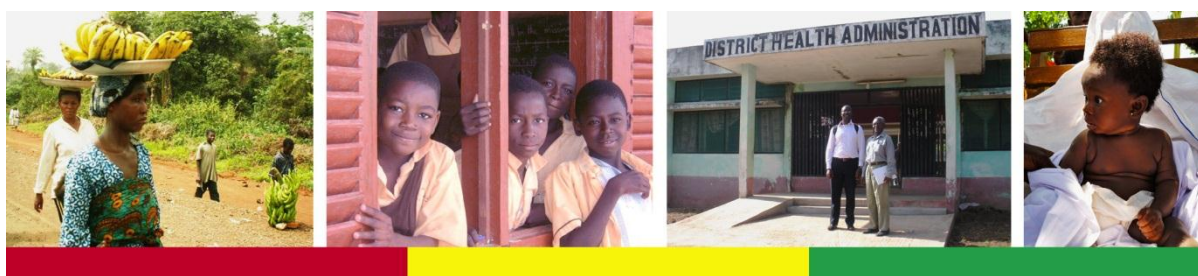




A Study of the Drivers of Routine Immunization System Performance in Ghana



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JSI Research & Training Institute, Inc.

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Acronyms and Abbreviations

A-O-B	Asikuma-Odoben-Brakwa
¢	cedis (Ghanaian currency)
ARISE	Africa Routine Immunization System Essentials project
BCG	Bacillus Calmette-Guerin vaccine
BMGF	Bill & Melinda Gates Foundation
CDC	U. S. Centers for Disease Control and Prevention
CHAG	Christian Health Association of Ghana
CHD	Child Health Day
CHN	Community health nurse
CHO	Community health officer
CHPS	Community-based health planning and services
CHW	Community health worker
cMYP	Comprehensive multiyear plan
CWC	Child welfare clinic
DC	Disease control
DDHS	District director of health services
DHMT	District health management team
DHO	District health officer
DPT+HepB+Hib	Pentavalent vaccine
DT	Diphtheria-tetanus vaccine
DTP	Diphtheria-tetanus-pertussis vaccine
DTP3	Diphtheria-tetanus-pertussis vaccine, third dose
EOS	Extended outreach services
EPI	Expanded Programme on Immunization
FBO	Faith-based organization
FIC	Fully immunized child
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross domestic product
GHS	Ghana Health Service
GNI	Gross national income
GoG	Government of Ghana
HepB	Hepatitis B vaccine
HiB	Haemophilus influenza type b
HIRD	Health impact rapid delivery
HSS	Health systems strengthening
IAC	Immunization Action Coalition
ICC	Inter-agency Coordinating Committee
IFFm	International Finance Facility for Immunization
IGF	Internally generated funds
IIP	Immunization in practice
IMCI	Integrated management of childhood illness

IMF	International Monetary Fund
IPV	Inactivated polio vaccine
IRB	Institutional Review Board
IRC	GAVI Alliance Independent Review Committee
ISS	GAVI Alliance Immunization Services Support
JRF	Joint reporting form
JSI	JSI Research & Training Institute, Inc.
KAP	Knowledge, attitudes, and practices
LPG	Liquid propane gas
MCH	Maternal and child health
MDHS	Municipal director of health services
MHMT	Municipal health management team
MLM	Mid-level management
MMR	Measles-mumps-rubella vaccine
MOH	Ministry of Health
MS	Medical supervision
NGO	Nongovernmental organization
NHIS	National Health Insurance Scheme
NID	National Immunization Day
OPV	Oral polio vaccine
PEI	Polio Eradication Initiative
PPP	Purchasing power parity
RCH	Reproductive and child health
RD	Regional director
RED	Reaching Every District strategy
RHASS	Regional health administration support services
RHC	Regional Health Committee
RHINO	Routine Health Information Network
RI	Routine immunization
RI Adviser	Routine immunization adviser
SC	Stakeholder consultation
SIF	Sustainable immunization financing
SNID	Sub-national Immunization Day
SWAp	Sectorwide approach
T&T	Travel and transport
THE	Total health expenditure
TL	Team Leader (ARISE)
TOR	Terms of reference
TT	Tetanus toxoid vaccine
UCI	Universal childhood immunization
UNICEF	United Nations Children's Fund
UPE	Universal primary education
USAID	U.S. Agency for International Development
USE	Universal secondary education

VVM
WHO

Vaccine vial monitor
World Health Organization

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The ARISE Ghana research team, from left to right: Ann Larson, Howard Lartey-Young, Moses Adibo, Caroline Amissah, Natasha Kanagat, Abdulah Aziz, Halley Petersen-Jobsis, and Kofi Amegah. Not pictured: Robin Biellik, Jenny Sequeira, and Lynn M. Atuyambe.

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Executive Summary

Background

Sub-Saharan African countries have achieved solid advances in immunization performance in the past decade. For example, in the 46 countries in the Africa region of the World Health Organization (WHO), the proportion of infants vaccinated with the recommended three doses of the vaccine for diphtheria-tetanus-pertussis (DTP) grew to 77 percent in 2010 from 55 percent in 2000 (World Health Organization, 2011b). But even as overall progress has been steady and sustained, coverage rates continue to vary among and within countries. Some of Africa's most populous countries, including Nigeria, South Africa, Democratic Republic of the Congo, and Uganda, have coverage rates below 80 percent, as do many districts throughout Africa.

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 learn from countries that have improved their immunization programs and increased coverage. Specifically, in Ghana, the project studied why some RI systems achieve improvements in immunization performance while others do not by conducting an in-depth study of RI performance in four districts. This research is part of a larger study that extends to Cameroon and Ethiopia. By comparing the drivers of RI systems in different settings, ARISE is building a body of evidence to inform programming and investment. ARISE is managed by the JSI Research & Training Institute, Inc. (JSI) and funded by the Bill & Melinda Gates Foundation (BMGF). JSI's partners on ARISE are the School of Public Health at Makerere University (Uganda) and the Dartmouth Institute at Dartmouth College (United States).

Methods

Health service research is often criticized for focusing on barriers that are not relevant to managers who want to identify evidence-based strategies that work (Bosch-Capblanch, Kelly & Garner, 2011). The ARISE design was informed by methodological approaches, such as realist evaluation and positive deviance, that offer more nuanced understanding of how health systems work and provide more practical guidance to managers operating in the real world (B Marchal, M Dedzo & G Kagels, 2010a; B Marchal, M Dedzo & G Kagels, 2010b; Pawson, 2002; Pawson, Greenhalgh, Harvey & Walshe, 2005).

The research design in Ghana used a mixed-methods, multiple-case-study design, which enabled investigators to identify which drivers were critical for improving district-level RI system performance, how drivers influenced

An effective national routine immunization (RI) system provides consistent, timely protection from common diseases to all children.

Despite improvements in vaccination coverage, the rates are still below 80 percent in many sub-Saharan countries.

ARISE investigated the drivers of RI system performance to inform effective policies that can foster improvement.

Districts need the essential components of an infrastructure for RI, but once those are in place, further improvement in RI system performance requires efforts to strengthen the health system overall.

Improvements in RI system performance in the case study districts were driven by management practices that motivate the workforce, engage communities, and give local health teams the financial resources needed to deliver RI services.

performance, which contextual factors impeded or promoted a driver’s effectiveness, and what relationships existed among the drivers.

Three of the study districts were selected because coverage rates had improved from 2008 to 2010, as measured by administration of the third dose of pentavalent vaccine (penta3). The fourth district was selected for comparison because the penta3 coverage rate had started at basically the same level as in the other districts but had not improved during the same period. Technical experts familiar with Ghana’s immunization program confirmed that the apparent trends in coverage accurately reflected the performance of the districts’ RI systems.

Eight Ghanaian and international researchers with experience in immunization and health program management conducted the study. The team spent four days in each district and interviewed more than 100 national stakeholders, members of the district health management teams, health workers at subdistricts and health facilities, district leaders, and community members. They also reviewed national and district documents and administrative records.

The case study method derives its analytical power from sequential development and testing of a grounded theory; that is, a theory systematically generated from an immersion in the data. After collecting data in one district whose penta3 coverage had improved, the team constructed a time line and conceptual map to identify the drivers of performance improvement, what gave rise to the drivers, and how the drivers influenced the district’s RI system. The team then adapted this model based on new information it gathered in the other districts.

Districts with improved performance:

- Krachi West district, Volta region
- Asikuma-Odoben-Brakwa district, Central region
- Ejisu-Juaben municipality, Ashanti region

District with steady performance:

- Ho municipality, Volta region

The rigor of the results came from replicating findings in the three improving districts and comparing them with the characteristics of the RI system in the district where penta3 coverage had not improved — the “steady” district. A driver’s presence in all three improving districts and absence in the steady district was taken to be a compelling argument for the driver’s importance as a source of improved performance.

National context

Ghana was the first sub-Saharan country to achieve independence, and it has enjoyed relative political stability and economic growth.

Half of Ghana’s 24 million people live in urban areas. The national government has placed a priority on health, and the country is on track to meet the fourth of the United Nations’ Millennium Development Goals: to reduce by two-thirds the under-five child mortality rate by 2015.

The Ghana Health Service (GHS) is responsible for the national immunization program, which since the early 1980s has vaccinated an increasing proportion of children. Penta3 coverage was 93 percent in 2010, the 11th-highest rate of all sub-Saharan African countries. A large part of this growth was driven by Ghana’s strategic investments in providing RI and strengthening district health services.

Ghana’s multilayered health service consists of the Ministry of Health (MOH), the GHS, 10 regional health services, and 170 district health services. Each district has a district director of health services (DDHS). District staff are appointed by the national and regional health services, and district funds come directly from the national government. District Assemblies comprise the political and administrative arm of Ghana’s decentralized system. Although the Assemblies do not control district health services, they are provided with regular reports by the district services’ directors.

Routine immunization is administered by community health nurses (CHNs), who have two years of pre-service training. Most vaccinations are given at monthly child welfare clinics (CWCs), which are conducted at fixed locations or on an outreach basis. CHNs are also responsible for conducting health and nutrition education, monitoring children's growth, aiding in school health programs, assisting with family planning, and treating minor illnesses.

District context

Krachi West, in the Volta region, is a hard-to-reach district. It took the ARISE Ghana team over 10 hours to reach this district from Accra, traveling over sections of rough road and crossing a river by ferry. Adding to the difficulty of working in this district, 15 percent of its population lives in communities situated on the lake. The district's RI program improved its performance significantly in the early 2000s, but it experienced a gradual decline in performance from 2006 to 2008. Recently, a committed management team has worked hard to motivate and empower health staff and to engage the community in the immunization program, contributing to recent gains in coverage.

Asikuma-Odoben-Brakwa, (A-O-B), in the Central region, is a disadvantaged district that had enjoyed high RI coverage when funding was available from international organizations. Coverage dipped in 2008, however, which served as a wake-up call for the managers of the district to radically reorganize its health services, including the daily work of every CHN.

The **Municipality of Ejisu-Juaben**, in the Ashanti region, had enjoyed 20 years of innovative district management and close partnerships with university researchers and nongovernmental organizations (NGOs) that kept penta3 coverage rates over 80 percent. With the changing economic climate, the municipal health management team now faces severe financial constraints. The current management team has used its assets, including volunteers and the revenue produced by hospitals and large health centers, to steadily improve RI performance.

The **Municipality of Ho**, in the Volta region, has a larger population than the average district, and it encompasses a complex area of urban, rural, and remote settlements. The municipality has a history of frequent changes in leadership, and this uncertainty has prevented strong municipal and submunicipal management teams from being put into place. This has had clear implications for RI performance. Penta3 coverage rates have been below 70 percent for most of the past decade.

District performance indicators and drivers

By 2010, penta3 coverage in the three improving districts ranged from 85 percent to 95 percent — similar to the national rate. The penta3 coverage rate in Ho municipality, the steady district, stayed below 70 percent between 2008 and 2010. Ho's coverage rate was one of the lowest in the country. Moreover, the municipality had a large negative dropout rate between penta1 and penta3 of 14 percent (Table ES1).

ESSENTIAL INFRASTRUCTURE IN HEALTH FACILITIES

All four study districts had reliable supplies of vaccines in their cold storage rooms. Key positions in the district health management teams (DHMTs) were filled and the numbers of CHNs were adequate. District directors of health services were highly qualified, with master's degrees in public health and technical competence in the management and administration of vaccines. Members of communities in the districts understood the benefits of childhood vaccines, and every district had a schedule of monthly vaccination clinics at fixed and outreach sites that had been in place for many years.

However, districts varied in the size of their populations and settlement patterns, as well as in the availability of essential immunization infrastructure, such as vehicles, cold chain equipment, and ratio of CHNs to population (Table ES1). The steady coverage district (Ho) was the largest. It had the most people, types of settlements, and health facilities. Ho also had a proportionally greater deficit of essential resources required for immunization service delivery.

Table ES1: Characteristics of the district health services in the ARISE case study

	Krachi West	Asikuma-Odoben-Brakwa	Ejisu-Juaben	Ho
Region	Volta	Central	Ashanti	Volta
Population (2010 estimate)	101,856	110,045	179,376	225,000
Characteristics of settlement	Rural and small urban	Rural and periurban	Periurban and urban	Rural and urban
Penta3 coverage 2008 and 2010 (from national data)	85/97	86/98	83/87	62/64
Number of fixed sites providing vaccinations	14	11	9	39
Number of outreach sites for immunization clinics	9	94	91	142
Number of working vehicles (four-wheeled and two-wheeled)	>30	>20	>8	25
Number of community health nurses (CHNs)	40	39	43	89
Number of working refrigerators at health care facilities	26	23	6	30
Penta3 coverage ranking out of 141 districts in 2008	102	96	111	140
Penta3 coverage ranking out of 170 districts in 2010	38	36	93	166
Dropout rate from penta1 to penta3 in 2010	0%	-0.5%	1.1%	-14%
Ratio of people to CHNs	2546:1	2822:1	4172:1	2528:1
Ratio of people to fixed vaccination sites	7275:1	10004:1	19931:1	5769:1
Ratio of people to outreach vaccination sites	11317:1	1171:1	1971:1	1585:1

PERFORMANCE DRIVERS

Districts need essential immunization infrastructure to improve the performance of RI systems, but the presence or absence of this infrastructure only partly explained the differences between the steady district and those whose RI systems had improved. Good district health management practices, which motivated health workers and increased the capacity of community-based services to reach every child, were the other important drivers of improved RI performance. The three improving districts achieved these outcomes by:

- clarifying roles and responsibilities for immunization activities
- holding regular review meetings on immunization and other health activities with subdistrict or facility teams
- increasing subdistrict or facility autonomy and accountability
- engaging with community leaders and community health volunteers

Clear roles and responsibilities

Clarity about the roles of teams and individuals is essential for creating and maintaining well-functioning health systems. In two of the improving districts, subdistrict teams had an officer who was responsible for immunization as well as other programs. This clear delineation of roles improved the quality of the supply chain and ensured the delivery of regular vaccination services.

Although the numbers of CHNs increased during the years examined in all four districts, in the improving districts the additional staff made it possible to add more outreach sites or to conduct regular home visits, or both. In the steady district, new CHNs were not given new duties but instead worked with existing staff to perform tasks already under way. Thus there was no increase in the number of clinics held or the number of vaccine doses administered.

Supervision helps frontline staff to gain skills and use them to fulfill their roles. Managers in the three improving districts conducted formal supervisory visits every quarter and had regular informal contact with staff between visits. CHNs and officers in charge of facilities reported that these visits were appreciated and motivated them to work to achieve their goals. Managers in the steady district also expressed commitment to improving the regularity of supervision, but in 2010 most facilities received only one visit. The district was too big for the DHMT to supervise every facility, and subdistrict management teams were not created to take up that function. As a result, staff in the steady district reported that they believed managers were not interested in their performance.

Regular review meetings

The three improving districts instituted or strengthened a practice of monthly or quarterly meetings with people responsible for community health services. In interviews, meetings to review performance were mentioned most frequently as a driver of RI system improvement.

Regular review meetings addressed all community health activities, but they emphasized RI, because of the importance that the Ghana Health Service places on it. At the meetings, each health team reported on the number of vaccine doses it administered in the preceding period relative to the estimated number of infants in its area under one year old. If the number of doses was lower than it was for the previous reporting period, staff were expected to explain why and to propose strategies for improvement. Respondents reported that these meetings inspired them to work hard, because they wanted the praise and recognition and because they learned practical solutions from their peers. The steady district held review meetings twice a year, but lack of follow-up meant that decisions were not sustained.

Autonomous local health teams

The previous example shows that reviewing data and making decisions is meaningless without giving the appropriate groups or individuals the authority and capacity to act. The three improving districts put mechanisms in place to shift authority and resources to subdistricts and facilities.

Asikuma-Odoben-Brakwa had the most radical approach. The DDHS assigned a team of “community directors of health services,” headed by a CHN, to be responsible for each community. Instead of services being delivered by anyone who happened to be available, the community directors were responsible for all clinics, home visits, and other activities. Interviews with CHNs and community members confirmed that the new structure increased accountability and job satisfaction and improved relations between the health service and the community.

Krachi West and Ejisu-Juaben increased autonomy and accountability through greater financial responsibility. Subdistricts in Krachi West had the authority to use imprest accounts for buying fuel, paying for public transportation, and arranging for minor maintenance. In Ejisu-Juaben, subdistricts were required to use funds generated from their curative services to support outreach programs. These initiatives made it possible for health teams to deliver regular services to communities and intensify efforts when necessary without having to rely on the district to approve payments or release vehicles.

In the steady district, the study team observed examples of local initiative, but it appeared that these practices were not encouraged systematically. The district headquarters retained control over all of the four-wheeled vehicles and dispersed funds to pay for public transportation. More than in the other districts, in the steady district staff complained that they were not given the resources needed to improve coverage, and management complained about the lack of initiative of frontline health workers.

Community engagement

Districts whose RI systems improved made efforts to support community health volunteers and to interact regularly with community leaders. Krachi West and A-O-B held workshops and training for community health volunteers and community leaders, while also working to reinvigorate community service delivery and strengthen local health teams. Ejisu-Juaben continued to support its strong community health volunteer program despite declining external funding, because district leaders recognized that volunteers were critical to any intensification of effort to improve RI coverage. CHNs from these districts frequently named community support, and particularly the assistance given by volunteers, as drivers of RI system improvement. Volunteers played a vital role in promoting the immunization services to community members. They also helped CHNs by reporting on recent births, tracing individuals who did not complete the immunization schedule (“defaulters”), assisting with home visits, and, in some cases, preparing the outreach clinic site and helping to weigh babies or record their weights.

Improving districts also fostered partnerships. As a result, district assemblies, private health care providers, and traditional chiefs promoted vaccinations and supplied buildings and other resources for immunization services.

The steady district did not place such a priority on increasing engagement with communities and partners. Citing a shortage of funds, the health team had postponed several times the training of new community health volunteers. In some parts of the district, relations between health program personnel and community leaders were strained because health workers refused to live in the poor-quality housing that the community provided.

Implications

Table ES2 summarizes the drivers into five broad groups. The Ghanaian EPI system runs so efficiently that it is possible to overlook the importance of vaccination equipment and transport for the effective delivery of district level services. Most districts have an adequate infrastructure. However, the steady district demonstrated that without these basic resources, the entire routine immunization service is at risk. Once those basics requirements are met and sustained over time, however, quality management practices are needed to praise or correct the health workforce and empower health teams to be responsive to the community. Community engagement is also critical to fully vaccinate a high proportion of all infants. Districts with recent improvements put effort into supporting community health volunteers, maintained regular dialogue with community leaders, and devoted staff time to health education and promotion. Table 6 also shows the pathways linking the drivers to improved performance.

The drivers included in Table ES2 are not new concepts in immunization programs. The importance of each has been recognized for 30 years. Yet, the case studies showed that successful management teams adapt these well-known approaches to their own staffs and communities. Each improving district faced unique challenges and opportunities. And each of them used initiative to motivate their staff and involve communities, rather than waiting for extra external funds, a training program to be developed, or a coverage survey to be conducted.

The strength of the ARISE methodology is that district RI performance was viewed through a wide lens encompassing communities’ socioeconomic contexts and histories of health service delivery. Unlike most investigations of RI performance drivers, the Ghana study team observed service delivery firsthand and its members interviewed health providers and community members as well as program managers. This intensive data gathering yielded an in-depth understanding of district RI systems. Replicating fieldwork in three districts whose coverage improved and in a fourth district that did not show positive change enabled the team members to test rigorously their hypotheses about the drivers of change.

Table ES2: How performance drivers improve routine immunization systems, as drawn from the case studies of four Ghana districts

Groupings of drivers	Specific drivers	Pathways to improved system performance
Essential infrastructure in health facilities	<ul style="list-style-type: none"> • National political commitment and well-functioning immunization program • Cold chain equipment and adequate transport at every health facility offering fixed services • Adequate number of vaccination providers on staff 	<ul style="list-style-type: none"> • Maintain the supply chain • Support the capacity to expand or intensify services to the community
Clear roles and responsibilities	<ul style="list-style-type: none"> • Well-functioning district and subdistrict management structures with clear RI roles and responsibilities • Supportive supervision to ensure that individuals are capable and motivated to perform their responsibilities 	<ul style="list-style-type: none"> • Motivate staff • Maintain the supply chain • Provide regular vaccination clinics, defaulter tracing, and health education
Regular review meetings	<ul style="list-style-type: none"> • Clear performance targets • Monthly or quarterly meetings with subdistrict or facilities teams to review performance • Praise for and correction of performance • Peer exchange of service delivery solutions 	<ul style="list-style-type: none"> • Motivate staff • Use data to inform decision making • Increase skills to improve community-level service delivery
Autonomous local health teams	<ul style="list-style-type: none"> • Transparent allocation of financial and other resources to subdistricts and health facilities • System of accountability 	<ul style="list-style-type: none"> • Motivate staff • Support the capacity to adapt services as appropriate for communities
Community engagement	<ul style="list-style-type: none"> • Regular interaction with community health volunteers • Good communication with traditional and political leadership • Involvement of communities in decisions about service delivery 	<ul style="list-style-type: none"> • Improve uptake of services • Increase the capacity to mobilize community support, trace defaulters, and educate communities about health • Increase resources for health service delivery

This study’s results cannot be directly generalized to other districts in Ghana or sub-Saharan Africa. However, similar findings have emerged from research by others on Ghana’s health system performance and also from ARISE case studies conducted in Cameroon and Ethiopia. This body of work is evidence of the potential of investing in health system improvements to strengthen RI coverage, as discussed below.

Investing in improved performance

Three practical policy implications for other sub-Saharan African districts emerged from the district-level case studies in Ghana. First, it is not sufficient to have essential EPI equipment and staff at the district level; rather, these resources must be deployed effectively to the health facilities. National governments should allocate resources based on a minimum standard that includes maintenance and replacement to ensure sustained service delivery capacity and avoid gaps in supply and quality. To maintain a high level of coverage, every facility must be provided with adequate resources. It is no longer sufficient to guarantee resources only at the district level.

Second, further increases in RI performance will depend on increased and improved investment to strengthen district health services and to build and support functioning community-based health services that have workers who are motivated to achieve targets and have access to the financial and other resources needed to act locally. Fostering good district management practices cannot be distilled into a simple check list. District and subdistrict managers will need to use mentoring, peer learning, and recognition of employees' efforts in order to best introduce innovative practices. These strategies will be more effective for improving management capacity than the typical strategies of holding workshops and devising microplans.

Third, community engagement will be vital if district health services are to maintain high vaccination coverage and introduce new vaccines. In the next year or two, Ghana will embark on a new phase of decentralization that will involve greater control of resources by district assemblies. District health directors will increasingly need advocacy and negotiation skills to secure financial and political support for RI efforts outside of the traditional funds available for district health system.

Chapter One: Introduction

The Africa Routine Immunization System Essentials (ARISE) project investigated routine immunization in four districts in Ghana. This work is part of a larger study conducted in three countries to advance understanding of the factors contributing to successful routine immunization (RI) performance 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 a vaccine containing diphtheria-tetanus-pertussis grew to 77 percent in 2010 from 55 percent in 2000 (World Health Organization, 2011b). Progress has been steady and sustained, but the underlying reasons behind improvements in immunization performance are still not well understood, and coverage rates vary among and within countries. Some of Africa's most populous countries, including Nigeria, South Africa, Democratic Republic of the Congo, and Uganda, have coverage rates below 80 percent, and many districts throughout Africa fall short of the 80 percent mark as well.

Routine immunization, an ongoing system that provides timely protection through vaccination to all children born in a single country, is the core of these immunization efforts. The ARISE project was created to learn from the countries whose RI systems are performing well, by documenting their experiences and consolidating them into a body of evidence that can inform future decisions on how to diffuse and scale up effective practices. Established in late 2009, ARISE is managed by the JSI Research & Training Institute, Inc. and funded by the Bill & Melinda Gates Foundation. JSI's partners on ARISE include the School of Public Health at Makerere University in Uganda and the Dartmouth Institute at Dartmouth College in the United States.

