Joint review of RI performance 	<ul style="list-style-type: none"> • Motivate health workers and community • Increase community involvement • Improve access to resources for immunization
<p>DRIVER: Focus on accountability and performance</p>	<ul style="list-style-type: none"> • Clear performance targets • Monthly or quarterly meetings with health teams to review performance • Praise for and correction of performance • Peer exchange of service delivery solutions • Supervision using data and peer learning 	<ul style="list-style-type: none"> • Motivate staff • Use data to inform decision making • Increase skills to improve community-level service delivery • Emphasize problem solving
<p>DRIVER/ENABLER: Development partner support for health and immunization</p>	<ul style="list-style-type: none"> • Capacity building • Resources to support immunization services • Technical tools and guidance 	<ul style="list-style-type: none"> • Improve service quality • Improve service consistency • Motivate health workers

I. INTRODUCTION

The foundation of successful national immunization programs is routine immunization (RI)—the provision to all children of consistent, timely protection from common childhood diseases through vaccination. Effective RI systems increase coverage rates, sustain the gains from vaccination campaigns, and provide a foundation for introducing new vaccines. The Africa Routine Immunization System Essentials (ARISE)¹ project was created in late 2009 to consolidate experience and learning about what drives improvement in RI coverage in Africa. Sub-Saharan countries have achieved solid advances in immunization programming in the past 10 years; the proportion of infants vaccinated with a third dose of the diphtheria-tetanus-pertussis (DTP) vaccine grew to 77% in 2010 from 55% in 2000 (World Health Organization, 2011). However, coverage rates for a third dose of DTP (DTP3) and for a third dose of pentavalent vaccine (penta3), which combines the DTP vaccine with vaccines for hepatitis B (HepB) and Haemophilus influenzae type b (Hib), still vary greatly among and within countries, and pockets of low vaccination coverage are common. Some of Africa’s most populous countries—Nigeria, South Africa, Democratic Republic of the Congo, and Uganda—have coverage rates well below the target of 80%, as do many districts throughout the continent.² ARISE aims to learn from African experience with RI, particularly from countries whose RI systems are performing well. It seeks to identify why coverage improves in some RI systems and not in others, and to translate these findings into actions to improve coverage in systems whose performance continues to falter.

The project’s overall objectives are to:

- Create an evidence base to better understand the drivers of RI system performance.
- Deepen and broaden African and global stakeholder engagement in improving RI.
- Position the learning from the project to inform the way forward to improve RI systems in Africa, identify potential investment options, and clarify stakeholder roles.

In the first stage of the project, conducted in 2010, ARISE team members interviewed implementers of RI, as well as RI technical and development partners and completed a systematic review of the literature on the drivers of RI system performance in Africa. (RI performance is defined in this context as DTP3/penta3 coverage.)³ The team reviewed both commercially published literature and “grey” literature produced by various other sources, including governments, nongovernmental organizations (NGOs), academic institutions, and industry. From these efforts, the team identified a preliminary set of policies, procedures, and investments that drive RI system performance (JSI Research & Training Institute, 2011b).

1 ARISE is managed by the JSI Research & Training Institute, Inc. (JSI) and funded by the Bill & Melinda Gates Foundation. JSI’s partners on the ARISE project are the School of Public Health at Makerere University in Uganda and, in the United States, the Dartmouth Institute at Dartmouth College and the School of Public Health at George Washington University.

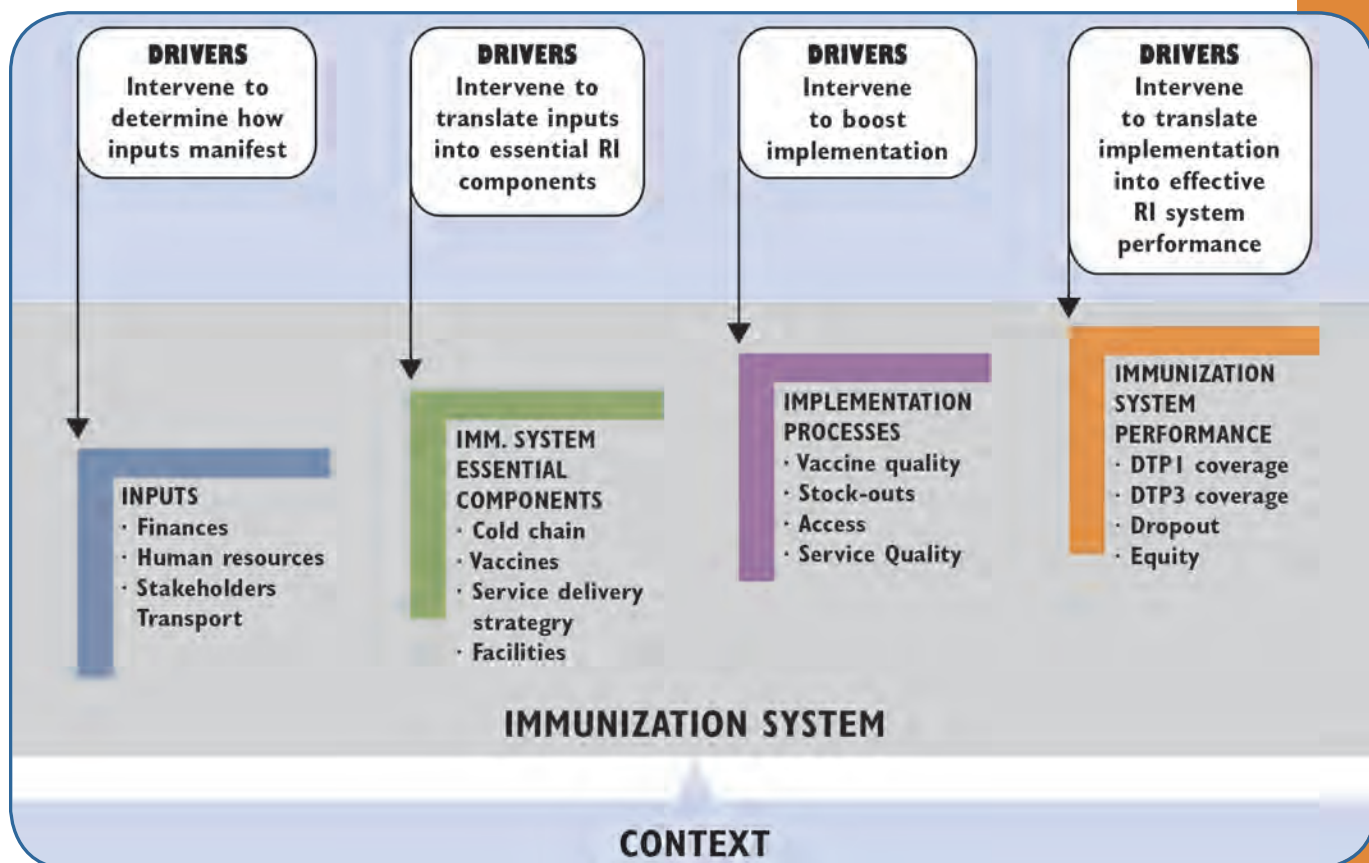
2 Landscape Analysis Synopsis: An Initial Investigation of the Drivers of Routine Immunization System Performance in Africa (May 2011). Arlington, VA: John Snow, Inc./ ARISE Project for the Bill & Melinda Gates Foundation. Available at <http://arise.jsi.com/landscape-analysis-2>

3 DTP3 and penta3 are accepted indicators of routine immunization system performance.

To further investigate these and other possible drivers of coverage improvement, and to understand better how they work in practice, ARISE conducted a study of RI performance in four districts (woredas) in Ethiopia. The research was part of a larger study that extends to Cameroon and Ghana as well. This report presents the results of the Ethiopia case study.⁴

The analytical framework used to guide the ARISE study of the drivers of RI performance is presented in Figure 1. Drivers can influence any stage of the program cycle: inputs, essential immunization components, implementation processes, and outcomes. Sections Two and Three of this report present an introduction to the social, economic, and political context and the national health care system in Ethiopia, with particular attention paid to the Expanded Program on Immunization (EPI). Section Four describes the ARISE case study design and its application in Ethiopia. Details are provided regarding data collection and the analytical approach. The characteristics of each case study woreda are described in Section Five, including information on livelihood, geography, health system, RI performance, and the essential components of a RI system. Section Six integrates the findings from the four woredas and discusses the drivers of RI performance and the pathways identified for improving RI performance. Implications of the findings for current and future RI policies in Ethiopia and elsewhere in sub-Saharan Africa are presented in Sections Seven and Eight.

Figure 1. In-Depth Country Case Study Analytical Framework



⁴ The full Ethiopia case study report, research reports, briefs from Cameroon and Ghana, and the synthesized findings of the three case studies are available at <http://arise.jsi.com>

II. ETHIOPIA COUNTRY BACKGROUND

Located in the interior of the Horn of Africa, Ethiopia is a low-income country that faces the challenge of providing equitable health services across a highly dispersed population. The country is home to approximately 83 million people who occupy 1.1 million square kilometers of diverse topography.⁵ Approximately 82% of the population lives in rural areas (World Bank, 2010b). Despite challenges related to drought and civil unrest, Ethiopia in recent years has made and sustained declines in maternal and child mortality and gains in education, as well as in its gross domestic product (GDP).

Ethiopia ranks 174th out of the 187 countries listed on the United Nations Development Program's Human Development Index for 2011. Its score of 0.363 is lower than the 0.463 average score for sub-Saharan Africa (UNDP, 2011).⁶ Despite the country's economic improvement, urban and rural poverty persist. Nearly half (47%) of the total population lives below the poverty line. Although reported enrollment in primary education is high, literacy among adults (age 15 and older) is low (36%), particularly when compared with the average for the region (62%). Amharic is the official language, but English is commonly spoken and is taught across secondary schools. Many primary schools teach in a local language, rather than in Amharic or English.

The country has a long and rich history, with a diverse population of 80 ethnic groups. The Oromo (34.5%), Amhara (26.9%), and Tigre (6.1%) ethnic groups account for more than two-thirds of the population. Additional ethnic groups include the Somali (6.2%), Sidama (4%), Guarage (2.5%), Wolaita (2.3%), and Afar (1.7%), with the remaining 3% of the population comprising numerous smaller ethnic groups. Dominant religious groups are Ethiopian Orthodox Christian (43.5%), Muslim (33.9%), and Protestant (18.6%) (Government of Ethiopia, 2007).

POLITICAL STRUCTURE

Ethiopia is a federal republic, and its political leadership and governance has changed multiple times since imperial rule ended in 1974. The first popular elections were held in May and June of 1995, when the current government took office. Since being elected, Minister Meles Zenawi's government has promoted a policy of ethnic federalism, where significant powers are delegated to regional ethnically based authorities (El-Saharty, 2009).

Ethiopia has a tiered government system consisting of a federal government with executive, legislative, and judiciary branches and authority decentralized to regional authorities. The federal government oversees the ethnically based regions, zones, woredas, and kebeles (the lowest administrative level). Ethiopia is divided into nine ethnically based administrative states and two City Administrations—Addis Ababa and Dire Dawa—and subdivided into 103 zones. It is further subdivided into approximately 800 woredas and 15,000 kebeles.

5 Country population data from the World Bank was accessed at <http://data.worldbank.org/country/ethiopia>

6 Human development index trends, 1980-2011. Human Development Report (2011). New York, NY: United Nations Development Programme. Available at http://hdr.undp.org/en/media/HDR_2011_EN_Table2.pdf

The nation's Constitution assigns extensive power to regions that can establish their own government and democracy. Each region has its own council, where members are directly elected to represent the woredas. The councils have legislative and executive powers to direct internal affairs of the regions. As a result, there is extensive decentralization of service delivery, with relatively autonomous regions largely responsible for implementation.

ECONOMY

According to the World Bank, Ethiopia's annual GDP was estimated at \$28.5 billion in 2009. (All dollar amounts in this report are in U.S. dollars, unless noted otherwise.) From 2005 to 2010, the economy experienced 8%-12% annual GDP growth, a particularly notable achievement in a period of global economic uncertainty (World Bank, 2010a). The World Bank has estimated that the economy will experience continued growth through 2013, with a 6.5% average annual increase in GDP. Despite the nation's economic growth, however, sharp inflation and currency depreciation have created economic challenges.

In 2010, Ethiopia launched a five-year Growth and Transformation Plan designed to support continued economic growth in the future. The plan is supported by the continuation of the Poverty Reduction Strategy Program, as an extension of the government's Plan for Accelerated and Sustained Development to End Poverty, which operated from 2005-2006 through 2009-2010. As part of these efforts, the government increased its share of total spending targeted at decreasing poverty to over 64.1% by the end of 2007-2008, up from 42% in 2002-2003. National investment in poverty reduction and human development programs has supported gains across much of the health and education sectors (OECD, 2011a).

Agriculture accounts for 50.7% of Ethiopia's GDP, followed by the service industry and industrial activity (OECD, 2011a). The government is emphasizing industrialization through increased exports and import substitution; industry and services demonstrate average annual growth of 20% and 11%, respectively, while agriculture is expected to grow by only 8.1% annually under the five years of the Growth and Transformation Plan, which extends through 2016 (OECD, 2011a). This transition away from the country's agrarian roots and toward more manufacturing may have interesting implications for the health of Ethiopia's people.

SOCIAL AND DEMOGRAPHIC BACKGROUND

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 World Health Organization (WHO) estimates maternal mortality at 470 deaths per 100,000 live births (WHO, 2010) and preliminary results from the most recent Ethiopia Demographic and Health Survey (EDHS), published in 2011, estimates neonatal mortality at 37 deaths per 1,000 live births. Preliminary results from the survey indicate a promising rapid decline in mortality among children under five years of age, to 88 deaths per 1,000 live births in 2011 (ICF Macro and Ethiopia Central Statistical Agency, 2011) from 133 deaths per 1,000 live births in 2006 (Central Statistical Agency [Ethiopia] and ORC Macro, 2006).

Fertility is high in Ethiopia, with an average of nearly five children born per woman and annual population growth estimated at 2.5% (ICF Macro and Ethiopia Central Statistical Agency, 2011). Fertility is markedly higher in the large rural population, at 5.5 children per woman, compared with 2.6 children in urban areas. Nationwide, nearly one-quarter of women have an unmet need for family planning, indicating that large family size is not always by choice. While unmet need remains high, contraceptive prevalence has nearly doubled in recent years, to 29% in 2011 (ICF Macro and Ethiopia Central Statistical Agency, 2011) from 15% in 2006 (Central Statistical Agency [Ethiopia] and ORC Macro, 2006). Ethiopia continues to have one of the lowest rates of skilled birth attendance in sub-Saharan Africa, estimated at only 10% of all births (ICF Macro and Ethiopia Central Statistical Agency, 2011).

The Organization for Economic Co-operation and Development (OECD) has noted that Ethiopia's government has made notable progress toward achieving the Millennium Development Goals (MDGs) set by the United Nations. The percent of Ethiopians living in poverty decreased to 32.3% in 2009-2010 from 38.7% in 2004-2005. The country is on track to achieve gender parity in primary school enrollment by 2015, as well as to meet the MDGs for maternal and child health.

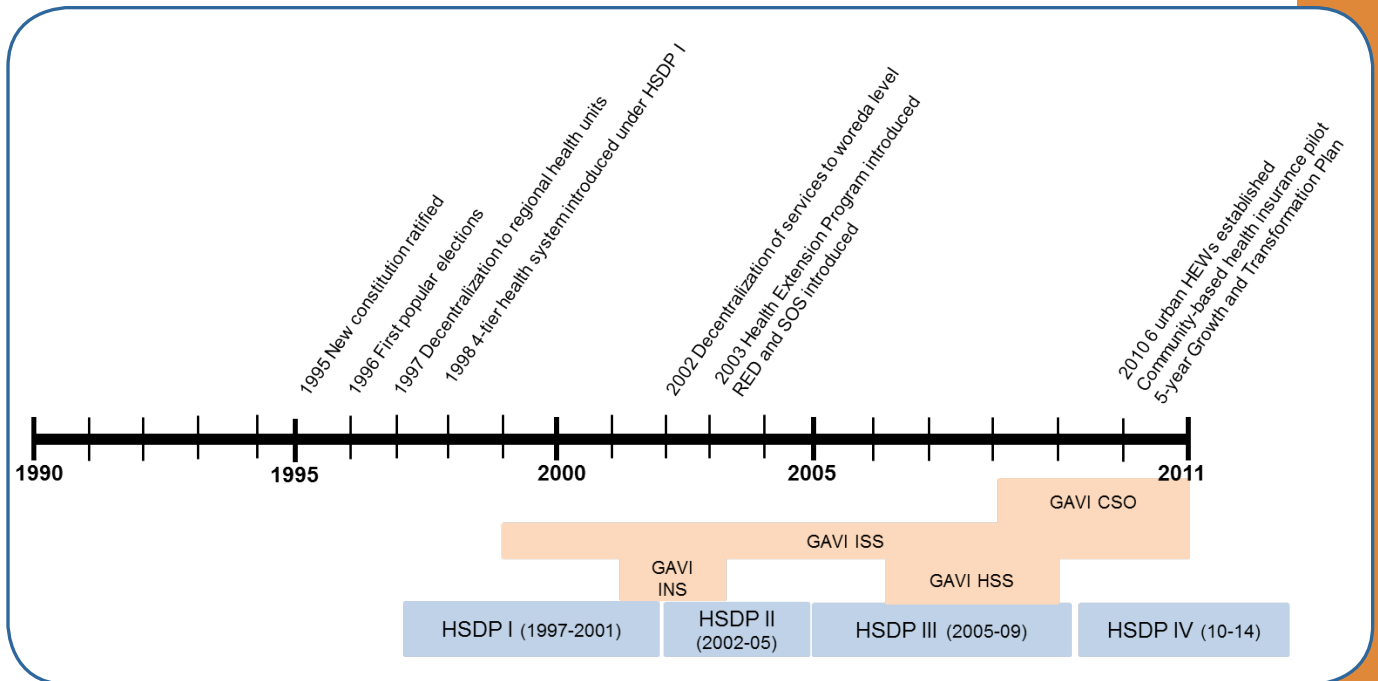
HEALTH SYSTEM

For nearly two decades, national health and development plans in Ethiopia, including the Plan for Accelerated and Sustained Development to End Poverty and Health Sector Development Programs (HSDPs), have proposed improvements in health services and health outcomes. The plans, which acknowledged the importance of improving health as part of a broader socio-economic development strategy, have helped to reform the system so that it delivers more consistent and equitable health services. Changes in the health sector, particularly efforts to decentralize programs and to increase the health workforce by adding community-based health workers, are beginning to produce better service outcomes. A timeline of recent political and policy-related events that have affected the health system is found below in Figure 2.⁷

The Ethiopian health sector has undergone significant reforms over the past two decades, beginning with a new health policy introduced in 1993—the first such change in over 50 years.⁸ Reforms have focused on fiscal and political decentralization of the health system, as well as on expanding primary health care and supporting partnerships with and participation by the private and nongovernmental sectors (Wamai, 2009). The government decentralized authority in the health system to the regional level in 1996, and further decentralized authority to the *woreda* level in 2002 (El-Saharty et al, 2009). According to Ethiopia's comprehensive Multi Year Plan (cMYP) for 2010-2014, the health system currently reaches 89.6% of the population, with access defined as residence less than 10 kilometers from a health facility, based on a framework specifying one Health Center (HC) per 25,000 catchment area population and one health post per 5,000 population (Federal Ministry of Health of Ethiopia, 2009a).

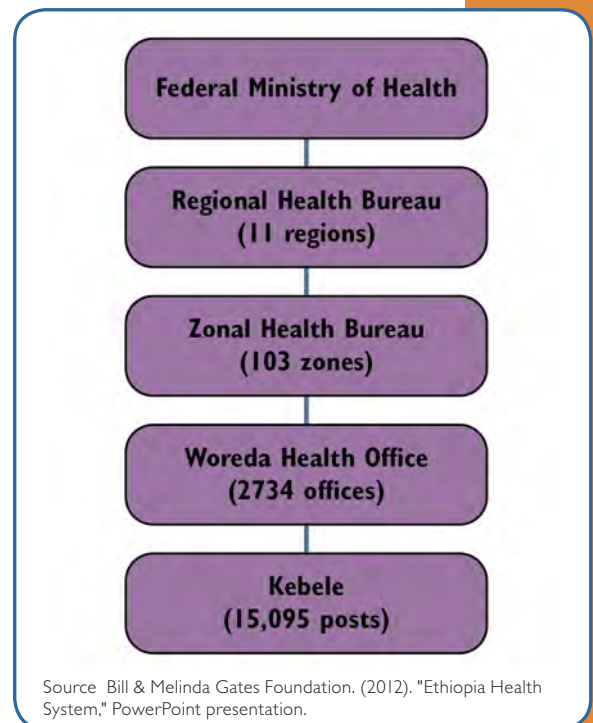
⁷ Details on GAVI support to Ethiopia can be found at <http://www.gavialliance.org/country/ethiopia>

⁸ Federal Democratic Republic of Ethiopia (FDRE). Health Policy of the Transitional Government of Ethiopia. Addis Ababa: FDRE; 1993.

Figure 2. Timeline of Major Health System Events

In 2012, the government continues to promote decentralization of leadership in the health system and meaningful participation of the population in local development programs. Publicly funded health services are administered through a Regional Health Bureau (RHB) at the regional level, a Zonal Health Department (ZHD) at the zonal level (with the exception of some regions, such as Tigray), and Woreda Health Offices (WoHO) (El-Saharty et al., 2009). The lowest level of the structure is the kebele level. The diagram on the right (Figure 3) illustrates the basic governmental health infrastructure.⁹

The varying levels of the health system have differing degrees of authority over one another and with respect to the Expanded Program on Immunization. Ethiopia does not have a national EPI manager, but has representatives that oversee EPI for agrarian and pastoralist areas. The RHB houses an EPI focal point, and it is responsible for overseeing the ZHD within its catchment area. ZHDs oversee the WoHOs, which are responsible for provision

Figure 3. Ethiopia Health System Structure

9 Reducing Unimmunized Children-Ethiopia Experience, Annual Regional Conference on Immunization, Harare, Zimbabwe, 15 December 2009.

of most services and for development of annual plans. (In cases where an area lacks a ZHD, the RHB provides oversight of the WoHOs.) In addition, HCs are strategically placed to best serve population centers, and they answer to the WoHO.

While governance and responsibility for service delivery is decentralized to the regions and woredas, all levels of the health sector continue to rely on some centralized policy, planning, and budget decisions and on the national supply chain for vaccines and other health commodities. Woredas receive block grants from regional governments and are allowed to set their own priorities, deliver services, and determine budget allocations responsive to local needs (El-Saharty et al., 2009). Educational and supervision visits are undertaken by both the Federal Ministry of Health (FMOH) and the regional and woreda leadership.

HEALTH FINANCING

Health services in Ethiopia are financed mainly by the government (both federal and regional) and bilateral and multilateral donors (both grants and loans). NGOs and private organizations also contribute financial and material support.

Government

As of 2009, expenditures on health care accounted for 11% of total government spending, and government expenditures on health accounted for 47.6% of total health expenditures in the country. Per capita health spending in the same year was estimated at \$15, compared with the \$34 per capita recommended by WHO for providing effective health services in developing countries. The government budget is set centrally and then allocated to regions, which in turn allocate funds to sectors according to local priorities.

In 2010, the federal government introduced a pilot program to test the feasibility of community-based health insurance schemes in order to provide a mechanism to protect individuals and families against financial hardship as a result of medical expenses. Targeted primarily at rural populations, the schemes will operate in conjunction with a social health insurance system, which will be covered through payroll taxes from public and private institutions, employer contributions, and government subsidies.

Donors

In 2009, Ethiopia received more than \$2 billion in assistance through bilateral aid through OECD's Development Assistance Committee countries. An additional \$549 million came from the World Bank (World Bank, 2011). Of the total donor assistance in 2009, \$516.35 million was allocated as development assistance for health, which amounts to approximately \$5.91 in donor health financing per capita. For comparison, the whole of sub-Saharan Africa received approximately \$7.6 billion in development assistance for health the same year.¹⁰

¹⁰ Institute for Health Metrics and Evaluation (2011). Financing Global Health 2011: Countdown to the Millennium Development Goals. University of Washington.

The United States government is one of the country's most substantial donors; in fiscal year 2012, over \$314 million was requested for human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) programs, \$45 million for maternal and child health programs, and millions more for other health priorities. European Union countries contributed \$202.5 million in donor support in 2009.

Private-sector

Private-sector contributions to the health system are limited. The World Bank estimated that out-of-pocket expenditures accounted for 42% of total health expenses in 2009.¹¹

HEALTH POLICY

Since the 1970s, Ethiopia has endorsed a Primary Health Care (PHC) strategy, and the government continues to emphasize the importance of nationwide access to an integrated package of PHC services. The current health policy, introduced in 1993, policy was implemented under the government's series of four five-year Health Sector Development Programs, and the health sector currently operates under HSDP IV, which was designed to cover the period from 2010-2011 to 2014-2015. The first HSDP, introduced in 1997, featured a four-tier health service system, which included a primary health care unit (a health center and five health posts), a hospital, a regional hospital, and a specialized referral hospital. HSDP III provided an institutional framework for achieving Ethiopia's MDGs (Federal Ministry of Health of Ethiopia, 2005).

HSDPs overlapped during the period from 1991 to 2002 when the country was operating under the sector-wide approach (SWAp) to health development. Originally pioneered by the organizations like WHO and the World Bank in the 1980s, SWAPs guided donors and lenders to contribute collectively to fund a country's entire health system (Cassels & Janovsky, 1998), and they became the mainstays of health sector development strategy in many countries. During implementation in Ethiopia, the SWAp was regarded as a way to achieve sustainability over time and to support capacity building around government management of health, education, and road programs (Brown et al., 2001).

In 2003, the Federal Ministry of Health launched a new health care plan, called Accelerated Expansion of Primary Health Care Coverage, as part of a comprehensive Health Extension Program (HEP). The HEP represented an innovative, community-driven approach to health service delivery, and it was designed with the goal of providing universal primary health care coverage by 2009. Recognizing the huge gap between need and health care services available, the FMOH focused on providing quality promotive, preventive, and selected curative health care services in an accessible and equitable manner to reach all segments of the population, with special attention to mothers and children (Bilal, 2011). The policy placed particular emphasis on establishing an effective and responsive health delivery system for those who live

¹¹ World Bank (2010). World Bank Data Library: Out-of-pocket health expenditure (percent of private expenditure on health). Accessed March 2012 at <http://data.worldbank.org/indicator/SH.XPD.OOPC.TO.ZS>

in rural areas, as highlighted in a recent Lancet article that described the Minister of Health's commitment to community-based health care (Donnelly, 2011). As part of this effort, the government introduced a new cadre of community-based health worker: the health extension worker (HEW).

In 2010 under this initiative, the program expanded beyond its initial rural targets to six urban areas where new HEWs installed. At the time of the study, training and deployment of urban HEWs had begun in Tigray region; Amhara region; Oromia region; Southern Nations, Nationalities and Peoples region; Harari region and the City Administrations of Dire Dawa, and Addis Ababa.

HEALTH WORKFORCE

In 2007, the World Bank reported that Ethiopia had an acute shortage of skilled health workers, with only 2.4 nurses or midwives and 0.2 physicians per 10,000 population (World Bank, 2007). According to the FMOH's 2007 assessment of human resources for health (HRH), low health workforce density, poor distribution of workers, weak HRH management, and absence of an effective HRH regulatory framework were the primary human resource challenges in the health sector. In response to these findings, the federal government has piloted and implemented several initiatives focused on training, education, and retention of health workers; released a 12-year HRH Strategic Plan (2009-2020); and developed a legal framework and Human Resources Information System.

Health Extension Workers

The comprehensive Health Extension Program, with its emphasis on expanding the number of health workers available to provide services, succeeded in increasing health care coverage dramatically (Wakabi, 2008). Coverage of publicly funded health care rose to 87% in 2007 from 61% in 2003, when the HEWs were introduced. If private health care is included, health care coverage reached 98% of the population in 2007.

By the end of 2009, a total of 33,819 HEWs had been trained and deployed under HSDP III. Even though this level of deployment exceeded the program's goal, however, only 26% of households were covered by a HEW, leaving more than 11 million households still in need of services (Federal Democratic Republic of Ethiopia Ministry of Health, 2010). Nevertheless, the size of this cadre of community-based health workers is growing quickly; in the kebeles served by the Last Ten Kilometers Project alone, an additional 7,000 HEWs and 45,000 community health volunteers (CHV) were scheduled to be trained in 2010 (Bill & Melinda Gates Foundation, 2010). A group that the Ethiopian government calls the Health Development Army, a network of volunteers started in Tigray in 2010, was rolled out nationally in 2011 after the completion of the ARISE study.

The HEP is structured such that two HEWs are selected from each kebele and assigned to the local health post. Community volunteers of varying numbers work under each pair of HEWs (Karim, 2011). The program plans to ensure that there are five HCs in each woreda, with one HC to serve a total of 25,000 population living in the woreda. Each HC supervises five health

posts. Except in some pastoral regions, the HEWs are female (primarily young women) and are required to have a minimum of a tenth grade education. Other criteria for becoming a HEW include residing in the local kebele and having personal good health and fitness. The HEWs are government employees and are paid from the government budget. They receive one year of training at the Technical and Vocational Training and Education Centers.

The requirements of HEWs are demanding. They are expected to implement all 16 components of the HEP package, which is divided into four main areas: hygiene and environmental sanitation, disease prevention and control, family health services, and health education and communication as part of outreach. Immunization is one of the preventive health interventions in the package. HEWs also have other responsibilities, such as supporting growth monitoring as part of community-based nutrition programs; informing members of the community about the HEP package through health education and other methods of creating community awareness; and working with community leaders, including kebele members, school directors and teachers, and local religious groups, to raise community awareness. One of the two HEWs in a given kebele—usually the senior HEW—serves as a member on the local kebele cabinet. At its core, the intent of the HEP and the work of the HEWs is to transfer ownership of and responsibility for individual health to households, through transferring knowledge and skills (Bilal & Herbst et al., 2011).

HEWs are tasked with spending 75% of their time visiting families in their homes and performing outreach activities in the community, training 360 “model families”¹² each year. They spend their remaining time providing services at the health posts, including providing immunizations and injectable contraceptives. In addition, collection of community-based data for decision making has been added to the core HEW strategy in 14 districts, where community health providers map the households in their neighborhoods for targeted maternal, newborn, and child health (MNCH) services. This addition has fostered community participation in planning, monitoring, and evaluating interventions (Karim, 2011). The HEWs also work in close collaboration with community-based reproductive health agents to provide reproductive health and family planning services at the household level.

In 2010, the Bill & Melinda Gates Foundation conducted a systematic review of assessments and evaluations of the HEP, in response to a request from the Government of Ethiopia. Key findings on the effectiveness of HEWs included:

- HEWs played a role in improving coverage of a number of preventive health services, such as bednets, family planning, hygiene, and antenatal care, but challenges remain related to access to safe delivery and newborn care services due to weak HEW capabilities and lack of demand for these services.
- Community volunteers were important in bolstering community trust of HEWs.
- There was inadequate supportive supervision of HEWs and inadequate training in management of labor and delivery.

¹² The model family initiative rewards families that have adopted all 16 services delivered under the HEP and holds them up as examples for others.

- Stockouts of key MNCH drugs and supplies at the health post levels limited HEWs' ability to provide services.
- HEWs had limited skills for making data-driven decisions at the local level.
- Promising information is becoming available on how revenue is being used for quality improvement, and reform components have been implemented.

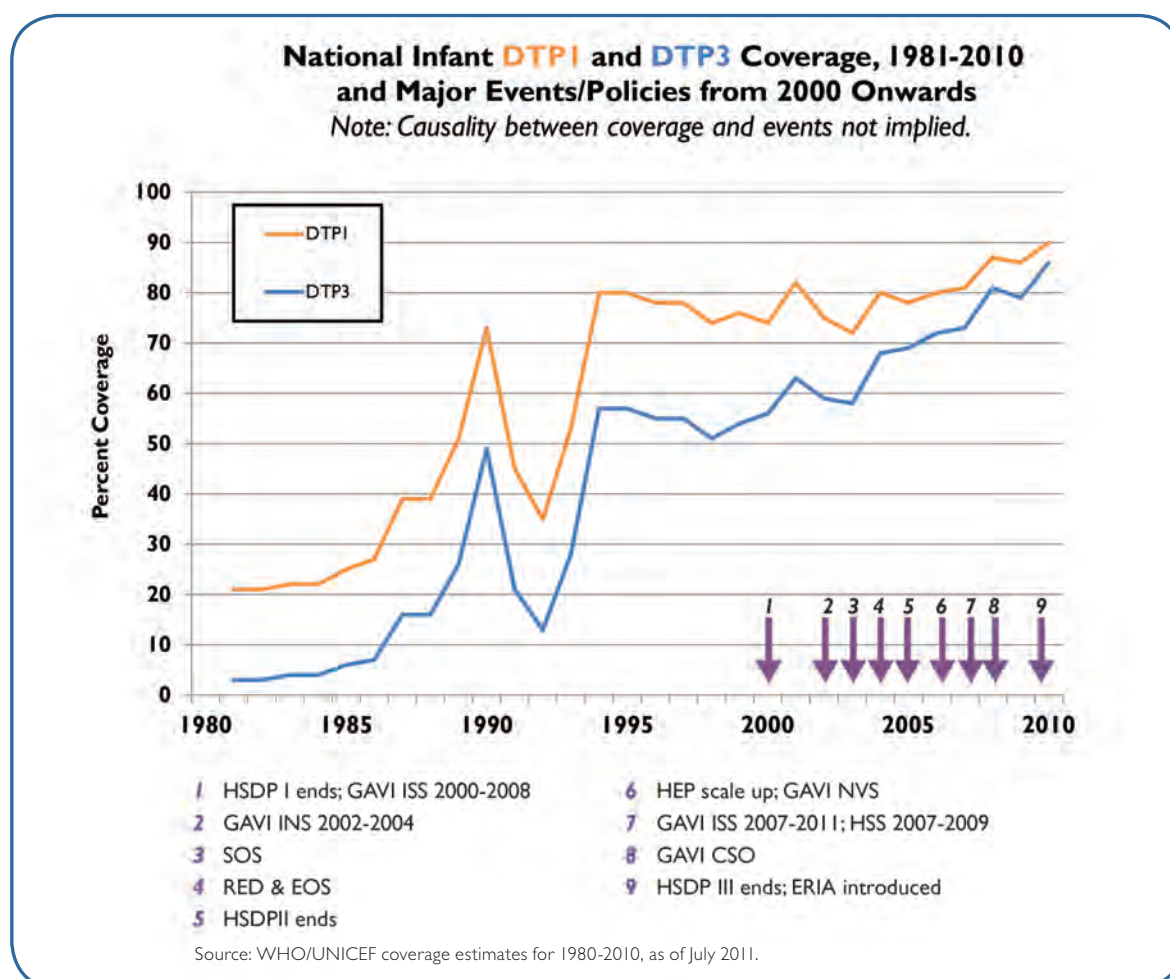
The HEP program was taken rapidly to scale and now faces the challenge of linking its achievements in training and deploying personnel to a medium-term strategy to focus HEP activities that will enable the program to translate outputs into impact (Bill & Melinda Gates Foundation, 2010).

III. BRIEF HISTORY OF THE EXPANDED PROGRAM ON IMMUNIZATION IN ETHIOPIA

The World Health Organization established the global Expanded Program on Immunization in 1974 to control vaccine-preventable diseases. In 1980, Ethiopia launched its national EPI, with a goal of achieving 100% vaccination coverage of children under two years of age by 1990. In 1986, Ethiopia set a more conservative goal of 75% coverage of infants under one year of age.

Figure 4 depicts the historical trends in coverage for the first dose of diphtheria-tetanus-pertussis vaccine (DTPI) and for DTP3, the third dose of the vaccine, from 1981 through 2010 in Ethiopia, according to estimates by WHO and the United Nation's Children's Fund (UNICEF)¹³ It also depicts trends in immunization drop-out rates, as illustrated by the gap between the two lines.

Figure 4. National Infant DTPI and DTP3 Coverage (1981-2010) and Major Events and Policies from 2000



¹³ For more information on how WHO/UNICEF estimates are derived, see http://www.who.int/immunization_monitoring/routine/immunization_coverage/en/index4.html. Please note that WHO/UNICEF coverage estimates were updated in July 2012. However, all national level coverage estimates used in this report are based on data reported by UNICEF/WHO in 2010 and 2011.

In Ethiopia, as in many resource-poor countries, massive external financial and technical support was invested during the 1980s in pursuit of a global goal of achieving universal childhood immunization by 1990. As a result, vaccination coverage increased rapidly, to 50% for DTP3 by 1990 from less than 5% in 1980. After 1990, external donors withdrew much of their funding, and coverage dropped precipitously. Other countries with weak health systems experienced similar challenges. After several years, coverage once again rose quickly to 1990 levels and beyond, then stagnated for several years before beginning a slow and steady rising trajectory during the past seven to eight years. As of 2010, DTP3 coverage had reached 87%, according to WHO/UNICEF estimates.

THE NATIONAL EPI POLICY AND OBJECTIVES

Ethiopia updated its policy governing the national EPI in 2007. Hepatitis B and Haemophilus influenzae type b vaccines were successfully added to the standard EPI schedule in 2007, when the country introduced pentavalent vaccine with support from the Global Alliance for Vaccines and Immunization (GAVI). In October 2011, also with GAVI's support, Ethiopia became the 15th GAVI-eligible country to introduce pneumococcal vaccine—thereby meeting one of the goals of its cMYP 2010-2014. By adding this vaccine to the EPI schedule, the country hopes to reduce child deaths from pneumonia which is the most common cause of death for children under age five in Ethiopia and globally.

The 2012 program currently focuses on reaching children younger than one year of age with these vaccines: Bacillus of Calmette and Guérin (BCG; target 95%), measles (target 86%), pentavalent vaccine (penta 1 target of 97%; penta 3 target of 91%), pneumococcal vaccine (target 91%), and oral polio vaccine (OPV; target of 91% for OPV3). The program also seeks to cover 87 percent of women of reproductive age (15 to 49 years old) with the tetanus toxoid vaccine (Federal Ministry of Health, 2009a). The immunization schedule for the basic EPI vaccines for children and tetanus immunization for women of reproductive age strictly follow the WHO recommendations for developing countries. Ethiopia plans to introduce rotavirus vaccine by 2012, according to the 2010-2014 cMYP.

Ethiopia has a national Inter-agency Coordinating Committee (ICC) created to improve sharing of technical, material, and financial resources. The national ICC advises the FMoH, provides technical assistance and supports planning, logistics, and monitoring and evaluation. Due to the decentralized structure of the Ethiopian health system, some regions have also established their own regional ICCs, with Somali region being first to take this step.

IMMUNIZATION SERVICE DELIVERY

Under Ethiopia's bicameral parliament, the Committee on Social Affairs in the House of People's Representatives has responsibility for overseeing immunization and immunization financing, along with various other health-related activities. Vaccines are placed under government regulation through the Food, Medicine and Health Care Administration and Control Proclamation No. 661/2009 (Federal Democratic Republic of Ethiopia Ministry of Health, 2010).

Ethiopia has adopted a national immunization policy that recommends the use of static sites (defined as health facilities with a refrigerator), outreach sites, and mobile teams as appropriate strategies for delivering immunization services. According to a 2006 EPI coverage survey, approximately 40% of the immunization services in Ethiopia are delivered at outreach sites and the remainder at static sites (Kidane et al., 2006).

For the purposes of planning service delivery, the regions of the country have been divided into agrarian and pastoralist blocs, with a specific WHO EPI Officer and UNICEF EPI Officer seconded to the FMoH and assigned to each bloc. The emphasis on vaccination service delivery through outreach is greater in the pastoralist bloc than in the agrarian bloc, as pastoralist communities are more dispersed and nomadic. Global goals and strategies related to specific disease control initiatives, including polio eradication, measles mortality reduction, and maternal and neonatal tetanus elimination, have been integrated into the national immunization policy (Federal Ministry of Health of Ethiopia, 2009a). In Ethiopia, both routine EPI activities and supplemental immunization activities also include efforts to provide Vitamin A supplementation to community members.

Ethiopia in 2002 adopted WHO policies covering the reuse of open vials of vaccines (multi dose open vial policy or MDVP), as well as policies that call for the exclusive use of auto-destruct syringes for delivering all immunization injections. In 2001, the government put in place national guidelines on safe injection practices and safe disposal of injection equipment for EPI services. The guidelines recommend, among other actions, the use of safety boxes for collection of used equipment and incinerators for their destruction (Federal Ministry of Health of Ethiopia, 2009b).

SERVICE DELIVERY AT THE WOREDA AND SUB-WOREDA LEVELS

The Federal Ministry of Health, the Regional Health Bureaus, and the Woreda Health Offices share in the decision-making processes in the development and implementation of the health system. As a result, the FMoH and the RHBs focus on policy matters and technical support, while the WoHOs manage and coordinate the day-to-day operation of PHC services, including immunization service delivery.

Each of the 11 RHBs has an EPI focal point (Sabin Vaccine Institute, 2011). As a result of the 2008-2009 reorganization of the FMoH, immunization services are now decentralized, along with numerous other health services. Immunization planning is included in the woreda planning process. With support from GAVI, the country introduced a system to ensure that cold chain equipment is available for vaccine storage for a cluster of two to three health posts in each woreda; in this way, no health post is more than five kilometers from a refrigerator. When health posts are particularly remote, they are provided with their own cold chain equipment.

Children often receive vaccinations from HEWs. By providing immunizations at the community level in rural areas, the country is addressing persistent obstacles in reaching remote populations with immunization services; some of the obstacles include low access to services, limited awareness of caregivers, and high drop-out rates (Kidane & Tekie, 2004).

EPI FINANCING

Routine immunization activities are funded primarily by development partners and the government, with donors providing most of the financial resources. The partners largely channel their funds through UNICEF, WHO, and GAVI. GAVI finances the bulk of costs for new vaccines, and UNICEF finances the bulk of costs for some traditional vaccines. The government's role is illustrated by its support in 2009. In that year, the government covered the cost of vaccines for BCG and TT, as well as 50% of the cost of OPV and injection materials for traditional vaccines (Federal Ministry of Health of Ethiopia, 2009a).

According to WHO/UNICEF, the government spent approximately \$1.4 million to immunize 3.2 million infants in 2009, accounting for 12% of the total EPI budget. However, data from the cMYP for 2010-2014 indicate government funds accounted for only 3% of the total EPI budget. The remainder was financed by private and donor sources (Sabin Vaccine Institute, 2011).

Government funds have not been consistently tracked while being disbursed to the decentralized administrative units. In 2008-2009, the FMoH did not generate real-time reports for quarterly disbursements to the RHBs. Many woredas had difficulty reporting financial data to the FMoH due to shortages of skilled personnel, and regions did not fully use their budgets (Federal Ministry of Health of Ethiopia, 2009b). As a result of the decentralization of immunization and other health services, many donors allocate funds at the regional or woreda level (Sabin Vaccine Institute, 2011).

The gap between DTPI and DTP3 coverage—the drop-out rate, illustrated by the difference between the two lines in Figure 4—began to narrow starting around 2002. This effect was likely related to the availability of Immunization Services Support (ISS) funding from GAVI and the introduction of the Reaching Every District (RED) strategy. Although DTP3 is not the only vaccine of interest in immunization programs, it is customarily used as a marker of the strength and development of the routine system to deliver successive vaccine doses of perceived good quality to a population that is prepared to receive them.

Since 2002, Ethiopia has received nearly \$279 million in funding from GAVI for five focus areas: Immunization services support (ISS), injection safety support (INS), new vaccine introduction support (NVS), health system strengthening (HSS) support, and civil society organization support. Of the funds disbursed by GAVI, 64% were allocated to procure vaccine, while the remainder supported building local capacities, strengthening systems, and implementing innovative financing and incentive systems. Specifically, GAVI's HSS support funding (\$76.5 million for a three-year period, 2007-2009) was allocated to strengthen human resources for delivery of basic health services; to improve supply, distribution, and maintenance systems; and to enhance the organization and management of health services delivery (John Snow, Inc., 2009). Funding for a number of other components, such as technical support, cold chain equipment, transport equipment, social mobilization, and some operational costs, has been made available by WHO, UNICEF, and other development partners.

With respect to general health financing and budget provisions, the government has taken steps to reallocate resources from urban hospital-based curative services toward more preventive and promotive care, targeting the rural population. The overall focus has been on communicable diseases, common nutritional disorders, environmental health and hygiene (i.e., latrines), and safe and adequate water supply.

ETHIOPIA'S CURRENT ROUTINE IMMUNIZATION SITUATION

Implementation of the Reaching Every District and Sustainable Outreach Services approaches to immunization have supported improvements in coverage since 2003. Currently, nearly all public health facilities, as well as select private hospitals in the Addis Ababa urban area, provide immunization services. Services are provided free of charge at public and NGO facilities; private institutions, which function primarily in urban areas, levy charges for vaccination services.

Systemic barriers to universal coverage remain, even as the country makes progress toward more equitable geographical distribution of care with construction and staffing of 15,000 additional peripheral health facilities. To address these challenges, the government implemented bridging approaches, such as the Enhanced Outreach Strategy (EOS) and Enhanced Routine Immunization Activity (ERIA), to support improvements in coverage in remote woredas (Fielder & Chuko, 2008). The cMYP for 2010-2014 indicates additional challenges for increasing RI coverage, including: limited harmonization among health and nutrition outreach initiatives; a need to cultivate an increased sense of responsibility for and social mobilization around protecting the health of the community and its children; desire for additional training among peripheral health workers; limited use of immunization cards as a mobilizing strategy among community members to ensure children stay on schedule; and the need to ensure that unit costs and service delivery mechanisms are the most cost-effective in a time of limited financial resources (Federal Ministry of Health of Ethiopia, 2009a).

IV. METHODOLOGY

The design of the ARISE Ethiopia study of drivers of routine immunization performance was structured as mixed-method case studies. The units of analysis are individual woredas. Case study methodology has a number of advantages for this type of investigation (Yin, 2009). It permits a holistic, detailed description and analysis of what the drivers are and how they are working to improve RI system performance in a specific setting. Case studies are particularly appropriate for an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context, especially when the boundaries between the phenomenon and its context are not clear, as is the case with drivers of RI system performance.