Objectives

The objectives of ARISE 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 to inform the way forward to improve RI systems in Africa, identify potential investment options, and clarify stakeholder roles

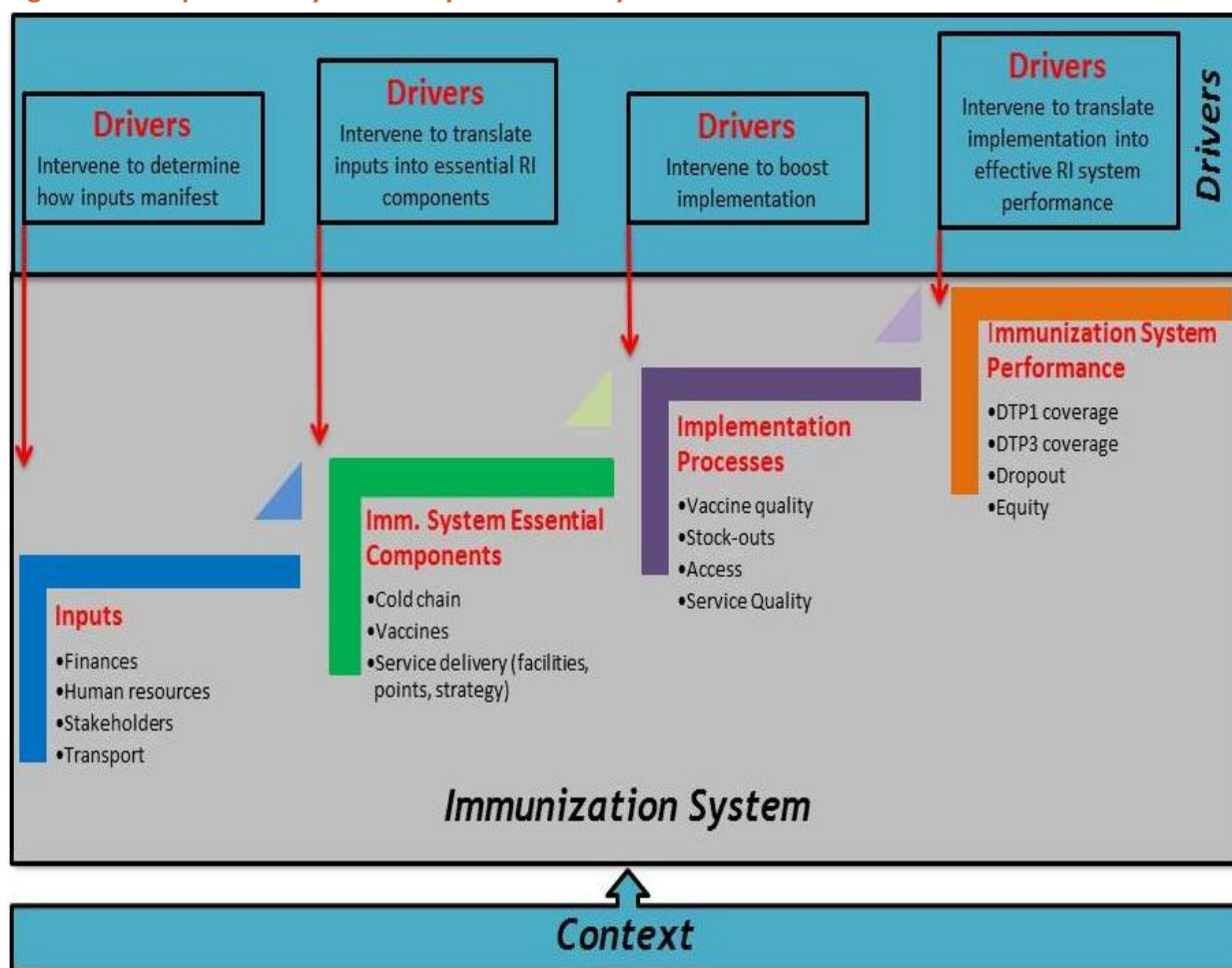
During the first year of the ARISE project, the project conducted a landscape analysis to systematically examine written documentation and existing data on RI systems in Africa and sought input from implementers and technical and development partners on RI performance experience to improve understanding of the drivers of system performance (John Snow Inc., 2011). The landscape analysis report presents the findings of the initial investigation and identifies the potential drivers of strong RI system performance that emerged from the preliminary project phase.

To confirm the relevance of these drivers and better understand how they work in practice, ARISE conducted in-depth studies of selected districts in Ghana, Cameroon, and Ethiopia. These case studies explore not only which drivers are critical for improving district-level RI system performance, but also how they influence performance, the contextual factors impeding or promoting their effectiveness, and the relationships among different drivers. The overall analytical framework for the case studies is illustrated in Figure 1. Drivers can operate at any stage of the program cycle: inputs, essential components, processes, and outcomes.

Through this case study approach, which uses a mix of qualitative and quantitative methods, the ARISE partners have undertaken a consultative process of investigation to build on and contribute to the evidence base and to generate solutions to both old and new challenges. Evidence from the landscape analysis and district case studies will be translated into clear and focused options for investments at the global, regional, national, and subnational levels that can promote optimal use of the resources available to support routine immunization.

This report presents the findings of the district case studies in Ghana. Section One provides an introduction to broad social and economic factors, the national political context, and the national health care system in Ghana, paying particular attention to the Expanded Programme on Immunization. Section Two, on methodology, describes the ARISE case study design and its application in Ghana. It provides details regarding data collection and the analytical approach. Section Three describes the characteristics of each case study district, including information on their social and economic development, health system, and RI performance, as well as on the factors found to be associated with recent improvements in routine immunization. One case study was of a district that had not had recent improvements in RI performance. This case study describes efforts to introduce the same drivers that had been effective in the three districts that showed improved performance, and barriers to their successful implementation. Section Four presents a model of pathways to RI performance improvement that integrates the findings from the four districts. Implications of the findings for current and future RI policies in Ghana and elsewhere in sub-Saharan Africa are presented in Section Five.

Figure 1: In-depth country case study: overall analytical framework



Introduction to Ghana

Ghana is presently classified as a lower-middle-income country with a goal of achieving middle-income status by 2015. Ghana has seen sustained economic growth of 5 percent to 7 percent over the past two decades, improvements in life expectancy and literacy rates, and a decline in mortality among children under five years of age (International Development Association, 2011). The International Monetary Fund (IMF) estimates Ghana's 2011

gross domestic product (GDP) per capita adjusted for purchasing power parity (PPP) to be \$2,931 (US dollars), one of the highest in sub-Saharan Africa (International Monetary Fund, 2011). Ghana's human development index score has risen by 0.8 percent annually, from 0.363 in 1980 to 0.467 in 2010, showing gradual development during the past three decades (UNDP, 2011). The index for sub-Saharan Africa is 0.389. Nevertheless, Ghana ranks 130th out of 169 countries worldwide.

Ghana is home to nearly 100 different ethnic groups. The most populous groups, based on the 2000 census, are Akan (45%), Mole-Dagbon (15%), Ewe (12%), and Ga-Dangme (7%). The country's major religions are Christianity (69%), Islam (16%), and traditional religions (9%). The current ethnic composition of Ghana can be traced to migrations of people from Arab states and areas in western Sudan. The influx of northern Africans for trading also created a local following of Islam.

Historically, Ghana has been one of the most organized states in the region, with formal militaries and rulers dating back more than 10 centuries. European merchants, who came to Ghana for its lucrative gold deposits, brought with them Christianity, which continued to spread during the colonial period. The British began their rule in the coastal region and then defeated the Ashanti state to gain power in the central territories. Colonial political structures began to form, and when those powers gained control of the northern territories, the name "Gold Coast" was given to what is now the Republic of Ghana (McLaughlin, 1994). In 1957, Ghana became the first sub-Saharan country to gain independence.

Political structure

Ghana is a constitutional democracy. The president and vice president are elected on the same ticket by popular vote to four-year terms, with a maximum of two terms. The president is head of state and is assisted by the vice president, cabinet ministers, ministers of state, and deputy ministers. The country has 10 regions, each headed by a regional minister who represents the president. The regional ministers are assisted by regional coordinating councils, which supervise the nation's various District Assemblies. The Assembly is the highest political and administrative authority in the district.

Traditional Councils, comprising a paramount chief, other chiefs, and elders, operate in parallel to the political and administrative systems. Queen mothers are women with traditional responsibilities for their communities and, in some cases, they share traditional power with male chiefs.

Ghana's fiscal, political, and administrative decentralization began after the country gained independence (World Bank, 2003). In 1988, the government created the Local Government Law, which delegated means and resources to the district level. Six subsequent policies endorsed and expanded the decentralization framework. A Legislative Instrument of 2009 required that beginning in 2012, the decentralized services of health, education, and agriculture would come under a consolidated budget controlled by the district assemblies.

Implementation of the Local Government Law in 1988 resulted in the designation of 110 districts within Ghana and the establishment of the District Assembly system. Nonpartisan District Assembly elections are held every four years. At the time of this study, the number of districts had expanded to 170. Each district is now responsible for an average population of about 150,000 and headed by a district chief executive, who is appointed by the president. Other district staff are members of the Ghana civil service.

Decentralization spread to the community level through urban, zonal, and town councils, as well as unit committees. Unit committees comprise volunteers and appointed community members who support the Assembly members. The committees have a role in birth and death registrations, organization of communal labor, fundraising, and public education.

Economy

The economy of Ghana is mainly fueled by the service and agriculture sectors, which contribute 40 percent and 37 percent of GDP, respectively (CIA, 2011). In practice, these sectors largely comprise subsistence farmers and small traders in the informal market. The principal crops include yams, grains, cocoa, palms, kola nuts, and timber. Most of the harvest is used domestically, although cocoa and timber are among Ghana's largest exports. Mining,

including for gold, diamonds, bauxite, and manganese, totals 5 percent of GDP and provides 37 percent of exports, with gold being the main mineral export. Commercial-scale export of oil and gas has started and is expected to accelerate economic growth (International Development Association, 2011).

Social and demographic characteristics

The provisional population count from Ghana's September 2010 census places the country's population at 24.2 million. The population grew at an annual rate of 2.4 percent between 2000 and 2010, down from a growth rate of 2.7 percent between 1984 and 2000 (Government of Ghana, 2011a). The urban population is growing faster than the rural population and may be as high as 51 percent of the total population (UNDP, 2009).

The provisional data from the 2010 census did not include age structure, so it is necessary to rely on national survey data. The 2008 Demographic and Health Survey, in which more than 43,000 people were interviewed, found that 41 percent of the population were under 15 years old, 52 percent were between 15 and 60 years old, and 7 percent were over age 60 (Ghana Statistical Service, Ghana Health Service & ICF Macro, 2009). Although this is a young population structure, there is evidence that fertility is declining. The total fertility rates from four successive demographic surveys were 6.4 in 1988, 4.4 in 1998, 4.4 in 2003, and 4.0 in 2008. Infant and child mortality has also fallen. The 1988 survey estimated that infant mortality from 1983 to 1987 was 77 deaths per 1,000 births and 155 deaths per 1,000 children under five years old. The figures for the period 2004 to 2008 are 50 deaths per 1,000 births and 80 deaths per 1,000 children under five.

Approximately one-third of Ghanaian households are headed by females. School attendance is fairly high. Based on the 2008 demographic survey, 74 percent of primary school-aged children and 42 percent of secondary school-aged children attend school (Ghana Statistical Service, et al., 2009). There is little difference by gender, but attendance is much lower in rural areas.

Ghana health system

Ghanaian political leaders have long viewed health as a key component of development. The 2007 National Health Policy and Five-year Programme of Work (2007 to 2011) is titled "Creating Wealth Through Health."

The Ministry of Health (MOH) is responsible for policy formulation, monitoring and evaluation, resource mobilization, and regulation of health services delivery. It has seven divisions:

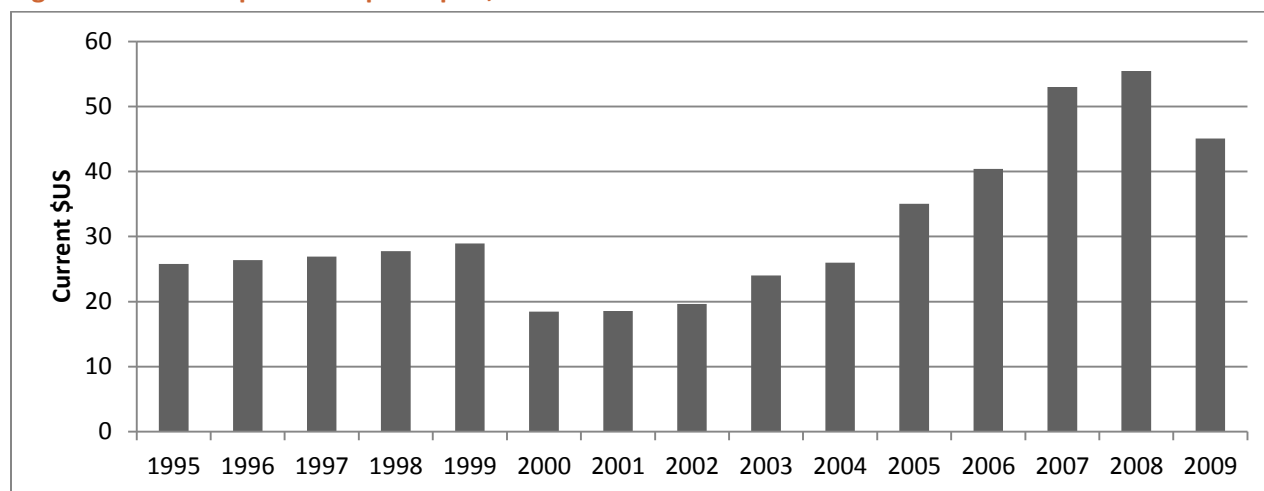
- Policy, Planning, Monitoring and Evaluation
- Research, Statistics, and Information Management
- Human Resource Development and Management
- Administration
- Procurement and Supplies
- Traditional and Alternative Medicine
- Finance

Beginning in 1993, the MOH underwent a restructuring, and in 1996 the Ghana Health Service (GHS) was created as an autonomous executive agency to implement national policies set by the MOH. The GHS is overseen by the MOH through its governing council: the multisectoral, 12-member Ghana Health Service Council. Administratively, the GHS is organized at three levels: national, regional and district. Two teaching hospitals, the Ghana Registered Nurses and Midwives Council, the Christian Health Association of Ghana (CHAG), and the Ghana Ambulance Service also operate under the MOH but independent of the GHS.

Health-sector financing

Ghana's health expenditure per capita has since 2001 ranged between \$35 and \$50 (in U.S. dollars), as shown in Figure 2. This is within the range recommended by the World Bank. After rising since 2001, expenditures peaked in 2008 and began dropping in 2009 in response to the global financial crisis.

Figure 2: Health expenditure per capita, 1995-2009



Source: World Bank (2011) online country data set

Health financing is governed through a framework that includes a sectorwide approach (SWAp) and takes into account the Paris Declaration, with the ultimate goal of ensuring that there is one country-led plan and budget and one mechanism for reporting, monitoring, and evaluating health services. Health Partners Summits are held biennially to review sector priorities and programs of work, and the partners sign an *aide memoire* to represent their commitments to implement the adopted recommendations. Quarterly business meetings and monthly partners meetings are held in-between summits to review progress and address emerging challenges (Government of Ghana, 2011b).

Funding for services provided through the Ghana Health Service comes from the government of Ghana (GoG); from internally generated funds (IGF) and household expenditures at GHS facilities; and from external funds from other donors, including development partners.

GOVERNMENT OF GHANA FUNDS

Government funds are channeled to the public health sector through the Ministry of Finance. Tax revenues are the main source of government income used to fund public expenditures. Most workers in public health are employed by the government and are paid from public funds, and salaries and allowances account for over 80 percent of total GoG health expenditure.

The proportion of total government expenditures devoted to health rose to 15 percent in 2005, but has since declined to 13 percent (World Health Organization, 2011a). Since 2009, inflationary pressures and a large government debt has forced the government to reduce public expenditures (Government of Ghana, 2011b).

Ghana introduced one of Africa's first national social health insurance systems. Passed into law in 2003 and put into operation in 2005, the National Health Insurance Scheme (NHIS) aims to build in a component of cost recovery for acute services while delivering universal coverage (Witter & Garshong, 2009). By mid-2010, the NHIS had registered over 15 million people, representing 66 percent of the population (Government of Ghana, 2011b). The majority of government health expenses are still met through the general tax revenue, but government and private facilities also receive funds from the NHIS. Critical health services, such as maternity services, are free to NHIS members, and the federal law establishing the NHIS requires that some money be set aside for public health programs, such as routine immunization. Although questions have been raised about the long-term economic viability of the scheme, the government's political commitment to charging for health care, and the scheme's impact on improving health equity, the NHIS is already profoundly impacting public health and acute care service delivery.

INTERNALLY GENERATED FUNDS

Public health facilities are expected to generate revenue through sale of acute health services and pharmaceuticals in order to fund their own service delivery. Facilities accredited by the National Health Insurance Authority are reimbursed for services provided to insured clients, while uninsured clients pay out of pocket for services. Facilities retain all of the money they collect and use it according to MOH guidelines.

EXTERNAL FUNDS

External funds include both sector budget support and earmarked funds. Earmarked funds may or may not be aligned with the annual budget. Nonaligned earmarked funds are mostly disbursed outside the planned annual budget. External funding for health has fluctuated from 29 percent of total expenditures on health in 2003 to 12-14 percent in the past three years (World Health Organization, 2011a). The GoG has recognized that the increasingly unpredictable and fragmented flow of external funding for health represents a major challenge (Government of Ghana, 2011b).

Structure of health services

Health service delivery is organized into a three-tier system that operates at the national, regional, and district levels. The national and regional health services are responsible for monitoring and technical assistance. The district is the focal point for health service delivery, as mandated by the health reform policies of the 1990s, supporting decentralization and primary health care.

Planning processes reflect the decentralized structure. Each year, a series of meetings held at all levels shapes health facility and subdistrict priorities into district plans, which are amalgamated into regional plans and ultimately submitted to the Health Partners Summit as the national plan (GAVI & Government of Ghana, 2005).

DISTRICT-LEVEL HEALTH SERVICES

District services are supposed to be relatively autonomous in setting their own health priorities and implementation strategies. But district health administrations are required to report to their District Assembly, and central control is still strong. Staff appointments and payment of salaries are managed centrally, and funds for recurrent expenses go directly to the district health service through budget management centers, which protect funds for high-priority purposes such as health. In a study of four countries with decentralized health services, Ghana was found to have retained the greatest amount of central control, as exercised through the Ghana Health Service (Bossert & Beauvais, 2002).

District hospitals serve as the first point of referral. They provide outpatient and in-patient clinical and maternity services and limited surgical procedures. GHS district hospitals are run by a medical superintendent. Some districts have a hospital run by the Christian Health Association of Ghana (CHAG).

All other health matters are the responsibility of the district health management team (DHMT), which consists of the district director of health services (DDHS), who is usually a medical doctor with a master's degree in public health; an administrator; an accountant; a disease control officer; and a public health nurse.

SUBDISTRICT LEVEL

A typical health district will have five to seven subdistricts, each with one or more health centers, reproductive and child health units, and functional community-based health and planning and services (CHPS) zones. The GHS health centers provide ambulatory clinical services, public health services, and maternity services. Most health centers are run by a medical assistant who also leads the subdistrict team.

COMMUNITY LEVEL

In both urban and rural areas, the community health nurse (CHN) is responsible for providing many personal public health services, including immunizations, growth monitoring, and distribution of vitamin A supplements. Most CHNs are based in health centers and organize outreach sessions to provide services into communities.

The Ministry of Health began the CHPS program to improve access to primary health care services to underserved communities. In 2010, there were 1,311 functional CHPS zones, up from 19 in 2000. Essential elements of the CHPS strategy include the creation of community health compounds as bases from which community health officers (CHOs), who are usually experienced CHNs with advanced training, deliver “close to client” services through home visits and outreach. These health officers, who typically live in the communities they serve, provide clinical and community outreach services, including household visits, antenatal and postnatal care, family planning services, health education, and child immunization. The CHOs normally refer women about to give birth to the nearest health center, but they may perform emergency deliveries.

Most communities have local health volunteers who assist with a range of public health functions, including social mobilization for mass campaigns, registration of births and deaths, disease surveillance, and some routine immunization duties. Some districts have active health committees in each community; committees typically comprise volunteers, traditional leaders, and other people with influence.

Private clinics and hospitals also provide clinical services including antenatal care and deliveries. Private maternity homes provide complete packages of maternity services and limited clinical services. Pharmacy shops provide both family planning devices and essential drugs. Recent years have seen an emergence of private laboratories, particularly in urban areas.

Health workforce

The Human Resource Division of the GHS is responsible for ensuring that health personnel are available in the right numbers and with the right skills, knowledge, and attitudes, and that they do the right things at the right time and right place (Ghana Health Service, 2005).

Ghana developed a Human Resource Policy in 2003 and a Five-year Human Resource Development Strategy in 2007, which was to cover the period through 2011. According to the Health Sector Medium-Term Development Plan 2010-2013, these strategies have resulted in an increase in the health workforce and an improvement in the ratio between program staff and the population at large. There has been a significant growth in the number of clinical and community health nurses, with their combined numbers up from 44 percent of the health workforce in 1996 to 60 percent in 2009 (Government of Ghana, 2011b).

As of 2010, the MOH employed 81.5% of Ghana’s total health sector workforce. Distribution of health workers is skewed in favor of the more affluent regions, which are mostly in the southern half of the country. In an effort to address the out-migration of skilled health professionals, the GoG significantly increased salaries in the sector between 2002 and 2004 to make them internationally competitive.

Still, problems remain. In numerous official documents, concerns have been expressed about attrition of personnel, an unwillingness of some individuals to take positions in more remote or disadvantaged areas, a lack of interpersonal skills among some doctors and nurses, and a general decline of staff morale. For example, the latest medium-term health sector plan included the statement, “There is no effective staffing norm in place and the levels of staff commitment, productivity and attitude to work has been questioned in several reviews” (Government of Ghana, 2011b).

TRAINING

Pre-service training of health professionals is shared between the Ministries of Health and Education. During the past decade, the nation established the Ghana College of Physicians and Surgeons and five general nursing schools. New programs have also been introduced to train people for direct entry into midwifery, courses have been added to train clinical health assistants, and programs have been developed for people to earn certificates and diplomas in community health nursing and midwifery. As a result of such efforts, the annual numbers of graduating community health nurses, field technicians, and disease control officers more than doubled from 2005 to 2010.

Increasing the capacity of districts to operate as efficient and technically competent units has been a priority for several decades. The Strengthening of District Health Systems initiative, which operated during the late 1980s

and into the 1990s, was designed to strengthen the capacity of district health management teams to undertake situational analysis, problem identification and analysis, program planning and implementation, and project evaluation. In-service training has been a major part of such efforts. For example, a training program for district health management teams was instituted in 1999 and reached all districts at that time. Additional rounds of training targeted new middle-level managers and continued through 2006 (Adjei et al., 2010). These training programs have not been implemented as extensively in recent years (Government of Ghana, 2011b).

Brief history of the Expanded Programme on Immunization in Ghana

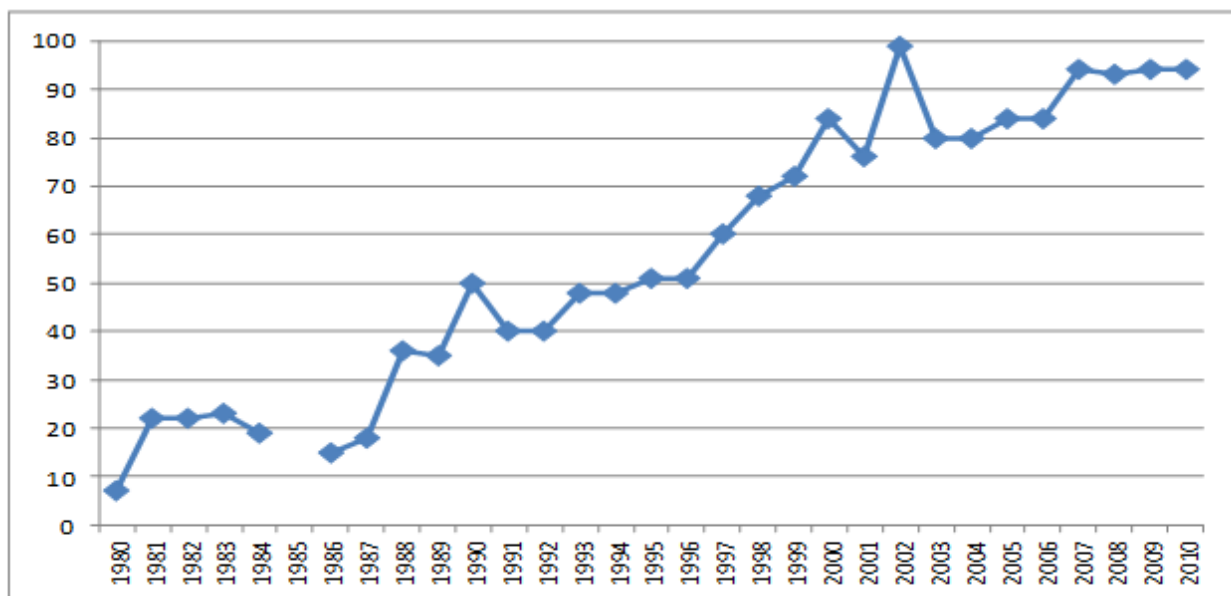
The Ghana Expanded Programme on Immunization is located within the Diseases Control Department of the Public Health Division of the Ghana Health Service. The program is headed by a public health specialist, who is assisted by trained personnel who are specialists in such areas as logistics management, data management, cold chain management, injection safety, social mobilization, and communication.

EPI in Ghana began in June 1978 with six antigens: Bacillus Calmette-Guerin (BCG), measles, DTP, and oral polio vaccination (OPV) for children under one year of age, and tetanus toxoid (TT) vaccination for pregnant women. Yellow fever vaccination was introduced in 1992 and the polio eradication initiative (PEI) was introduced in 1996.

In January 2002, the Government of Ghana, in partnership with the Global Alliance for Vaccine and Immunization (GAVI), introduced two new vaccines, for hepatitis B and Haemophilus influenza type b. The new vaccines were combined with the DPT vaccine into DPT+HepB+Hib, which is commonly referred to as the pentavalent vaccine in Ghana. These efforts were also supported by other health development partners, including WHO, the United Nations Children’s Fund (UNICEF), World Bank, the United States Agency for International Development (USAID), Japan International Cooperation Agency (JICA), Rotary International, the Department for International Development (DFID) of the United Kingdom, DANIDA, and various civil society organizations (CSCs) in Ghana.

The proportion of children immunized has steadily increased, and great progress has been made in controlling vaccine-preventable diseases. For example, the 2010 estimate for penta3 coverage was 93 percent (Figure 3). No child has died of measles since 2002. Wild polio outbreaks occur rarely; in the past 10 years, there has been only a cluster of cases in 2003 and 2008 (Ministry of Health & Ghana Health Service, 2010).

Figure 3: Three decades of penta3 coverage in Ghana



Source: WHO vaccine-preventable diseases: monitoring system 2011 global summary

EPI has been cited as a priority health intervention in every five-year work plan published by the MOH. EPI administrative coverage is considered to be a key health performance indicator for the entire health sector and is monitored at all levels (Ministry of Health & Ghana Health Service, 2010). It is the de facto indicator of district health performance (GAVI & Government of Ghana, 2005).