The approach for primary data collection was mainly qualitative. The methodology was designed to be iterative. The focus of inquiry expanded, narrowed, and shifted as information saturation and convergence was reached and as new relationships and factors emerged. The qualitative approach does not rule out the use of quantitative indicators. One of the study's important analytical tools was to triangulate information gained from the review of health records and reports, coverage data, and observations of data use at health facilities. In addition, the team conducted semi-structured interviews that yielded quantitative measures of RI performance, including changes in performance over time, within a woreda or specific health facility. In this way, the team gained details about such measures as vaccination coverage, numbers of vaccine doses administered, numbers of vaccinators, and numbers of cold chain and other logistical equipment available.

Table I. Multiple Means of Testing for Drivers in Qualitative Study

QUALITY	DEFINITION
Replicability	Methods are clearly documented and can be replicated in other settings
Reliability	Driver mentioned frequently and considered important in diverse settings
Internal validity	Opinions about drivers and their cause and effect are consistent in improving woredas and absent or weak in steady woreda
Triangulation	Driver emerged through different data methods and sources
Chronology	Driver emerged prior to changes in performance or outcomes
External validity	Stakeholders and subject experts consider the driver's impact to be plausible

Mixed-method case studies conform to a set of rigorous data collection and analysis techniques to enhance validity and generalizability of the findings, as described in Table I. In quantitative studies, validity and generalizability are achieved principally through use of an unbiased sample selection and a sufficiently large number of cases. In qualitative studies, validity and generalizability are achieved through the use of specific data collection and analysis processes that reduce interviewer bias and subjective interpretations. Examples of these

processes include good interviewing techniques and note taking. Robust qualitative analytical processes include such methods as verifying the information through more than one source or method, postulating the chronology of events to be causal, ensuring the logical plausibility of relationships, and using some type of study control.

For the purposes of the ARISE project, a RI performance driver is defined as a structure, resource, or process that works on or through the immunization system to make the system perform effectively or to improve its performance (JSI Research & Training Institute, 2011a).

SELECTION OF STUDY WOREDAS

The study team focused on four woredas. The ARISE protocol, which was adapted to Ethiopia in collaboration with the FMOH, called for the woredas to be selected from the most populous regions of the country. The team selected three woredas showing increased DTP3/penta3 coverage from 2007 to 2009 and, for comparison, one “steady” woreda that had little change in coverage during the same period. (In selecting the woredas, the study team also relied on the advice of EPI experts in Addis Ababa on the reliability of national estimates of immunization coverage.) The steady woreda was chosen from the same region as one of the three “improving” woredas to control for regional contextual factors. The study time frame was chosen based on the availability of coverage data and the need to focus on recent patterns of change to reduce recall bias.

Based on data from the 2007 census, the study team selected woredas from Amhara, Oromia, and Tigray regions. (Southern Nations, Nationalities and Peoples region met the criteria but was excluded due to difficulties securing coverage data in time for case selection. Somali region was excluded because of security constraints and road closures.) Additional criteria for selection included such practical considerations as access and the ability to obtain clearances for the study from regional Institutional Review Boards.

In Ethiopia, most vaccination coverage data are aggregated at the zonal level, then computerized and reported by zone to the national level. The exception is Tigray region, which computerizes and reports coverage to the national level by woreda rather than zone. Thus, for Tigray, the team was able to review coverage data and apply the woreda selection criteria using data available at the national level. To select the study woredas in the two other regions, the team first applied the selection criteria to zonal-level coverage data. Once zones were selected, the team requested woreda-level coverage data from each zone directly and then attempted to apply the following criteria to select study woredas:

- DTP3/penta3 coverage in 2007 between 65% and 70%.
- DTP3/penta3 coverage in 2009 greater than 85%.
- Not recently subdivided or newly created.
- Not in a major urban area.
- Minimum population of 100,000.

In all cases, the team had to adapt the selection process because of challenges faced with the

availability and consistency of coverage data. In Oromia, for example, the team was unable to obtain a full set of woreda-level data. Thus, to make the final selection of study woredas, it was necessary to adapt the woreda selection process in each region, as explained in the following sections.

Tigray region was the only one for which woreda-level coverage data were readily available at both the national and regional levels. Yet data from the regional level showed an unusual degree of variability, which appeared to be related to denominator estimates used to calculate population targets and coverage. For example, Tigray used different target population estimates from those employed by the FMoH both prior to and following the 2007 census. The region conducted its own population census to estimate the target population for vaccination. Furthermore, the FMoH had advised regional staff to use different denominator estimates for calculating coverage for antigens recommended at birth (BCG, OPV0) than for antigens given later in life (pentavalent and measles—3.8% and 3.5% of the total population, respectively) in order to comply with donor reporting requirements. The study team's efforts to recalculate denominators using growth rates derived from the 2007 census were unsuccessful because census data were unavailable at the time.

To select the study woreda, researchers sorted woredas in descending order of official 2009 vaccination coverage used by Tigray region (based on 2007 census denominators). They then selected woredas with a consistent year-by-year upward trend of 15%-25% based on numerator data from 2007 to 2009. Woredas with 2009 coverage greater than 100% or less than 85%, and those subject to security concerns or located in extremely remote areas (requiring more than one day by car to reach the site), were excluded. From the three eligible woredas that remained, the team selected Alage woreda, because it allowed maximum access to the largest number of health facilities during the fieldwork period.

In Amhara region, only one eligible zone emerged from the application of the selection criteria: Wag Himra. Applying the same approach to woreda selection as used in Tigray revealed only one eligible woreda: Sekota Zuria. In Oromia region, woreda-level data were available for only three of 17 zones. Applying the same approach to woreda selection as above revealed only one eligible woreda: Toke Kutaye, in West Showa zone. To select the fourth woreda, the steady woreda, the team reviewed coverage in woredas that were in close proximity to Toke Kutaye and whose coverage rates had been largely unchanged based on numerator data from 2007 to 2009. Only one eligible woreda emerged, Tikur Incini, and it was contiguous with Toke Kutaye.

All study woredas were located in agrarian areas. Feedback from the FMoH and partners at the national level regarding the RI coverage scenarios and data quality concerns in each of the four woredas affirmed that the woredas fell into the specified selection categories: woredas with recently improved coverage from 2007 to 2009 and a comparison woreda with a steady coverage for the same period.

STUDY TEAM

A case study approach requires that the team collectively has multiple skill sets, including case study methodology expertise, qualitative research expertise, immunization expertise, and

knowledge of local context. The team members in Ethiopia brought significant experience in conducting qualitative health services research and in RI along with specific understanding of health service delivery and RI systems in the country.

The international team members were:

- Judith Justice, PhD , team leader
- Jenny Sequeira, JSI/ARISE Ethiopia research manager
- Robin Biellik, PhD, Routine Immunization adviser

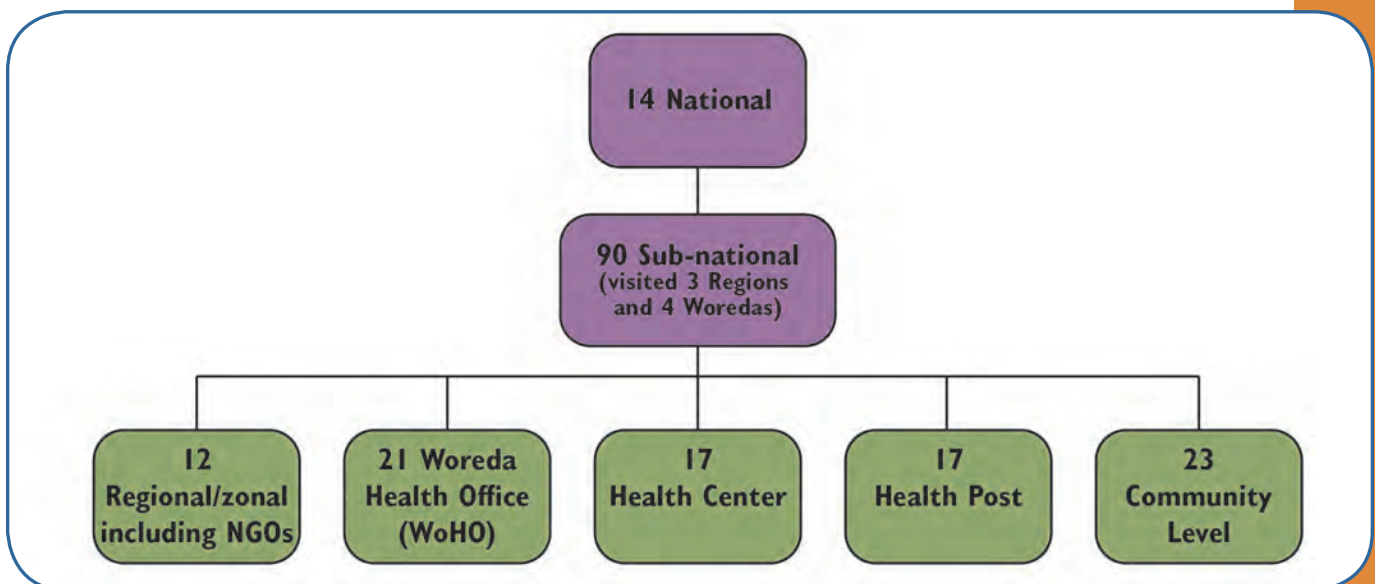
The local team was recruited by an Ethiopian firm, JaRco Consulting. Team members were:

- Getu Tarekegn, public health research consultant
- Henok Negussie, public health research consultant
- Edris Seid, public health researcher
- Wubitu Hailu, public health researcher
- Negusu Yiflashewa, researcher

DATA COLLECTION

The team collected data at national, regional, zonal, woreda, health center, health post, and community levels (Figure 5). In the four study woredas, the team attempted to visit all health centers and satellite health posts whenever possible. The team adapted open-ended and semi-structured interview guides from the ARISE field manual to reflect the Ethiopian context, and it pretested all data-collection instruments in a peri-urban woreda near Addis Ababa, making further modifications based on the results. During field work, the team made minor changes in the instruments to improve the flow of questioning and data recording.

Figure 5. Interviews Conducted by the ARISE Team



The team used one main interview guide for interviews with central-level stakeholders, woreda administrators, health managers and supervisors, health staff (doctors, nurses, cold chain managers, health extension workers), community leaders (in the kebele administration and other groups), and community members (local groups, volunteers) regarding drivers of RI improvement. The interview guide included the use of follow-up probes. Suggested question lines were also created for community health volunteers and mothers.

The team developed separate tools for conducting the RI situation analysis at the national and woreda levels. In collecting data from documents and administrative records and in conducting interviews, the team focused on:

1. the history of immunization system development;
2. the current immunization system at the national level and in study woredas;
3. the capacity of the immunization system in study woredas; and
4. immunization system performance data (mainly on coverage) at national, regional/zonal, and woreda levels.

At the subnational level, the team used one semi-structured questionnaire for the woreda-level RI situation analysis. It focused on performance indicators and descriptions of RI service delivery capacity and was used to interview the following: the woreda EPI/cold chain officer or equivalent, the planning and/or maternal and child health (MCH) officer, and the disease control or surveillance officer, if available. The team also collected information from the head or deputy head of the woreda health unit. The goal of the situation analysis was not to provide a comprehensive picture of RI technical capacity. Rather, it aimed at providing sufficient information about how the RI system was organized and managed and how it delivered services within the specific woreda (and with reference to the national context) so that the team would be able to pursue meaningful inquiry about drivers of RI system performance.

The team collected data in February and March of 2011, conducting a total of 104 interviews or group discussions. It conducted 14 interviews at the central level with representatives of the FMoH, WHO, UNICEF, and NGOs, among other groups. The team used the results of these interviews to understand the context of immunization service delivery at the woreda level and to map central-level perceptions of key RI performance drivers. The remaining interviews (90) were conducted at the subnational level. In most cases, team members spent three to four days in the woredas. They followed a field-level data collection process subject to availability of key informants.

In the fieldwork, one team focused on quantitative data collection for the RI situation analysis, collected administrative documents, and took photographs of charts and graphs displayed in health units. Where possible, the team also recorded data on vaccination doses given at the health-facility level and reviewed service delivery records (e.g., immunization data in the EPI registers, data graphing, and cold chain status). Another team of two interviewers conducted key informant interviews with managers, health workers, community respondents, and representatives of development partners (donors and NGOs), traveling to HCs, health

posts, administrative offices, and community meeting places. One team member took the role of principal interviewer and the second served as note taker. As soon after the interview as possible, the note taker would enter the notes into a Microsoft Word document, which would be reviewed and modified by the other team members before finalization. When respondents gave permission, the team members recorded interviews as a memory aid. Consistent with the ARISE protocol, team members did not construct verbatim transcripts.

At the national level, the team conducted all interviews in English. Interviews conducted at the subnational level were conducted in English where possible, but were mostly conducted in local languages, sometimes through an interpreter. The team had five Ethiopian researchers who were fluent in Amharic, while one spoke Oromian and one spoke Tigranian.

At a workshop held in Addis Ababa in July 2011, the team presented study results to stakeholders from national and woreda levels, elicited feedback, and verified findings. The team also conducted additional individual interviews and group exercises at the workshop to augment the initial data set. Two members of the team then returned to each study woreda in August 2011 to conduct a second stage of data collection. This second visit included repeat interviews with some respondents in the woredas and interviews with new respondents at national and subnational levels.

ANALYSIS

The team conducted its data analysis in several stages in order to identify and test RI drivers. It used Algae woreda in Tigray region as a full-scale pilot test for the methodology, which allowed for further adaptation to the local context. During fieldwork in Alage, the team held daily discussions to refine interview techniques, note-taking procedures, and formatting of interview notes, as well as to refine the process of data analysis. During this period, the team formulated and discussed initial theories related to key performance drivers. The process continued in each subsequent woreda visited.

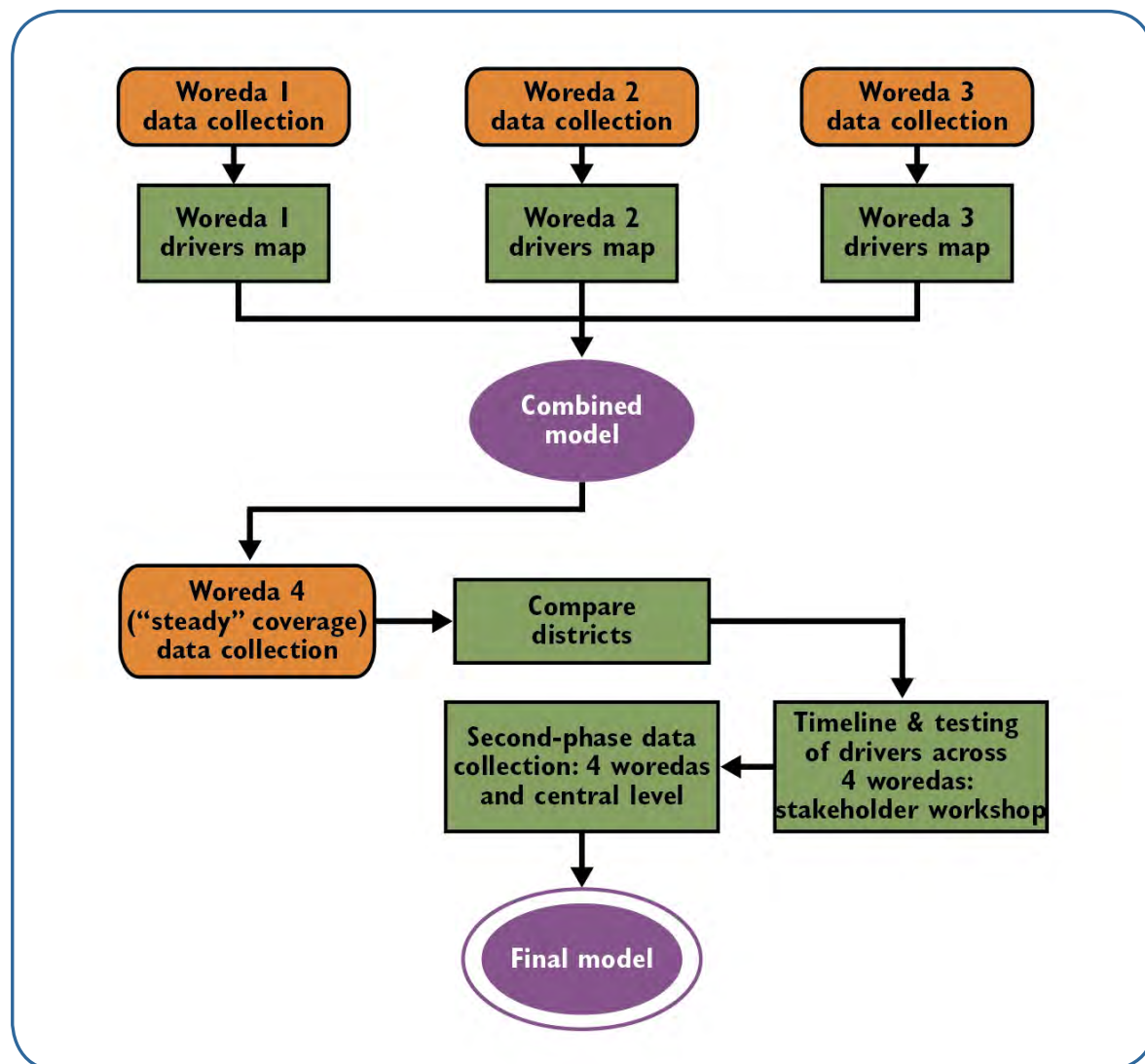
In all four woredas, the team held two-hour analysis sessions most evenings, where researchers identified key points of each interview and identified and gradually categorized performance drivers by theme. Interview recordings and interview notes were logged, and duplicate files were sent to JSI headquarters. The team later reviewed records of the analysis meetings in order to advance the analysis process. Between woreda field visits, the team held analysis meetings where researchers scrutinized notes and began to categorize RI performance drivers by theme. Once fieldwork was completed, the study team held additional analysis discussions to further develop theories related to key drivers and subdrivers that influenced RI performance.

In the next stage of analysis, the researchers conducted a systematic review of the full set of interview notes using a standard template and integrated interview data with data from the RI situation analysis. The researchers compared data from the three woredas where coverage had improved in order to find common or contrasting driver experience, and they examined data from the steady woreda where coverage had not improved to explore the presence or

absence of the drivers and to identify obstacles to coverage improvement. At the same time, the team identified data gaps and constructed a plan for the second phase of fieldwork.

At the stakeholder workshop where preliminary study results were shared with national and study woreda actors working in EPI, woreda team members from each woreda case study constructed a chronology of all events or actions at contextual, policy, and program levels to explore the temporal relationship between context, drivers, and RI performance. Researchers later integrated these chronologies and data from the second phase of fieldwork into the data set, along with related information from relevant literature and documentation, and then analyzed the data using concept mapping, driver coding and data triangulation to reach conclusions. The researchers constructed a conceptual map of drivers showing the temporal and logical pathways that created the drivers and how the drivers influenced improved RI performance. Figure 6 outlines the data collection and analysis process.

Figure 6. Data Collection and Analysis Procedure



V. WOREDA REPORTS

INTRODUCTION TO THE WOREDAS

The analysis of the ARISE study woredas revealed a range of experience with RI programming. This section of the report presents background on each woreda, including key contextual and environmental characteristics, social and demographic data, and details of the RI programs. By examining the experiences of the three woredas that have seen recent improvements in immunization coverage, as well as the experience of the woreda that showed little or no improvement, the analysis begins to draw out key forces and conditions that influenced coverage improvement—or drivers of change and map the pathways to performance. Section VI will compare and contrast woreda experience for a comprehensive look at woreda-level RI performance drivers.

ROUTINE IMMUNIZATION COVERAGE IN STUDY WOREDAS

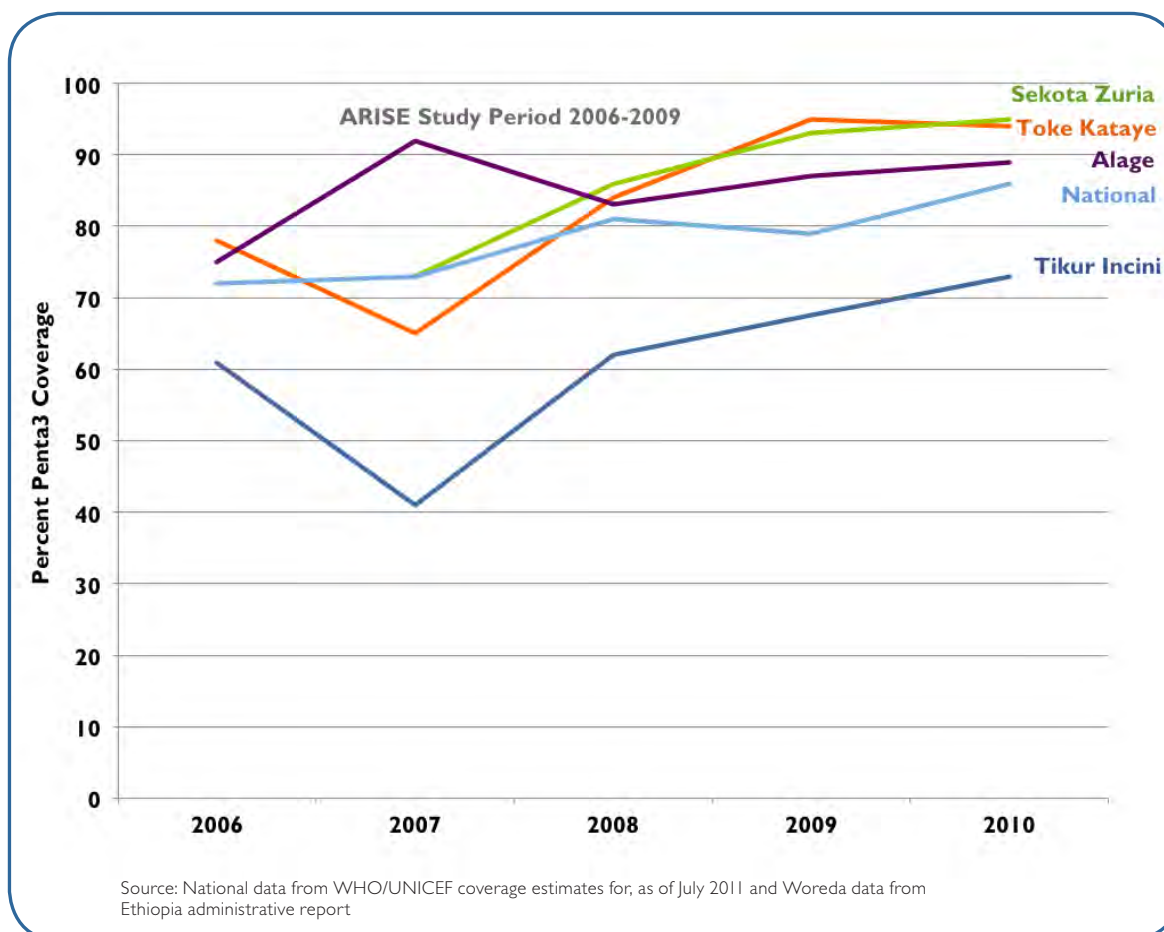
While initial selection of the woredas was based on data and feedback gathered from national-level databases, this section reports coverage data provided by woreda-level respondents (Figure 7). As noted above, the study team found some discrepancies between coverage data reported at the woreda level and the national level. The discrepancies arose from the fact that some woredas used their own census data to calculate immunization program denominators (the number of children under one year of age) rather than the estimates derived from the latest national census.

In the study woredas, there were numerous missing data and numerical discrepancies in the numerator and denominator data, including unusual trends in total population estimates and, as a result, in the denominators used to calculate vaccination coverage. The study team was told that Tigray region used new census data to adjust denominators from 2007 onward, whereas the other two regions with improved RI performance appeared to follow FMoH policy and adjusted denominators from 2009 onward. In addition, two of the three woredas with improving penta3 coverage appeared to meet the selection criteria based on coverage estimates reported from the national level, whereas local data from Alage woreda in Tigray region suggested that in fact it had a mixed coverage trend from 2007 to 2009. EPI data quality is acknowledged to be a continuing concern in Ethiopia, and under its cMYP for 2010-2014, the country intends to strengthen activities to improve the reporting system in the future (Federal Ministry of Health of Ethiopia, 2009a).

In the three woredas where coverage improved, penta3 coverage rose to 87% or above in 2009 from percentages in the low to middle 70s in 2006. In the steady woreda, coverage remained in the mid-60s during that period, only increasing in 2010 to 73%. During fieldwork, the study team was in some cases able to learn more about the trends in RI coverage over a longer period than 2007 to 2009 and about some of the challenges health teams faced in calculating coverage. Some woreda coverage trends are not comparable to national-level figures because of the use of different denominator estimates, as noted. For example, the dramatic change in 2007 coverage in all of the study woredas is likely due to the updating of denominators with new census figures.

The identification and analysis of the drivers of coverage improvement reported below and in Section VI explain the difference between the woredas where coverage improved and the woreda where improvement was limited.

Figure 7. Study Woreda and National Penta3 Coverage, 2006-2010



ALAGE WOREDA, TIGRAY REGION

Background

The study team began woreda-level data collection in Alage woreda in Tigray region. Alage is one of three study woredas where vaccination coverage improved from 2006–2010. Alage has a total of 21 kebeles. The health facility located nearest to the regional capital, Mekele, is approximately a two-hour drive south along the main road. Agriculture is the main economic activity in Alage. The topography is hilly and road travel can be challenging. Health workers estimate that up to 40% of villages are inaccessible at some point during the year. The total population of Alage in 2010 was 116,263.

Health service

The Woreda Health Office supports five health centers and 14 health posts. Although some facilities are close to the main road leading in and out of Mekele, several HCs and most health posts are in remote areas, some of which are not accessible by four-wheeled vehicles. Figure 8 depicts a local map showing the location of most health facilities.

Woreda methodology

The study team conducted fieldwork in Mekele and Alage for four days. In Alage, the team visited all five HCs and six health posts. Team members conducted 32 interviews with representatives of the Regional Health Bureau and WoHO, woreda administration, HCs and health posts, and NGOs, as well as with members of the community. The team met three times to debrief during the fieldwork and held a half-day analysis workshop in Addis Ababa immediately following the field visit. The team reviewed and verified its findings with woreda-level participants at the stakeholder workshop in July 2011.

Routine immunization performance

The target population for DTPI is 4,418 children under one year of age. Penta3 coverage increased to 89% in 2010 from 75% in 2006, with a peak of 92% in 2007 (see Figure 10 and Table 2). This spike in coverage may be explained by the region's use of new census data to adjust denominators from 2007 onward. From 2008 to 2010, there was a decrease in the proportion of children who were "left out"—never reached by immunization services—as measured by the gap between the target population and those immunized with pentavalent (dark green on the graph in Figure 9). Pentavalent data for 2006 and 2007 were not available from the woreda. The drop-out rate, which measures the percentage of children who received pentavalent but did not receive the third dose of pentavalent vaccine (deep purple on the graph), has remained consistently under 10% for the past three years.

Figure 8. Location of Health Facilities in Alage Woreda, Tigray Region

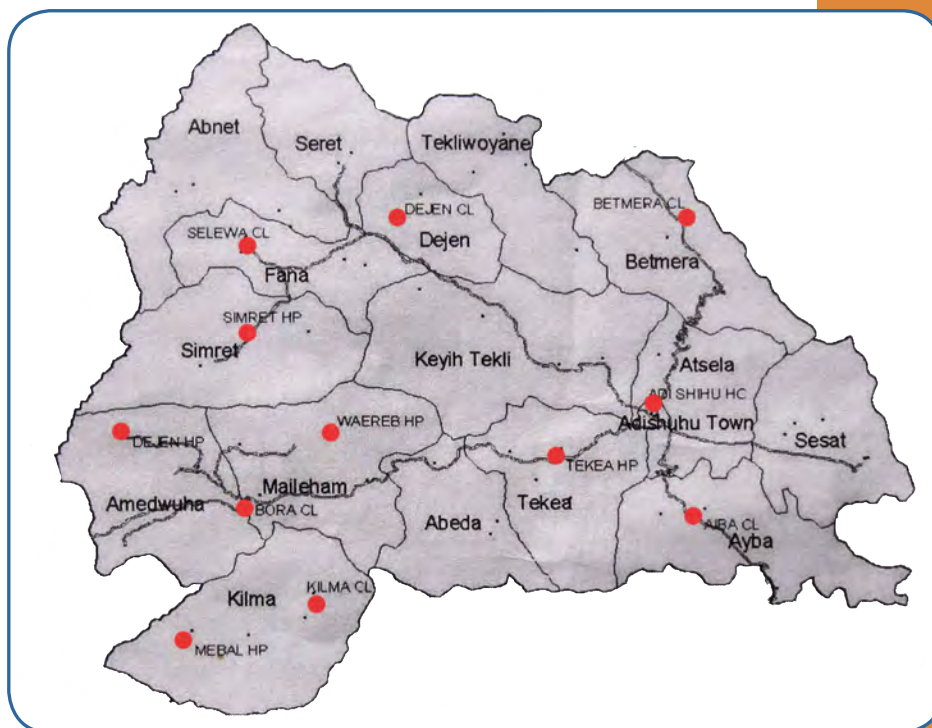


Figure 9. Pental and Penta3 Vaccination Coverage, Alage Woreda, Tigray Region, 2006-2010

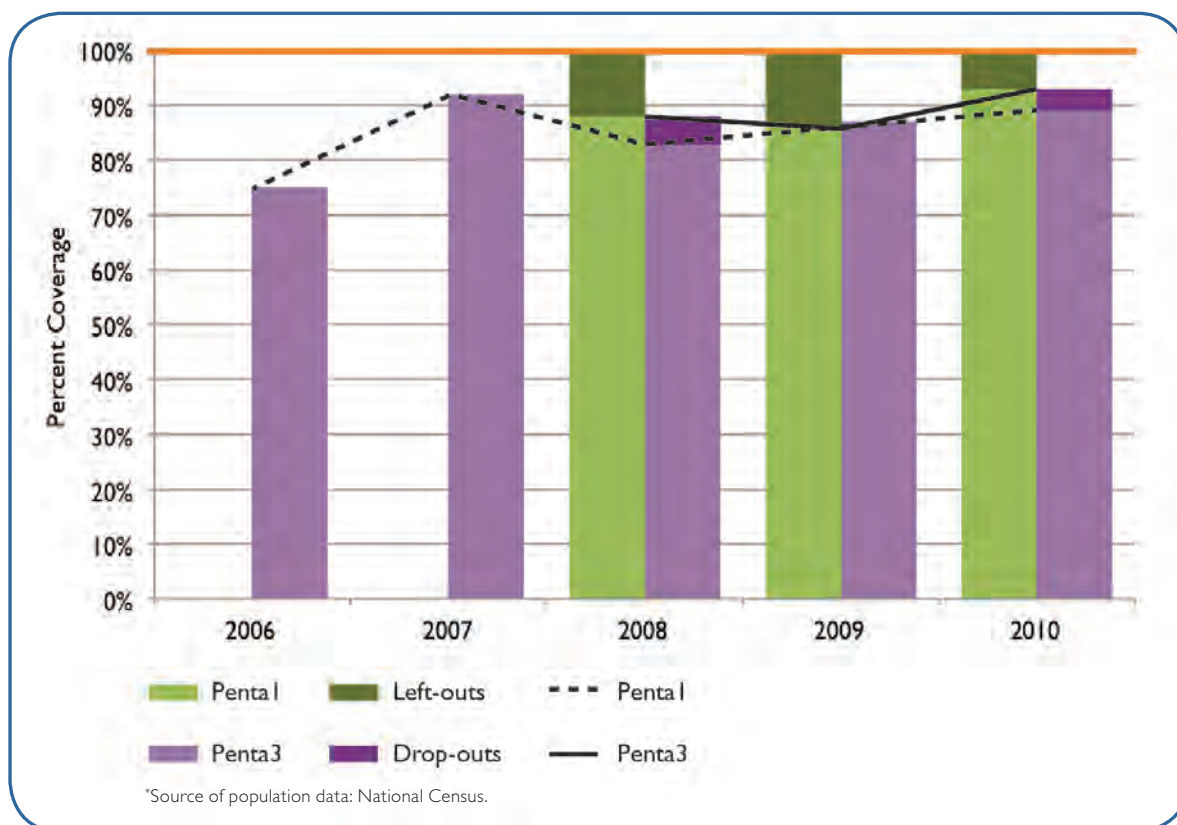


Table 2. Population Estimates and Pentavalent Coverage for Alage Woreda, 2006-2010

	2006	2007	2008	2009	2010
Total population*	130,658	106,184	104,868	116,263	
Surviving infants**	4,258	3,461	3,411	4,069	NA
Pental coverage (%)***	Data unavailable	Data unavailable	88%	86%	93%
Penta3 coverage (%)***	75%	92%	83%	87%	89%
Pental-3 drop-out (%)****			6%	-1%	4%

*Source of population data: National Census.

**Surviving infants are the number of children who survived to their first birthday (the target used for all nonbirth EPI doses such as pental and 3).

***Pental and penta3 data from woreda administrative reports.

****[doses pental – doses penta3] x100 ÷ doses pental

Routine immunization service sites

Vaccination services were offered at both fixed and outreach sites, including HCs (5), health posts (14), and outreach sites (72). The number of health posts that deliver vaccine increased to 14 in 2010 from 11 in 2006. The number of outreach sites doubled between 2007 and 2008 and nearly doubled again between 2008 and 2009 (Figure 10).

Human resources for immunization

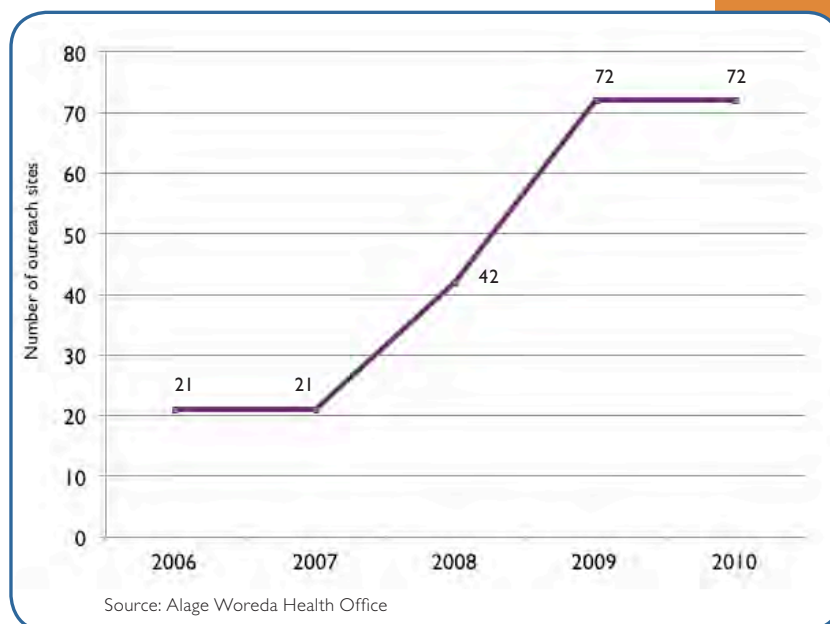
The woreda health team includes a Woreda Health Head, a Deputy Head/MCH Planning officer, an EPI officer, a staff member serving as a data manager/secretary, and another staff member serving as a surveillance officer. The EPI officer is responsible for cold chain management. Vaccines are administered by nurses and HEWs. There were no vacant vaccinator posts reported in the woreda. The Woreda Health Head who coordinates and directs the team was not medically trained and had been in the post for two years.

In Alage, a network of volunteers supports the health service and particularly the immunization services. Many of these volunteers help in community-based nutrition programs. In 2008, these volunteers were each assigned 30 families to serve. Prior to 2008, there were other groups of volunteers working with a variety of health programs. These groups included community-based reproductive health agents, traditional birth attendants, and other groups trained to treat minor illnesses and malaria. These tasks have now been absorbed into the responsibilities of the volunteers in community-based nutrition programs. The volunteers perform activities for the EPI as well as other programs, and they support the kebele's work to encourage families to become model families (families that adopt the full complement of HEP health practices). There were a total of 750 volunteers in the five sub-woredas of Alage. At the time of the study, plans were under way to roll out the Health Development Army, a new concept for volunteer coordination.

Cold chain and vaccine supply

All five HCs had a functioning cold chain. The study team observed good vaccine-handling practices at the HCs. Each refrigerator was equipped with a temperature-monitoring chart that was up to date and showed twice-daily temperature recordings within normal range.

Figure 10. Number of Outreach Sites in Alage Woreda, Tigray Region, 2006-2010



No date-expired vaccine vials or vaccine vials with changed monitors (indicating that vaccine should be discarded) were observed. All 14 health posts had refrigerators that could run on either electricity or kerosene. However, most health posts lacked electricity and local staff were not able to operate the refrigerators using kerosene. The Tigray Regional Health Bureau has a small staff of five technicians responsible for the maintenance and repair of all health facility equipment, including cold chain, and three trucks to transport equipment. The officer in charge reported that he did not have sufficient resources to maintain the cold chain at the woreda level, and he did not consider it feasible to train HEWs to manage and maintain kerosene refrigerators.

The study team was not able to examine the woreda stock control register. However, staff reported that there had been no vaccine stockouts in the past 12 months, which was confirmed by other respondents. Normally, the woreda sends a vehicle to the Maichew town satellite cold store (38 kilometers away) to collect vaccines. In 2010 when fuel for the woreda vehicle was unavailable, the health team borrowed a vehicle from the agriculture service to make the trip. Vaccines are typically sent to HCs by car or motorbike. In most instances, health post staff had to collect vaccines from the health centers, walking several hours each way.

Transportation

The woreda health team had the use of one four-wheeled vehicle and five motorbikes. Delays in releasing funds disrupted fuel supplies for the four-wheeled vehicle for all of 2010 and for the motorbikes for one month the same year.

EPI policies, strategies, and operations

The woreda has an EPI plan that includes targets, but not specific strategies for reaching them.

Figure 11. Wall Chart with 2011 Vaccination Targets, Alage Woreda Health Office

TABJA	BCG	MEASLES	DTaP	HIB	POLIO	HEPB	OTHER	PLC	FLP	G/line	CSD	ART	EMLS	U/A	ALICE	PARTE
1. ALSHUBU	18	16	16	17	45	17	17	17	92	399	85	99	37	67	35	17
2. AKSALA	17	15	15	16	41	16	16	16	85	368	78	91	34	61	31	16
3. SESAT	26	23	23	24	64	24	24	24	130	567	121	141	52	95	63	24
4. E/ALBE	12	10	10	11	28	11	11	11	57	250	53	62	23	42	25	11
5. E/TERIL	23	20	20	21	56	21	21	21	115	499	106	124	46	83	56	21
6. BET ANA	21	17	17	18	47	18	18	18	96	419	89	104	39	70	47	18
7. LUYANA	17	19	19	20	52	20	20	20	107	465	99	115	43	78	52	20
8. TEREA	14	15	15	16	42	16	16	16	86	376	80	98	35	65	42	16
9. ABEDA	27	13	13	13	35	13	13	13	71	307	65	76	28	51	34	13
10. AYSA	29	24	24	25	66	25	25	25	134	584	124	145	54	97	65	25
11. AMED WONA	25	25	25	26	70	26	26	26	142	618	132	154	57	103	69	26
12. MAY LADOM	13	22	22	23	61	23	23	23	125	545	116	135	50	91	61	23
13. WAREB	18	11	11	12	32	12	12	12	64	280	60	70	26	47	31	12
14. KILMA	10	16	16	17	45	17	17	17	92	399	85	99	37	67	45	17
15. MEAL	22	9	9	9	25	9	9	9	51	211	47	55	20	37	25	9
16. FANA	12	20	20	21	55	21	21	21	112	486	104	121	45	81	54	21
17. SERET	16	11	11	11	30	11	11	11	61	265	56	65	24	44	29	11
18. SIMRET	9	14	14	15	39	15	15	15	79	344	73	85	32	57	38	15
19. ABNET	8	8	8	8	22	8	8	8	45	197	42	49	18	33	22	8
20. MARENAY	11	10	10	10	26	10	10	10	57	232	50	58	22	39	26	10
21. DEJAN	16	15	15	15	40	15	15	15	82	356	76	88	33	59	40	15
WOREDA HO	377	340	334	348	919	348	348	348	1878	681	1490	2030	759	1369	915	348

These EPI targets were posted on the wall of the Woreda Health Office (Figure 11: Wall Chart with 2011). Health workers reported that the majority of vaccines were delivered through outreach services (approximately 60%), and the frequency and number of outreach sites had increased in recent years (Figure 10). The number of outreach sites was initially set at one per kebele (21) until 2008, when an additional 21 outreach sites were established.

This expansion provided one outreach site per kushet (the lowest administrative unit in Tigray), doubling the availability of outreach sites. Outreach sites increased again in 2009 to a total of 72. Recent key events in the development of the RI system in Alage are depicted in the chronology made in consultation with country stakeholders at the workshop in July 2011 (Figure 12).

Vaccination is offered on a daily basis at the HCs, and on a monthly basis in health posts and through outreach. Staff reported that in the previous year they had succeeded in holding all planned vaccination sessions. Activities conducted as part of periodic intensification of RI efforts, including Child Health Days and ERAs, are conducted during quarterly nutrition screenings. Workers review vaccination cards and identify defaulters who have missed routine doses. Target groups include children less than one year of age and children one year of age or older.

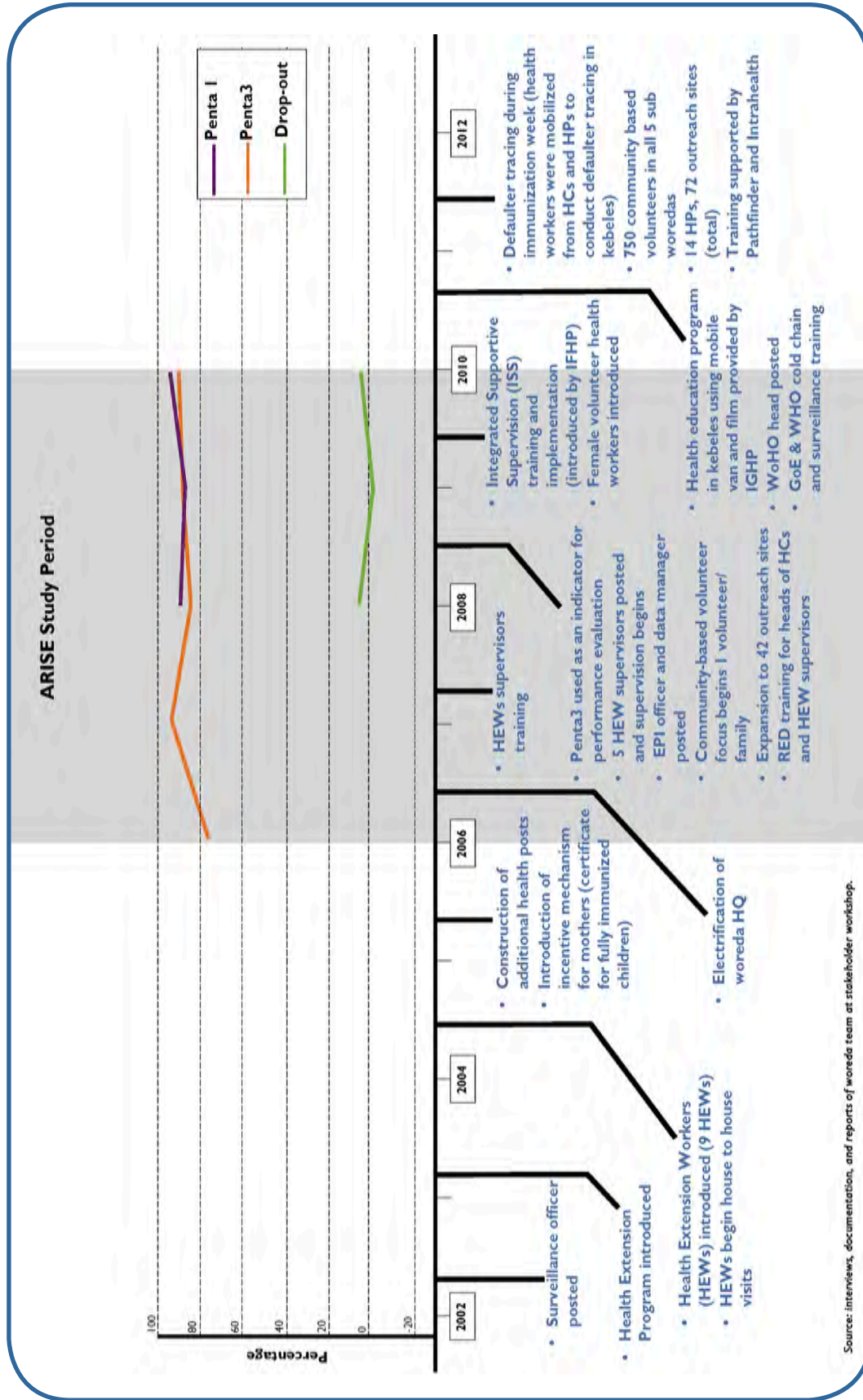
In 2008, the Reaching Every District approach was introduced in Alage. Health center heads and supervisors were trained, and they in turn trained HEWs and community health volunteers. The team developed microplans that expanded HEW activities and increased community engagement. HEWs and CHVs/health promoters began to register births and actively trace immunization defaulters starting in 2010. The woreda also introduced routine supervision of HEWs in 2008. The study team found supervisory reports at health facilities from the WoHO, regional health offices, and development partners (who introduced a supervision checklist). Pathfinder, IntraHealth, and WHO provide support for EPI in Alage. The number of supervisors remained constant over the past three to four years. Respondents reported that supervision and review meetings are held quarterly.

Driver Pathways to Improved Routine Immunization Coverage

At every interview, the study team explored with respondents their analysis of the most important factors responsible for the recent improvements in RI performance in the woreda. They reviewed the timing of interventions and the impetus for and the effect of each driver mentioned. The team analyzed the rich qualitative data and compared it with the performance indicators and the RI situation analysis reported above to see if the purported changes in coverage could be validated and explained. Taking all of the evidence together, the team reached a consensus that Alage had achieved its high performance mainly through its service delivery capacity; the effective actions of the new HEW workforce; the remarkable efforts of communities and local administration who worked in concert with the health teams; and the regular use of monitoring, incentives, supervision, and accountability. Support from local partners also played a role in coverage improvement in Alage.