The Ghana National EPI Policy calls for each child to receive one dose of BCG vaccine at birth, three doses of pentavalent vaccine (at 6, 10, and 14 weeks), four doses of OPV (at birth and at 6, 10, and 14 weeks), one dose of measles vaccine (at 9 months), and one dose of yellow fever vaccine (at 9 months). In high-risk areas, the aim is to give every woman of childbearing age (12-44 years) five doses of TT vaccine; in other districts, pregnant women are the target. In 2002, Ghana replaced DPT in the scheme with the pentavalent vaccine. In 2012, with GAVI support, Ghana plans to introduce rotavirus and pneumococcal vaccines and a second dose of measles to the regular schedule.

OBJECTIVES OF THE NATIONAL IMMUNIZATION PROGRAMME

Ghana's Comprehensive Multiyear Plan (cMYP) for 2010-2014 lists the following objectives of the National Immunization Programme:

- Objective 1: Reach everyone targeted for immunization to achieve and sustain 94 percent coverage in all childhood immunizations and 85 percent coverage for tetanus toxoid immunization for pregnant women, by 2014
- Objective 2: Improve communication, advocacy, and information dissemination
- Objective 3: Strengthen surveillance system
- Objective 4: Improve program management and integration with health systems

IMMUNIZATION SERVICE DELIVERY

EPI services are decentralized to the district level, where operational activities are a component of an integrated package of health interventions provided by the DHMT and the subdistrict health teams. The DDHS is ultimately responsible for the management of EPI in the district. This responsibility is often delegated to a DHMT member who is either a technical disease control officer or a public health nurse.

Districts are responsible for collecting vaccines and ancillary supplies from regional stores and cold rooms and storing them in the district facilities. Arrangements are made for subdistricts of health facilities to collect supplies from the district. An assessment of effective vaccine management conducted in 2010 found that there were weaknesses at the subnational level in storage capacity, temperature monitoring, and vaccine management. Recommendations included enhanced "cascade" training of staff and replacement or expansion of equipment (Ghana Health Service, 2010).

Subdistrict health teams provide integrated static and outreach EPI services to the communities in their catchment areas. Teams comprise community health nurses, field assistants, and midwives, and they may be supervised by a technical disease control officer or a public health nurse. The disease control officers and field technicians often manage the district and subdistrict cold chain, while CHNs are largely responsible for giving vaccinations.

Most static and outreach immunization services are delivered during child welfare clinics (CWCs) by CHNs and disease control officers or field technicians. A typical child welfare clinic will provide health education, growth monitoring, vitamin A supplementation, and, in some districts, family planning. However, the major focus is on childhood immunizations, and CWCs are viewed as immunization clinics (GAVI & Government of Ghana, 2005). Health centers and reproductive health units should have the required cold chain equipment, vaccines, and injection supplies to enable them to offer vaccines on a daily basis and in a static clinic at the facility held at least once a month.

These facilities also service outlying communities through monthly CWCs. Holding outreach services requires transportation for the CHNs and vaccine supplies. This means that the facility needs access to a vehicle and fuel

or to funds to pay for public transport, such as buses or taxis. Allowances for these costs are called “T&T” (travel and transport).

In many districts, community health volunteers assist in routine immunization by ensuring that mothers are aware when the child welfare clinic will occur. Volunteers collaborate with traditional leaders to use the gong gong player (a kind of town crier) or public address system to inform the community. Other duties often include recording births and assisting with tracing defaulters. Volunteers are rarely paid for assisting with routine immunization, although there are reports of volunteers charging small payments (“tokens”) from mothers to recoup costs. Volunteers assist in National Immunization Days (NIDs) and receive payment for that work. Services to hard-to-reach communities are usually organized by the district because they require additional transport and personnel.

The close-to-community approach to routine immunization and other public health service delivery is embodied in the CHPS strategy. It has been shown to be effective in increasing vaccination coverage (Awoonor-Williams, Vaughan-Smith, Phillips & Nyonator, 2007) and in reducing childhood mortality (Nyarko, Pence & Debpuur, 2001).

EPI FINANCING

The Ghanaian government has borne the cost of financing traditional vaccines and supplies since EPI was launched in 1978. The GoG and GAVI have a cost-sharing agreement for pentavalent and yellow fever immunizations, and the agreement was emphasized in the financial sustainability plan that was created in 2002 when pentavalent vaccine was introduced. In 2007, the country moved to a co-payment scheme with a bridge financing mechanism. Development partners provide support in various forms, including support for immunization campaigns. Some of the partners support needy districts with additional resources to improve their immunization programs.

The GoG has increased its contribution to funding routine immunization activities to over 50 percent of the total cost, but this proportion will decline as the new vaccines are introduced with GAVI support (Ministry of Health & Ghana Health Service, 2010). Since 2001, there has been a line item in the budget dedicated to the purchase of vaccines used in routine immunization and a line item for the purchase of injection supplies (such as syringes, needles, and safety boxes) used in routine immunization. GAVI has been assisting the GoG in the area of immunization and health development since 2000. Currently, 88 percent of GAVI funds are directed toward vaccine support.

This funding for routine immunization reaches the district in the form of the “common basket” that covers the costs of an integrated package of health services, including routine immunization. Delays in the arrival of funds are a constant challenge for district health service management. At the time of the ARISE study, districts no longer received sources of targeted funds for routine immunization.

Chapter Two: Methods

The design of the ARISE in-depth study of drivers of routine immunization (RI) performance was structured as mixed-method case studies in which the units of analysis are health service districts, as defined in the three countries: Ghana, Cameroon, and Ethiopia.

Case study methodology has a number of advantages (Yin, 2009). It permits a holistic, detailed description and analysis of what the drivers are and how they work to improve RI system performance. Case studies are particularly appropriate for an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between the phenomenon of interest and its context are not clear, as is the case with drivers of RI system performance.

The approach for primary data collection was qualitative. Members of the research team immersed themselves in the districts, collecting information about social, environmental, and economic characteristics and the dynamics of district health teams. This broad approach to data collection was taken to understand the context in which drivers of performance change emerged.

Another qualitative characteristic of the study methodology is that it was iterative; the focus of inquiry expanded, narrowed, or 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. Indeed, an important analytical tool used in ARISE Ghana was to triangulate information gained from observation and semistructured interviews with quantitative measures of RI performance, such as vaccination coverage, numbers of vaccine doses administered, numbers of vaccinators, and supply of cold chain equipment, within districts or at particular health facilities.

Table 1: Multiple means of testing for drivers in qualitative studies

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 districts and absent or weak in steady district
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 drivers 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 1. In quantitative studies, validity and generalizability are achieved principally through the 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 technique and note taking. Robust qualitative analytical processes include such methods as verifying the information with more than one source or method, confirming the chronology of events to be consistent with causality, ensuring the logical plausibility of relationships, and using a steady district as a control.

District selection

The districts were selected using positive deviance to study the overall research question of what drives RI performance success. That is, three of the four study districts were selected because they had experienced recent improvements, while the fourth district had not shown any recent improvements.

The ARISE protocol called for four case study districts to be selected from three of Ghana's 10 regions (Figure 4). The sparsely populated regions of Upper West and Upper East were excluded to avoid idiosyncrasies specific to smaller, more remote areas. Greater Accra was excluded because of its large size and the fact that it includes the national capital. Large cities often have unique administrative arrangements that complicate comparisons with other districts in the country and internationally.

From these regions, ARISE selected three districts that had achieved increased performance in penta3 coverage over the past three years and one “steady” district that had started at a lower level of coverage and showed little change between 2008 and 2010. The steady district was selected from the same region as one of the improving districts to control for regional factors.

ARISE used three years as the time frame for improvement for several pragmatic reasons. Only 2008, 2009, and 2010 district coverage rates were available. In addition, for many district health services, institutional memory does not stretch longer than three years. Most important, lessons learned from recent performance improvement would be more relevant for other districts in Ghana and sub-Saharan Africa, because they reflect current economic, political, social, health, and demographic realities.

In the process of selecting the districts for study, the team used a data set of district penta3 coverage in 2008, 2009, and 2010 to compile a preliminary list of eligible districts. Districts were eligible for selection if they had the same boundaries and comparable data for the three years and a reasonably large population (in the upper 75 percentile). Improving districts had to have shown an increase each year, whereas steady districts needed to have shown little or no change. Districts with a coverage estimate over 110 percent were excluded.

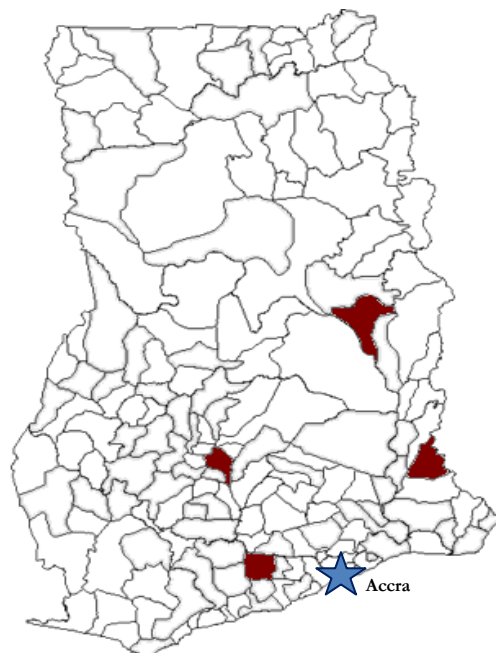
Based on these criteria, study team created a list of five districts with recent improvement and then shared the list with the national EPI manager and other experts on Ghana's RI program to ensure that there were no data quality issues that would have resulted in the coverage rates portraying an inaccurate improving trend. Three districts experienced steady penta3 coverage from 2008 to 2010. Only one of them met all the criteria for final selection. Other issues that might positively or negatively affect the value of the districts as a case study, such as the stability of key staff, diversity of environments, and population characteristics, were also considered.

Figure 4: Regions of Ghana



Source: Wikicommons

Figure 5: Location of selected districts, clockwise from top: Krachi, Ho municipality, Asikuma-Odoben-Brakwa, and Ejisu-Juaben



The final four districts selected and their locations are shown in Figure 5.

Districts with recently increased performance:

- Krachi West district, Volta region
- Asikuma-Odoben-Brakwa district, Central region
- Ejisu-Juaben municipality, Ashanti region

District with steady performance:

- Ho municipality, Volta region

Research team

A case study approach requires multiple skill sets, including case study methodology expertise, qualitative research expertise, immunization expertise, statistical modeling expertise, and knowledge of local context. The current ARISE partnership, which includes John Snow, Inc. (JSI), the Makerere University School of Public Health, and the George Washington University Department of Global Health, a local research organizations has been structured to ensure the inclusion of these skill sets for the design, implementation, and analysis of the in-depth study.

The ARISE team members brought to the study significant experience in the conduct of qualitative health services research and specific expertise in Ghana health service delivery and RI systems.

The international team members were:

- Ann Larson, team leader
- Natasha Kanagat, ARISE Ghana research manager
- Halley Petersen-Jobsis, research assistant
- Robin Biellik, PhD, EPI adviser
- Jenny Sequeira, ARISE research manager and EPI Adviser

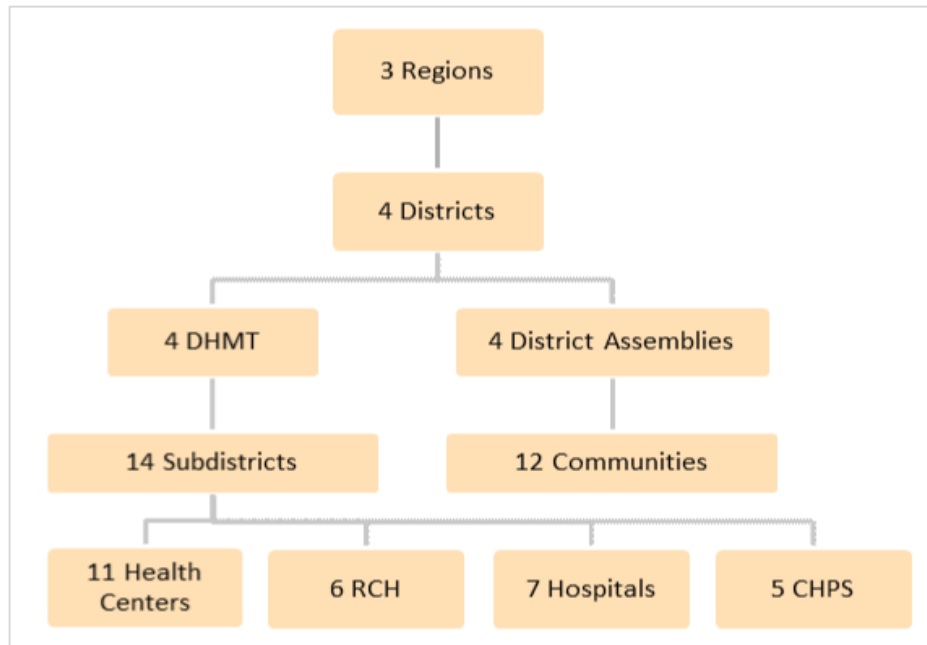
The local research team was recruited by a Ghanaian firm, Radel Consulting. Team members were:

- Kofi Adeldza Amegah, public health researcher and consultant
- Dr. Moses Adibo, public health physician and retired director of medical services
- Dr. Caroline Amissah, public health physician and former member of the national EPI team
- Abdul Aziz Abdulai, manager of a municipal health service and former member of the national EPI team
- Howard Lartey-Young, logistics manager and agricultural development expert

Instruments

ARISE Ghana had the benefit of the data collection instruments developed for the cases studies in Ethiopia and Cameroon. The Ghana research team reviewed these instruments during a weeklong workshop prior to beginning fieldwork and adapted them for the local context. The team also pre-tested the instruments in a periurban district and made further modifications. Most of these modifications were done to reflect the levels of the health service that held administrative records. During fieldwork, the team made minor changes to improve the flow of questioning and data recording.

Figure 6: Flowchart of semistructured interviews on performance indicators



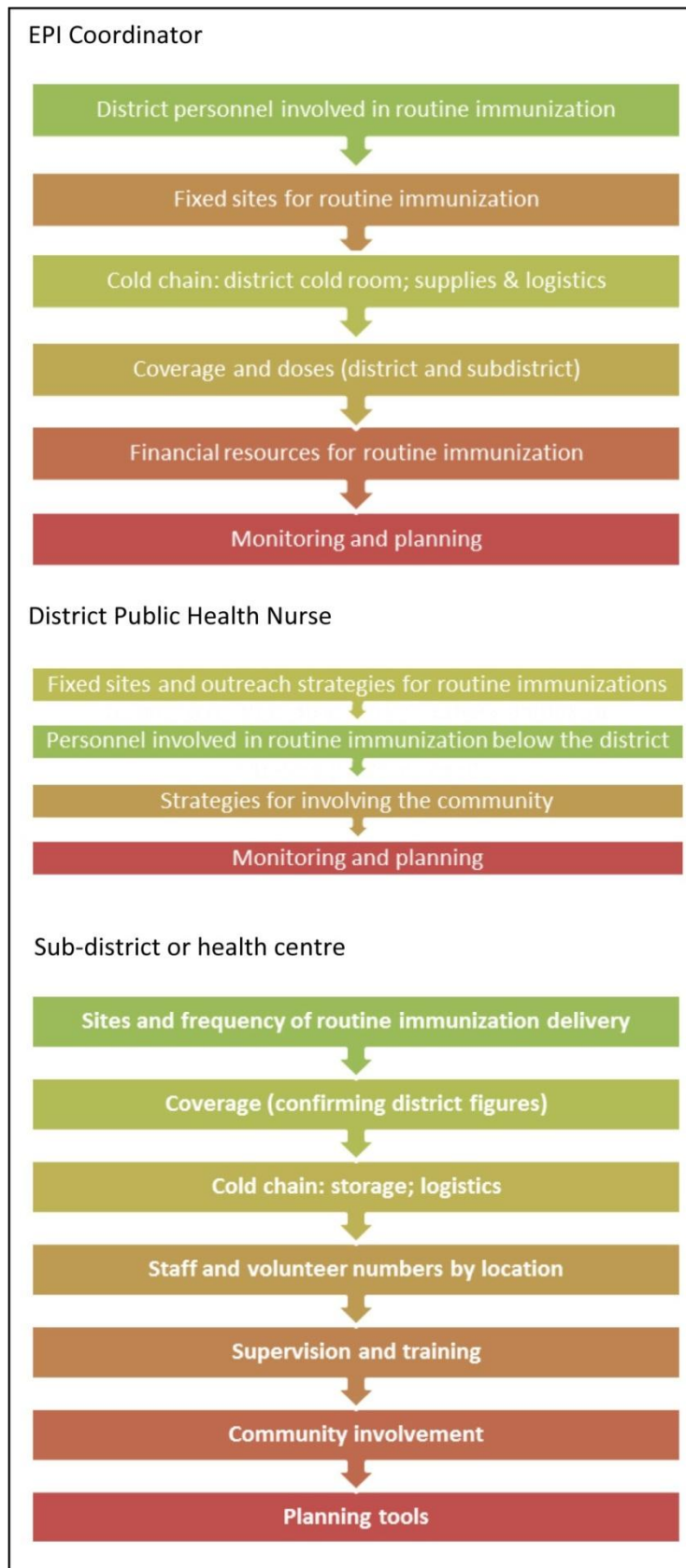
Ultimately, the team used four semistructured questionnaires to collect performance indicators and descriptions of routine service delivery. These were used to interview the district EPI coordinator or equivalent, the district public health nurse, staff at subdistricts or health centers, and staff at community-based health planning services (CHPS) or small reproductive health units. Figure 6 depicts flow charts describing the content of the questionnaires. One question guideline was used for interviews with health staff and community members regarding drivers of RI improvement. Suggested question lines were also created for community health volunteers and mothers.

Data collection

The research team took three to three-and-a-half days to collect data in each district, in addition to travel time, in June and July 2011. The team followed a field data collection process in each district, subject to availability of key informants.

Where possible, all team members paid a courtesy call to the regional director of health services before visiting the district in that region. The team explained the purpose of the research and sought advice on which staff members at the regional office would be able to provide information about district performance. Arrangements were made to interview those individuals at a later time. Once in the district, all team members met with the district director of health services (DDHS) and senior members of the management team to explain the purpose of the research and what was involved in data collection. The DDHS (or delegate, if the director was not available) briefed the team on the structure of the health service and on key issues related to RI, and a team member took notes of the briefing. At the end of the fieldwork, the team conducted a formal interview with the DDHS. This provided the team with an opportunity to explain its observations, ask for clarification about various issues, and thank the district health staff for their cooperation. All team members attended the final meeting with the director.

Figure 7: Number of settings where ARISE Ghana interviews took place



After the initial briefing, the study team divided into three teams: A, B, and C. In each district, Team A interviewed the EPI coordinator and other members of the disease control team and collected the indicators of RI performance. Team B interviewed the district public health nurse, collecting performance indicators about the community health nurse (CHN) workforce as well as their perspective about drivers. Team C paid a courtesy call to the District Assembly chief executive officer (when available) and interviewed the district coordinating director and other relevant staff regarding the District Assembly’s involvement in RI and other issues related to health in the district. Team C was also responsible for interviewing officers from the regional health service, representatives of the Traditional Council, representatives of nongovernment organizations (NGOs) based in the district and partnering in RI, private health service providers, and senior staff at local hospitals.

All teams were also assigned one subdistrict to visit. Subdistrict visits usually took two days and involved meetings with in-charge officers, CHNs, and field technicians at all or most of the health facilities, including health centers, reproductive health units, and CHPS. In most cases, team members observed at least one outreach clinic and spoke with mothers of infants, community health volunteers, and community opinion leaders, such as chiefs, elders, queen mothers, private health care providers, and District Assembly members.

Team A always included at least one Ghanaian EPI expert, and Team C was always led by Dr. Moses Adibo, because of his high profile and broad knowledge of health and other development sectors. Other research team members rotated through different teams for each district to ensure the capture of all possible perspectives.

Fieldwork was greatly assisted by access to a fleet of three four-wheeled drive vehicles that would not falter over the rough Ghanaian roads. This ensured that the teams could

reach all but the hardest to reach communities. In Krachi West, a team even used the district boat to visit one population that lived on an island in a lake.

The teams conducted virtually all of the interviews with health staff at every level in English. Interviews with community members were conducted in English or Twi, depending on the preferences of the respondents. Four of the five Ghanaian team members were fluent in Twi. In only a few cases in Ho municipality did the team have to rely on other community members or health staff to translate the local language to Twi or English. All interviews were conducted by two and sometimes three people. One researcher took the role of principal interviewer while another researcher served as principal note taker. The note taker entered the notes into a MS Word document that was reviewed and modified by the other team members before finalizing. When respondents gave permission, interviews were recorded as a memory aid. Consistent with the ARISE protocol, verbatim transcripts were not made. The team members completed their interview notes before or soon after the start of fieldwork at the next district.

The study team logged 99 sets of interview notes. As these included focus group discussions with mothers and group interviews with teams of community health nurses at facilities, the actual number of people interviewed was much greater. Respondents were drawn from many settings, including health facilities of every size, and from urban, rural, and remote communities. Figure 7 presents the number of settings where formal interviews took place.

Analysis



Research team constructing a conceptual map of drivers Photo by Ann Larson

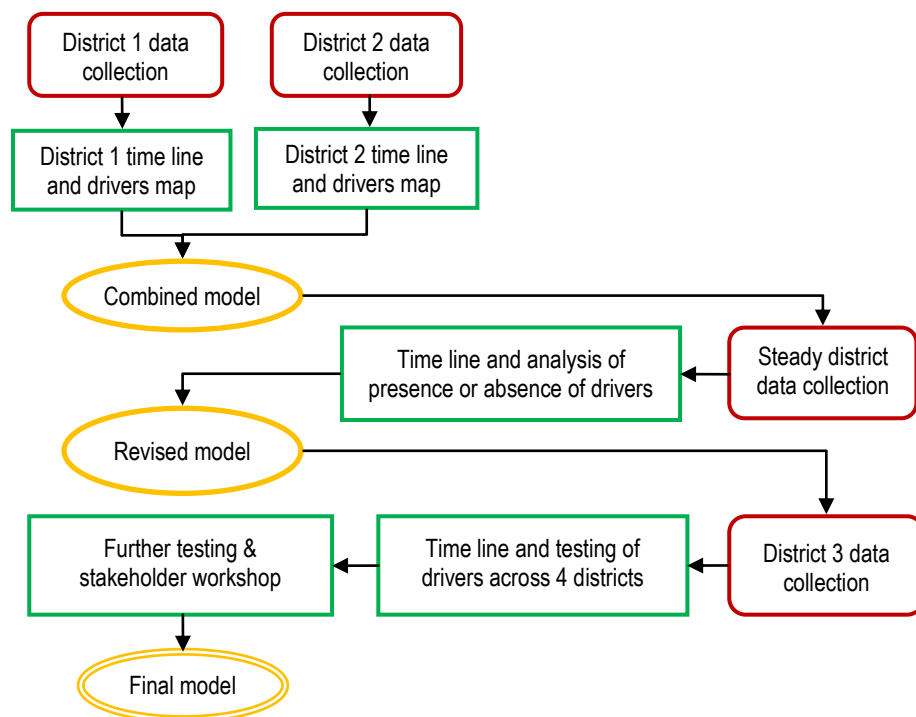
The study team made use of “grounded theory” development as its structural paradigm. Team members adopted this approach to make full use of the mixed data collection methods and to capitalize on the advantage of being able to compare and contrast the three recently improving districts with the fourth steady district. In brief, development of a grounded theory involves iterative theory construction, starting with a close analysis of all data to form the preliminary theoretical model (Bernard, 2000). The iterative process comes when additional data collection is used to systematically support, refute, or modify the initial model through comparisons and contrasts and analysis of outliers (unexpected or

unexplained findings). The final model is one that “explains” the principal research question. The ARISE Ghana analytical method differs from classic grounded theory development in that the principal research question was imposed on the data from the beginning of the study, rather than emerging from the data (Yin, 2009).

Theory development and testing of the drivers had six stages, as depicted in Figure 8. The first four stages took place in Ghana, with participation by the full research team. The team met for half-day analysis workshops following fieldwork in the first and second improving districts. At the meetings, the team scrutinized notes and constructed a time line of all events or actions that potentially influenced RI performance. These actions could have occurred at or impacted any level, including the national Ghana Health Service, the regional health service, the district health service, the health facilities, or the community. After constructing the time line, the team constructed a conceptual map of drivers showing the temporal and logical pathways that created the drivers and how the drivers acted to improve RI performance. At the end of the second analysis meeting, the team constructed a map of drivers that incorporated findings from both districts.

The team conducted the third week of fieldwork in the steady district. The team used the same data collection tools, with the addition of questions related to perceived and experienced barriers to improving RI performance. At an analysis workshop following the fieldwork, the team discussed the presence and absence in the steady district of drivers that had been identified as important in the first and second districts. The team also considered the barriers to improved performance in the steady district and explored the question of whether or not they had been present or overcome in the other districts. In this way, consideration of the steady district enriched and refined the model by confirming or denying the importance of drivers that had

Figure 8: ARISE Ghana grounded theory development process



been identified and suggesting other possible drivers. These new drivers, along with those that had been identified previously, were explored during fieldwork in the fourth district (the third with recent improvement in coverage).

During the final in-country analysis workshop, the team systematically compared and contrasted data to identify drivers that were present in the three districts with recent improvements but absent or weaker in the steady district. The team developed a draft of the full model, which showed the logical flow of key inputs, processes, and outcomes from the national level to the community that contributed to improved RI

performance. The team leader continued this analysis, with input from the full research team, after the final analysis meeting. This stage involved careful reading and rereading of interview notes in order to construct tables that recorded the presence or absence of drivers in each district, along with the characteristics of the drivers.

Additional validation of the final model of drivers and the pathways by which they improve RI performance came during a preliminary dissemination workshop held in Accra, Ghana, on August 4, 2011. Project members refined the findings after this meeting and after other discussions with key stakeholders from Ghana's health sector and civil society.