An important aspect of Alage's success in RI was the solid service delivery system in place in Tigray. Cold chain was sufficiently maintained at the HCs, the numbers of staff were for the most part adequate (although one HC reported the need for additional nurses), and vaccine supply was reliable. The Health Extension Program introduced in 2003 also provided a strong foundation for coverage improvement through increasing the size and focus of the health workforce and the number of fixed and outreach vaccination sites.

Figure 12. Chronology of Events in Alage Woreda, Tigray Region



Beyond capacity and human resources for immunization, however, the work of the health staff and the strategies they used to make service delivery effective and to improve community demand for services played perhaps the most critical role in driving RI improvements. For example, the way in which HEWs worked in the community made immunization efforts particularly effective. These workers, trained and paid by the government, are typically female, recruited from the community, and work closely with local volunteers. Key aspects of their work, such as visiting people in their homes to deliver health education and to encourage use of health care and trace defaulters, were reported to have had a direct effect on immunization uptake. Moreover, HEWs' knowledge of their community enables them to rearrange service schedules according to the seasonal calendar—they are most active during the agricultural low season when community members or mothers have more time to pay attention to a HEW's message—and to take services into the community on a regular basis. Alage's recent penta1 and penta3 trends reflect efforts to reduce both left-outs and drop-outs through the work of the HEWs and community volunteers to trace and vaccinate all children in their woreda.

A second performance driver was the work of communities in promoting and delivering immunization. Tigray has long-term experience in community organization for social development. Alage was notable for its extensive volunteer network, with one volunteer covering five or more households to encourage sound health practices and support other development activities. HEWs and other members of the health team worked closely with the local administration to organize services, spread the word about the importance of immunization, and build local credibility for the immunization and health program.

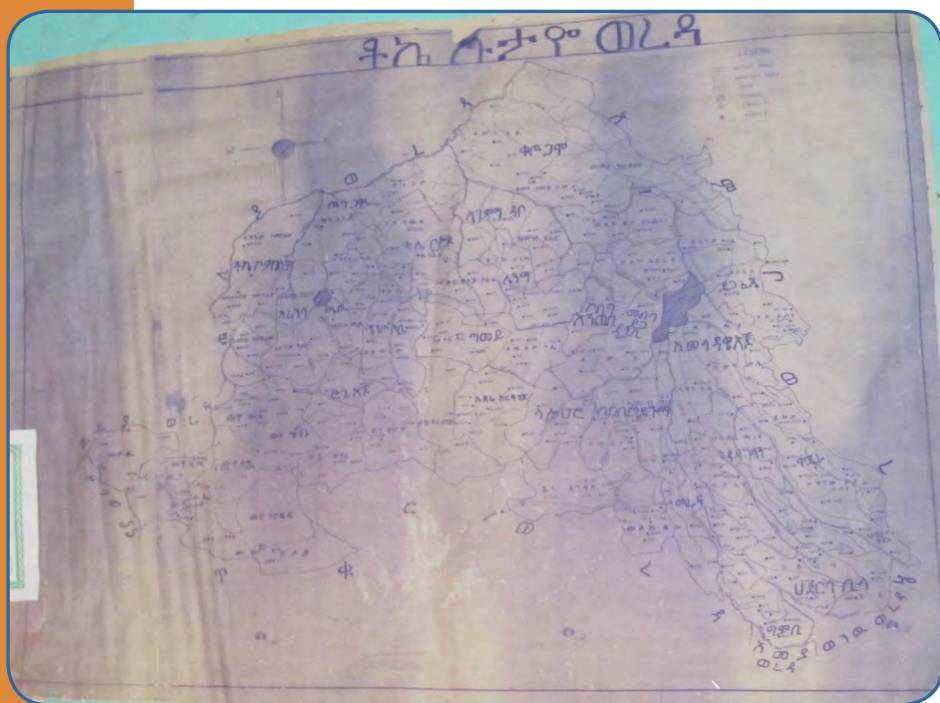
Finally, the HEWs collaborated closely with kebele leaders to jointly monitor RI program performance and held regular review meetings to discuss successes and challenges. The challenges were addressed with a problem-solving mindset. The local administration ranked health posts, HCs, and woredas based on DTP3/penta3 performance, and this approach encouraged open accountability and healthy competition. The health workers and the local political and administrative leaders also introduced the model family concept to encourage families to achieve the highest levels of task adherence to a wide variety of public health activities through public recognition and rewards. Performance review and related accountability and incentives practices extended to the community with the use of a certificate for a fully vaccinated child given to families whose child completed the vaccination schedule.

TOKE KUTAYE WOREDA, OROMIA REGION

Background

Toke Kutaye was the second woreda visited where immunization coverage had improved. The woreda was established in January 2006. It contains 31 rural and four urban kebeles. Major crops include teff, maize, and barley. The Gudar, Colle, Indris, and Kolba rivers flow through the woreda. Respondents estimated that roughly one-third of the kebeles are inaccessible by vehicle during some parts of the year. Total population of Toke Kutaye in 2010 was 122,582.

Figure 13. Location of Health Facilities in Toke Kutaye Woreda, Oromia Region



Health service

The Woreda Health Office supports two HCs and 31 health posts. The HCs were built in 2008. Between 2006 and 2010, the number of health posts increased to 31 from 10. Figure 13 is a local map of the woreda that shows the location of the health facilities.

Woreda methodology

The study team stayed in Ambo, which is the capital of the West Showa zone and located three hours by car from Addis Ababa. Toke Kutaye is approximately 12 kilometers from Ambo. The team conducted fieldwork

for four days, visiting both HCs and four of the 31 health posts. The researchers conducted 31 interviews with representatives of the ZHDs and WoHOs, woreda administration, HCs and health posts, and NGOs, as well as with members of the community. The team met two times to debrief during the fieldwork, wrote up interviews, and met to discuss woreda findings in Addis immediately following the field visit. The team reviewed and verified its findings with woreda-level representatives at the stakeholder workshop in July 2011.

Routine immunization performance

The target population for DTPI/pental is 4,339 children under one year of age. Penta3 coverage increased to 94% in 2010 from 78% in 2006, with a dip in 2007 that likely was a result of the use of new census data to adjust denominators from 2007 onward (see Figure 14 and Table 3). Figure 14 illustrates, in dark green, a decline in recent years in the number of children who were left out—never reached by immunization services—for pental. The drop-out rate—children who received pental but did not receive the third penta dose (noted in dark purple)—has also declined in the past three years. Health staff linked this reduction in left-outs and drop-outs to the woreda health team's efforts to establish a systematic defaulter tracing system in the woreda, with particular focus on the health post level.

Routine immunization service sites

Vaccination services were offered at all fixed sites, including the two HCs and 31 health posts, as well as from 62 outreach sites. The team found that a working cold chain was available in

Figure 14. Pentavalent and Pentavalent3 Vaccination Coverage, Toke Kutaye Woreda, Oromia Region, 2006-2010

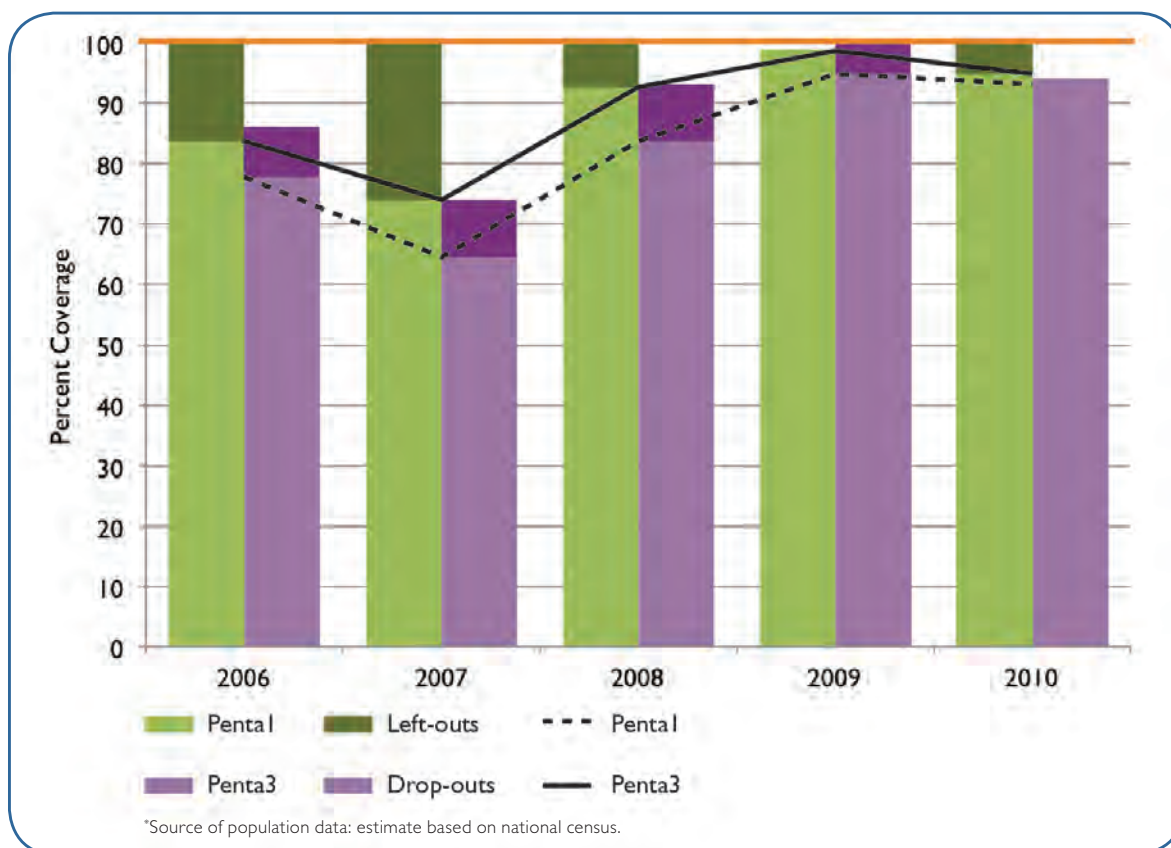


Table 3. Population Estimates and Pentavalent Coverage for Toke Kutaye Woreda, 2006-2010

	2006	2007	2008	2009	2010
Total population*	119,519	122,980	126,546	123,166	122,582
Surviving infants**	4,422	4,550	4,366	4,064	4,339
Pentavalent coverage (%)***	84%	74%	93%	99%	95%
Pentavalent3 coverage (%)***	78%	65%	84%	95%	94%
Pentavalent-3 drop-out (%)****	7%	12%	10%	4%	1%

*Source of population data: estimate based on national census.

**Surviving infants are the number of children who survived to their first birthday (the target used for all nonbirth EPI doses such as pentavalent and pentavalent3).

***Pentavalent and pentavalent3 data from woreda administrative reports.

****[doses pentavalent – doses pentavalent3] × 100 ÷ doses pentavalent.

both HCs. Only seven of the 31 health posts had a functioning cold chain (either electric or kerosene). A respondent at the health-post level reported that the cold chain had been out of order for the past six months.

Human resources for vaccinations

The woreda health team includes a Woreda Health Head, woreda deputy head, an MCH/Planning officer, an EPI officer, a data manager, and a surveillance officer. The EPI officer managed the cold chain. Vaccines are administered by nurses and HEWs. The number of HEWs increased to 62 in 2010 from six in 2006. However, there were five vacant posts related to staff qualified to vaccinate. In Toke Kutaye, a network of volunteers supports the health service and particularly the immunization services. One respondent reported that the policy aims to assign one health volunteer for every five households. An estimate of the total number of volunteers working in the health sector was not available.

Cold chain and vaccine supply

All HCs had functioning cold chain. The study team observed good vaccine-handling practices at the HCs. Each refrigerator was equipped with a temperature-monitoring chart that was up to date and showed twice-daily temperature recordings within normal range. No date-expired vaccine vials or vaccine vials with changed monitors (indicating that vaccine should be discarded) were observed. Staff reported a TT stockout in the past month at the zonal level, which they said stemmed from a stockout at the regional level. In addition, a batch of OPV showed exposure to heat the past month and was destroyed. Respondents reported that in the past UNICEF provided funds for vaccines, but recently the government had assumed this responsibility. Since then, there have been periodic stockouts.

Transportation

The team found that no four-wheeled vehicles had been assigned to the WoHO or the HCs since the formation of the Toke Kutaye woreda in 2006. Four motorbikes were assigned to the woreda; two of them were working and two were in need of repair. Respondents noted that fuel shortages for the motorbikes had become more frequent. Previously, the local gas stations allowed workers to purchase fuel on credit, and the woreda would provide funds from the Extended Outreach Strategy budget. Now that this source of funding is ending, there is no budget for motorbike fuel, so workers must travel by foot, horse, or donkey, or use their own resources to secure transport.

EPI policies, strategies, and operations

The woreda has an EPI plan that includes targets, but not specific strategies for reaching them. Staff estimate that 30% of immunization services are delivered at fixed sites and 70% through outreach services. Vaccines are available on a daily basis in HCs and once or twice a month at health posts and outreach sites. The frequency of outreach has increased considerably since 2006, mainly because the number of outreach sites has nearly doubled (Figure 15). Staff conduct minicampaigns every three months with a focus on tracing defaulters and immunizing

them. This strategy was introduced to reduce drop-out rates. The woreda conducts monthly supervision at HCs and weekly supervision visits at various health posts. The woreda holds a monthly review meeting for staff. Health workers and kebele representatives hold meetings twice a month. Recent key events in the development of the RI system in the woreda are depicted along a timeline developed in consultation with country stakeholders at the workshop in July 2011 (Figure 16).

Driver Pathways to Improved Routine Immunization Coverage

As in Alage, the study team analyzed all of the qualitative interview data, observations, and results of the RI situation analysis to determine the most important factors responsible for the recent improvements in RI performance in Toke Kotaye. Taking all of the evidence together, the team reached a consensus that the woreda had improved coverage through many of the same drivers that emerged in Alage.

Health extension workers were again central to coverage improvement. Respondents described the wide range of activities that HEWs carried out, including: vaccination at health posts and through outreach, defaulter tracing, birth registration, and house-to-house visits for raising awareness and vaccinating. The HEWs work with health facilities or keep their own records to track the families within their communities and monitor their use of health services. A HEW in Toke Kutaye explained,

“We give community members an appointment to visit us at our outreach sites. If they do not show up, we visit their house to deliver vaccination. We carry vaccine carriers with us on such defaulter tracking house visits. We visit each house to determine immunization status and if we find an unimmunized child we immunize on the spot.”

Toke Kutaye health staff also testified to the importance of recruiting HEWs locally and building on these local ties to gain access to community events and meetings and relay health messages. HEWs in Toke Kutaye developed six-month plans that included such tasks as conducting health education at church gatherings, training religious leaders to pass on health messages, working with micro-credit groups, and attending kebele council meetings or community meetings of more than 200 people. The HEWs' use of multiple channels for reaching the community was a key strategy. A woreda health manager noted: “Prior to 2008, when HEWs arrived, awareness was very low in the community. HEWs inform the people

Figure 15. Number of Outreach sites in Toke Kutaye Woreda, Oromia Region, 2006-2010

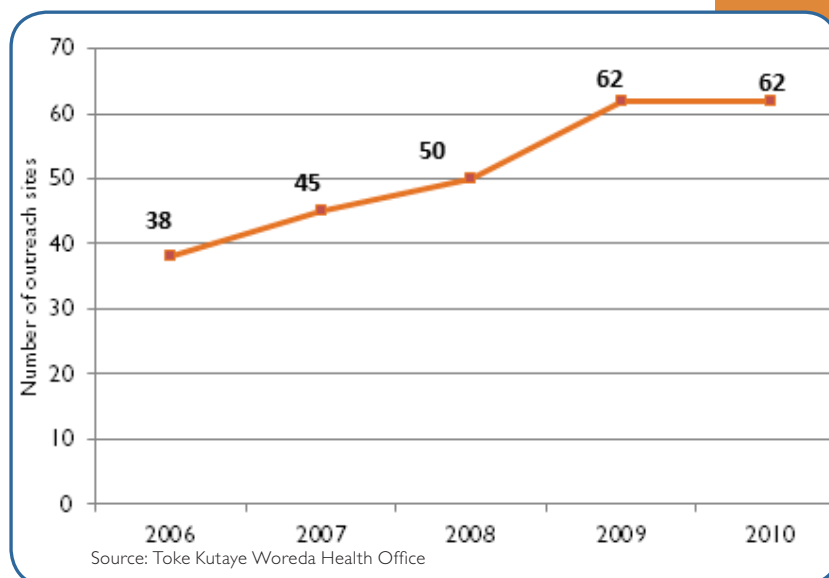
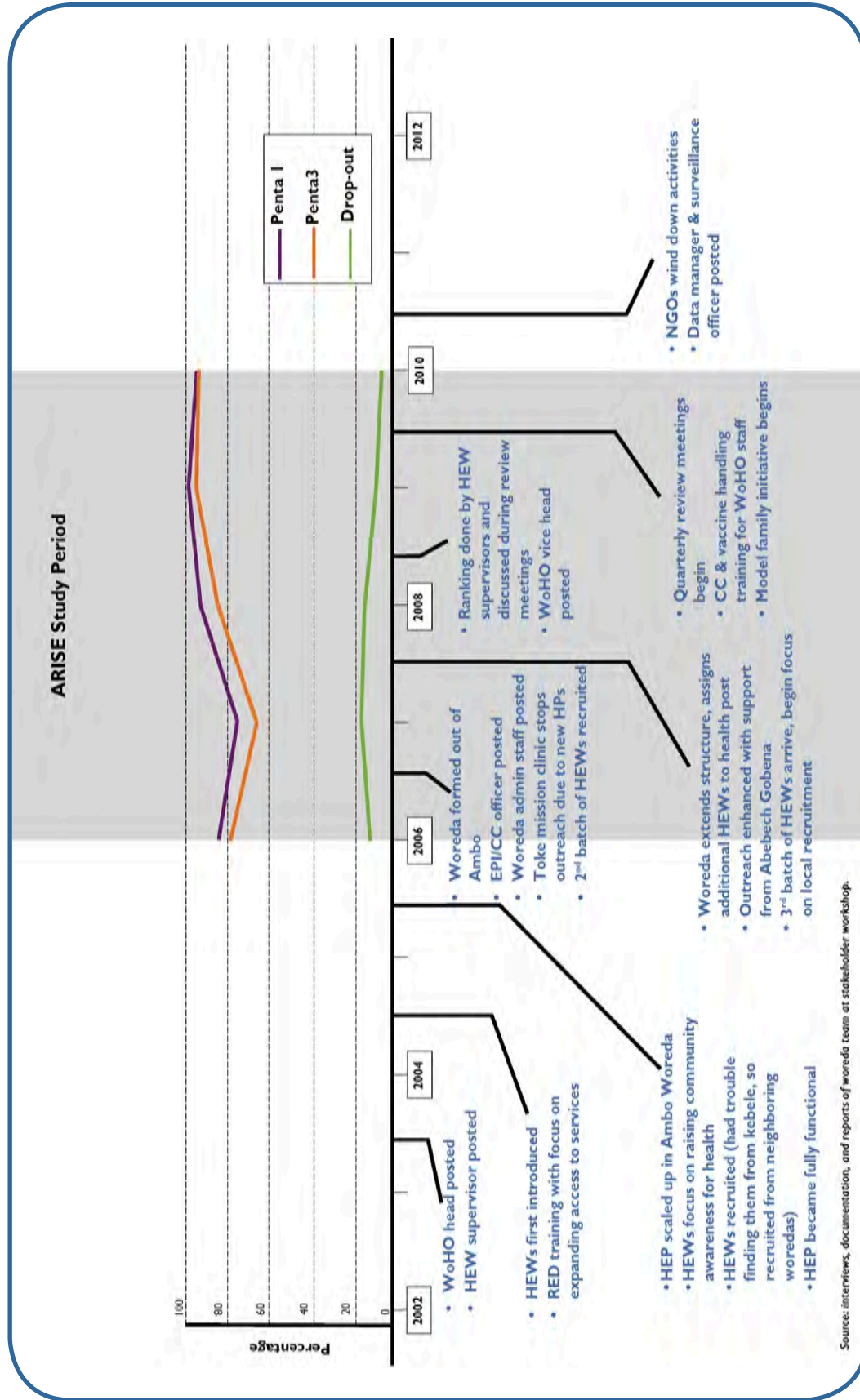


Figure 16. Chronology of Events in Toke Kutaye Woreda, Oromia Region



about immunization at every chance and visit house-to-house. When there is a social gathering in the community they use the opportunity to talk to people about immunization.”

In Toke Kutaye, kebele leaders and health supervisors both supported and supervised HEWs. Supervisors follow up with individual families directly to determine whether the HEWs have carried out vaccination as planned. Supervisors are expected to visit each health post once a week; however, the study team could not verify whether these visits took place regularly. Nevertheless, direct reports from HEWs confirmed the benefits of supervisory practices. HEWs reported that supervisors provide verbal guidance to help the HEWs define the right approach to reaching specific communities or families with health messages, and supervisors leave written reports to which they refer during subsequent visits. In addition, the kebele leaders help the HEWs solve problems related to the organization of community vaccination sessions or the encouragement of those who are reluctant to vaccinate their children to attend the outreach sessions. The kebele leaders also meet with the HEWs regularly to plan services and receive reports of vaccination activities conducted during the week. This style of formalized teamwork between the health system and the community ensures that the HEWs have a strong network of support.

Toke Kutaye also employed a transparent and data-driven strategy to motivate health facility teams and health workers, reward good performance, and promote cross-site learning. Woreda-level review meetings that coincided with the distribution of salaries used coverage-based rating to compare HCs and kebeles in terms of vaccination coverage or targets reached. Between regular review meetings and routine supervision, support for and assessment of HEWs was continuous and deemed helpful by many HEWs. As in Alage, Toke Kutaye promoted peer exchange and knowledge sharing about best practices and challenges among the well-performing and poor-performing health posts and HCs, and these activities reportedly fostered an environment of mutual learning and open competition.

Health workers noted that they received widespread support for RI activities in the woreda, including from the woreda head who lent them vehicles, community volunteers, members of the kebele cabinet, model families, women's groups, youth associations, and leaders of “30-family” clusters. However, compared with Alage, the volunteer network in Toke Kutaye was less extensive and less motivated. Health workers reported that volunteers come and go based on expectations related to financial incentives that are provided for immunization campaigns, and they also expressed concern that incentives are not available for routine immunization.

Finally, Toke Kutaye's immunization activities benefited from the involvement of national and local-level development partners. WHO provided financial resources and surveillance officers; UNICEF provided support for the cold chain; Pathfinder provided technical assistance; and local NGOs, such as the Toke Mission clinic, provided services directly. The Toke Mission has been delivering health care in the area since 1989 and is estimated to vaccinate up to 30% of the children in the woreda annually. Abebech Gobena, a local NGO, also trained and supported community volunteers and traditional birth attendants and delivered other services.