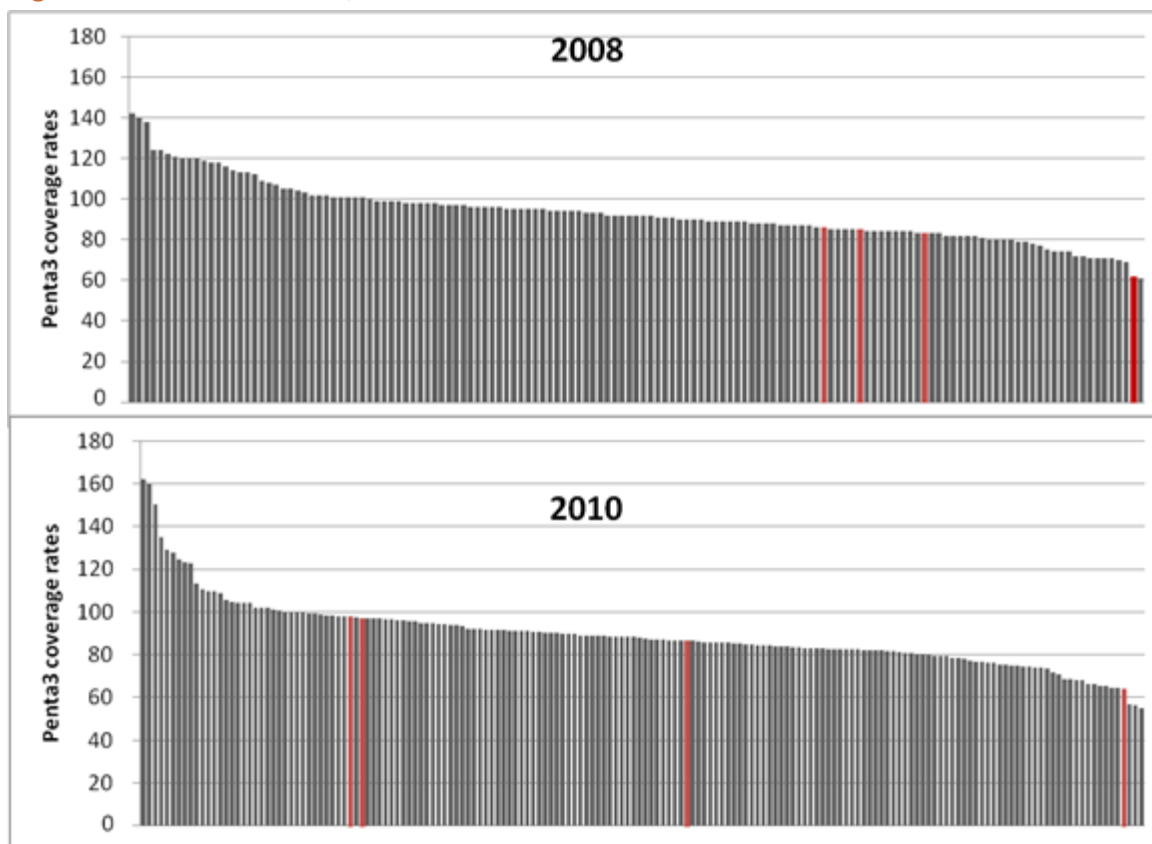
Chapter Three: District reports

Introduction to the districts

This section presents details about the districts studied, describing their environmental, economic, social, and demographic characteristics, outlining their health systems, and detailing their routine immunization (RI) programs. Using the full range of data collected, the predominant features that were instrumental in enabling or obstructing improvement are presented. The next section will pull these themes together for a comprehensive look at a model of district-level RI performance drivers.

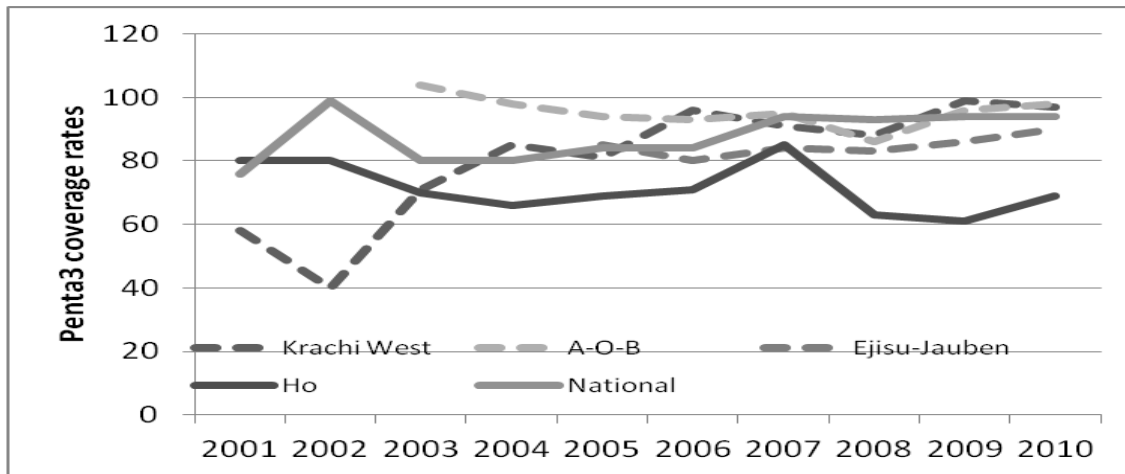
The case study districts were not among the highest performing districts in the country. Many other districts in Ghana had achieved and maintained penta3 coverage rates well above 95 percent prior to 2008. Figure 9 contrasts the relative ranking of the three improving districts and the steady district in 2008 and 2010. The three ARISE districts where coverage improved, increased their ranking among all of the districts in the country. The steady district was among the districts with the very lowest coverage in both years.

Figure 9: Penta3 coverage rates from administrative records for all districts in Ghana, showing rankings of the selected districts, 2008 and 2010



When the study team arrived in each district, the team members learned more about the trends in RI performance over a longer period. These trends are illustrated in Figure 10 using estimates collected in the districts. The national trend is included for information, but it is not directly comparable as it uses a denominator of surviving infants rather than the estimated midyear population of under-one year olds used by districts.

Figure 10: Penta3 coverage for case study districts, compared with national trend, 2001-10



Source: District administrative reports collected during fieldwork and national WHO/UNICEF estimates.

Krachi West is a hard-to-reach district. The study team took over 10 hours to reach this district from Accra, traveling over sections of rough road and making a ferry crossing. In addition, 15 percent of the district’s population lives in communities situated on islands in Lake Volta. The RI program improved significantly in the early 2000s and then had a gradual decline from 2006 to 2008. Recently, a committed management team has worked hard to motivate and empower staff and to engage the community, and these efforts have resulted in notable gains in RI coverage.

Asikuma-Odoben-Brakwa is a disadvantaged district that had enjoyed high immunization coverage when pooled funds were available from international donors. The district experienced a dip in coverage in 2008, and this served as a wake-up call to district management to undertake a radical and thorough reorganization of public health services, including to the level of the daily work of every community health nurse (CHN).

The **Municipality of Ejisu-Jauben** had enjoyed a couple of decades of innovative district management and close partnerships with university researchers and nongovernmental organizations (NGOs) that kept the penta3 coverage rates over 80 percent. With the changing economic climate, the municipal health management team now faces severe financial constraints. The current management has used their assets, including volunteers and the revenue produced by hospitals and large health centers, to steadily improve RI performance.

The **Municipality of Ho** has a larger population than the average district and serves a complex area of remote, rural, and urban settlements. A history of frequent changes in leadership has prevented a strong municipal and submunicipal management from being put into place. This has had clear implications for RI performance. Penta3 coverage rates have been below 70 percent for most of the past decade.

The districts’ population characteristics and RI performance indicators are summarized in Table 2.

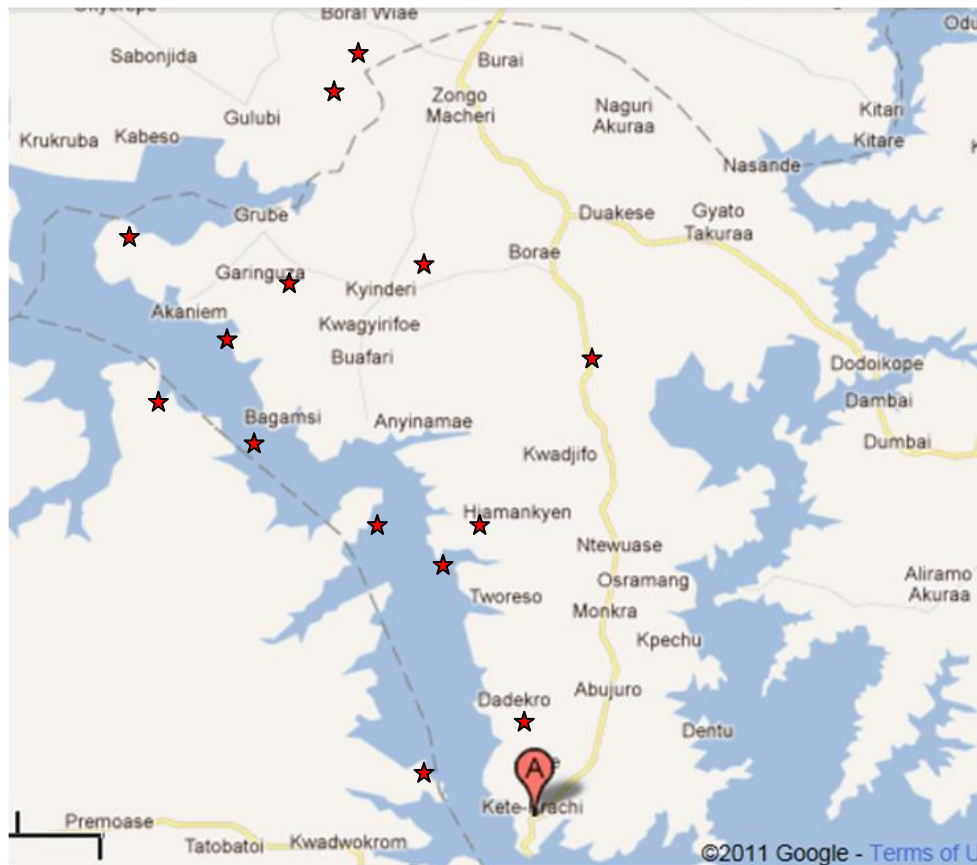
Krachi West

Krachi West was the first district with recent improvements in RI performance that the study team studied. The district is in the north of the Volta region. In the 1960s, Lake Volta, an artificial lake and the world’s largest reservoir, was created, cutting-off this picturesque region from existing transport routes. As Figure 11 illustrates, the district capital, Kete-Krachi, is surrounded by water and any approach from the south or west requires a ferry crossing. The flooding of the river also created numerous islands, many of which sustain large, but largely isolated, populations without permanent health or education services.

Table 2: Characteristics of the district health services in the ARISE case study

	Krachi West	Asikuma- Odoben- Brakwa	Ejisu- Jauben	Ho
Region	Volta	Central	Ashanti	Volta
Population (2010 estimate)	101,856	110,045	179,376	225,000
Characteristics of settlement	Rural and small urban	Rural and periurban	Periurban and urban	Rural and urban
Penta3 coverage, 2008 and 2010 (from national data)	85/97	86/98	83/87	62/64
Number of fixed sites providing vaccinations	14	11	9	39
Number of outreach sites for immunization clinics	9	94	91	142
Number of working vehicles (four-wheeled and two-wheeled)	>30	>20	>8	25
Number of community health nurses (CHNs)	40	39	43	89
Number of working refrigerators at health care facilities	26	23	6	30
Penta3 coverage ranking out of 141 districts in 2008	102	96	111	140
Penta3 coverage ranking out of 170 districts in 2010	38	36	93	166
Penta1 to penta3 dropout rate (2010)	0%	-0. 5%	1. 1%	-14%
Ratio of people to CHNs	2546:1	2822:1	4172:1	2528:1
Ratio of people to fixed vaccination sites	7275:1	10004:1	19931:1	5769:1
Ratio of people to outreach vaccination sites	11317:1	1171:1	1971:1	1585:1

Figure 11: Location of health facilities in Krachi West



In 2004, the district of Krachi was split and the land on the western shore of Lake Volta became Krachi West, retaining the original district capital. Over one-third of the area of this new district is water, and the estimated current population is 102,000, with 15,000 people living on the islands.

Agriculture is the main economic activity, with yams the major crop. Settlers from southern Ghana regularly fish in Lake Volta.

Improvements in the district's road network, including sealing the main road and repairing feeder roads, has occurred over the past five or six years. Most of the district began receiving electricity between 2000 and 2004, but power outages are frequent. The district is expected to grow economically. Already, the District Assembly has recorded an increase in small business activity, and daily bus service to Accra was started during the study team's fieldwork.

Nevertheless, this is a very poor district that faces considerable obstacles in delivering basic services. Difficulties in staff recruitment are one of those challenges, with the district's isolation and lack of accommodations acting as barriers to attracting government employees (Agbewode, 2011b).

Health service

The District Health Service is organized into six subdistricts with 12 health centers and two community-based health planning services (CHPS) compounds. One of the four



Yams for sale at the Borae market, Photo by Ann Larson

subdistricts is Dente, which incorporates the town of Kete-Krachi. Dente lacks a separate health facility but offers child welfare clinics (CWCs) and family planning from the district offices and a number of outreach points. Other subdistricts are Osramanae, Borae, Banda, and Chinderi. Most of the island communities are served by a separate subdistrict managed by the district health management team (DHMT). Subdistrict management provides regular support to all facilities. However, since there is no clear alignment between health centers, CHPS zones, and subdistrict boundaries, each health center and CHPS zone submits monthly activity reports directly to the DHMT.

A district hospital delivers approximately 800 babies a year and is a referral hospital for people living in the eastern side of the neighboring district to the west.

World Vision has an office in the district. Its health program is new and focused primarily on health education. A small NGO run by a local man gives practical support to the health service through the provision of an outboard boat motor.

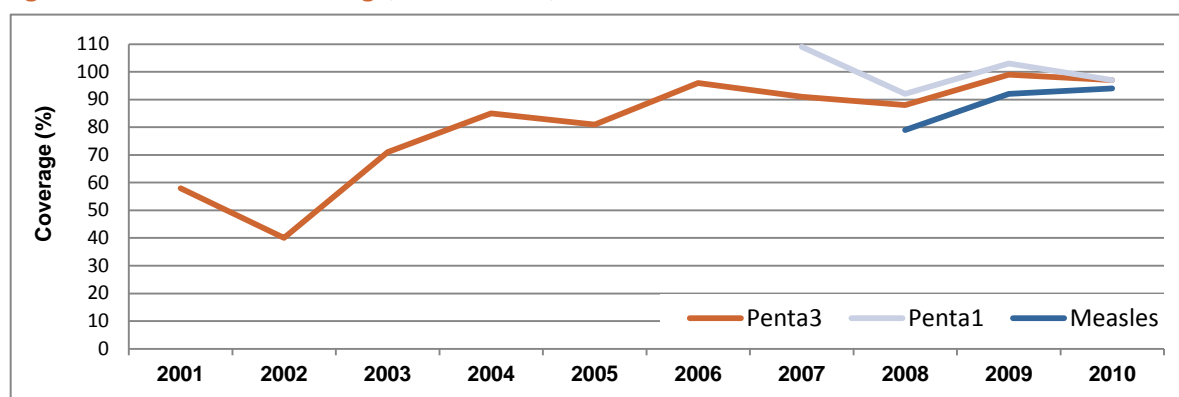
The district director of health services (DDHS) is a medical doctor who has recently completed his MPH. He took up his appointment in October 2009, 18 months before the study team’s visit.

District methodology

The team took the nine-hour journey from Accra to Kete-Krachi on June 13, 2011, and stayed to June 17. Team members visited four health centers, one reproductive health clinic, and three CHPS compounds; observed one child welfare clinic session; and visited two outreach points. They held interviews with health workers at those facilities and at the DHMT. They also interviewed representatives of the district Traditional Council, staff at World Vision, an officer of the Ghana Statistical Service based at the district assembly, the district hospital’s maternity unit, two community volunteers, several traditional chiefs, a member of the District Assembly, and a number of mothers attending a child welfare clinic.

The team met three times to debrief during the fieldwork and held a half-day analysis workshop in Accra immediately following the visit. At the workshop, team members constructed a time line of significant events relevant to RI performance and a conceptual map of the drivers of the district’s improved performance, showing their proximal origins and consequences.

Figure 12: Vaccination coverage, Krachi West, 2001-10



Routine immunization performance

RI COVERAGE

Coverage at the district level among infants under one year old with penta3 (DTP3 prior to 2002) climbed from an average of roughly 50 percent in 2001 to plateau at an average of 95 percent during the second half of the decade (Figure 12). The district could not provide the study team with historical data for the other two antigens.

A review of the number of first and third doses of pentavalent vaccine and all doses of measles vaccine administered between 2008 and the first half of 2011 shows that the number of vaccines doses increased between 2008 and 2009. Between 2009 and 2010, there was a small increase in the number of measles doses and a decline in the number of penta1 doses, making it almost equal to the number of penta3 doses (Figure 13). During the first five months of 2011, slightly more penta3 doses and many more measles doses were administered, compared with penta1 doses. When asked, members of the DHMT could not explain these patterns.

Figure 13: Number of doses of penta1, penta3, and measles vaccines, Krachi West, 2008-May 2011

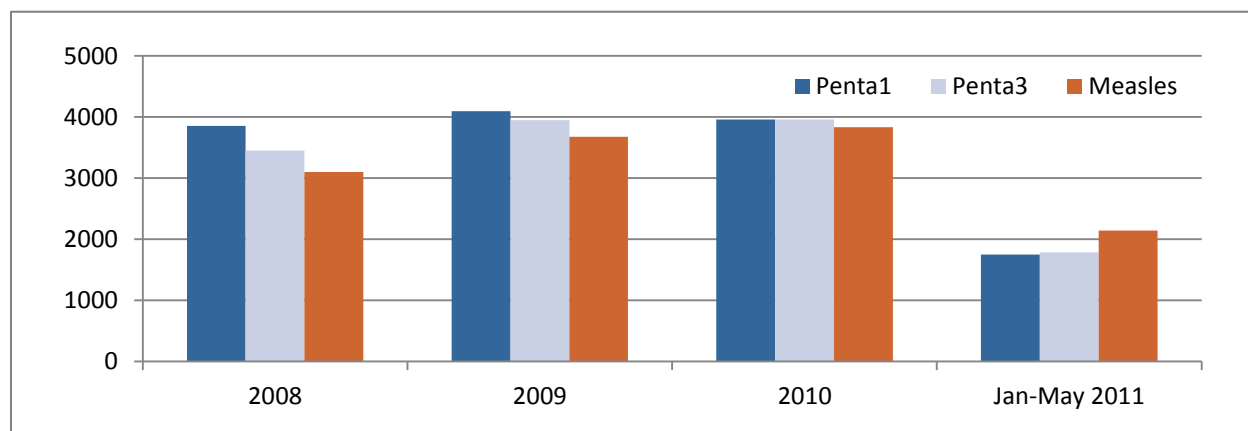
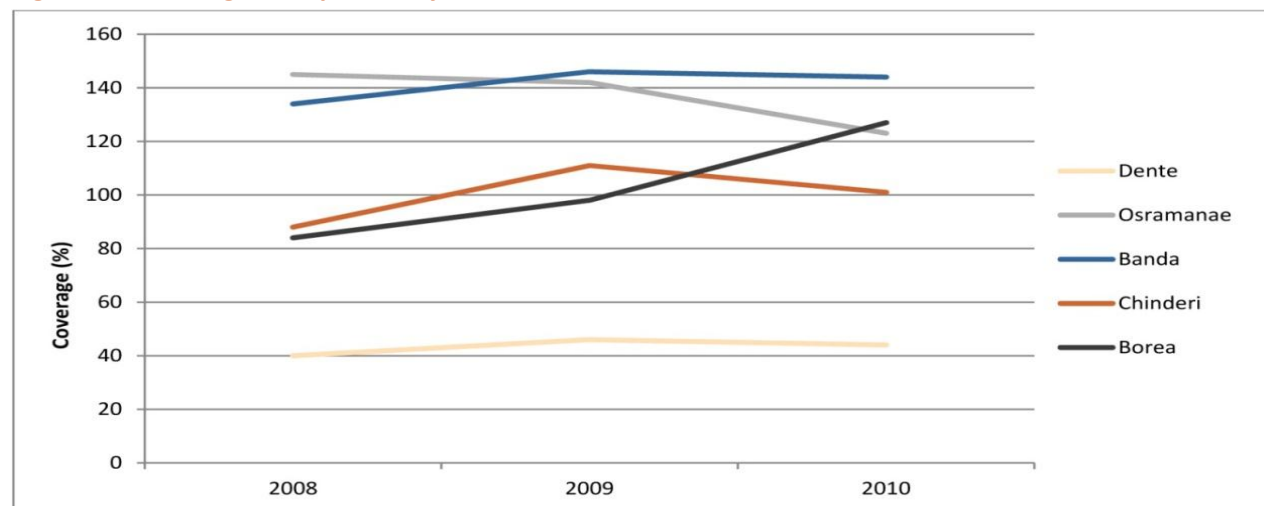


Figure 14 shows the recent trends in penta3 coverage by subdistrict. Only the Borea subdistrict exhibited consistent improvement in coverage during the period. The fact that three out of five subdistricts had coverage significantly in excess of 100 percent in 2010, and that Dente, which incorporates the district capital, consistently had less than 50 percent, suggests that estimated target population denominators by subdistrict were inaccurate, possibly as a result of in-migration to Kete-Krachi.

Figure 14: Coverage with penta3 by subdistrict, Krachi West, 2008-10



ROUTINE IMMUNIZATION SERVICE SITES

At the time of the study, vaccination services were offered at 16 fixed sites, including the district hospital, 12 health centers, three CHPS zones, and at nine outreach sites. A weekly fixed site operated at the district health administration office in Kete-Krachi on market-days. The district hospital had CHNs attached to the maternity

unit, who gave TT vaccinations as part of antenatal care, and BCG and OPV vaccinations to newborns. In 2010, a CHN from the Dente subdistrict conducted outreach sessions at the out-patient department for children who were due vaccines.

One CHPS zone had been operating in the district for about four years, and two more CHPS zones opened in 2010. Four more CHPS zones, including one in the lake islands, were to be inaugurated before the end of 2011. At the time of the study team visit, children living on the lake islands were vaccinated during quarterly visits by vaccination teams. Mothers also took children to CWCs held on market days on the mainland. There are now a total of nine outreach sites, up from six in 2006.

HUMAN RESOURCES FOR VACCINATIONS

The district health organogram consists of the DDHS who coordinates and directs the DHMT, which includes a medical officer, a public health nurse, and a disease control officer, plus an accountant and a senior administrative officer. The officer responsible for the Expanded Programme on Immunization (EPI) was new to his post, but had occupied another position in the district prior to taking up this role. Vaccines are administered by CHNs at vaccination sites. Between 2004 and 2010, the number of CHNs in the district increased from 20 to 40. No field technicians or disease control officers were based at subdistricts. Key informants advised that no EPI-related posts were vacant.

COLD CHAIN, VACCINES, AND ANCILLARY SUPPLIES

At the time of the study, the district vaccine store had four functioning electric 2-8°C refrigerators. A fifth refrigerator had been out of order for two months, but was repairable. The store also had two -20°C chest freezers, but both had been out of order for an extended period; one was repairable and one was not.

In general, the electricity supply was relatively reliable for the district cold room. Short interruptions of less than one hour were frequent, but posed no problem to the adequate storage of vaccine. Power outages of up to 12 hours were reported to occur five to six times per year, on average, and longer interruptions were reported to occur “a few times per year.” During power outages, the staff followed standard procedures, including transferring vaccines to cold boxes maintained with frozen ice-packs.

All fixed sites had functioning cold chain, mostly electric-powered, but a few fixed units used liquid propane gas (LPG). Villages outside Kete-Krachi were connected with electricity supply in 2003.

The study team observed good vaccine-handling practices at the district cold room and health centers. Each refrigerator was equipped with a temperature monitoring chart, which was kept up to date and showed twice-daily temperatures within normal range. The team observed no date-expired vaccine vials or vaccine vials whose vaccine vial monitors (VVMs) indicated that the vaccine should be discarded.

All three CHPS compounds visited had challenges maintaining a cold chain. One CHPS had a working refrigerator that could operate on electricity or LPG. The community did not have electricity; solar panels had been installed but had not been connected. The LPG cylinders would last only two weeks, and in most months the district had to make an urgent delivery of a new cannister. If the delivery was late, the CHN from the CHPS had to collect ice blocks from the nearest health center to use to ensure safe storage. Another CHPS compound depended on a solar-powered refrigerator, because its electric power outlet had malfunctioned at least a year before the visit. The refrigerator at the final CHPS compound was not working and the community health officer (CHO) stored vaccines at the nearest health center.

The team’s examination of the district stock control register showed that no vaccine stock-outs had occurred during the past 12 months, and this was reconfirmed by key informants. There had been a recent temporary shortage of BCG when stocks were not available from the regional coldroom, but the district delivered the vials to each facility when they became available within a couple of weeks. Only one health center reported that the amounts it requested were not always available, but this shortage did not affect the numbers of children immunized.

At the time of the study, a full stock of injection equipment, waste disposal boxes, child health cards, and vaccine tally sheets was present in the store. The only stock absent was the CWC registers used at health facilities and outreach sites for defaulter tracing. CHNs devised their own registers to record all children attending, their weight, and the vaccines they received. According to informants, the hand-drawn registers did not compromise defaulter tracing.

LOGISTICS

The team found that resources for transport in the district were very good. During 2009-10, two new pickup trucks were assigned to the district for use in distributing vaccine and other supplies to vaccination sites and to provide transport for outreach activities. One pickup was procured with funds provided through the GAVI health systems strengthening (HSS) the other was purchased with internally generated funds (IGF), which are user fees generated by health facilities from curative services.

Prior to 2000, the district had five motorbikes; now it has more than 30 motorbikes, of which 16 were new in 2010. There are sufficient motorbikes to make at least one available for each fixed vaccination site. From 2009, subdistricts were given imprest accounts to use to arrange for local maintenance and repair of motorbikes, reducing downtime and increasing efficiency.