SEKOTA ZURIA WOREDA, AMHARA REGION

Background

Sekota Zuria was the third woreda visited that had shown recent improvements in RI coverage. Sekota Zuria is located in the northeastern highlands of Ethiopia, in Amhara region bordering Tigray. The woreda is 720 and 430 kilometers from Addis Ababa and Bahir Dar (the capital of the Amhara region), respectively. Amhara region is characterized by rugged mountains, extensive plateaus, and scattered plains separated by deep gorges, with altitudes ranging from 600 to 4,600 meters. In Amhara region, about 90% of the population lives in rural areas and is engaged in agriculture. Approximately, 35% of the 33 kebeles within the Sekota Zuria are inaccessible at some time of the year, especially during the big rains from June through October. Total population in Sekota Zuria in 2010 was 142,728.

Figure 17. Location of Health Facilities in Sekota Zuria Woreda, Amhara Region



Health service

The WoHO supports seven HCs and 33 health posts. Since a Health Management Information Systems training in December 2010, the woreda has been computerizing all of its data by health post and HC. Figure 17 provides a local map depicting the location of most health facilities.

Woreda methodology

Driving from Addis Ababa to the woreda takes at least a full day, so the study team used the woreda headquarters as its base of operations. The team

conducted fieldwork for three days. Researchers visited two HCs and five health posts and conducted a total of 18 interviews with representatives of the Zonal Health Department and WoHO, woreda administration, HCs and health posts, and NGOs, as well as with members of the community. The team met once to debrief during the fieldwork and held a half-day analysis workshop in Addis Ababa immediately following the field visit. The team reviewed and verified its findings with woreda-level representatives at the stakeholder workshop in July 2011.

Routine immunization performance

The target population for pentavalent is 4,704 children under one year of age (Table 4). Penta3 coverage increased to 95% in 2010 from 73% in 2007. Figure 18 illustrates (in dark green) a reduction in recent years in the number of children who were left out for pentavalent immunization. The drop-out rate for children reached by pentavalent but not penta3 (shown in dark purple) decreased from 2008 onward and has remained under 10% since then. Respondents linked this decline in drop-outs to focused efforts to find all children eligible for vaccination and to trace children who failed to return for a second or third dose of pentavalent vaccine.

Routine immunization service sites

Vaccination services were offered at fixed sites, including seven HCs and 33 health posts, and through outreach. The number of health posts increased to 33 in 2010 from five in 2006. A working cold chain was available in six of the HCs and six of the health posts.

Human resources for vaccinations

The woreda health team includes a Woreda Health Head, a deputy head, an MCH/planning officer, an EPI officer, a nutrition officer, and a surveillance officer. The EPI officer also manages the cold chain. Vaccines are administered by nurses and HEWs. The number of HEWs increased from six to 62 between 2006 and 2010. A network of volunteers supports the health service, particularly the immunization services.

Cold chain and vaccines supply

The six HCs with functioning cold chains used either electric- or kerosene-fueled equipment. Two health posts had cold chain equipment that had been out of order for six months. Respondents reported a problem with the wick function and lack of budgetary resources for making repairs. The woreda store also had a functioning cold chain. Staff reported that the length of kerosene stockouts for the cold chain varied, but did not exceed two months in total over the past year. The reason cited for the stockouts was a lack of funds to purchase fuel. The woreda experienced a three-day shortage of pentavalent vaccine during the year. Otherwise, vaccine supply was considered reliable.

Transportation

Sekota Zuria had the use of one four-wheeled vehicle and two working motorbikes. Two other motorcycles were available, but required basic maintenance to function. Little had changed in transport availability between 2006 and 2010. The WoHO and HC staff reported a three- to four-month fuel shortage in the past year. The NGO Save the Children/UK provided fuel to fill this temporary gap.

EPI policies, strategies, and operations

The EPI plan in place has annual planned targets and activities for each kebele. Health workers reported that the majority of vaccines were delivered through outreach services (more than

Figure 18. Pental and Penta3 Vaccination Coverage, Sekota Zuria Woreda, Amhara Region, 2007-2010

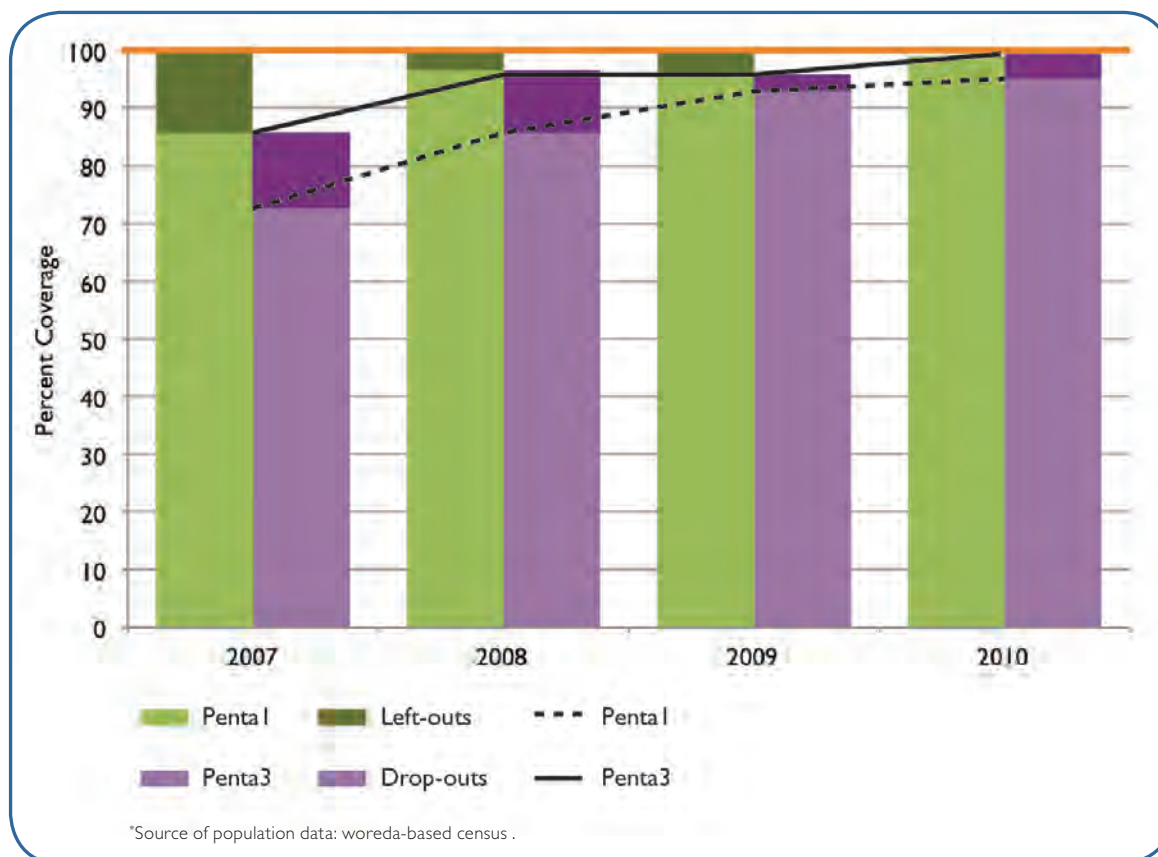


Table 4. Population Estimates and Pentavalent Coverage for Sekota Zuria Woreda, 2007-2010

	2007	2008	2009	2010
Total population*	104,108	112,257	137,552	142,728
Surviving infants**	3,545	3,225	4,026	4,704
Pental coverage (%)***	86%	97%	96%	99%
Penta3 coverage (%)***	73%	86%	93%	95%
Pental-3 drop-out (%)****	15%	11%	3%	4%

Coverage data from 2006 were not available.

*Source of population data: woreda-based census .

**Surviving infants are the number of children who survived to their first birthday (the target used for all nonbirth EPI doses such as pental and 3).

***Pental and penta3 data from woreda administrative reports.

****doses pental – doses penta3] x100 ÷ doses pental.

85%), and that the frequency and number of outreach sites had increased in recent years to 132. Outreach also includes mobile strategies. Health staff discussed the many methods used to ensure that children were reached through fixed and outreach services, as well as the system of active defaulter tracking used by HEWs and a network of volunteers. Supportive supervision was introduced in 2006. Previously, nurses at HCs supervised HEWs, but now one supervisor has been designated for each health post. Team-based review meetings were conducted quarterly in 2010, but were not held in 2011 (in the first quarter) due to a shortage of funding. Recent key events in the development of the RI system in Sekota Zuria are depicted in the chronology made in consultation with country stakeholders at the workshop in July 2011 (Figure 19).

Driver Pathways to Improved Routine Immunization Coverage

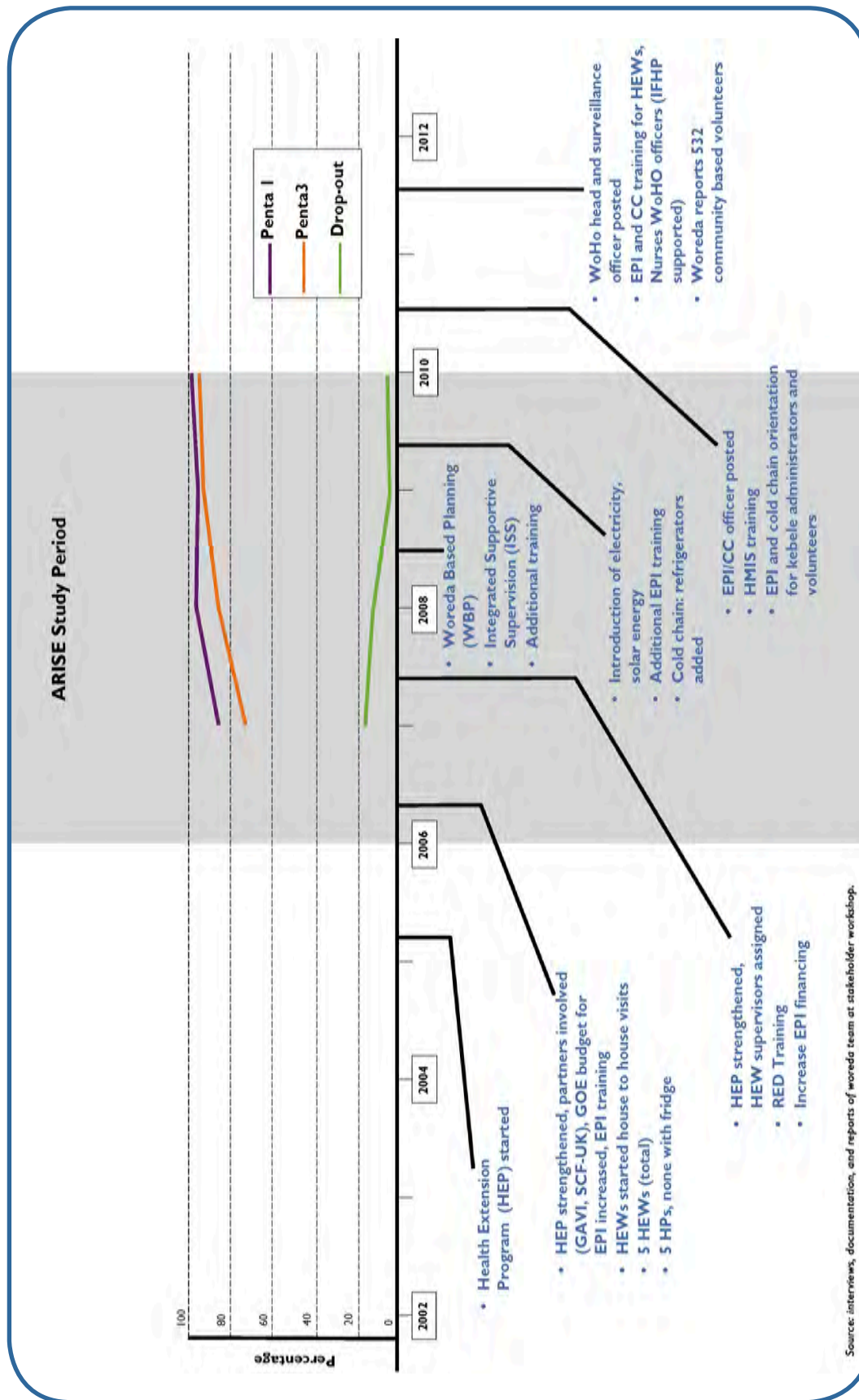
In Sekota Zuria, the study team synthesized information from administrative records, observations, group discussions, and interviews to identify the key resources, practices, and other factors that drove recent RI coverage improvement. As in Alage and Toke Kutaye, vaccination coverage in Sekota Zuria improved steadily (by 16 percentage points) between 2007 and 2010, due to several key interventions or practices that worked together to facilitate change.

Respondents confirmed the importance of HEWs in making vaccination services more accessible, reliable, and acceptable at the community level through regular and frequent interaction with mothers and community members to promote the use of vaccination. HEWs in Sekota Zuria used many of the same practices used by their counterparts in Alage and Toke Kutaye, including defaulter tracing, birth registration, and mobilization and involvement of the community. What distinguished Sekota Zuria's experience from the others were the practices used to monitor performance and reward health workers and community members for their work to promote immunization. Respondents estimated that 85% of all vaccinations were delivered through outreach. HEWs provided most of these vaccinations, but they were facilitated by the extensive network of volunteers and with consistent support from local kebeles. Volunteers reported that they worked with HEWs to find children who had not initiated vaccination on time or had failed to return for their second or third dose. They also helped collect vaccines from HCs and sensitized the community to the importance of vaccination. Volunteers' roles were clearly defined and their participation deemed essential to the success of community-based vaccination.

One management practice that bolstered the work of the community-based teams, improving vaccination service delivery and use was the introduction of supervision that promotes learning and rewards the use of strategic and effective practices that tailor services to community needs. HEWs noted that supervision improved over time with the use of a supervisory checklist and the practice by supervisors of conducting follow-up from visit to visit to ensure that problems identified during previous visits were subsequently addressed. Supervisors not only provided technical guidance for HEWs; they also promoted joint planning and problem solving among the kebele members and the HEWs. As ties between kebeles and HEWs strengthened, HEW credibility in the community grew along with the acceptance of the package of 16 health interventions that HEWs deliver.

A second effective management practice was the extensive use of public incentives and

Figure 19. Chronology of Events in Sekota Zuria Woreda, Amhara Region



rewards to motivate both communities and health workers. Woreda health teams held competitions among health facilities for meeting vaccination targets. HEWs could receive rewards, such as tape recorders, that could be used to share prerecorded health messages, or they were allowed to visit other health posts to share their experience or receive additional training. At the community level, families that adopted all 16 health interventions were given a white flag to fly above their homes to recognize them as models in the community. Kebele-level review meetings to assess the work of HEWs created a sense of ownership over the health services in the community. The WoHO was recognized by several respondents as particularly adept at leading the entire health team and encouraging kebeles to focus their work on improving health services. As in Toke Kutaye and Alage, local development partners supported the work of the woreda with training, funds, surveillance support, strengthening of supervision, and planning and monitoring.

TIKUR INCINI WOREDA, OROMIA REGION

Background

Tikur Incini was selected as the woreda with limited change in penta3 coverage from 2006–2010. The woreda was established in 1996, has an estimated area of 538 square kilometers, and includes only one urban center, Incini, the woreda capital. Geographically, Tikur Incini has plateaus, hills, mountains, plains, and valleys. Agalo, Dabale, Mute, and Bajo are the major mountains located in the woreda. Roughly 68% (13 out of 19) kebeles are inaccessible by wheeled transport from July to September. Total population in Tikur Incini in 2010 was 107,536.

Health service

The Woreda Health Office supports two HCs and 13 health posts. There were also six additional health posts under construction. Previously, in 2006, there had been only three health posts, including one HC that had been downgraded to a health post. Figure 20 depicts a local map with the location of many of the health facilities.

Figure 20. Location of Health Facilities in Tikur Incini Woreda, Oromia Region



Woreda methodology

The study team conducted fieldwork in Tikur Incini for two days. Researchers visited one HC and two health posts and conducted 13 interviews with representatives of the WoHO, woreda administration, HCs and health posts, and NGOs, as well as with members of the community. In contrast to the data collection strategy in the other three study woredas, in Tikur Incini the study team explored whether performance drivers found in Alage, Toke Kutaye, and Sekota Zuria were present in Tikur Incini, and if present, were working effectively. The team also explored with interview respondents the barriers to coverage improvement. The team met once to debrief during the fieldwork and held a half-day analysis workshop in Addis Ababa immediately following the field visit. The team reviewed and verified its findings with woreda-level representatives at the stakeholder workshop in July 2011.

Routine immunization performance

The target population for DPT1 is 3,808 children under one year of age. Penta3 coverage was in the range of 61% from 2006 to 2009, with a dip in 2007 likely due to use of updated census figures. Coverage then rose to 73% in 2010. Respondents reported that coverage began to improve only recently, due to steps taken to improve supervision and defaulter tracing. Figure 21 shows a high number of children left out, or never receiving pentavalent vaccine (shown in dark green), a trend that persisted from 2006 to 2010. The drop-out rate fell to 6% in 2010 from 35% in 2007.

Routine immunization service sites

Vaccination services were offered at fixed sites, including two HCs and 13 health posts, as well as at 55 outreach sites. A working cold chain was available at one HC (electric) and seven health posts (kerosene).

Human resources for vaccinations

The woreda health team includes a Woreda Health Head, an EPI officer, a nurse, a data manager, and a disease control officer. The EPI officer managed the cold chain, and the nurse provided backup; both had been trained in cold chain and vaccine handling practices in 2007. Vaccines are administered by nurses and HEWs. The number of HEWs in the woreda increased to 39 in 2010 from seven in 2006. No training related to immunization programming had been done in the woreda in the past five years.

Cold chain and vaccine supply

In general, the supply of electricity was reliable for roughly half of the woreda cold chain. Only one HC and seven health posts had a functioning cold chain. In the past 12 months, there had been frequent stockouts of BCG and OPV (e.g., approximately every two months). Staff reported that when vaccines were provided, the quantity was often insufficient; staff were told that stockouts emanated from national and regional-level shortages.

Figure 21. Pental and Penta3 Vaccination Coverage, Tikur Incini Woreda, Oromia Region, 2006-2010

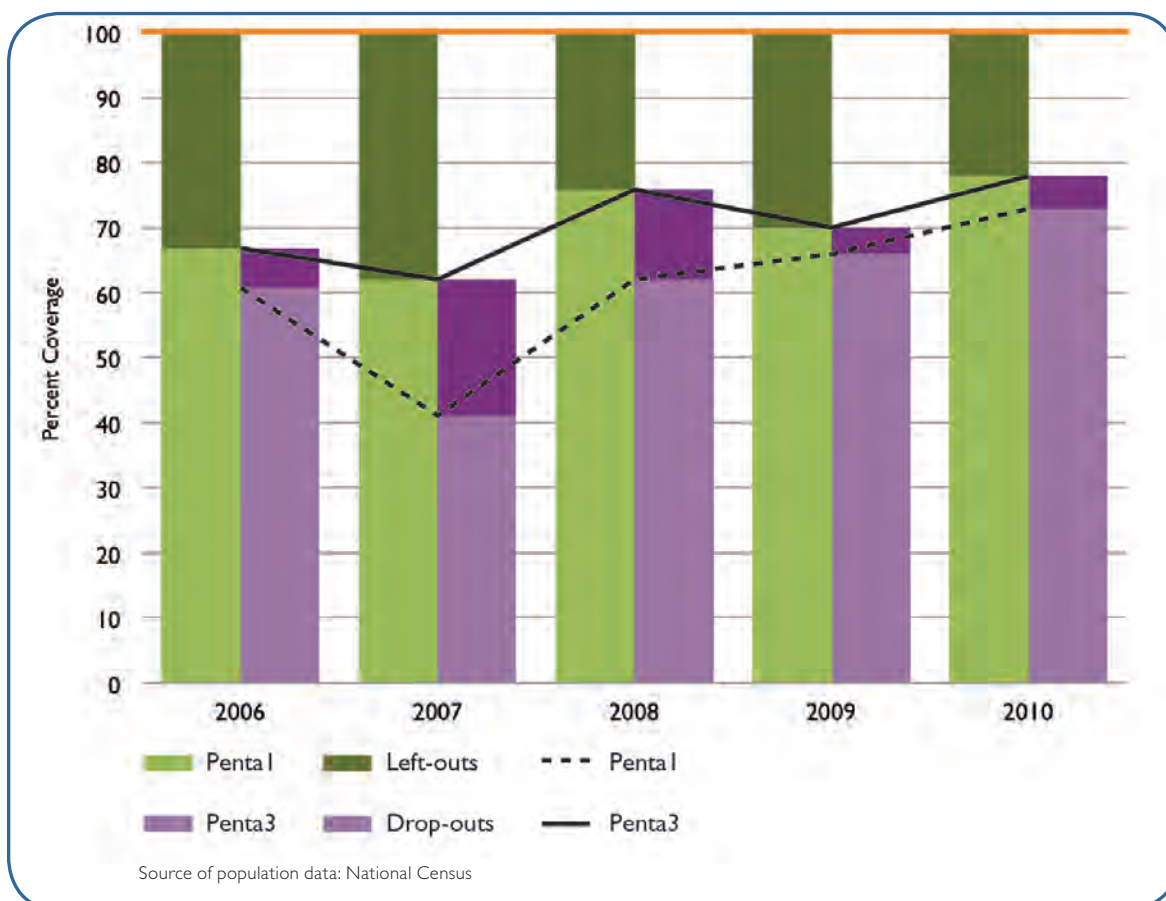


Table 5. Population Estimates and Pentavalent Coverage for Tikur Incini Woreda, 2006-2010

	2006	2007	2008	2009	2010
Total population*	95,127	97,884	103,679	106,685	107,536
Surviving infants**	3,520	3,727	3,577	3,672	3,808
Pental coverage (%)***	67%	62%	76%	70%	78%**
Penta3 coverage (%)***	61%	41%	62%	66%	73%
Pental-3 drop-out (%)****	9%	35%	19%	6%	6%

*source of population data: National Census

**Surviving infants are the number of children who survived to their first birthday (the target used for all nonbirth EPI doses such as pental and 3).

***Pental and penta3 data from woreda administrative reports.

**** doses pental – doses penta3] x100 ÷ doses pental.

Transportation

Tikur Incini had one four-wheeled vehicle at the HC level and no working motorbikes. There were five motorbikes in need of repair. Respondents reported that they were able to use immunization campaign funds if required to purchase kerosene or petrol.