To provide services to the lake island communities, the district must have water transport available. Originally, the United Nations Children's Fund (UNICEF) supported logistics in order to facilitate quarterly visits to the island communities. Two of the visits were combined with National Immunization Days (NIDs), and RI represented the main health service delivered during each trip. Trips customarily take two to five days. In 2003, the World Health Organization (WHO) provided the district with a boat and outboard motor, and provided fuel to run it until around 2008. Since then, the district has covered the costs of fuel, crew for the boat, and "T&T" (payments to cover travel and transport cost) to community health volunteers and CHNs.

Key informants from the district and health facilities reported that there were adequate funds available to purchase fuel and use public transport. There was no evidence to suggest that travel was limited or activities curtailed due to lack of funds.

EPI POLICIES, STRATEGIES, AND OPERATIONS

The team found that the district's annual plans for RI were not strategic plans in the usual sense. For the most part, they consisted of scheduling and activity planning.

The DHMT met on a quarterly basis with CHNs from all facilities to review performance, validate data, and review plans for upcoming RI activities. The DHMT also makes quarterly supervisory visits with all staff involved in EPI service delivery, including CHNs and midwives at the fixed vaccination sites. The visits are used to review performance, validate data, and identify challenges and potential solutions. At the subdistrict or facility level, monthly meetings are held among relevant staff to review performance and plans for upcoming RI activities and prepare for the quarterly meetings at the district. All the meetings and visits address issues related to community health programs, but RI receives the most attention.

FINANCE

Finance for RI is, for the most part, integrated into district general health budgets, rather than being a single line item. Annual operating expenditure for LPG for refrigerators and fuel, maintenance, and repair for motorbikes and the district boat was estimated to be around 7,500 cedis (about US\$4,425) at the time of the study. Most of the costs were met from the district budget or IGF; the DHMT managed the IGF for all of the facilities in the district. Salaries and the costs for vaccines, injecting supplies, and other equipment are paid at the national or regional level. Obtaining further details on the real cost of RI service delivery would require piecing together data from national and regional budget allocations.

In the past, the District Assembly provided fuel to support NIDs. Since the arrival of the DDHS in late 2009, the Assembly has given a minimum of 2,000 cedis (about US\$1,200) in cash to support each immunization day. The district leverages this money to ensure that it delivers the quarterly RI activities on the islands.

Driver pathways to high routine immunization coverage

At every interview, the study team asked the informants what they thought were the most important factors responsible for the recent improvements in RI performance in Krachi West or the communities in which they worked. Interviewers probed to learn about the timing, causes, and impact of each driver that was mentioned. When the informants could not think of any more factors, interviewers asked about the role of other possible drivers, especially those related to recent changes or those that had been mentioned by others in the district.

The team members analyzed the qualitative data and held it up against the performance indicators that had been identified to see if the purported changes could be validated. The researchers also used their own considerable expertise in EPI and health system performance to decide which drivers were plausible and significant.

Taking all of the evidence together, the team reached a consensus that Krachi West had achieved and maintained its high RI performance through provision of key infrastructure and staff, implementation of new management practices, and the adoption of a welcoming and transparent approach to engaging with community leaders and other partners. These drivers are described in detail below.

RESOURCE INPUTS: FUNDING, TRANSPORT, WORKFORCE/PERSONNEL, SUPPLY CHAIN

As mentioned, Krachi West had benefited from the purchase of boats and, more recently, vehicles to be used for outreach. Due to the district's challenges in reaching the island communities, the district has received priority over the past decade for additional funding (Diamenu & Eshetu, 2005). The strategic provision of external funding between 2000 and 2002 enabled the regular provision of service to the islands, with the district being able to absorb the additional recurrent cost when the funding ceased.

Land transport was improved through the acquisition of appropriate vehicles. First, the district acquired a vehicle that could reliably make the trip to the regional capital each month to collect vaccines. The previously available transport was unreliable, and its failure frequently resulted in occasional stock-outs at the district. Second, in 2009, two four-wheeled vehicles were allocated to the larger health facilities, making outreach visits more feasible. Finally, motorbikes are now available at every health facility that does immunizations.

Members of the DHMT and health facility teams also stressed that increases in the workforce were very important to improved RI performance. The doubling of the total number of CHNs has meant that there currently are two or three CHNs at every facility, so there is always someone available to keep it functioning.

Solving transport and workforce constraints, combined with the district's reliable supply chain, has enabled Krachi West to achieve near-universal RI coverage.

INNOVATION IN MANAGEMENT

The study team was impressed with the depth of skill in the DHMT. A senior administrative officer had been with the service for ten years and had an excellent understanding of public health programs, including RI. The current disease control officer and public health nurse had been in their roles since 2004. Although the EPI coordinator was new to the position, he had worked in the district in the malaria program prior to taking up this role and had the benefit of frequent assistance from the former EPI coordinator, who had left for further study but returned to the district during breaks.

In fact, the district has benefited from 20 years of continuity in leadership. A former medical superintendent who used to be acting district director worked in various capacities in the district health services from 1991 to 2002 and still maintains a



CHPS compound, a fixed vaccination site in Krachi West. Photo by Ann Larson

private medical clinic in town. In the 1980s, childhood immunizations were principally administered through mass campaigns. The RI program was established between 1992 and 1997 through the drive of a talented district public health nurse, and the program expanded under the leadership of an effective DDHS from 1997 to 2004.

This history suggests a pattern of multiple levels of leadership that were able to introduce and sustain good practices. This continuity assisted the rapid improvements in vaccine coverage that the district experienced between 2000 and 2006 and the sustained penta3 coverage rate at about 95 percent since then, with a temporary faltering in 2008.

The study team focused on the management innovations put in place by the current DDHS. These have been in operation only since 2010, after the rebounding of the coverage rates in 2009. Nonetheless, people interviewed from the DHMT and health facilities named the new practices as one of the drivers to sustaining performance. Five innovations are worthy of note.

The first innovation was strengthening the earlier practice of holding annual and midyear review meetings with staff from all of the health facilities prior to the semiannual review meetings, which preceded the semiannual regional meetings. The DDHS introduced two additional meetings in 2011. At these meetings, all facilities reported on their activities, including their RI coverage. Staff who could not make the trip to Kete-Krachi and back in one day were accommodated at a local hotel. Staff at facilities whose performance did not meet targets were asked to explain the reasons, and staff at facilities whose performance achieved or exceeded targets were praised. The participants took the comments back to colleagues at their facilities for discussion about what they would do to make improvements. As a result of such efforts, one subdistrict instituted a static clinic on a market day, several facilities talked with communities to identify more convenient days for outreach clinics, and others made intensive home visits to identify children who had not been immunized or whose immunizations were not up to date. The district has also instituted annual cash prizes for outstanding individual achievement; health facilities have felt this competition keenly and try to do their best to boost RI performance.

The second innovation was establishing an imprest account to be held at the facility to pay for fuel, public transport, minor motorcycle repairs, and other small, necessary costs. This account is replenished as needed, subject to full acquittal. The DDHS said that he hoped to allow facilities to give small amounts of money to the community volunteers from the account as well. This fund greatly increased facilities' flexibility in responding to minor difficulties. Although at least one health worker told the study team that there were delays in getting the funds, most of those interviewed were satisfied with the arrangement. One informant reported that the DHMT had recently increased the monthly fuel allowance from four to six gallons per month, illustrating that providing sufficient funds for outreach was a district priority.

Continuing the encouragement of accountability, the third innovation was that the DDHS used the quarterly meetings as forums for deciding on how to allocate Health Impact Rapid Delivery (HIRD) funds to increase RI coverage. These were largely directed to intensive activities in hard-to-reach areas.

The fourth innovation was reestablishing quarterly supervision meetings. This entailed all senior members of the DHMT, including the DDHS, visiting each facility to inspect equipment and record keeping, discussing new policies, and reviewing performance across all health activities. The people interviewed by the study team reported that they used checklists to assess performance and provided feedback during the meetings. The feedback was generally constructive and often involved praise.

The fifth innovation involved the provision of incentives. The research team heard some reports that staff in the district sometimes receive financial incentives, but often the reports were conflicting. Bonuses were not tied directly to performance, but were in recognition of performing extra duties, such as participating in NIDs and periodic intensified RI activities on the islands or taking part in other specifically funded programs. It was not possible to ascertain the effect of these payments on staff motivation and RI performance.

COMMUNITY ENGAGEMENT AND OTHER PARTNERSHIPS

The study team found that Krachi West district health services enjoyed close relations with other institutions, stakeholders, and community leaders. Starting at the district level, representatives in the District Assembly stressed to the research team their high level of support for health. Officers explained that health was essential for productivity. The Assembly gave financial support through money for NIDs, and the district directorate leveraged the funds to conduct quarterly missions to the island communities for routine as well as supplementary immunizations. The Assembly also gave high priority to using one-off infrastructure-development funding from the Government of Ghana to pay for necessary accommodations for health staff and provided support in non-quantifiable ways. For example, the chief executive officer gave up his official residence to a medical superintendent recruited by the current DDHS, and Assembly-supported houses allocated for teachers were temporarily assigned to new midwives. The DDHS and public health nurse regularly briefed the members of the Assembly about health issues, urging the Assembly and its members to spread information about the importance of RI to their people.

An interview with chiefs and elders from the Traditional Council echoed strong partnerships with health services. The men praised how the health service worked with them and with the community. They particularly commended how the nurses took the vaccine services to everyone and explained to them why it was important to be immunized. Similar comments about the DHMT's willingness to work together to reach every community were made by representatives of World Vision.

The model of working with political and traditional structures had clearly been a part of the culture of the district health service for some time and it was evident at the community level. Chiefs, Assembly members, and community volunteers all reported feeling as if they were essential components of immunization services. For example, one Assembly member told the study team:

As you can see I live very close to the health center and interact very much with the health staff and thus very much aware of the benefits of immunization. As the assembly man any time it is time for vaccination I am informed, I in turn inform the chief who gives his consent for a gong gong to be beaten to remind the women. This is normally done a day before the immunization. I use this opportunity to educate the community on the benefits of immunization; as a result mothers are very well informed when it comes to immunization. ... every year in August, there is a durbar during our festival; I ensure the community is given a health talk during this period and this includes topics about immunization.

— Interview notes, Krachi West

The officer in charge of a health center explained how he fostered community engagement. When he took up his post, he visited every chief in the communities in his catchment. He said it was important that they know the new boss. When he attended CWCs, he always asked to see the chief. This familiarity enabled him to go to the chief when problems arose and for the chiefs to let him know about community concerns.

The current DHMT has strengthened the community engagement in the past year through conducting workshops and training sessions for community health volunteers and community leaders. Staff from health centers reported that this initiative was appreciated by the community and, in particular, community members responded positively to the opportunity to have personal contact with the DDHS.

Health teams reported that having close relations with communities made it possible to find local solutions to deliver services. For example, in one community a dispute between rival chiefs meant that some community members did not want to use a health facility that the other faction had supported. The CHN solved this dilemma by offering one monthly CWC at the facility and another under a tree, away from the center.

DELIVERY CLOSER TO THE COMMUNITY

Krachi West district health service had a strong commitment to delivering services close to the community. Establishing CHPS compounds was one of their strategies. Three CHPs compounds were situated in areas that had formerly received only outreach visits from a more distant health service. Expanding the number of CHPs compounds was a priority for the DDHS.

At the facility level, community health nurses attributed maintaining high coverage to various strategies, employed as required. Many CHNs mentioned home visits as an important way to become aware of recent births, identify children due vaccinations, and educate mothers about the importance of vaccination. CHNs also reported that they considered community volunteers and/or chiefs to be important allies in educating mothers and identifying those whose children were due for vaccinations. Some volunteers and chiefs also took it upon themselves to convince women that vaccinations were essential for their children's well-being.

Summary

The drivers identified in Krachi West include availability of essential equipment; use of innovative management practices that create autonomous, accountable subdistrict and facility health teams; and positive engagement with communities and other partners. The study team noted that the district had a decade of solid improvements in RI performance. Many of the new transport assets and CHNs arrived prior to the new DDHS taking up his post. However, the team also saw evidence that performance in recent months has improved.

Figure 15 compares the cumulative monthly doses of penta1, penta3, and measles for the first five months of 2010 and 2011 to capture the impact of those recent management initiatives installed during the course of late 2010 and in 2011. For each antigen, the numbers of vaccines administered was greater in 2011 than in 2010.

Asikuma-Odoben-Brakwa

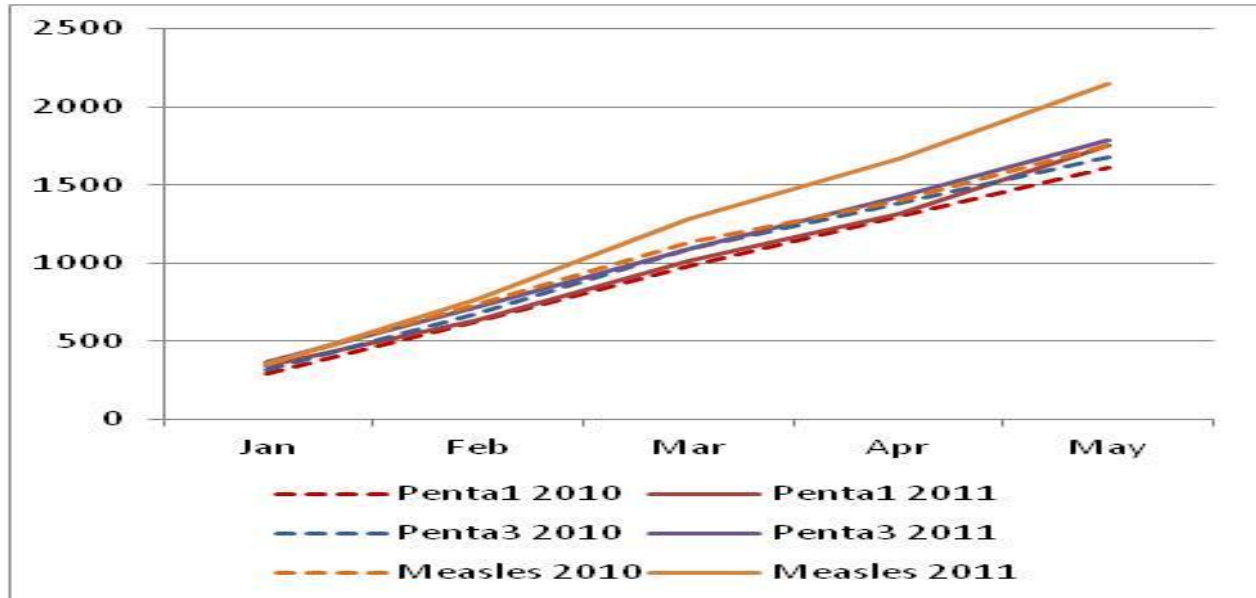
Asikuma-Odoben-Brakwa (A-O-B) was the second district with recent improvements in RI performance that the study team studied. A-O-B is in the Central region, which is the fourth most disadvantaged region in the country, following the very poor regions in the north. A-O-B is ranked lowest among districts in the region on a relative deprivation index (Ghana Health Service, 2007). The 2000 census counted 87,796 people in A-O-B, and the 2010 population estimate based on the Ghana Statistical Service projection is 110,045.

The disadvantage experienced by A-O-B — and, indeed, by the entire the Central region — is surprising. The region has the most extensive educational infrastructure in the country. The regional capital, Cape Coast, is the former colonial capital and enjoys excellent access to Accra and a beautiful ocean setting.

A-O-B's disadvantage stems, in part, from its location. Although it is surrounded by major market towns located in adjacent districts, there is a notable absence of major commercial activity, such as plantations or even traditional employment generation. Subsistence farming is pervasive, but very few agricultural goods are for sale.

The study team saw evidence of widespread poverty in the district, most notably in the condition of children's clothing, the number of children not attending school, and the lack of motorized transport in many communities.

Figure 15: Cumulative number of doses administered between January and May in 2010 and 2011, Krachi West



In 2011, the main trunk road through the district was in good repair and the major feeder roads were of acceptable quality. Smaller roads linking large communities to the main roads were in poor condition. The state of the road network is an improvement over the conditions found as recently as four years ago, when even the main feeder roads were of bad quality.

The Central region is a focus for several large NGOs, UNICEF, and other donors that funnel some health-related resources into the area. The study team saw cold chain equipment provided through the U.S. Agency for International Development (USAID), and other health projects benefiting the district may operate from the regional or national capital. According to the district health management team, no NGOs involved in health were based in the district.

The District Assembly supported the health service but generally lacked resources. The Assembly provided in-kind support through lending vehicles for mass campaigns such as National Immunization Days, and the district executive regularly met with and received reports from the district director of health services. The Assembly was also involved in acquiring funds for CHPS compounds.

The district has a Paramount Chief and a Traditional Council. Queen Mothers have a role in some communities.

Health service

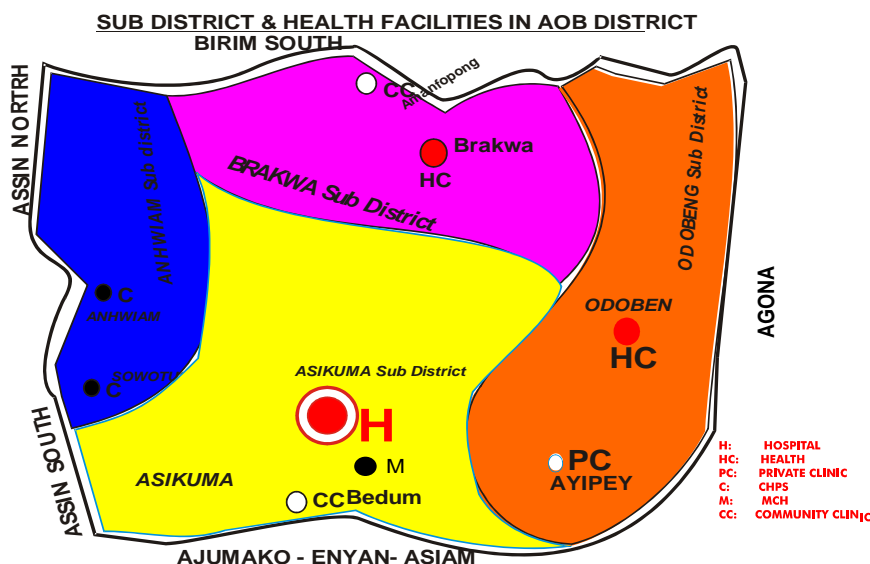
The district health service is divided into four subdistricts: Asikuma, Odoben, Brakwa, and Anhwiam (Figure 16). The Asikuma subdistrict incorporates the district capital and is managed by the DHMT. A Regional Health Committee (RHC) fertility-planning clinic and the Our Lady of Grace Hospital, a Catholic hospital that serves as the district hospital, are in Asikuma. The district also has two health centers, one RHC unit, seven CHPS zones, and 93 outreach points that serve 92 communities. The CHPS teams are supported by the subdistrict. Disease control officers from the subdistricts visit the compounds at least monthly to check on supply and cold chain equipment and discuss issues. Community health nurses at the CHPS are responsible for collecting their own vaccines from the district cold room.

The DDHS is a medical doctor with an MPH and a clinical interest in reproductive health. He has been in A-O-B since 2003. Starting in early 2009, the DDHS instituted organizational changes to improve the quality of

RI and other maternal and child health and public health programs in the district. The principal components of the new organizational strategy included:

- Teams led by a CHN were made responsible for all health activities in their assigned communities
- Self-assessment forms were provided to the community health teams to record their activities against monthly targets
- Monthly meetings were instituted for all CHNs with the DDHS at the district office to report on performance

Figure 16: Subdistricts and health facilities in Asikuma-Odoben-Brakwa



District methodology

The study team went to three of the four subdistricts; seven health facilities, including the mission hospital; two health centers; one reproductive health unit; and three CHPS compounds; and they observed two child welfare clinics and visited an outreach point. In addition to speaking with CHNs and disease control officers, team members interviewed four community volunteers, mothers, and opinion leaders, including over 20 members of a Catholic women’s group.

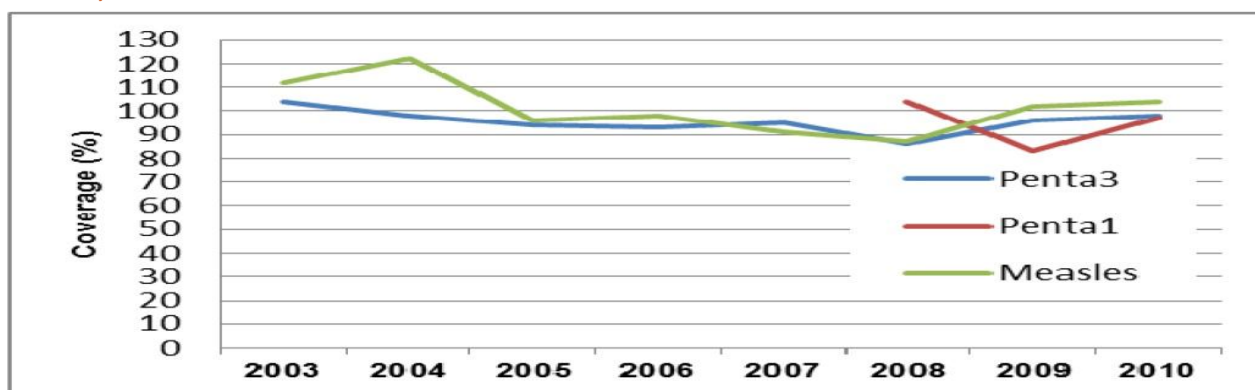
The team discussed findings at three debriefing meetings during fieldwork and during a half-day analysis workshop in Accra immediately after the fieldwork. At the workshop, the team constructed a time line of significant events that directly or indirectly had an impact on RI. The team also made a conceptual map of key inputs, processes, and other actions in order to identify the most important drivers of recent RI performance. They compared the map with the map made for Krachi West, and then made a combined map of drivers that incorporated the findings from both districts.

Routine immunization performance

ROUTINE IMMUNIZATION COVERAGE

Information provided by the DHMT showed that penta3 coverage among infants under one year old declined between 2003 and 2008 in the district, but then increased modestly in 2009 and 2010 (Figure 17). In 2008, penta3 coverage dipped below 90 percent, for the first time in the decade. It was this poor performance that lead the DDHS to restructure RI services in 2009. In 2010, the coverage rates, based on administrative records, were 98 percent for penta1, 97 percent for penta3, and 104 percent for measles.

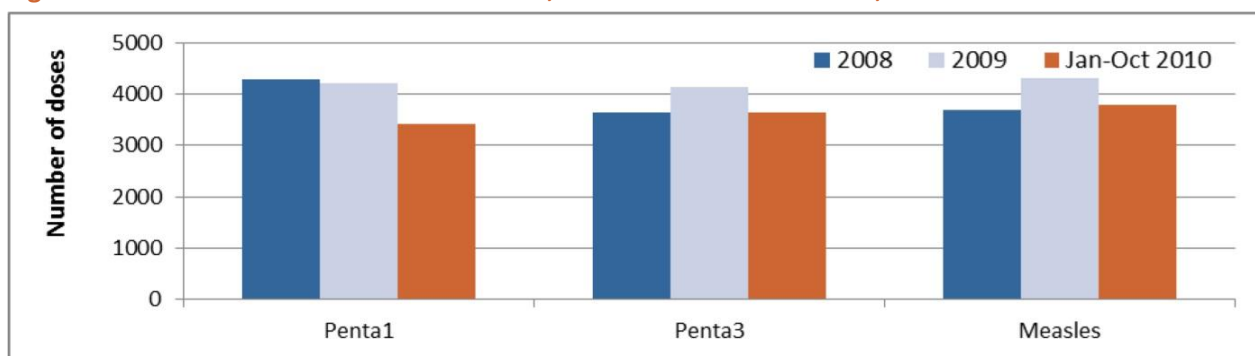
Figure 17: Vaccination coverage among infants less than one year old, Asikuma-Odoben-Brakwa, 2003-10



Vaccination coverage for the district was reported over 100 percent several times during the decade, suggesting that either the target population denominator was inaccurately estimated or the reported doses administered were inflated (through inclusion of children outside of the age range or use of supplementary doses).

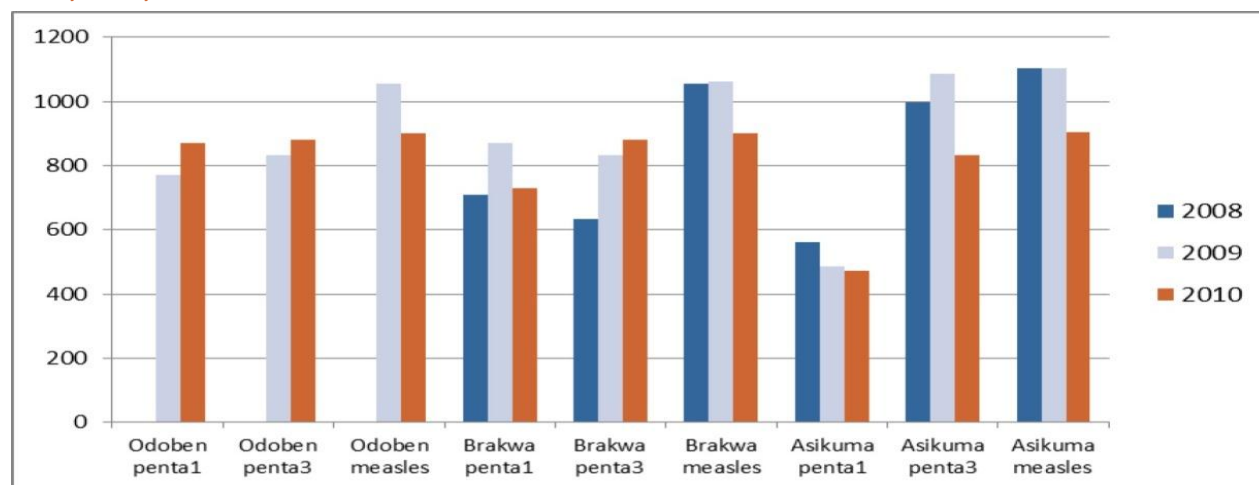
The study team also recorded the number of doses by month provided by the district. The information in Figure 18 is incomplete for 2010. Still, the graph shows increases in penta3 and measles in 2009 and the emergence of a small negative dropout rate between penta1 and penta3 in 2010. The number of measles doses has increased steadily since 2008. Data collected by the study team on the number of annual doses for two subdistricts and the Asikuma RHC/fertility-planning clinic show small changes in most antigens over time. For the subdistrict and health facility where information was available for 2008, the team found that there was an increase in 2009, reflecting a districtwide trend. In 2010, there was an adjustment with the number of some doses increasing and some decreasing (Figure 19). The RHC/fertility-planning clinic had administered a low number of penta1 doses because the district hospital gives penta1 at the sixth-week postnatal visit. The hospital in 2010 started a vaccination clinic that offered all routine childhood immunizations. Given the estimated coverage rates at approximately 100 percent, combined with the speed of Ghana’s recent fertility decline, sustained increases in the number of doses would be implausible.