EPI policies, strategies, and operations

The woreda has a current EPI plan. Staff report that in the past coverage was better, but there has been a decline in recent years. They also noted that although the number of health staff had increased in the past two to three years, financial resources had decreased. Health workers reported that they were beginning to take steps to address the decline in coverage. For example, they hold minicampaigns annually, using regular woreda funds, to “catch-up” with children who had not received any vaccination or had not received the appropriate doses. Moreover, the Reaching Every District strategy had been initiated in 2009, which included improved reporting and registration of children and follow-up with defaulters. Respondents reported that review meetings are also held regularly. Recent key events in the development of the RI system in Tikur Incini are depicted in the chronology made in consultation with country stakeholders at the workshop in July 2011 (Figure 22)

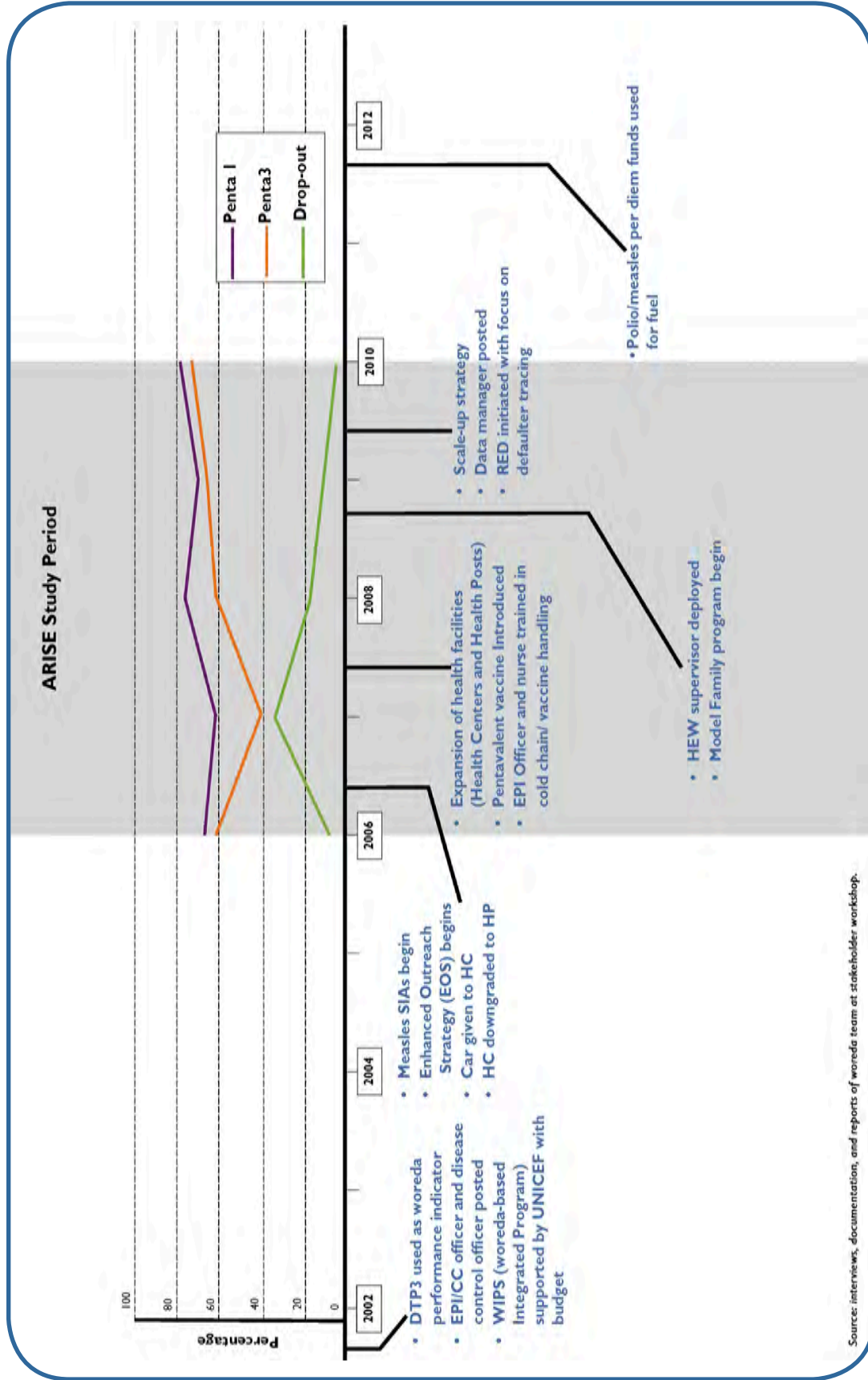
Driver Pathways to Improved Routine Immunization Coverage

Tikur Incini woreda, in spite of its stagnant coverage from 2006 to 2009, was making a strong effort to provide RI services to children. The basic resources required for delivering immunization were available, including staff, cold chain, and vaccines. The woreda health team provided outreach vaccination frequently, and the team also worked to raise community awareness of vaccination and to motivate HEWs with regular review meetings. Nevertheless, the study team found that many of elements that drove coverage improvement in the other three study woredas were either very recently instituted in Tikur Incini, present but not functioning as effectively as in the improving districts, or missing altogether.

In Tikur Incini, there had been a delay in constructing several health posts. Although the woreda gained a large number of HEWs and doubled the number of outreach sites (Figure 23), many HEWs did not have a base in the community from which to provide services and where they could live. The woreda health team estimated that 80% of vaccination was delivered through outreach. However, staff reported that HEWs were traveling long distances because they lacked a base in the community, which undermined their ability to provide services routinely and to form strong ties to their communities. Lack of housing in the community or an allowance to secure housing also negatively affected HEW motivation and in some cases delayed the assignment of HEWs to some communities. Indeed, respondents reported that HEWs had not built up trust between themselves and the community, and community awareness and acceptance of vaccination was lacking in some areas.

The study team also learned that there was limited collaboration between the woreda health team and the woreda administration, and this situation restricted the health team’s ability to secure resources in a timely way or to engage the local administration in health activities.

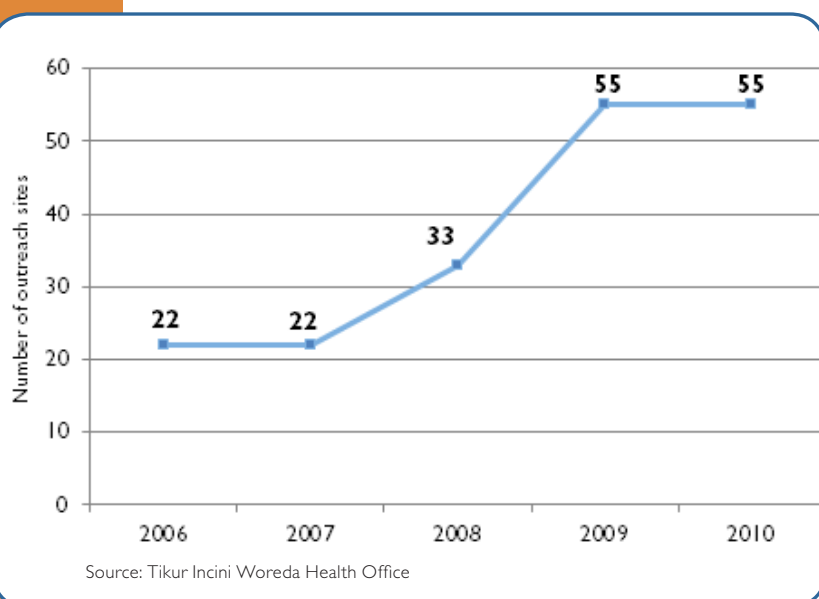
Figure 22. Chronology of Events in Tikur Incini Woreda, Oromia Region



Source: interviews, documentation, and reports of woreda team at stakeholder workshop.

Respondents also reported that volunteer activity had waned because the NGO that once had provided incentives to volunteers for working on immunization campaigns had left the area. Finally, although health staff reported to the study team that they conducted review meetings and regularly used data to assess progress in their program, they did not raise the issue of low coverage rates for DTPI coverage and the need to focus on children who had never initiated vaccination. It appears that Tikur Incini woreda was not able to benefit in the same way as the other study woredas from increased access to services delivery sites, increased numbers of HEWs under the HEP, and regular performance review practices.

Figure 23. Number of Outreach Sites in Tikur Incini Woreda, Oromia Region, 2004-2010



Unlike in previous years, Tikur Incini showed a marked improvement in penta3 coverage from 2009 to 2010, and this provided the study team an opportunity to explore both coverage stagnation and coverage improvement in one woreda. Health staff explained that they had taken several steps recently to address the lack of improvement in the immunization program. For example, the health team stepped up supervision frequency and improved the practice of supervision with the use of a checklist. In addition, in 2009 HEWs began to conduct defaulter tracing. The health managers linked the decline in the drop-out rate, which fell to 6% in 2010 from 35% in 2007, to the practice of regularly

locating and vaccinating children who had failed to complete the vaccination schedule. Although respondents did not link these newly instituted practices of supervision and defaulter tracing to RED, they did note that RED was initiated in 2009 through training.

VI. DRIVERS OF ROUTINE IMMUNIZATION PERFORMANCE AT THE WOREDA LEVEL IN ETHIOPIA

FRAMING RI PERFORMANCE IMPROVEMENT

The expected outcome of a national or woreda-level routine immunization system—improved penta3 coverage, in the case of this study—depends on the context in which RI services are delivered, the availability of essential program inputs, and the presence of key performance improvement drivers. Figure 24 depicts a framework that describes the performance improvement pathway. Although the type of pathway depicted is, in practice, rarely perfectly linear, the diagram is useful for mapping broad steps on the way to improved coverage. It also helps guide policymakers and program managers in defining areas of potential intervention for improving RI coverage.

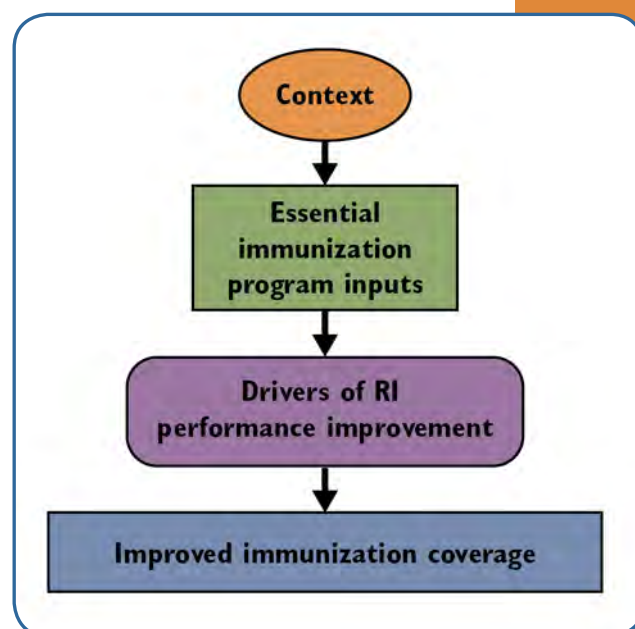
The following section outlines the key factors influencing RI performance in the study woredas. The narrative integrates findings on the RI systems and the five drivers of change found to contribute to RI coverage improvement in the case study woredas. It also reports aspects of the national and local context that supported coverage improvement. To qualify as a driver, a policy, resource, action, or process had to be present in some form in the woredas that had experienced recent gains in immunization coverage and to be absent or weak in the steady coverage woreda. In addition, key informants must have identified the importance of the driver, and the driver had to have a logical link to improved coverage by either improving the supply or use of immunization services during the period under study. Some drivers directly affect how services are delivered in communities, while other drivers act through district health service management practices that motivate health workers and engage the community, enabling improved access and use.

The drivers identified in this study are not meant to represent a comprehensive list of what is required for a successful RI program. Instead, they are drivers of the positive change that occurred in the case study woredas in recent years. Inputs or processes that did not drive recent improvement are not included, even though such factors may be key drivers in other districts or different countries.

NATIONAL AND SUBNATIONAL CONTEXT OF RI PERFORMANCE IMPROVEMENT

The context in which RI is delivered influences the effectiveness of the service and may be as important as any strategy chosen to improve coverage (Sovoronos & Mate, 2011). In Pawson and Tilley's realistic evaluation framework, the context is described as an organization's

Figure 24. Elements of the Pathway to Routine Immunization Performance



“existing reality” that needs to be factored into strategic planning, as well as analyses meant to shed light on the outcome of an intervention (Pawson & Tilley, 1997). In Ethiopia, several RI contextual factors created conditions that were found to support the introduction and effective implementation of performance drivers. These factors include:

- political commitment, both current and historical, to RI;
- ongoing efforts to strengthen community structures; and
- transparent and data-based accountability for improving health outcomes.

Political commitment

Historically, and during the study period, leaders in the government of Ethiopia demonstrated high level political commitment to improving RI services and immunization coverage. They expressed their commitment in terms of policies, funding for immunization and primary health care (Federal Ministry of Health of Ethiopia, 2005) and adoption of specific strategies (e.g., RED and ERIA) in response to reports of large numbers of unvaccinated children in many parts of the country. In addition, the prime minister paid consistent attention to the national immunization program. However, some respondents cited the government’s reluctance to appoint a single national EPI program manager as a lingering gap in its political commitment to EPI.

In 2003, prior to the study period, Ethiopia introduced a new program that prioritized health as a part of national development: the Health Extension Program. Although the government had promoted childhood immunization for many years under the Health Sector Development Programs,¹⁴ the introduction and rapid expansion of the HEP marked a period of intense investment in basic health services that set the stage for the success of RI in the study woredas. Both the content of the HEP and, more critically, the way it has been implemented at the woreda level have improved RI performance.

The HEP’s main focus has been on improving access to health services in rural areas, by expanding infrastructure (Health Centers and health posts) and increasing the size and skills of the health workforce, particularly at the community level. It introduced a cadre of government-paid, community-based, and community-focused health extension workers whose job is to deliver a package of 16 essential health services, and it created positions for coordination and supervision of the HEWs. The country’s serious and sustained investment in the HEP yielded remarkable progress in increasing both geographical and social access to health care (mainly preventive, though curative care is also part of the service package), and this trend created positive conditions for immunization coverage improvement between 2006 and 2010 in the study woredas.¹⁵ The majority of respondents interviewed by the study team said that they viewed the HEP as a

¹⁴ The third Health Sector Development Plan in particular affirmed government commitment to improving rural access to care and strengthening health services.

¹⁵ The HEP is characterized by consistent and focused push by government to increase access to health services at the community level. It increased numbers and skills of the health workforce, particularly at community level; introduced positions for coordination and supervision of HEWs; introduced a package of 16 essential health services; and made resources available to expand the health infrastructure alongside the health workforce. The majority of respondents viewed the HEP as a positive influence on coverage improvement, because it channeled support for immunization from the national level to lower levels and gave prominence to immunization as part of the HEP package at the community level.

positive influence on coverage because it channeled support for immunization from the national level to lower levels and gave prominence to immunization services as part of the community-level HEP package.

Strengthening community structures

The HEP also proved vital in driving efforts to strengthen community structures, including the networks of community-level volunteers, and to support their links to health service activity. Under the HEP, it is expected that local government (kebele administrations) and local volunteers will be actively involved in health and development activities, including immunization. In addition, the program promotes the extensive use of community volunteers who work closely with the kebele administration and the HEWs to organize services, deliver care, educate and encourage mothers to immunize their children, and track immunization defaulters. A new approach to organizing volunteers was emerging during the study period, defined in various ways, including “the women’s development army,” reflecting the fact that most of the volunteers are expected to be female.

Transparent and data-based accountability for improving health

The strong emphasis placed on measuring and openly reporting on progress related to health care, including immunization, proved valuable in a number of ways. Nationally, the Ethiopian government’s use of business process reengineering (Debela, 2009) promoted the streamlining of performance measurement and encouraged administrative offices at all levels to pay closer attention to indicators relating to the Millennium Development Goals and to health. The government has also emphasized improving the public sector’s accountability and performance. At the woreda level, health and local government institutions and community actors are held accountable for achieving health targets. Penta3 coverage by woreda, zone, and region is one of several indicators reported up the administrative chain of Ethiopia’s political and health systems. It is used to stimulate competition and motivate health managers and government administrators. Respondents interviewed by the study team reported having received feedback from as high as the prime minister’s office when coverage levels fell below expectations. The model family initiative, which rewards families that have adopted all 16 services delivered under the HEP and holds them up as examples for others, illustrates the use of accountability and incentives at the community level.

Overall, the implementation of the HEP illustrates a strong expression of political commitment to health that provided an important foundation on which three of the study woredas (Alage, Sekota Zuria, and Toke Kutaye) were able to increase immunization coverage.

ESSENTIAL IMMUNIZATION INPUTS

To improve immunization coverage, a woreda-level immunization system requires an essential set of program inputs that enables the health team to reliably deliver good-quality immunization services. In Ethiopia, these inputs are mainly funded by national and regional entities with support from development partners, and they rely on centrally managed systems, including the vaccine supply chain and workforce planning and deployment. Through the woreda RI situation analyses, the study team assessed the basic capacity of each woreda to deliver immunization services,

focused on the period from 2006 through 2010, based in terms of the availability of these essential inputs, and explored the relationship among this basic delivery capacity, RI performance drivers, and improvement in coverage. The team collected data on the reliability and adequacy of cold chain equipment and management; vaccine supply; the health workforce for immunization; transportation assets, such as vehicles and motorbikes; and immunization service delivery sites. The availability of quantitative data for tracking these essential immunization inputs over time varied in each woreda. Thus, the team augmented the record review on service capacity with interview responses and observations of service delivery.¹⁶ Individual woreda reports are presented in Section V.

Vaccine supply chain, including the cold chain, is a key component of the health infrastructure. In Ethiopia, the government and various donors have worked to improve supply chain reliability. Investments have been made in equipment (e.g., refrigerators), supplies (auto-destruct syringes), operating costs (budgetary resources for kerosene for refrigerators and petrol for vehicles), and training to ensure cold chain functioning and maintenance. The most frequently mentioned challenges to vaccine supply at every level related to transportation, including vehicle shortages and gaps in funding for maintenance and fuel. Distribution of vaccines from centralized woreda facilities to HCs, health posts, and outreach sites was sometimes problematic in all four woredas, mainly because of periodic transport shortages and difficult road conditions. In addition, although HEWs appreciated having a refrigerator in their health post—which offered the possibility of increasing vaccine availability and reducing travel time required to collect vaccines for outreach (often two to three hours walking in each direction)—many health posts lacked kerosene to run the refrigerators. Thus HEWs and volunteers often walked from facility to facility to secure vaccine.

In spite of these gaps in the supply chain and transportation resources, respondents from all four woredas reported that there were very few vaccine shortages or cold chain problems that disrupted vaccination activities during the study period. When vaccine supply or cold chain problems arose, the health team was able to address the problem by moving vaccines to adequate cold storage or finding alternative transportation, such as borrowing a vehicle to collect vaccines, using public transport, or walking.

With respect to human resources, key positions in the woreda health teams were filled. In addition, all four woredas experienced a marked increase in size of the community-level health workforce under the HEP. From 2006 to 2010, in two of the three woredas where coverage improved, the number of HEWs increased tenfold. Alongside this boom in the health workforce, each woreda gained health posts (ranging from three to 28) and experienced large increases in the number of outreach vaccination sites. The increases in the number of health posts and outreach sites were less dramatic in the steady woreda than in the improving woredas. However, in most cases, the availability of essential inputs for RI did not differ greatly among the four woredas. Table 6 compares several characteristics, including basic EPI capacity, of the woredas.

¹⁶ The situation analysis was not intended to provide a comprehensive picture of RI technical capacity. Rather it aimed to obtain sufficient information about how the routine immunization system was organized, managed, and how it delivered services within the context of a given woreda (and with reference to the national context) to be able to pursue meaningful inquiry about drivers of routine immunization system performance.

Table 6. Characteristics of the Four Study Woredas and their Routine Immunization Systems

WOREDA	ALAGE	TOKE KUTAYE	SEKOTA ZURIA	TIKUR INCINI
Region	Tigray	Oromia	Amhara	Oromia
Population size	116,263 (2009)	122,582 (2010)	142,728 (2010)	107,536 (2010)
Characteristics of settlement	Rural	Rural/semi-urban	Rural	Rural
Penta3 coverage rates in 2006 and 2009	75%; 87%	78%; 95%	73%*; 93%	61%; 66%
Dropout rates between penta1 and penta3 in 2006 and 2009	6%*; -1%	7%; 4%	15%*; 3%	9%; 6%
Number of health posts in 2006 and 2010	11; 14	10; 31	5; 33	3; 7
Ratio of health post to population, 2010	1: 8,304	1: 3,954	1: 4,325	1:15,360
Number of outreach sites for vaccination in 2006 and 2010	21; 72	38; 62	Unknown; 132	22; 55
Ratio of outreach sites to population, 2010	1:1,614	1: 1,977	1: 1,081	1:1,955
Estimated share of vaccines delivered by outreach, 2010	60%	70%	85%	80%
Number of 4-wheeled and 2-wheeled working vehicles, 2010	6	2	3	1
Number of health extension workers (HEWs) in 2006 and 2010	22; 35	6; 62	5; 64	7; 39
Ratio of HEW to population, 2010	1:3,321	1: 1,977	1: 2,230	1: 2,757
Number of working refrigerators at health care facilities, 2010	5	9	12	8

*2008 data; **2007 data

WHO/UNICEF coverage estimates for 1980-2010, as of July 2011. Please note that WHO/UNICEF coverage estimates were updated in July 2012. However, all national level coverage estimates used in this report are based on data reported by UNICEF/WHO in 2010 and 2011.

WOREDA-LEVEL DRIVERS OF ROUTINE IMMUNIZATION PERFORMANCE IMPROVEMENT

Respondents at the national and woreda levels cited the availability of essential immunization inputs as an important contributor to improved coverage. However, the presence or absence of resources and infrastructure only partly explains the differences in outcomes between the woredas where coverage improved and the steady woreda. By comparing and synthesizing the woredas' experiences, the study team identified five common practices or innovative steps that drove positive change in immunization coverage. These drivers of the performance of RI systems were:

- locally recruited and supported HEWs,
- active community participation in RI and health,
- partnership between the woreda health team and the local government (woreda and kebele) administrations,
- focus on accountability and performance monitoring, and
- support from development partners.

This section of the report synthesizes and compares woreda experience on RI performance drivers to address the following questions:

- What are the specific practices or processes that lead to improved RI performance?
- In which contexts are the practices most likely to be adopted?
- What factors affect the implementation of the practices?

Locally Recruited and Supported Health Extension Workers

Health extension workers were central to improvements in RI coverage. In the woredas where coverage increased, respondents identified the HEWs more frequently than any other factor as the primary force of change. Several recent surveys have also reported a link between RI coverage improvement and the presence of HEWs at woreda level (Karim, 2011). These workers contribute directly to improved immunization coverage by delivering immunization services and health messages in the community on a regular basis. Before the HEWs were placed at health posts, outreach for immunization was conducted less frequently in some woredas from fixed health centers by health assistants or nurses. The dramatic growth in the size and reach of the community-focused health workforce not only increased geographic access to immunization services; it also established HEWs as focal points in their communities for health generally and immunization specifically. Once the HEWs arrived, a respondent from Alage reported, "...everything changed straight away. Immunization became their responsibility."

HEWs provide immunization at established and newly constructed health posts and through outreach vaccination and by making house-to-house visits. During home visits and in many different settings in the community, the HEWs were reported to educate and inspire mothers

to seek out vaccination for their children. Through their work organizing vaccination sessions and raising awareness, HEWs in the three woredas where coverage improved built trust and rapport, which encouraged the use of immunization and other primary health services (Bill & Melinda Gates Foundation, 2010). The HEWs also established partnerships with community leaders and volunteers, employing mechanisms such as registration of newborns and immunization defaulter tracing to increase the likelihood of mothers initiating immunization and completing it on schedule. The drop-out rate between penta1 and penta3, for example, declined considerably between 2006 and 2010 in two of the woredas where coverage improved.