Figure 18: Annual number of doses recorded, Asibuma-Odoben-Brakwa, 2008-10



The study team also recorded the monthly number of doses for two CHPS compounds. The general increases in numbers of doses of some antigens between 2008 and 2010 is not apparent at the CHPS, and numbers of doses actually declined or stayed relatively stable. In the case of Jamra CHPS in Asikuma subdistrict, the decline was most pronounced in penta1 doses; this may be due to a midwife leaving the facility and being replaced by a senior CHN who did fewer deliveries. Declines at the other CHPS may have resulted from the larger health facilities increasing their RI activities, such as by holding CWCs on market days, which would attract women from communities who would otherwise go to a CHPS child welfare clinic.

Figure 19: Annual number of vaccine doses for selected subdistricts, Asikuma-Odoben-Brakwa, 2008, 2009, and 2010



ROUTINE IMMUNIZATION SERVICE SITES

At the time of the study, vaccination services were offered at 11 fixed sites, including one mission hospital, two health centers, seven CHPS zones, and one additional location, as well as at 93 outreach points. The CHPS zone at Ankase currently lacks functioning cold chain equipment. The 10 fixed sites with cold chain equipment all had electric-powered refrigerators (some were combined electric/gas-powered).

There has been a recent expansion of services closer to the community. Three of the CHPS compounds opened in 2010. In 2011, two outreach sites were inaugurated. Key informants estimated that approximately 80 percent of vaccinations are given each month at outreach sessions.

HUMAN RESOURCES FOR VACCINATIONS

The district health organogram consists of a DDHS who coordinates and directs the DHMT, which includes a public health nurse, a disease control officer, an EPI officer (who also serves as cold chain manager), a nutrition officer, a data manager/secretary, a human resource officer, and a head of finance.

Vaccines are administered by CHNs at all vaccination sites. There were 39 CHNs in 2011. Another 13 CHNs arrived a week before the team visit and are not included in this total. Each of the four subdistricts had a disease control officer or field technician. Key informants advised that no EPI-related posts were vacant at the time of the study.

COLD CHAIN, VACCINES, AND ANCILLARY SUPPLIES

The study team found that the district vaccine store had one functioning electric 2-8°C refrigerator. A second refrigerator had been out of order for two months but was considered repairable. The store had two -20°C chest freezers in good working order.

In general, the electricity supply was relatively reliable. Short power outages of up to one hour were reported to occur occasionally. Longer interruptions were rare, and appropriate measures were in place to safeguard the vaccine should outages occur.

The team observed good vaccine-handling practices at the district cold room and at all of the facilities visited. Each refrigerator and freezer was equipped with a temperature monitoring chart, which was kept up to date and showed twice-daily temperatures within normal range. The team observed no date-expired vaccine vials or vaccine vials whose VVMs indicated that the vaccine should be discarded.

Key informants recalled that a nationwide stock-out of vaccines had occurred during the first quarter of 2009, and that brief stock-outs of OPV and TT had occurred around April-May 2011, again originating with a

nationwide stock-out. However, informants reported that the brief stock-outs had not caused any disruptions to vaccination service delivery at the fixed sites or cancelations of outreach clinics.

The team found a full stock of injection equipment, waste disposal boxes, patient registers, and vaccine tally sheets present in the store. Child health cards were stored with the public health nurse and regular shortages were reported.

LOGISTICS

The team found the transport fleet in the district to be adequate. The district had three 4-wheeled vehicles and 16 motorbikes in working order. The Ghana Health Service supplied two 4-wheeled vehicles in 2009 and 16 new motorbikes in 2010, and some of these vehicles were specifically assigned to health centers. Subdistricts send transport monthly to collect vaccines from the district vaccine store. There had been motorbikes in the district prior to the new stock, but the actual number was not recorded.

EPI POLICIES, STRATEGIES, AND OPERATIONS

The district had generated an Activity Action Plan in 2009 and an Annual Strategic Plan in 2010 covering RI services in the district within the context of overall health service delivery. The plans did not include specific vaccination targets, but focused on universal coverage. Vaccination monitoring charts displayed on the walls were current for all antigens.

As described above, the DDHS and his team meet on a monthly basis with CHNs and disease control officers from all health facilities to review performance, validate data, and review plans for upcoming RI activities.

The EPI officer made quarterly supervisory visits with all staff involved in RI service delivery to monitor performance, inspect the cold chain, and identify gaps. He frequently accompanied the DDHS and other DHMT members on these visits. Compliance has been good, with all scheduled supervisions being fully implemented since 2009.

FINANCE

Finance for RI is, for the most part, integrated into district health budgets. The annual operating expenditure for RI in A-O-B district could not be estimated. Approximately 8,440 cedis (about US\$5,600) of health impact rapid delivery (HIRD) funding was received in 2010 for maternal and child health (MCH) services, including RI. Obtaining complete costing of RI service delivery in the district would require piecing together data from national and regional budget allocations.

Driver pathways to high routine immunization coverage

By putting together information from administrative records, observations, group discussions, and interviews, the study team was able to identify the key resources, practices, and other factors that drove recent RI performance improvement and maintenance of high coverage rates.

ESSENTIAL EPI COMPONENTS

Supply chain

The team found that the RI program in A-O-B was functioning at a high level. The vaccine supply chain was well organized from the region, to the district, to the health centers and CHPS compounds, and eventually to the outreach communities. This organization ensured that there were no significant stock-outs or improperly stored vaccines. Some problems remained, however. Although inconsistencies in the data make it difficult to determine true stock levels and wastage, it appears that minimum stock levels were not maintained through the system and that the people responsible for stocking acted only when there were not enough vaccines to complete scheduled activities. Still, adequate access to transport, fuel, and staff means that stocks were replenished quickly and little or no interruption to services resulted. Since virtually all vaccines were given during scheduled fixed and outreach clinics, the temporary shortages were reported to not affect service delivery. In 2011, the DHMT instituted a system whereby the disease control officer from the district collected

vaccines from the region every two weeks to ensure an adequate supply in case a facility ran low on stock or had a stock-out.

Resourcing levels

The reorganization of community health service delivery was made easier by the increase in numbers of community health nurses. The DDHS stressed to the study team that the reorganization was cost-neutral and designed to improve RI performance without additional inputs of program funds. While it is true there were no additional funds available for RI, the program benefited from the increase in the staff quota allocated to the region. The DDHS took advantage of the nurses training program at the hospital to encourage students to request a post at A-O-B after qualifying. Although the district regularly experiences a “churn” of CHNs, efforts to promote A-O-B as a good place to work have enabled the district to attract new nurses to replace those who leave.

The program also benefited from a couple of new vehicles and many motorbikes for health centers and CHPS compounds. Interviews at the health facilities indicated that the additional motorbikes enabled staff to visit some of the outreach sites more regularly. Key informants advised that certain difficulties had arisen because some female CHNs were uncomfortable riding motorbikes alone. However, this situation had been largely solved by assigning male riders to take them to their destinations.

INNOVATION IN MANAGEMENT

The study team found that the DDHS has many qualities of leadership, including the ability to innovate and to unite his team around a common mission. He takes a hands-on approach to management, personally undertaking supervision visits to health centers and CHPS compounds and chairing the monthly meeting of CHNs. Combined with his good management practices, the DDHS has been able to institute and maintain significant organizational change.

In general, A-O-B lacks a second tier of strong management. Members of the DHMT had an operational focus and did not appear to contribute leadership or senior management expertise. Subdistrict management had been enhanced by the placement of disease control officers at each subdistrict to oversee the CWCs, including in the RI program. These individuals took their positions seriously and appeared to relish their roles. The existing positions were moved to the district in 2009 to complement the other organizational changes. In most facilities, the midwife was no longer responsible for supervising CHNs or RI activities.

Human resource management

The study team identified a number of human resource management innovations as key drivers to achieving and maintaining high RI performance. Collectively, these new practices gave considerable autonomy to the CHNs in the health facilities, though there remained many checks and balances in place to ensure accountability and transparency.

The DDHS reported that the idea for the reorganization came from a situational analysis that identified staff attitude, community mobilization and participation, and transport as areas for improvement. An analysis of the job description of CHNs followed, which highlighted their community-based, holistic primary health care role. Table 3 summarizes the human resource initiatives that motivated health teams to act autonomously, the accompanying strategies identified to ensure accountability, and the consequences of these changes on program performance.

As a word of note, the study team expressed doubt that replicating these human resource policies alone could drive RI performance in other districts. In A-O-B, leadership was vital in maintaining the pressure on health teams. Even though high RI performance was reinforced through self-assessed and team-assessed performance, without continuous input from the DDHS, it is improbable that this system can be replicated elsewhere with the same effect.

Service delivery to communities

While the district commonly administers vaccines at outreach clinics, the study team learned that there had been no increases in outreach sites in recent years. The current clinics had been established prior to 2008, and the extensive network may have been one of the reasons the district has had a long history of high vaccination coverage. However, prior to 2008, service delivery was supported from a pooled donor fund that financed outreach and various periodic activities, such as mop-ups — limited and targeted activities that involve visiting every home for unvaccinated and undervaccinated children. Since 2009, service delivery has been driven by the CHNs or "directors of community health services," as a direct result of their self-assessed performance. The result has been more services offered more frequently in the communities.

Table 3: Features and outcomes of the reorganized community health operating system, Asikuma-Odoben-Brakwa District, Central Region

Autonomy	Accountability	Outcomes
CHNs responsible for leading health teams for specific communities. Some facilities chose to reassign communities each year to share the burden of hard-to-reach areas, while in other facilities the CHNs kept the same communities.	Clear demarcation into teams with explicit areas of responsibility. Schedules of the daily activities of teams prepared monthly.	CHNs have a sense of ownership and responsibility for their communities. Furthermore, the community knows who is responsible.
CHNs know the monthly targets for each community and decide on their own strategies to meet them, such as reviewing the registration book to find children due for vaccinations.	Performance sheets are reviewed by members of the community team and the facility team, as well as at the district level meeting with all CHNs. Shortfalls are noted and discussed.	CHNs clearly understand what is expected of them and use their own initiative to ensure that they meet targets. This results in greater commitment to delivering good programs in communities, including early starts.
The facility has the resources to use a range of transport options, including vehicles in some subdistricts, public transport and taxis, and motorbikes. In some areas, riders are employed to take the CHNs on motorbikes.	District provides facilities with T&T funds quarterly. The amount is based on historical levels and justified or acquitted based on evidence of the outreach schedule.	No transport barriers prevent the operation of the RI outreach program.
Disease control officers based at the subdistrict are responsible for the child welfare clinics.	Local supervision with specific attention to the immunization program means that the program is carefully monitored and that there is someone responsible for the whole program at the subdistrict level, helping the various health teams to work together.	Strong local supervision and monitoring.

COMMUNITY ENGAGEMENT

The community volunteers in O-A-B are generally referred to as “community based agents,” reflecting their involvement in a UNICEF program that uses volunteers in its Community Integrated Management of Childhood Illnesses initiative. The agents are equipped with basic medicines and trained to treat or refer people with specific ailments. As volunteers, they receive support in the form of rain weather gear and bicycles. It was beyond the scope of this project to explore community based agents’ roles other than those directly related to RI.

Many volunteers were involved in home visits, locating defaulters, assisting in weighing babies, and in recording births. Volunteers were paid to help during NIDs, which proved to be an important incentive. While almost everyone interviewed said that community health volunteers were important to RI, informants less frequently mentioned volunteers as an important driver of recent success, compared with informants’ reports in other case study districts with recent improvements.

As part of the restructuring of service delivery in 2009, the DHMT began to hold regular meetings and workshops with community volunteers and local leaders. Several informants said these meetings improved relations between the district health service and community members and represented a driver of recent RI improvements.

The greater contact with the community that has resulted from the creation of community health teams has improved the quality of the relationships between nurses and community members. When the study team asked mothers and community health volunteers what, if anything, had changed in RI delivery in recent years, they reported that nurses were more “friendly” or “cordial.”

Over several months before the team’s visit, the district had been paying increased attention to the formation and regular functioning of community health committees. Informants reported various diverse views on the role of the communities, including supporting the welfare of health workers living in the community and advocating for various health issues with opinion leaders, such as the chief and District Assembly member. It is too early to say what the impact of these health committees will be on RI performance.

DEMAND CREATION

People in A-O-B have a good understanding of the importance of vaccination, and RI has been well accepted for a very long time. The importance of RI is reinforced through mass media (especially radio in local languages), at antenatal care sessions, and through interaction between CHNs and members of the public. The study team found that women were incredulous that any mother would not know that she should have her children vaccinated. The increase in hospital-based deliveries in this district is likely to reinforce this widespread understanding of the importance of vaccinations.

There is no organized resistance to vaccinations. Occasionally, individual women express concern about having their child vaccinated, especially if they have experienced or heard about fever or other side effects. However, community volunteers and CHNs report success in convincing even these women of the importance of protecting against “childhood killer diseases.” These conversations happen during home visits, defaulter tracing, and opportunistic meetings. Sometimes chiefs would intervene on behalf of the health service to speak to reluctant families about the importance of immunization.

Summary

The most obvious driver of improved RI performance in A-O-B was the significant restructuring of community health service delivery. The DDHS personally developed new processes that helped in promoting greater clarity and specificity around CHNs’ roles and responsibilities, and these concepts were reinforced during monthly meetings at the district and subdistrict or facility. The district had already achieved high immunization coverage prior to the restructuring, and the new efforts helped to reverse what had been a recent trend of declining coverage.

Other factors made the introduction of the restructuring a success. The district already had many outreach points and was increasing the number of CHPS compounds. It also had ample transport, which meant that CHN-led health teams could visit their communities regularly, and the district management had invested in reinvigorating community-health service relationships. The study team found that the health service district director's personal involvement in establishing and maintaining the health system reforms was another critical factor. If the district can continue all of these elements, it should be able to sustain very high RI performance.

Municipality of Ejisu-Juaben

The Municipality of Ejisu-Juaben was the third and final district with recent improvements in RI performance that the study team studied. It lies in the Ashanti region on the outskirts of Kumasi, Ghana's second-largest city. The region is the traditional heartland of the Akan tribe and it continues to be relatively culturally homogenous, with 86 percent of the municipality identifying as Akan in the 2000 census.

The region is one of the most populated and fastest growing in the country. However, its demography is changing. The 2008 Demographic and Health Survey estimated a lower total fertility rate of 3.6 in Ashanti: lower than the national estimate of 4.0 (Ghana Statistical Service, et al., 2009).

Even though 70 percent of the municipality was classified as rural in the 2000 census, its small area and large and growing population make for a very dense settlement. The Municipal Assembly uses an estimate of 167,277 for the municipality's 2011 population, while the regional health service uses a higher figure of 179,376. The discrepancy appears to be the result of different estimates of population growth, ranging from 2.5 percent to 3.4 percent. The higher figure gives a population density of 280 persons per square kilometer, compared with a national population density of 104 persons.

Ejisu is the municipal capital. The other major towns include Juaben, Kwamo, Bonwire, Besease, Kwaso, Tikrom, Achiase, and Bomfa. Good-quality roads connect towns in the municipality, and it takes less than 30 minutes to travel between them. Other communities are connected by dirt feeder roads and tracks that are impassable by vehicle during heavy or prolonged rains.

Health service

The Ejisu-Juaben Municipal Health Service has five submunicipalities, three hospitals supported by the Ghana Health Service, five government health centers, five mission health centers or maternity homes, one functioning CHPS compound, and 12 private facilities (hospitals, maternity homes, and clinics). The locations of the facilities are shown in Figure 20.

The study team found that a distinctive feature of the municipality was its strong commitment to providing services in the community. Ejisu-Juaben health service operated monthly child welfare clinics from nine static clinics and at 91 outreach points. The management team boasted that "every community is a clinic site." Informants reported that only a few new outreach sites had been established. Most CWCs had been held at the same sites for many, many years. The four submunicipalities visited by the team offered eight monthly static clinics and 80 monthly outreach clinics (Table 4).

Another distinctive feature is the collaboration between public and private curative health care services and the public health and maternal and child health services. Two of the five submunicipalities are led by hospitals that have Reproductive and Child Health (RCH) units answerable to the medical superintendents. A third hospital, which recently transitioned from a mission hospital to a GHS hospital, has established an RCH unit with three community health nurses.

Members of the Municipal Health Management Team (MHMT) stressed to the study team that the municipality's own funds were extremely limited. The funds provided by the national government frequently arrived late, and to illustrate the challenges, one person described how the municipal director of health services (MDHS) would personally cover operating costs until the money arrived. Internally generated funds were

retained by the facilities, which made money through fees and reimbursements from the National Health Insurance Scheme for acute care. The study team did not ascertain if Ejisu-Juaben actually had less money than the other case study districts or if the management team was just more concerned about the finances.

Figure 20: Location of subdistricts and health facilities in Ejisu-Juaben

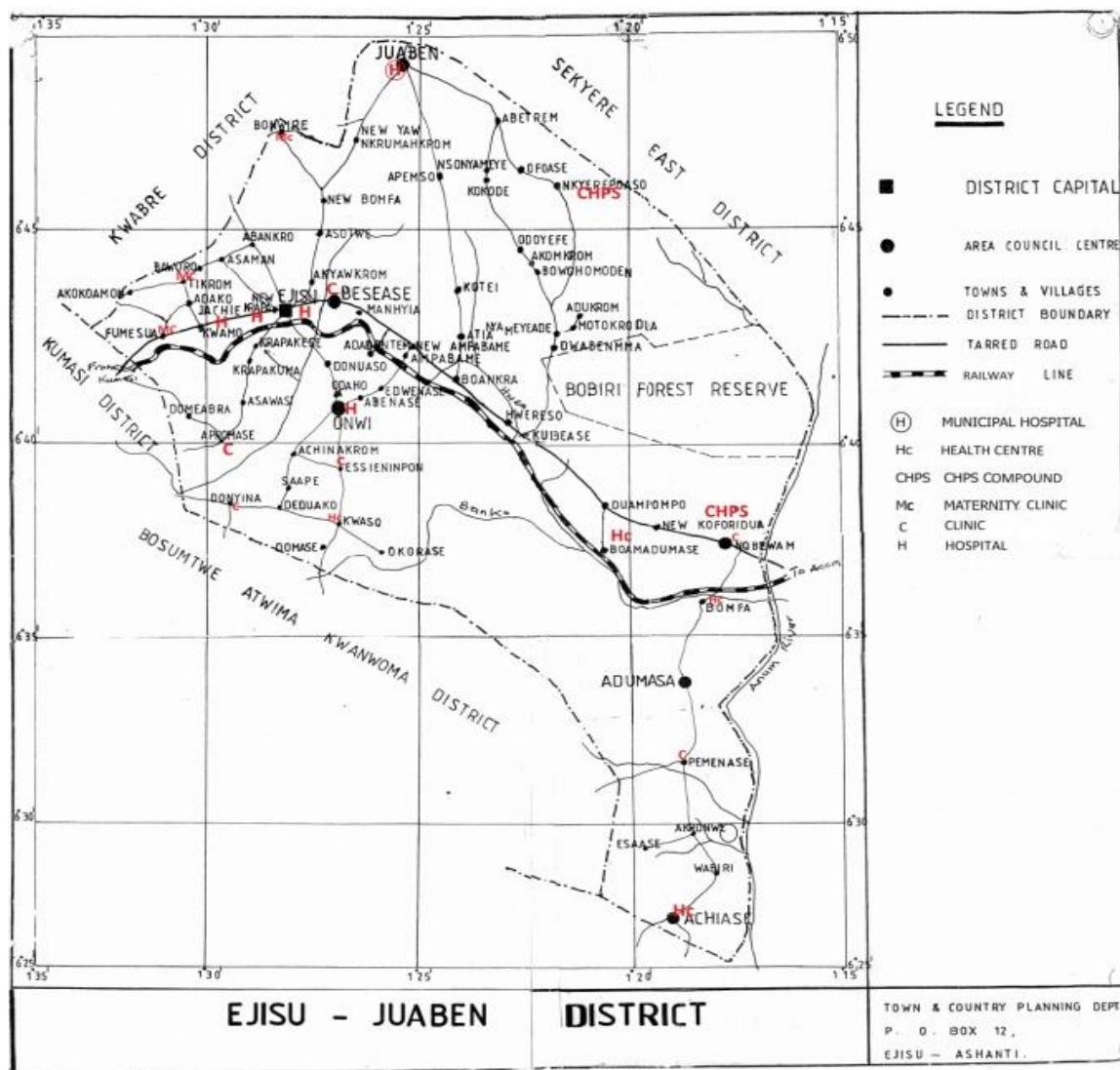


Table 4: Number of monthly child welfare clinics scheduled in four of the five submunicipalities of Ejisu-Juaben

	Static clinics	Outreach points
Ejisu	3	30
Juaben	1	26
Bomfrah	1	13
Kwaso	3 (one started two months earlier)	11

District methodology

In its fieldwork, the team visited four of the five submunicipalities, interviewing staff at government facilities. Team members also interviewed clinicians and administrators at two private facilities, mothers at four child welfare clinics, five community volunteers, and representatives from the regional health service who had responsibilities for RI. In addition, they interviewed the MDHS, the disease control officer, and the public health nurse. They also reviewed minutes from the MHMT monthly meetings from 2009 onward to learn about additional issues and actions related to RI.

The team used the various data collection instruments developed before and during the fieldwork, along with other means to learn details about CHNs' subjective experiences of their work and life in their communities and about the quality and details of community-health service engagement. These issues had been identified as important drivers that needed more investigation during the workshop analyzing the steady district.

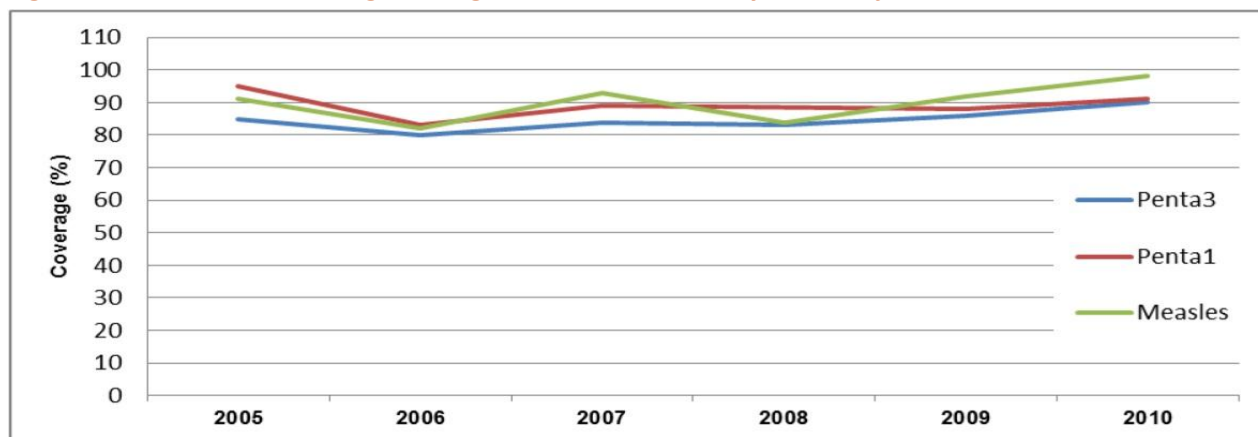
The team analyzed the drivers of RI performance both during and after the fieldwork. In a daylong analysis workshop following the fieldwork, the team produced a time line of key events related to RI in the municipality and compared the role of specific drivers in all four study districts.

Routine immunization performance

ROUTINE IMMUNIZATION COVERAGE

The data provided by the MHMT showed that municipal coverage rates for penta1, penta3, and measles ranged from 80 percent to 100 percent between 2005 and 2010 (Figure 21). Whereas penta1 coverage declined modestly from 95 percent to 91 percent during the period, coverage of penta3 rose modestly from 85 percent to 90 percent and the dropout rate between the first and third doses was virtually eliminated. Measles vaccine coverage rose from 91 percent to 98 percent.

Figure 21: Vaccination coverage among infants less than one year old, Ejisu-Juaben, 2005-10



An analysis of penta3 coverage at submunicipals among infants under one year of age during the same period showed an improvement in performance in Achiase, Bomfa, and Ejisu and a decline in Juaben and Kwaso (Figure 22). Coverage in all five submunicipalities varied from 60 percent to 100 percent.

A review of the monthly reported penta1 and penta3 doses and all doses of measles vaccine administered during the 2005-10 period (no data available for 2008) showed fairly wide variation in performance (Figure 23). There were peaks in measles vaccine doses administered in November 2005, November 2007, and November 2009, suggesting that periodic intensification of RI activities were carried out during those months to raise coverage. MHMT members confirmed that they conducted mop-ups in underperforming areas near the end of each calendar year in order to reach children who had not been vaccinated. One midwife in-charge of a subdistrict proudly told the study team that mop-ups were no longer needed in her communities.

Penta1 doses showed virtually no trend between 2005 and 2011 (blue linear trend line), whereas penta3 and measles doses both showed marked upward trends (red and green linear trend lines, respectively).

Figure 22: Penta3 coverage among infants less than one year old by sub-municipality, Ejisu-Juaben Municipality, Ashanti Region, January, 2005-May, 2010

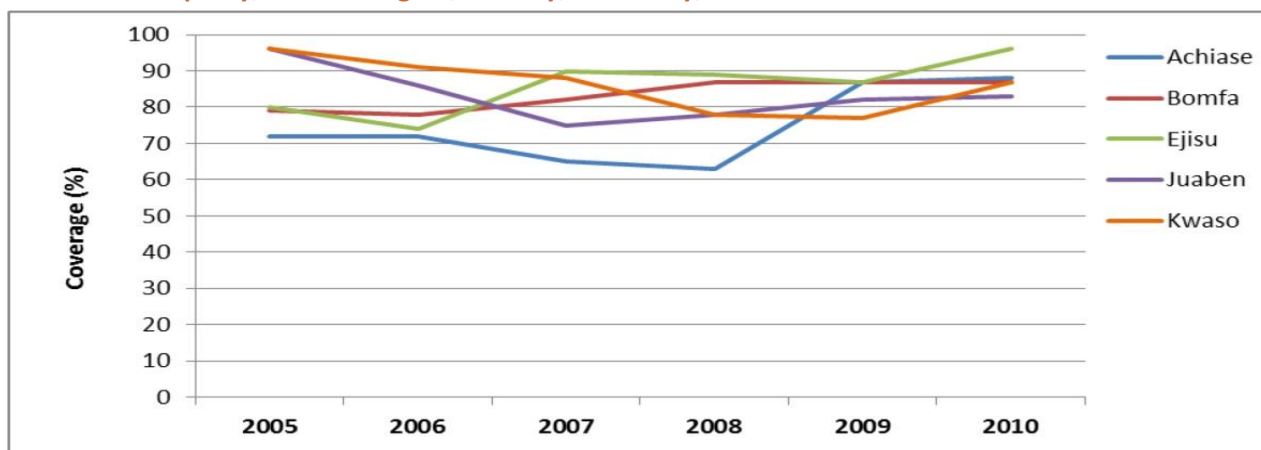
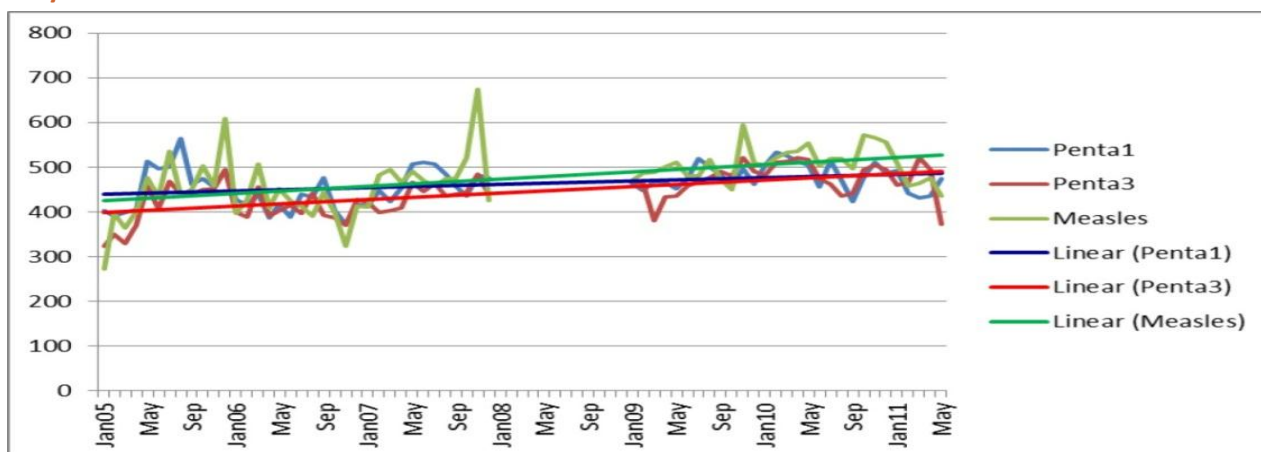


Figure 23: Monthly doses of penta1, penta3, and measles vaccine doses given to infants less than one year old, and linear trends, Ejisu-Juaben municipality, Ashanti Region, January 2005-May 2011



ROUTINE IMMUNIZATION SERVICE SITES

At the time of the study, vaccination services were offered at nine fixed sites (two hospitals, six health centers, and one CHPS zone) and 91 outreach sites. Vaccination services were inaugurated at Onwe Hospital in Kwaso in May 2011, following the installation of a refrigerator and the hiring of three CHNs. Previously, Onwe had been an outreach site. The team found that three of the nine fixed sites (two of the six health centers and the CHPS zones) lacked a functioning cold chain. In the six fixed sites with cold chain, all equipment was electric-powered.

The municipality held one outreach CWC monthly in each community, except for one community that was large enough to warrant two clinics. The static clinics held at the fixed sites were very large, with 100 to 200 mothers attending. A few outreach sites also had very large attendances. Outreach sessions usually occurred monthly, except during the rains when access to seven or eight of the communities becomes particularly difficult. CHNs interviewed explained that when a village could not be reached on a scheduled day, they would send a message to the community health volunteer and hold a clinic when the roads became passable. CHNs from other health facilities were occasionally mobilized to deliver services in hard-to-reach communities, especially in Bomfa submunicipality, or to assist in areas that required a mop-up effort.

Three CHPS zones were opened in 2006, but one was damaged in 2007; this and a second CHPS zone were out of service. The CHPS sites were used as outreach points for the monthly CWCs. At least one private facility maintained cold chain equipment and administered BCG and OPV to newborns. Private facilities were frequently used as outreach points, and community health nurses supported by the GHS were based in at least two private facilities.

HUMAN RESOURCES FOR VACCINATIONS

The municipal health organogram consisted of the MDHS who led the MHMT consisting of a medical superintendent, a public health nurse, a disease control officer (who also served as EPI officer), a pharmacist, a nutrition officer (who also served as assistant cold chain officer), a biostatistician, and a cold chain officer (also referred to as the storekeeper), plus an executive officer, a head of finance, and an estate officer.

Vaccines were administered by CHNs with the assistance of community health volunteers. Field technicians were based at Bomfa, Juaben, and Kwaso submunicipalities. The study team heard from key informants that no EPI-related posts were vacant. The disease control officer was on extended leave, but made herself available to meet with the team. The nutrition officer was performing her RI duties.

COLD CHAIN, VACCINES, AND ANCILLARY SUPPLIES

The team found that the municipal vaccine store had one functioning electric 2-8°C refrigerator. A second refrigerator had been out of order for three years, but was considered repairable. The store had one -20°C chest freezer working; another was out of order but considered repairable.

In general, the electricity supply was relatively reliable. Power outages of up to 12 hours were reported to occur on average once per month. Longer interruptions were not reported.

Good vaccine-handling practices were observed at the district cold room and facilities. Each refrigerator and freezer was equipped with a temperature monitoring chart, which had up-to-date twice-daily temperatures within normal range. The team observed no date-expired vaccine vials or vaccine vials whose VVMs indicated that the vaccine should be discarded.

An examination of the municipal stock control register showed there had been a stock-out of pentavalent vaccine for two months at the beginning of 2011. Key informants reported vaccine stock-outs as otherwise rare and of short duration, usually not causing any disruption to service delivery at the vaccination sites. A full stock of injection equipment, waste disposal boxes, child health cards, and vaccine tally sheets was present in the store. The only stock absent were the CWC registers used by CHNs for defaulter tracing. If a register needed to be replaced, CHNs drew columns by hand in notebooks or foliobooks.

LOGISTICS

Resources for transport in the municipality were basic. The municipality had two 4-wheeled vehicles and nine motorbikes in working order. In 2007, there had been three four-wheeled vehicles and only three working motorbikes. None of the four-wheeled vehicles were based at facilities, although Onwe Hospital in Kwaso (a former mission hospital) had acquired a vehicle the week of the team's visit. The facilities were responsible for providing T&T for outreach clinics. The district could make vehicles available for outreach, but the cost of fuel had to be met by the subdistrict.

EPI POLICIES, STRATEGIES, AND OPERATIONS

The disease control officer reported that she prepared annual plans for RI for her own use, but these were not available during the study team's visit.

The core MHMT staff met weekly to discuss operational issues. They also met monthly with the leader, the person in-charge of reproductive and child health and field technicians from each submunicipality, at which time participants presented and discussed child health performance indicators. In addition, the municipality held an annual review meeting to which members of the Municipal Assembly, heads of other decentralized

services, representatives of the Traditional Councils, and the press were invited. The regional office held meetings regarding immunization twice a year, attended by the disease control officer and the MDHS. The MDHS also attended annual national meetings at which immunization issues were discussed.

The MHMT conducted quarterly integrated supervision visits, and the disease control officer and others also made regular informal visits to facilities. A check list and structured feedback was used during the formal supervision visits. Staff in facilities reported that the public health nurse also made frequent informal visits to sites and that the “in-charge” staff and field technicians kept in regular contact with the CHNs in their submunicipality.

FINANCE

Finance for RI was, for the most part, integrated into the district health budget. Annual operating expenditure in the municipality in 2010 for RI (mainly transport costs) was estimated at 2,000-2,500 cedis (roughly US\$1,300-1,700). Obtaining a complete costing of RI service delivery in the municipality would require piecing together data from national and regional budget allocations.

The Municipal Assembly provided roughly 1,000-2,000 cedis (roughly US\$700-1,400) to support polio campaigns in 2010. The DHMT reserved HIRD funding for a range of public health activities, including training and mop-ups. It received no funding from nongovernmental agencies to support RI.

Driver pathways to high routine immunization coverage

From various data sources, the study team identified the key resources, practices, and other factors that drove recent RI performance improvement.

LEADERSHIP AND ORGANIZATIONAL STRUCTURE

Ejisu-Juaben health service has benefited from a history of strong leadership and a partnership with the Department of Community Health of the School of Medical Sciences, at Kwame Nkrumah University of Science and Technology in Kumasi. One innovative director led the district for almost 15 years and established a network of community health volunteers who fully participated in health service delivery, rather than being confined to social mobilization and disease surveillance. Projects conducted by the health service in collaboration with the university and NGOs brought resources and innovation to the municipality, and the GPS has adopted a number of health-related policies that are based on successful practices initiated in Ejisu-Juaben.

The study team observed a robust municipal health service structure in which the management team worked well together and supported submunicipal teams. The monthly MHMT meetings, which involved the submunicipal leaders (including a medical superintendent or medical assistant), the in-charges of the RCHs, and field technicians, were instrumental in developing the shared commitment to high vaccine coverage, joint problem solving, and transparent sharing of resources observed by the team. Presentations of monthly returns, as well as frank discussions of underlying reasons for performance and actions (documented with minutes), were features of these meetings, which became more formal and results-oriented with the arrival of the new MDHS. Among their topics of discussion, participants presented examples of peer learning, and CHNs reported adopting some of the practices after hearing about their successful implementation in other submunicipalities. The meetings were a particularly important means to ensure that submunicipalities kept RI performance as a priority, because the municipal directorate had almost no money of its own to initiate activities.

The monthly meetings explicitly encouraged competition among submunicipalities. At the submunicipal level, staff were encouraged to work hard and to improve coverage, but according to reports child health nurses in the same facility or submunicipality did not compete with one another. At the main facility in the submunicipality staff regularly worked together to compile returns. Those informal discussions rarely involved CHNs from other facilities, who usually deliver their returns only to the submunicipality.

COMMUNITY VOLUNTEERS

Community health volunteers in the municipality play a prominent role in RI delivery, largely because of the legacy of various NGO and research-funded programs. All health staff interviewed spontaneously mentioned the community volunteers as one of the main drivers of performance. The volunteers the team interviewed similarly stressed that they felt they were essential to the system. The roles most commonly brought up were compilation of the community health registration book in which births were recorded, weighing babies and keeping records during CWCs, mobilizing mothers and following up those who did not attend clinics, and serving as information conduits and gatekeepers between the health service and the community.

Community members acknowledged and respected the community volunteers. The study team spoke with one group of mothers who believed that the volunteers were part of the health service. The volunteers were the first people these mothers went to when they had problems with their national health insurance or when their children had a fever. At another site, however, the team members heard from community members who were less certain about the volunteers' role at the CWCs and who believed that the nurses should be the ones to weigh the babies.

As in the other districts, health workers in Ejisu-Juaben expressed concern about volunteers who were not active and said that there was less volunteerism than in the past. The difference was that in this municipality, "active" meant actually being present and working alongside the community health nurses at every CWC. Even "inactive" volunteers participated in monthly meetings and were involved in several nonimmunization-related health programs and NIDs.

The meetings of volunteers were chaired by their own officers and held at health facilities with health workers present. The meetings were reported to have a number of objectives, including looking out for the volunteers' welfare and sharing information and tasks related to specific external projects. The volunteers often received refreshments and gifts of small amounts of money during the meetings, especially when NGOs or research-funded projects were involved. The MHMT encouraged submunicipalities to have parties for the volunteers at the end of the year, or more frequently, to show their appreciation.

Volunteers told the study team that they were dissatisfied that they did not receive more substantial benefits in the form of payment or items to enhance their work, such as a bicycle. Volunteers and health workers justified the money (called "tokens") they collected from the mothers at CWCs as necessary to pay for benches, for announcements of clinic days by the gong gong beater or over a public address system, and for service-related travel. The volunteers were proud that they had been selected by their chiefs and the health service, and they were eager to maintain their positions. Two of the volunteers interviewed were bringing their adult children into volunteering roles.

Community health volunteers in this municipality have been a part of the system for over 20 years. Their significant roles may be under threat due to emerging concerns about their technical competence and to the larger numbers of CHNs on the ground, lack of resources to engage and motivate them, and limited encouragement to maintain the community registration books. However, the volunteers remain a critical resource for the frontline staff, and in that regard they can be considered a driver of recent improvements in RI performance. Any intensification of activities, such as opening a new outreach point or increasing the frequency of clinics, required volunteers to broker the conversations with the community. Health workers and community volunteers collaborated to inform mothers about clinic times, identify women who did not attend clinics, and conduct home visits. Volunteers were also a vital resource during NIDs and other mass campaigns.

COMMUNITY ENGAGEMENT BY THE HEALTH SERVICE

The study team found that the partnerships between health workers and community health volunteers were at the center of the relationship between the health service and the community. Various practical issues, such as the location and timing of CWCs and the operation of mass campaigns, largely follow well-established practices and do not require special consultations with chiefs, local elected officials, or other opinion leaders. The community health volunteer was usually the recognized spokesperson for the community in these matters.

Some of the people interviewed suggested that community leaders in the municipality were not supportive. When probed, they explained that the leaders were not hostile to RI, but that they were not involved on a regular basis. This was partly because in this centrally located municipality, some of the chiefs and Assembly members lived outside their communities.

The study team found that the MHMT and the workers in facilities were very aware of the importance of regular contact with the community and made an effort to build relations at a number of levels. To best reach individual women and families, the municipality employed health education techniques at the CWCs and during home visits. The team saw evidence that health talks given in churches, mosques, and other community settings, such as durbars, were a part of the annual schedule of activities. For newer initiatives, such as opening a new outreach point or establishing a CHPS compound, the municipality followed the accepted protocol of working with the community through chiefs and other opinion leaders.

STAFF LEVELS

MHMT members reported that they considered the staffing levels to be too low. In particular, the disease control officer had appealed to the region for two more field technicians to be placed in the two submunicipalities without an officer. “We were told we were lucky to have three,” she related.

Nevertheless, the municipality has benefited from the larger supply of CHNs. In 2004, it had 10 CHNs; in 2007, it had 18, and when the team visited in 2011, 30 CHNs were employed. As one woman in charge of an RCH said, “Our hands are many now so we can visit their homes more regularly.” Labor-intensive home visits were identified as another driver of increased vaccination coverage in the submunicipality.

TRANSPORT NEEDS

Transport for outreach was a challenge in Ejisu-Juaben. None of the submunicipalities visited by the study team had its own four-wheeled vehicle, and the municipal directorate had only two. The directorate offered use of its vehicles to submunicipalities that had specific requirements. This arrangement had worked well in Kwaso, which needed a vehicle to access a hard-to-reach community where taxis are not prepared to go. Under this agreement, the submunicipality paid for the fuel. On the other hand, representatives of Ejisu Hospital’s RCH unit, which offered immunization, infant feeding education, family planning, home visits, and school health in the 23 communities it served, told the team that they could do more services if they had a dedicated vehicle for the submunicipality. The hospital in Onwe acquired a vehicle the week before the team’s visit. The community health nurse told the team that she would request its use for some scheduled outreaches.

Most of the larger facilities had a motorbike, but the facilities rarely used them to support RI. Females CHNs were said to be unwilling to ride motorbikes. The main roads were very busy and the minor roads were too rough. A recent serious crash that had left a health service staff member disabled had made everyone cautious about riding a motorbike. Public transport was the usual mode of transport for collecting vaccines from the municipal store and for visiting communities for outreach, school health projects, and home visits.

The MHMT had historically paid the transport costs associated with outreach. With the removal of donor pooled funding, submunicipalities and facilities became responsible for providing T&T out of their internally generated funds. By 2011, the procedure for providing T&T was fairly well established. The in-charge staff member would prepare a memo to the medical superintendent or medical assistant detailing the outreach points and the cost of the journey by public transport. Once approved, the accountant would give the in-charge a quarterly advance to disburse as needed. Only one of the submunicipalities expected CHNs to pay out of their own pockets and be reimbursed.

Nevertheless, staff in the municipality complained about the T&T. The study team heard that the amount was not always enough to cover multiple trips to the community for home visits and school health, and that the funds provided did not keep up with rising fuel costs. In the minutes of the monthly meetings, some staff complained about slow payment or nonpayment of T&T. In those cases, the MDHS vowed to raise the issue with the appropriate authorities at the facilities. No one reported that transport or fuel problems prevented regularly scheduled child welfare clinics.

DATA QUALITY

In several interviews, informants suggested that the quality of data recorded by the CHNs was a factor constraining further increases in vaccination coverage. The minutes of the MHMT meetings and annual reviews documented that in the year preceding the team's visit, the MDHS had taken action to improve data quality. Her first initiative was to ensure that submunicipalities presented indicators that were internally consistent. More recently, visiting supervisors had scrutinized the tally books in which CHNs note the number of vaccine doses they administered (including whether it is the first, second, or third dose of oral polio or penta). The analysis revealed that inconsistencies between the number of tally marks and the summary totals were relatively common.

The MHMT was also concerned that the number of penta3 doses were persistently higher than the number of penta1 doses administered. The team was instructing CHNs to record in the registration book the reasons they administered a penta2 or penta3 to a child who had not received an earlier dose at the same facility.

Any exercise in improving data quality carries a risk of encouraging falsification. However, with appropriate checks and balances, frontline vaccinators can benefit from a greater appreciation of their roles in increasing coverage. The link between what they do and what they record becomes more explicit, and the task of record keeping becomes more meaningful and purposeful. A motivated CHN who was new in her post showed the study team errors in a tally book that had resulted in an undercount of doses administered. She said she was determined to improve record keeping so that she could know how well her community health program was performing.

Summary

Ejisu-Juaben is a large, densely settled municipal health service. It has relatively few fixed sites for performing RI activities, and the CHNs and field technicians conduct a large number of monthly outreach clinics to ensure that every mother can access vaccination services. Community health volunteers are generally considered to be a driver of recent improvements in RI performance. The volunteers assist in the delivery of services by weighing babies and recording information, as well as through mobilization, birth recording and defaulter tracing, and the performance of various duties that volunteers performed in other case study districts.

Other drivers were related to the strong submunicipal teams. The MHMT supported these teams in their efforts to foster RI improvements through the monthly meetings with team leaders, formal and informal supervision, increases in the CHN workforce, and placement of field technicians at some of the submunicipalities. The MHMT had been able to improve performance without additional external resources by relying on the internally generated funds from GHS hospitals and health centers.

Ho municipality

The Municipality of Ho was the “steady district” in the ARISE project and the third district visited during fieldwork. It contains Ho township, the capital of the Volta region. At an estimated 225,000 population in 2011, the municipality is larger than the other case study districts. Ho township has 84,000 people, or 37 percent of the population.

The municipality depends largely on subsistence agriculture and small animal production for livelihoods. Industry and other large commercial activities are limited, leading to high local unemployment, migration of young people to Accra, and a very low revenue base for the Municipal Assembly (Government of Ghana, 2006).

Most of the municipality is easily accessible by public transport; however, there are a number of forest reserves and other hard-to-reach locations, and providing services to these areas is a challenge.

Health service

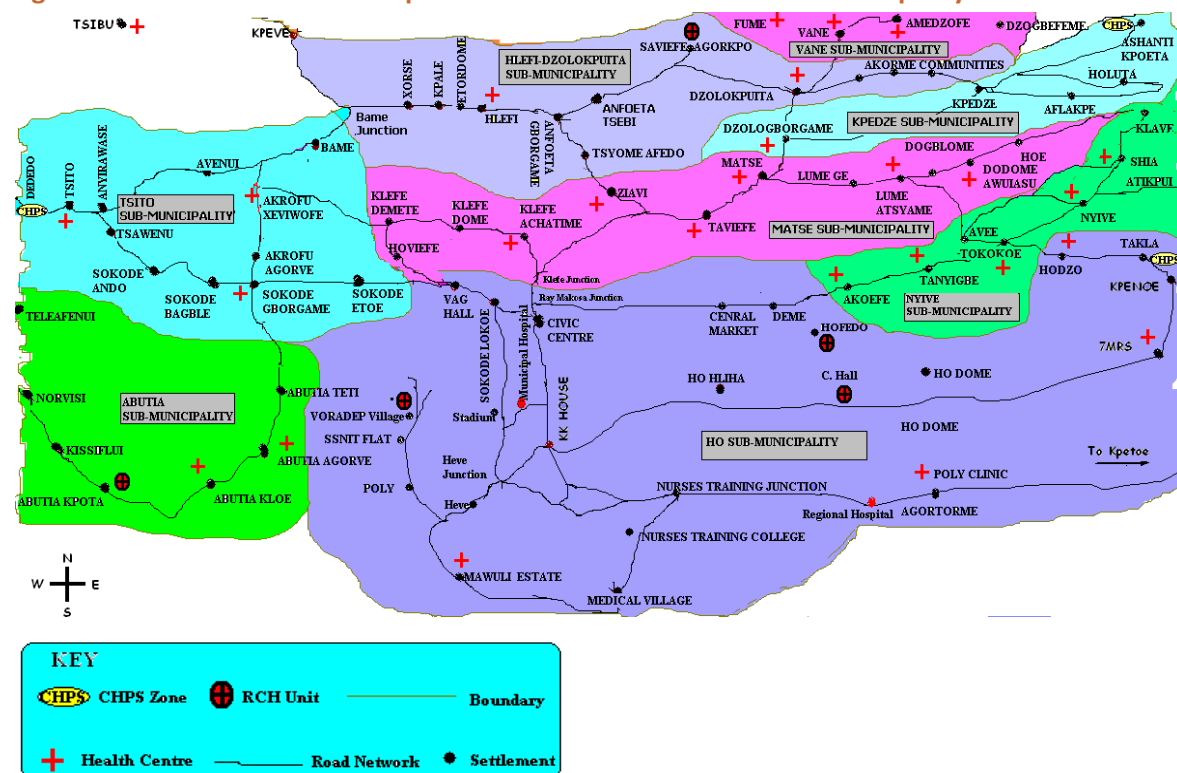
The municipal health service has a municipal hospital, a polyclinic, health centers, reproductive and child health units, three functioning CHPS zones, and 15 private facilities (Figure 24). The Regional Hospital is also located in Ho.

Although the municipal health service is divided into four submunicipalities, there is no management structure to support the submunicipalities. The municipal management is flat, with all 39 GHS facilities and 15 private hospitals and clinics reporting directly to the municipal directorate. This is many more health facilities than found in any of the other districts (see Table 2). Members of the MHMT gave many examples of how this system was unworkable: annual budget meetings were attended by 40 facilities; supervisory visits tended to be postponed for lack of time because supervisors had to visit every facility; and all facilities collected vaccines from the single district cold room.

At the time the study team conducted its fieldwork, the directorate was developing a plan to create eight to 10 submunicipalities and three or four vaccine storage depots, and to decentralize management responsibilities. Implementation would require additional staff and alignment of current boundaries to be consistent with unit committees in the Municipal Assembly. The Assembly executive agreed that the municipality was too large, and there was a separate proposal to split it into two or three districts. In fact, the Government of Ghana announced in October 2011 that new, smaller districts would be created from the current municipal boundaries (Agbewode, 2011a).

As in other case study districts, community health volunteers in Ho undertook community mobilization and disease surveillance activities. There were 130 volunteers, and plans were under way to train another 60. Ho township had few volunteers. The disease control officer responsible for disease surveillance said that the district did not have active volunteers in the township and did not plan to include urban volunteers in the next training program. Individuals at some of the urban facilities visited by the study team said there were a few volunteers, but they were mostly inactive. As part of the Better Ghana Management Services, which started in 2006, Community-Based Growth Promoters had been recruited and trained in parts of the municipality. Their duties included monitoring the weight of children and keeping a weight chart, identifying and treating minor ailments, referring patients, counseling, and mobilizing mothers for RI activities.

Figure 24: Location of submunicipalities and health facilities in Ho municipality



District methodology

After making a courtesy call on the Volta region's director of health services, the eight members of the study team had a briefing with the MDHS on June 27, 2011, and a longer debriefing and interview with him on June 30. Following the usual study protocol, the team split into three groups. One group interviewed the senior technical officer responsible for disease control, along with his two technical officers, and another group interviewed the municipal public health nurse. Performance data for the municipality was collected during the interviews. The third group interviewed executive members of Volta's District Assembly and senior management responsible for RI within in the Volta region Health Service, Regional Hospital, and Municipal Hospital. Each team visited one submunicipality, observing and interviewing staff, clients, community volunteers, and community leaders at a total of three health centers, four reproductive health units, one child welfare clinic, and five outreach points. Two private facilities and at least one catholic facility were visited.

As noted above, Ho Municipality was selected as a "steady" district based on the ARISE study protocol. Unlike the other districts in the study, Ho municipality had one of the lowest penta3 rates in Ghana, and coverage rates had not increased in recent years. Including the municipality in the study was important for adding analytical robustness, but its different experience required that the data collection instruments be modified. In the other districts, the exploration of drivers of program improvement and the documentation of RI performance were conducted in the context of overall progress. In Ho, data collection had to achieve three objectives: identify the presence or absence of drivers identified to be important for service improvement in the other districts; understand the context, causes, and impact of events and actions undertaken in Ho municipality; and understand the barriers to the successful initiation or implementation of strategies that may have been successful drivers in the higher-performing districts.

The team made its preliminary analysis of information gathered in the field during a meeting on July 1 in Accra. Team members used the information to test the relevance and strength of drivers of RI success that had been identified from field visits to the districts with recent improved performance.