Several characteristics of their job enable HEWs to be effective in community-focused health care. First, many HEWs are recruited from the local area and are based in the community. Second, most of them are women, and health workers interviewed by the study team reported that their gender helps them develop close relationships with other women and gain trust in the community. As one health worker said: “An important factor in influencing immunization is the fact that the HEW is a woman. It has a positive influence on MCH activities. They have a good approach and women tell the HEWs their personal problems. It helps with encouraging immunization and family planning, and with other things. The HEW as a woman has a better outcome in terms of sensitization.”

Clearly, the presence of HEWs does not always guarantee success. In the woreda with steady coverage, the dropout trend shows a decline that started somewhat later than in the other woredas, leaving a large share of children (25%) unreached by immunization, even by one dose of pentavalent vaccine. The lack of parallel improvement in the steady woreda despite HEW involvement can be traced to three factors. First, in the steady woreda, many planned HCs and health posts had not yet been constructed by 2010. The HEWs therefore moved in and out of the community to provide outreach services, but unlike their counterparts in the other three woredas, they had no base to live and work. Second, some HEWs were not recruited locally and were therefore reported to be less effective. Toke Kutaye woreda learned this lesson early, and in its second HEW recruitment drive, the woreda hired many local women. Finally, the relationships between the HEWs and the local administration were not as strong as those in the other woredas. The experience of Tikur Incini woreda suggests that while HEWs are important for RI success, their effectiveness in driving improvement in coverage depends on several other factors. For example, the HEW’s role was found to work best when she had support from the kebele administration, worked closely with the network of community volunteers, and was regularly supported and supervised by the health center or woreda health office. These complementary drivers are discussed below.

“When the HEWs arrived they came with their job description about immunization and other activities and everything changed straight away. Immunization became their responsibility.”

Alage respondent

“In a typical week, HEWs often walk several hours each day to visit families in the villages, in addition to providing services at the health post.”

Health worker

Box 1: Locally Recruited and Supported Health Extension Workers

HEWs are trained, paid, locally recruited female workers supported by community-based volunteers and development committees to implement the Health Extension Program that includes a package of 16 health services, including vaccination. HEWs conduct house-to-house visits to create awareness about the benefits of vaccination and mobilize the community to attend vaccination clinics and outreach sessions. HEWs, community-based volunteers, and development committees together register children for vaccination and track vaccination defaulters who fail to return to complete all vaccinations. The HEWs collaborate closely with kebele leaders to jointly monitor program performance through regular review meetings and to discuss the challenges to improving vaccination coverage.

The placement of locally recruited health workers has brought immunization services closer to the community; built a relationship between the community, local administration, and the health system; improved awareness of the value of immunization; and increased uptake of immunization services.

“The community mobilization and the work with the kebele administrations have increased in the last two years and coverage has improved.”

Woreda level respondent

“Assignment of HEWs who are recruited from the community at grassroots level and within the community holds the lion share for increasing vaccination coverage among others who are recruited from the community.”

Sekota Zuria woreda

Active Community Participation in Routine Immunization and Health

From the local government (woreda and kebele administrations) to local networks of volunteers, teachers, and religious leaders, the community's role in making immunization services effective and acceptable was undisputed in Alage, Sekota Zuria, and Toke Kutaye. In these woredas where coverage improved, the HEWs and the community formed a solid team that committed time and human and material resources to raising awareness of health needs and interventions, organizing outreach vaccination, and setting high expectations in the community for meeting health service targets.

Community structures are well defined in Ethiopia. The study team found that volunteers are organized under a variety of structures. The most common is a local structure consisting of 30 families, subdivided into six groups of five families, each having one volunteer leader. In some woredas, these volunteers were known as development or work groups; in Tigray, this structure was referred to as the “network” or “networking.” The volunteer leaders are trained on a range of development issues, including health, and are expected to take this

information back to families in each subgroup. Interviewees in Tigray also described a women's development group, referred to as an "army of women," who volunteer for house-to-house visits during which they validate that all eligible infants are up to date with vaccinations, and carry out other supportive functions.

Other organizations, such as women's affairs groups, women's associations, and youth associations, were described as working together with HEWs and community health volunteers. As one respondent told the study team, "The presence of community volunteer health workers is another factor contributing to high vaccination coverage." Some community volunteers help by collecting vaccines for outreach clinics and kerosene to power refrigerators, and by tracking individuals who fail to return for second and third doses of vaccine ("defaulters"). In the woreda where coverage remained steady, the overall number of volunteers was low, many volunteer roles were unclear, volunteers complained that incentives given during campaigns and by NGOs were not available for routine services, and few volunteers were involved in tracing defaulters.

Partnership Between Health and Government Administration

An important positive force for improved RI performance in the three improving woredas was a strong working relationship between the health and the administrative arms of the government. The impetus for partnering came partly from the national level, where the prime minister encouraged health-sector reform and supported the FMoH in implementing the HEP. The study team also noted the same interplay between the administrative and health departments at regional, woreda, and kebele levels. This type of coordination and collaboration between administrative and health offices and workers distinguished the three woredas where coverage improved from the woreda where coverage was steady. Administrative and health offices worked closely together in annual planning. Kebele heads often supervised the HEWs and helped to raise the profile of health and health workers in the community. They met frequently with HEWs to review the HEW's short- and long-term work plans and assess performance as part of oversight and evaluation. In these woredas, the local government also shared its resources to support health activities—for example, by lending vehicles for the transport of vaccines and supervisors. Moreover, every kebele member interviewed was well informed about immunization activities.

The study team heard from many respondents that they viewed the interpersonal relationships between the woreda administration and woreda health office as critical for the improved performance of the health system in general and, by extension, of immunization efforts. At the local administrative level a kebele manager noted: "We meet with HEWs every week and we raise different immunization and other health related issues, discuss them and solve problems encountered as per our capacity." HEWs confirmed the importance of kebele support. One HEW stated: "The woreda health office and kebele leaders also urge the community to trust us and listen to our message. This increases our credibility within the community." Another HEW stated, "The community mobilization and the work with kebele administration have increased in the last two years and coverage has improved." Enhanced coordination also

Box 2: Strong Partnership Between Health Workers and the Woreda and Kebele Offices

Kebele in Amharic means “neighborhood.” The kebele is the smallest administrative unit of local government. Each kebele cabinet has a manager and eight members, including a chair and community leaders. The senior of the two HEWs assigned to a kebele is also a member of the kebele cabinet.

The woreda and kebele leaders work closely with the HEWs and the community to achieve their immunization targets, collaborating on planning, community mobilization, implementation, performance monitoring, defaulter tracking, and problem solving. The woreda and kebele leaders also lend credibility to the health workers by promoting their work within the community. The kebele leaders and the woreda health offices coordinate their supervisory visits to the health facilities; the entire process is organized and integrated. The HEWs value the supervision because they see it as a learning opportunity. The woreda also supports the HEWs by providing transport, such as cars or bikes, when outreach sessions are scheduled.

This integrated, organized approach motivates the health workers to perform their duties because they are recognized as key implementers of the health plan they were involved in shaping

Essential elements of the HEW and administration partnership model include:

- Health extension workers appreciate the supportive supervision with its orientation toward problem solving.
- The community recognizes the importance being placed on the health workers’ activities by the woreda and kebele leaders and responds accordingly by providing volunteers and attending the fixed site and outreach sessions.
- The good working relationship between the woreda administration and kebele leaders leads to a coordinated response to request for resources for immunization.
- The commitment to a harmonized approach to health is illustrated by the presence of the HEW on the kebele cabinet, where the HEW reports on the program activities and discusses strategies for improvement.

“There is a framework between the woreda admin and health office to carry out immunization activities in a transparent and planned manner and based on the agreed share of responsibilities.”

Toke Kutaye woreda

“Supervision is done in an integrated and coordinated manner. The woreda health office and woreda administration office work together in integrated and coordinated way. They go out together and assess the progress of the activities.”

“The kebele administration organizes the community and helps us call people for meetings. They are influential and help us to gather people whenever we need them.”

Sekota Zuria woreda

stimulated greater participation of other community members, including religious leaders and school personnel, and enabled the health teams to secure additional resources to fill gaps in the health budget. For example, the health and woreda administration might share vehicles to ensure that vaccines are transported to the health posts.

Focus on Accountability and Performance Monitoring

This driver represents a group of actions or mechanisms by which the program manager and health staff routinely employ data to monitor program performance. The steps are taken to ensure accountability from all stakeholders, recognize achievement, promote learning, and focus stakeholders on a common goal. A sharp focus on accountability and improving the performance of the RI system was woven into the partnership between the HEWs and the local administration in all study woredas. At the woreda and community level, program performance review takes the form of quarterly meetings of woreda health and administrative staff and regular supervision. At the community level, HEWs, kebele representatives, and community members meet to review progress and trace defaulters, guided by reports of children who are behind in their vaccinations or who have not been vaccinated at all. Ranking health facilities and woredas based on coverage and other indicators is also common. In addition to ensuring accountability, these practices are used to recognize achievement, promote learning, and focus stakeholders on a common goal. Data on immunization coverage is deemed “data for action” that focuses volunteers, health workers, and local government representatives on areas where targets are being met and areas where progress is lacking.

What makes these simple management tasks effective are their regularity and the managers’ commitment to following up reports with specific actions to rectify poor performance, the peer learning approach, public recognition of achievement, and the centrality of data. Several examples are discussed below.

Supervision

Supervision varied across all woredas in terms of frequency, level of training of supervisors, location of the supervisor, and use of supervisory tools, such as checklists. However, several common practices emerged in the woredas where coverage improved. In each of them, woreda staff planned to conduct supervision on a quarterly basis, and they reported to the study team that they had carried out the majority of planned visits. The study team confirmed that supervisors conducted visits because they left notes and suggestions for the staff. More critically, supervisors and respondents reported that supervision visits not only involved a review of performance; they also involved the introduction of problem-solving approaches and the setting of new objectives for the coming quarter. Health workers told the team that they greatly appreciated the follow-up from supervisors from one visit to the next and the constructive support for addressing obstacles to achieving service delivery goals. Some

“We get encouragement and advice [at review meetings] and continuous follow-up. The monthly review meetings help us to strengthen our skills.”

Health worker

aspects of supervision in Tikur Incini, the woreda with steady coverage, were clearly different. Supervision visits were frequently canceled due to budget shortfalls. In addition, supervisors did not begin using a checklist until 2011.

Supervisors also collect examples of effective HEW practices and innovative community strategies and share them with fellow workers at team meetings and during regular rounds of supervision. The workers reported a direct benefit from this peer-learning approach and from the public recognition of achievement, which they said motivated them and gave them credibility in their communities. The HEWs reported that supervisors encouraged the use of local data to guide immunization activities and strategies. Supervisors, through their work with HEWs, learned how HEWs met their targets and then shared this knowledge with others. An HEW reported that at health center review meetings, the “stronger HEWs help to give advice and share ideas with others.”

Review meetings

Regular team meetings are held at different levels of the system to review performance, share experience, and solve problems. At regional and zonal levels, respondents reported that they held quarterly meetings with woredas to review work using a standard set of indicators. Vaccination coverage for penta3, BCG, and sometimes measles are included on the list of performance markers. Each woreda reviews progress during the past quarter and develops an action plan for the coming quarter. The region then ranks the woredas on past performance, and some woreda representatives present their statistics and their plan. The study team found that this type of data-driven performance review occurred at various levels of the system. For immunization, woreda staff use the data from monthly reports (usually penta3 coverage and drop-out rates) and supervision visits (usually planned versus conducted activities) as the basis of their reports.

On the community side, review meetings occurred at varied times and frequency across the three improving woredas. One woreda repeatedly cited weekly meetings at the kebele level where discussions focused on what was achieved with respect to immunization sessions versus what was planned. Since the HEW is part of the kebele cabinet, the kebele management meetings were also named as an important avenue for highlighting achievements and gaps in health, including immunization.

Woreda and health staff reported that they conduct monthly review meetings at health facilities that are often scheduled to coincide with when HEWs come to collect their monthly salaries. During these meetings, they discuss the achievements of health facilities and the problems faced by poor performers. The meeting engenders healthy competition since expectations around performance are high. However, these meetings are also used to exchange information and experience, discuss progress and challenges faced, and explore strategies for overcoming obstacles. Respondents reported that HEWs and supervisors who have performed well are asked to explain how they managed to achieve high performance.

Box 3: Promoting Accountability Through Regular Review Meetings and Supervision Using Data

The health extension workers and the kebele leaders work closely to monitor performance, as measured by DTP3/penta3 coverage. The kebele leaders set clear monthly performance targets, which are reviewed during their monthly or quarterly meetings with subdistricts or facilities. Facilities that perform well are publicly recognized and praised. Staff at poor-performing facilities discuss their challenges with supervisors with a problem-solving mindset. The regular review meetings also serve as platforms for the exchange of knowledge and information about best practices and challenges between well-performing and poor-performing health facilities, and such exchanges often foster an environment of mutual learning and healthy competition.

The regularly scheduled performance review meetings hold the health workers, the local administration, and the network of community volunteers accountable for achieving their target vaccination coverage. Consequently, data on births, catchment areas, vaccination targets, and defaulters are carefully monitored to inform decisions on service delivery and community mobilization. The public recognition of good performance as an incentive serves to motivate the health workers in their work, and HEWs often respond by working hard to improve access to services.

“There have also been visits of the lower ranked health posts to see how the higher ranked health posts work. This helps not only to discuss what the good health posts are doing, but to see what they are doing too.

There are lots of opportunities at the quarterly review meetings for HEWs to discuss how they do their work, so that others learn. For example, the top three health posts not only discussed their practices, but also had health posts in the same catchment area visit them, and then later health posts from other catchment areas visited them.”

Alage woreda

Support from Development Partners

Development partners contribute to improving RI performance at all levels of the system. However, the study team concluded that development partners acted more as enablers than direct drivers of improvement in RI system performance. Major international agencies, such as the World Health Organization, the United Nations Children’s Fund, and the Global Alliance for Vaccines and Immunization, historically have made substantial contributions to the National Immunization Program in Ethiopia and continued their assistance between 2006 and 2010. Among their contributions, the groups provided guidance on policy and technical issues; support for EPI posts, training, EPI surveys, and rapid assessments; and support for the development of ERIA guidelines. From the woreda perspective, however, respondents were more likely to link improvements in RI coverage with the contribution of NGOs than to major funders or advisers. In the three woredas where coverage improved, NGOs provided

equipment, training, fuel, vehicles, and technical assistance. They also helped to build capacity by providing training on all 16 HEP interventions to woreda health administrators, health care providers, and HEWs. In addition, to strengthen the supervision of HEWs, the NGOs provided training, introduced checklists, and mentored in supportive supervision. Several NGOs provided the primary support to community health volunteers through training for advocacy, creating awareness, and conducting social mobilization, in addition to building capacity. In contrast, there was no equivalent support from NGOs in the woreda with steady coverage, and health managers considered this an obstacle to improving RI system performance.

VII. IMPLICATIONS

To improve and sustain RI coverage, woredas need a supportive political and policy context, as well as essential immunization infrastructure. The national Health Extension Program provided the impetus and the resources to bring about a dramatic improvement in geographic access to immunization (and other health interventions). Longstanding national commitment to RI and the support of development partners ensure the availability of vaccines and equipment. In the three woredas where coverage improved, the relatively consistent availability of these essential inputs provided the foundation on which the five RI performance drivers were able to move penta3 coverage to as high as 94%, up from around 75% prior to the study period. Without these inputs from the national government and international development partners for the maintenance of an RI system's basic infrastructure, commodities, workforce skills, and operations, the performance drivers could not work effectively to bring about positive change in immunization coverage.

The ARISE exploration of district-level RI reveals, however, that it is the way in which each improving woreda implemented RI that triggered coverage improvements, giving rise to the RI performance drivers discussed above. Comparing the woredas, there was not much difference in terms of health infrastructure. Rather, woreda experience differed in relation to the choices that woreda health teams made in managing their resources and the shared commitment of the health system, the local government, and the community to improving immunization coverage. Such positive relationships and enhanced coordination motivated a range of community members, including volunteers, religious leaders, and school personnel, as well as health workers to promote RI. In addition, in woredas where relationships between the woreda administration and health offices were strong, resource pooling, such as the sharing of vehicles, was reported to be crucial to an effective immunization system, particularly for the distribution of vaccines to health posts and outreach clinics. In the steady coverage woreda, many of the performance drivers, including performance review, HEWs' work in defaulter tracing, and raising community awareness, were either very recently instituted, present but not functioning as effectively as they were in the improving woredas, or missing altogether.

Throughout Ethiopia, there is a wide variation in woreda-level vaccination coverage. The ARISE case study woredas were not among the highest performing woredas in the country, nor were they among the poorest performers. The three woredas whose coverage improved, however, do represent the experience of woredas that have reached a certain level of performance (around 75% for penta3) and increased coverage to around 90% within three to four years.

The ARISE study in Ethiopia explored the pathways to RI system performance to understand how and why performance improves in different settings, Table 7 summarizes the pathway of these RI performance drivers, key contextual elements, and the role of basic immunization infrastructure.

Table 7. Context, Essential Immunization Infrastructure, and Performance Drivers Work Together to Improve Coverage of Routine Immunization (ARISE Case Studies of Four Ethiopian Woredas)

FOUNDATION AND DRIVERS	MECHANISMS	PATHWAYS TO RI SYSTEM PERFORMANCE IMPROVEMENT
<p>CONTEXT: Political commitment to RI Supportive policies</p>	<ul style="list-style-type: none"> • Policies and funding that: <ul style="list-style-type: none"> – focus on increasing access to care – focus on community-based health – focus on performance measurement and improvement • Regular supply of vaccines and basic inputs for immunization 	<ul style="list-style-type: none"> • Services move closer to the community • Maintain vaccine supply chain • Increase community-focused health workforce • Motivate staff and promote accountability
<p>FOUNDATION: Essential immunization infrastructure in health facilities</p>	<ul style="list-style-type: none"> • National political commitment through HEP & well-functioning immunization program • Cold chain equipment and basic transport at every health facility offering fixed services • Increase in the size of community-focused health workforce 	<ul style="list-style-type: none"> • Maintain the vaccine supply chain • Maintain an adequate number of vaccination providers • Increase opportunities for fixed-site and outreach vaccination
<p>DRIVER: Locally-recruited and supported health extension workers (HEWs)</p>	<ul style="list-style-type: none"> • HEW characteristics: female, from the community, living in the community • HEW partners with kebele administration • HEW teams with extensive volunteer network • Community-based vaccination, defaulter tracing, awareness raising 	<ul style="list-style-type: none"> • Establish personal links between health workers and community • Provide regular vaccination clinics, defaulter tracing, and health education • Increase community and health partnership • Support the credibility of vaccination and HEWs
<p>DRIVER: Active community participation in RI and health</p>	<ul style="list-style-type: none"> • Regular interaction of community health volunteers with RI program • Strong partnership of HEW and kebele administration • Involvement of communities in decisions about service delivery 	<ul style="list-style-type: none"> • Increase capacity to mobilize community support, trace defaulters, and educate communities about health • Increase resources for health service delivery
<p>DRIVER: Partnership between health and government administration</p>	<ul style="list-style-type: none"> • Joint planning and implementation of RI • Regular supervision by woreda, HC, and kebele • HEW sits on kebele cabinet • Joint review of RI performance 	<ul style="list-style-type: none"> • Motivate health workers and community • Increase community involvement • Improve access to resources for immunization
<p>DRIVER: Focus on accountability and performance</p>	<ul style="list-style-type: none"> • Clear performance targets • Monthly or quarterly meetings with health teams to review performance • Praise for and correction of performance • Peer exchange of service delivery solutions • Supervision using data and peer learning 	<ul style="list-style-type: none"> • Motivate staff • Use data to inform decision making • Increase skills to improve community-level service delivery • Emphasize problem solving
<p>DRIVER/ENABLER: Development partner support for health and immunization</p>	<ul style="list-style-type: none"> • Capacity building • Resources to support immunization services • Technical tools and guidance 	<ul style="list-style-type: none"> • Improve service quality • Improve service consistency • Motivate health workers

VIII. INVESTMENT TO IMPROVE ROUTINE IMMUNIZATION PERFORMANCE

The results of the study of drivers of routine immunization performance in four woredas in Ethiopia may have a number of practical policy implications for other sub-Saharan African districts.

First, Ethiopia's success with taking vaccination into the hearts of communities through health extension workers suggests that a community-focused, community-based health workforce may catalyze the uptake of immunization services and completion of vaccination schedules. Closer physical proximity to services and the trust built from regular interaction with HEWs worked together to increase the availability of RI and the commitment of community members to take their children for vaccination.

Second, historic investment in establishing functional RI systems imbued with basic technical capacity to deliver services has clearly been effective in some woredas in Ethiopia and in other African countries. The study team found that few respondents even considered that vaccines, the cold chain, or trained health workers served as drivers of coverage improvement. Yet without continued attention and investment to sustain the supply of essential EPI elements, no RI program can deliver potent vaccines effectively and build the credibility for RI within a community that is required to sustain acceptance and use of vaccination. As countries gradually introduce new vaccines into the routine system, maintaining these basic service inputs is critically important.

Third, respondents may have placed less weight on the role of essential RI program inputs in driving coverage improvement, because the study woredas had become competent in maintaining those inputs. From 2006 onward, no major changes—positive or negative—in service supply were reported. Respondents instead traced coverage improvement to decisions and actions related to management and the motivation of staff, to the coalitions formed between health and community actors, to the regular use of data, and to learning to focus workers on reaching targets. Many of the performance drivers were not specific to immunization programs, but could be generalized to the basic practices and functions of a health system as a whole. Effective woreda-level RI services benefit from health systems that channel resources and services as close to the community as possible. These health systems engage ordinary citizens and leaders and influential people alike in the management of community health services and, through shared work, build commitment to a common goal. Effective health systems also use data to hold health and community workers accountable for the system's performance and use program review techniques to motivate workers to stay focused on performance goals. Data quality becomes particularly relevant for making this performance improvement strategy effective. All of these drivers are potentially as important to other basic health services as they are to immunization.

Fourth, in the woredas where coverage improved, no single driver could account for coverage improvement. Rather, drivers tended to work in concert to influence RI system performance. Managers and policymakers are therefore cautioned about looking for one key driver of

coverage improvement. When addressing complex systems with limited resources, the use of multiple strategies for achieving better immunization service delivery and increased use of vaccination is needed.

Finally, the responsibility for determining which performance drivers are effective in a particular woreda, and for managing resources to apply and adapt performance drivers, rests mainly with woreda (or district)-level health teams. These teams were effective advocates for strategies that worked, and they channeled resources toward effective actions, such as the use of data for regular performance review and for motivating HEWs. As the study of how three woredas in Ethiopia improved their immunization systems suggests, investment is needed to enable local health managers in Africa to work strategically to improve health service capacity and effectiveness and increase the use of health services. In this effort, they will require resources, skills, and the authority to use different strategies and adapt them as needed to the local context in order to make optimal use of resources and maximize chances of program success.

Post Script:

Following the ARISE stakeholder work shop, the project conducted a stakeholder consultation to discuss how to translate study findings into action. Stakeholders were asked to recommend potential steps to improve RI performance based on the RI performance drivers that emerged from the research and to identify any enabling or constraining factors to implementing the recommended actions. A report of this stakeholder consultation is available on www.arise.jsi.com.

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FURTHER READING (AVAILABLE AT [HTTP://ARISE.JSI.COM/](http://arise.jsi.com/))

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