Routine immunization performance

ROUTINE IMMUNIZATION COVERAGE

Figure 25 shows the vaccination coverage estimates provided by the MHMT. Penta3 coverage in Ho municipality has been stable at approximately 70 percent since 2003. After peaking in 2000, vaccination coverage at the district level among infants under one year of age with penta3 and measles vaccines declined gradually during the period 2001-06. Following mixed performance in 2007, the municipality had a further decline in 2008. In 2009, data from the Regional Hospital, which at the time was running a well-attended CWC, was not reported; therefore, the apparent increase in 2010 may or may not be real. Figure 27 also shows that Ho had a large negative dropout between penta1 and penta3 coverage, on the order of -15 percent. In 2009, that figure could be explained by the lack of data from the regional hospital, but no satisfactory reason was given for this pattern in other years.

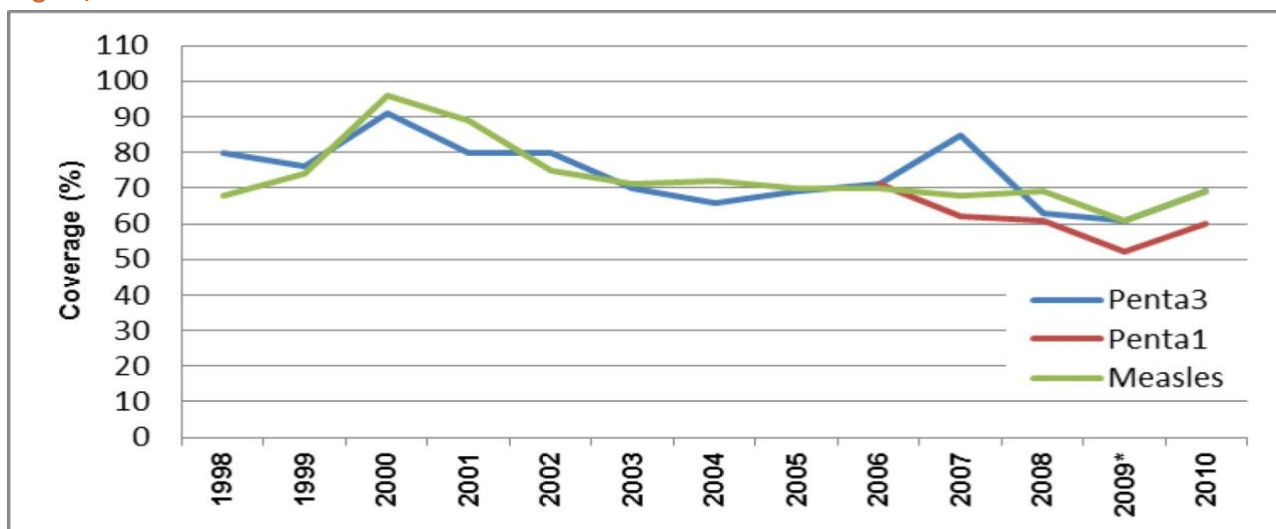
The municipality has struggled with obtaining accurate population estimates. In 2004, Adaklu Anigbe District was created out of a portion of Ho municipality, throwing the estimates for the urban population of Ho township into doubt. The National Population Council provided technical assistance to conduct a head count in the new district to clarify the accuracy of population estimates. In 2010, the MHMT made a decision to use estimates provided by the Ghana Statistical Service and Ho Municipal Assembly. This figure was larger than the one used by the Ministry of Health. In 2006, the MHMT had similarly raised the population estimate based on counts from a National Immunization Day. Figure 25 is based on population estimates derived by using a linear rate of growth between 2006 and 2010. The MHMT observed that if it had used the MOH population estimates, penta3 coverage would have been 88 percent, compared with its estimate of 69 percent. The Volta regional disease control unit agrees that the larger population estimate is more accurate.

The team's analysis of the monthly reported doses of penta1, penta3, and measles administered throughout the municipality between 2008 and 2011 showed fairly consistent performance (Figure 26). There had been a

modest upward trend from around 400 doses of each antigen administered per month in early 2008 to around 500 doses of each antigen administered per month in early 2011. However, the monthly target population of infants under one year old in 2010 was 750, suggesting that coverage was inadequate and that the increased number of doses was not keeping up with the annual estimated increase in the target population.

Further analysis of the annual penta3 doses presented by the four submunicipalities showed that each had an increase between 2008 and 2010 (Figure 27).

Figure 25: Vaccination coverage among infants under one year old, Ho municipality, Volta region, 1998-2010



*2009 data do not include doses provided at the Regional Hospital

Figure 26: Monthly reported doses and linear trends of penta1, penta3, and measles given to infants less than one year old, Ho municipality, Volta region, January, 2008-May, 2011

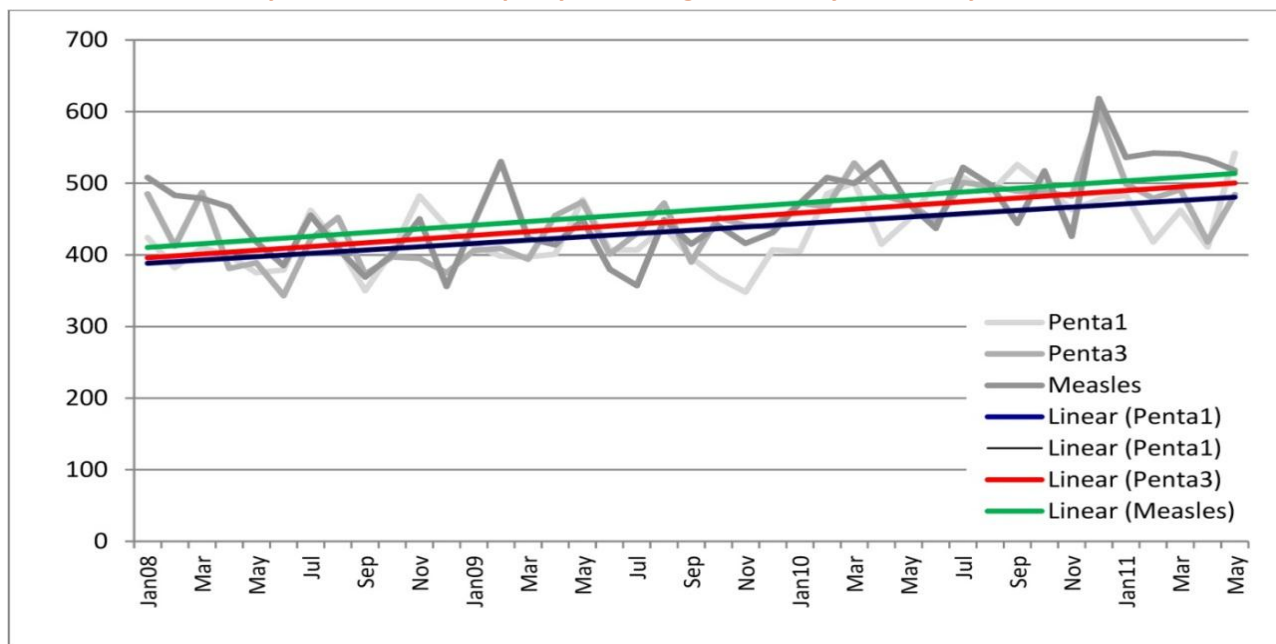
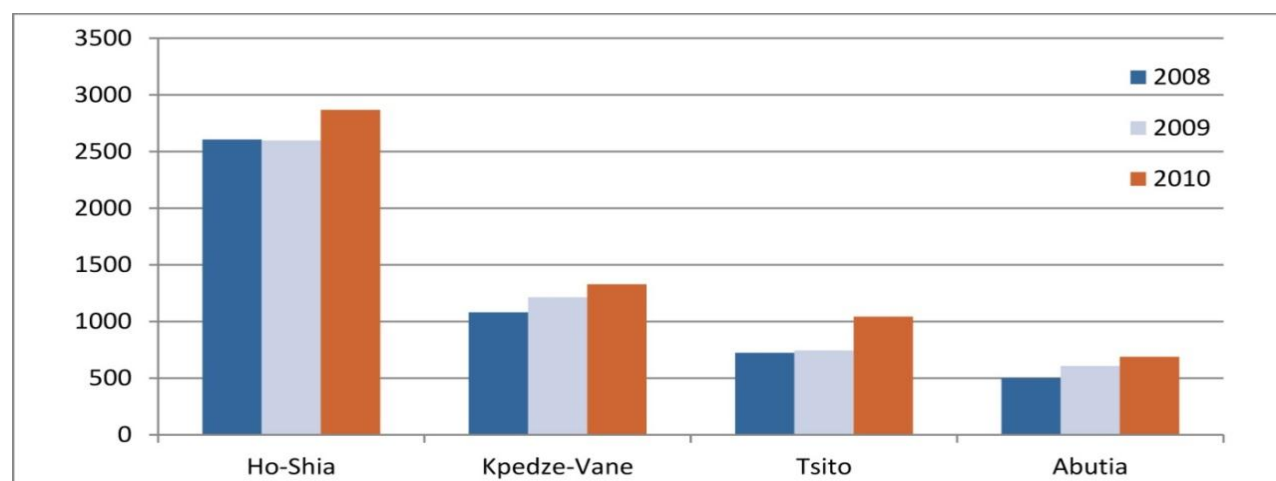


Figure 27: Annual number of penta3 doses by submunicipality in Ho municipality, Volta region, 2008-10



ROUTINE IMMUNIZATION SERVICE SITES

At the time of the study, vaccination services were offered at 40 fixed sites, including 38 health centers and RCH clinics and two CHPS zones, and also at 151 outreach sites. Two hospitals provided BCG vaccination for newborns in their respective maternity wards. Ten health centers lacked functioning cold chain equipment. An additional health center lacked a CHN to administer vaccines, and one CHPS zone lacked a refrigerator. All but one of the other health centers had electric-powered refrigerators, although some were domestic refrigerators donated by NGOs.

Three-quarters of the fixed sites in Ho municipality have been functioning since 2007. Two RCH clinics were created in 2009 and another in 2010. There was a plan to upgrade all RCH centers to CHPS zones in the future.

Key informants estimated that in general the majority of all vaccinations given each month were administered at outreach sessions.

HUMAN RESOURCES FOR VACCINATIONS

The municipal health organogram consisted of a MDHS who led the MHMT, comprised of two public health nurses, a senior technical officer (who was the disease control officer and also managed the immunization program), two technical officers supporting disease surveillance, malaria and health information, and a head of finance. Compared with other case study districts, the senior management in Ho had been in their posts for a relatively short time. The MHMT started in the first half of 2010. The public health nurse had been in her post since 2007, but she was in the process of leaving. Her replacement had been in the post for three months, as had the disease control officer. The junior staff had been at the MHMT for many years, with one member previously responsible for the immunization program.

Vaccines were administered by CHNs at all vaccination sites. At the time of the study, there were three medical assistants, 89 CHNs, 11 midwives, and 130 community health volunteers. Key informants told the team that no EPI-related posts were vacant. There had been a six-month gap without a disease control officer when the current one took up the position.

COLD CHAIN, VACCINES, AND ANCILLARY SUPPLIES

The study team found that the district vaccine store had one functioning electric 2-8°C refrigerator. A second refrigerator had been out of order for five months, but was considered repairable. The store had two -20°C chest freezers in good working order. In general, the electricity supply was relatively reliable. Power outages of less than 12 hours were reported to occur occasionally, but vaccine storage remained secure since the vaccine store is located on the grounds of the Municipal Hospital and is connected to its back-up generator.

The team observed good vaccine-handling practices at the district cold room. Each refrigerator and freezer was equipped with a temperature monitoring chart, which was up-to-date and showed twice-daily temperatures within normal range. In the district vaccine store, the team observed no date-expired vaccine vials or vaccine vials whose vaccine vial monitors (VVMs) indicated that the vaccine should be discarded. Shortcomings in cold chain management at health facilities will be discussed later.

Key informants described local vaccine stock-outs as being of short duration, usually not causing any disruption to vaccination service delivery at the fixed sites, since stocks were replenished from the regional store on the same day.

At the time of the study, there were no 5-milliliter reconstitution syringes in stock in the district store. Other injection equipment, waste disposal boxes, and stationery, including child health cards and vaccine tally sheets, were present in the store, but there were no patient registers available.

LOGISTICS

The transport fleet in the district was considered inadequate. At the time of this study, the district had three four-wheeled vehicles in working order, two acquired new in 2010. All of the vehicles were kept at the municipal office and made available to facilities on request. The number of motorbikes had increased steadily through the years. The annual reports document that there were nine motorbikes in working order in 2003, 10 in 2006, and 13 in 2008. The municipality received 22 new motorbikes in 2010. Despite the increase, a number of health facilities did not have a motorbike. Facilities collected vaccines from the district vaccine store monthly, usually one or two weeks after submitting the monthly returns. The disease control officer was revising the procurement process to include information on current stock.

EPI POLICIES, STRATEGIES, AND OPERATIONS

The MHMT had an Integrated Strategic Plan covering 2007-11 and an EPI plan developed from the recommendations of a meeting in late 2010. Health facilities also prepared annual action plans. Reports for 2011 included mention of targets for RI, but did not describe the current level of performance or detail strategies to achieve targets.

The MHMT met internally on a weekly basis to discuss general management issues. The MDHS and his team aimed to meet two or three times a year with CHNs and in-charges from all health facilities to review performance, validate data, and review plans for upcoming RI activities. These were integrated meetings that included other public health activities. Since the arrival of the new director, there had been two meetings: one in July 2010 and another in February 2011. Following the July meeting, facilities in the Ho township submitted a combined monthly report; however, there was no person responsible for reviewing the data.

Some facilities had one or no supervisory visits in 2010. In early 2011, the MHMT had made a commitment to conduct visits every quarter. At the time of study team's visit in June, the first round of visits had recently been completed. All members of the MHMT made regular informal supervisory visits to some facilities, and formal supervisory visits made use of checklists that were reviewed and stored at the municipal office.

FINANCE

Finance for RI was, for the most part, integrated into district health budgets. A complete costing of RI service delivery in the district would need to be pieced together from national and regional budget allocations. The MDHS estimated that T&T for outreach cost 12,000¢ (about US\$7,000) a year.

Financial records examined by the team showed that in 2008 and 2009, about 45,000 cedis (about US\$27,000) were made available to cover RI services, disease control, and NIDs. Ho municipality received 15,000 cedis (about US\$9,000) in HIRD funds annually, but the funds were used on a number of community health projects. Only hospitals earned internally generated funds. The director told the team that it was a challenge to find the necessary money for such RI activities as outreach, periodic intensification activities, training, and review meetings. He supported these by combining activities supported through special projects.

Drivers of routine immunization performance

Since Ho was the steady district, the study team collected qualitative and quantitative data to understand the persistent underperformance of routine immunization. As described above, the team found that there were shortages in essential elements of an RI system such as cold chain equipment and transport for outreach and limited supervision.

The fieldwork also uncovered that many of the other elements of the health system and human resource management and community engagement were either very recently instituted, present but not functioning as effectively as they were in the improving districts, or missing altogether.

LEADERSHIP AND ORGANIZATIONAL MANAGEMENT

In other case study districts, the team identified leadership from the district directorate and well-functioning district and submunicipal management structures as crucial to improved RI performance. These factors were missing in Ho municipality, and their absence had a profound effect on RI performance.

Given the MHMT's direct responsibility for 39 facilities, its members readily acknowledged that their attention was often diverted. In districts with fewer facilities or stronger subdistricts, monthly or quarterly review meetings were a powerful tool to present activity, share successful strategies, and resolve to adopt remedial or intensive actions. All participants at the meetings understood their contribution to overall district performance and were motivated (sometimes through rewards or shaming) to raise coverage.

In Ho municipality, the review meetings involved all 39 facilities. Since the new director's arrival, review meetings have occurred twice, and several of the recent initiatives had their origins in those meetings, demonstrating how effective this approach can be. The study team was told that another review meeting would take place in July or August 2011.

MANAGEMENT OF THE HO TOWNSHIP SUBMUNICIPALITY

The absence of a clear submunicipal structure was felt most acutely in Ho township, where there were at least eight facilities offering RI services. A recent initiative by the directorate had seen all of the urban facilities collating their returns. However, the act of collating data had not sparked collaboration. The study team learned that representatives at several of the facilities did not always attend the meeting where results were compiled, no representative from the MHMT attended, and review and discussion about performance was rare. The facility that had been given responsibility to submit the combined returns did not have the authority to supervise staff in other health facilities.

Each urban facility held responsibility for a zone or a number of communities, but none of them had been told the target populations for their catchments. Although CHNs conduct CWCs and several facilities have opened new outreach points, the nurses claim they are not receiving feedback on the impact of their efforts on coverage.

The trends in cumulative monthly doses in Ho township demonstrated that recent efforts made only a minor impact on the number of doses (Figure 28). There were small gains in the number of penta1 and penta3 doses in 2010, compared with previous years, but no gains in measles doses. The number of doses for the first five months of 2011 was not much higher than in the previous year.

TRANSPORT

Transport was mentioned by the MHMT and some facilities as a barrier to improved immunization coverage. The municipality had fairly limited transportation resources, and payment of T&T was controlled by the MHMT and not respected or understood by staff at most health facilities.

There are only three four-wheeled vehicles, and all of them are kept at the municipal directorate. These vehicles are used for supervisory visits and district initiated mop-ups in low coverage or hard-to-reach areas. They are not used to support routine outreach services or to distribute vaccines to facilities. The municipality's 20 motorcycles were supposed to be shared between 39 facilities. Furthermore, the motorbikes at the facilities

were too large for most of the female CHNs to feel comfortable riding, although CHNs at one facility said that they wanted to be trained to ride the motorbike.

Among the few CHNs who did not report having transport problems was a CHN working at a rural facility. The roads in her catchment were not sealed, but they were relatively quiet, and the nurse said she was experienced in riding motorbikes. She runs ten outreach points and a static clinic on her own, and she attributed her good performance to an adequate T&T allowance. When the study team visited her facility, her motorbike, supplied by the GHS, was in Ho for repairs and she was riding a motorbike lent by a community leader and landlord of the facility. Transport problems in this facility were solved by having no competition for the use of the bike, adequate funds for miscellaneous travel expenses, and arrangements for a back-up vehicle. These elements were not present at most facilities.

All of the urban facilities reported that the T&T they were allocated was not sufficient to cover the costs of all of their outreach clinics and that they made up the difference out of their own money. Most CHNs at rural sites were reliant on public transport or men who would drive the motorbikes, carrying the female CHNs as passengers. In one case, the male was a field technician who used the motorbike for his other duties and was not always available to take the nurses to the outreach clinics. At the other facilities, the nurses would hire a local man to drive them to their outreach sites, and in at least one case, two facilities shared the same motorbike. These arrangements took time and money and were thrown into disarray when motorbikes needed repairs. CHNs at these sites told the team that the T&T funds were adequate for visiting the CWCs, but not sufficient for additional visits to communities for home visits and school health programs.

COLD CHAIN EQUIPMENT AND LOGISTICS

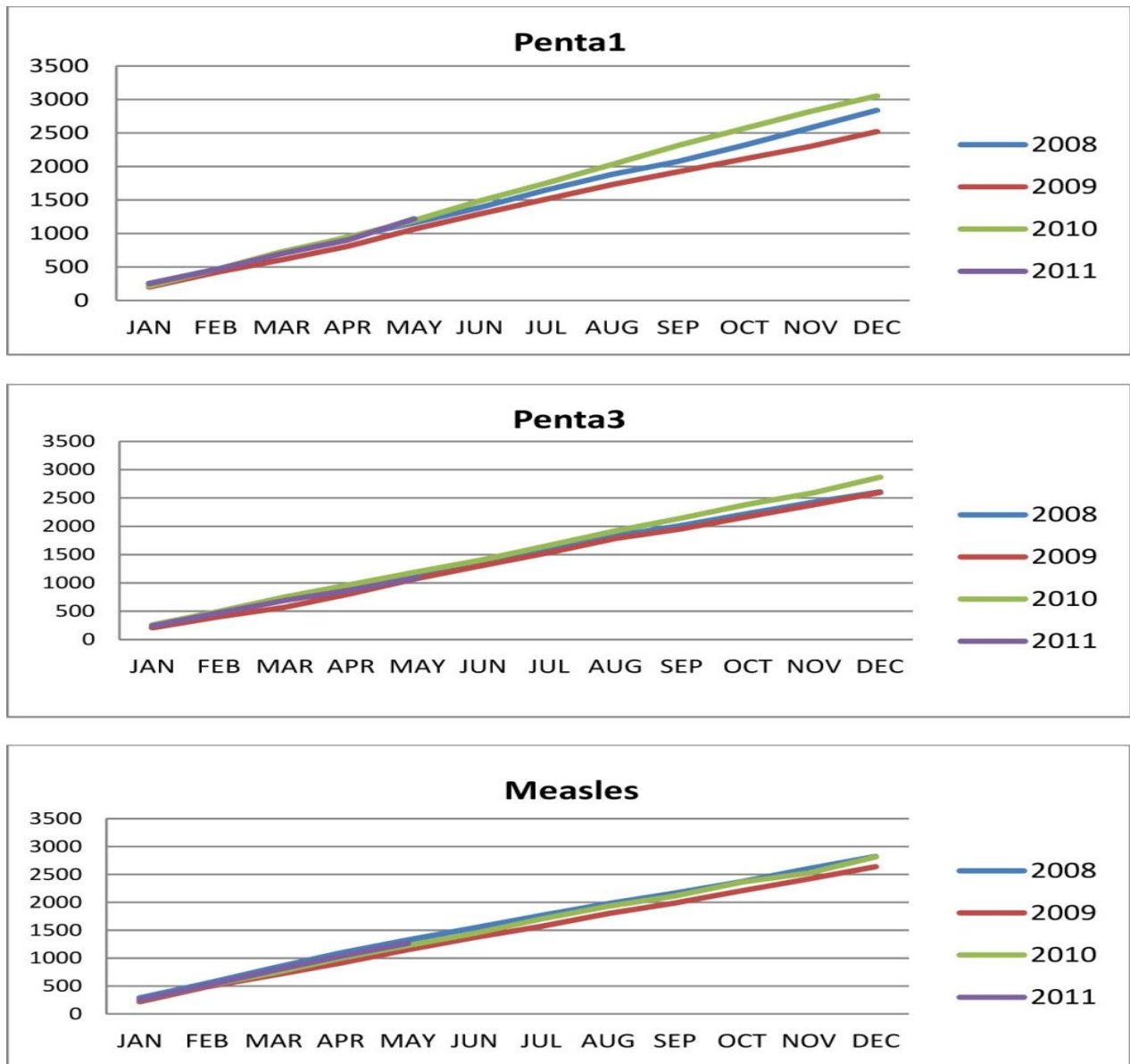
As described above, the supply chain from the regional cold room to the municipal cold room was secure and efficient and the municipal cold room had a back-up generator and sufficient storage. The vaccine supply chain to the facilities functioned well in most cases, but there were clear areas for improvement, a fact that demonstrates how important a supply chain is to RI performance.

There were at least 10 facilities (one person reported 11 facilities) that provided routine immunizations but had no cold chain equipment; CHNs had to pick up vaccines from another facility or the municipal cold room before every clinic. Some of the other facilities operated domestic refrigerators, usually a legacy of a donation from an NGO.

The facilities with refrigerators were responsible for picking up their own vaccines. As the study team visited at the end of the month, it was able to observe that some facilities did not maintain minimum stock levels and instead would be without vaccines for one or two weeks before collecting more. New vaccines were collected at a different time from the submission of monthly returns, requiring multiple trips to Ho each month and interrupting normal clinic operations. The MHMT was seeking additional cold chain equipment for facilities and planned to create submunicipal depots to reduce travel time, but its first request for additional equipment had not been met.

It was in this municipality that the study team also observed the only examples of inadequate vaccine supply management. In two health facilities, the most recent refrigerator temperature-monitoring checks had not been done, and in a third facility the temperature was consistently recorded outside of the acceptable range. The senior technical officer also shared with the team his concern in recently finding that tetanus toxoid vaccines had been stored outside of a refrigerator at the army barracks clinic; he proposed to arrange for training for the clinic staff.

Figure 28: Cumulative number of doses by antigen and year for Ho township, 2008-11



STAFF MOTIVATION

According to members of the MHMT and other senior health professionals familiar with the operation of the municipality, the most important barrier to improved RI coverage was the lack of commitment displayed by CHNs toward their jobs. Annual reports from the municipality dating back to 2003 also made that observation. As one member of the MHMT said, “They don’t show much interest in their work and think they are probably working for us, their bosses” (Ho interview notes).

The study team observed a number of committed and hardworking CHNs who were introducing new services and working closely with their community. Such initiative was the norm in other districts, but these nurses were an exception in Ho municipality. One of the most obvious manifestations of low motivation was staff absenteeism and lateness. The study team observed clinics closed during official working hours and CWCs that did not open until mid or late morning.

The reasons given to the study team ranged from CHNs being too young and not committed to community nursing as a profession, to senior CHNs and midwives being too old and set in their ways. However, through its interviews, and observations and comparisons with the arrangements in other districts, the team was able to identify some more specific causes of this reported lack of motivation.

A striking feature of this district is that health workers in some rural sites commuted daily to their posts from their homes in Ho township. This arrangement, while superficially convenient for staff, negatively impacts on their motivation and performance. Public transportation to many of the rural areas is irregular, resulting in frustrating delays. Commuting also costs money, increasing the temptation for workers to stay in Ho. The MDHS reported that some of the chiefs complained regularly and vehemently to the municipal director that nurses were not living in the community. The appreciation of mothers and the broader community is a motivating factor for CHNs, but late and irregular attendance causes friction between health care provider and client, reducing the quality of their interaction and the pleasure of serving.

One reason for the number of staff who commuted was the environment at their post. In many communities, there was no available accommodation or the accommodation that had been made available was unacceptable. The condition of some of the facilities was extremely poor, with some of them lacking water, toilets, and general maintenance. These environments were highly demotivating for staff and, when combined with delays in receiving T&T, inadequate transport, and relatively little contact with management, resulted in staff who felt unsupported.

Management may even have been reinforcing the undesirability of some posts. The study team heard of some instances of CHNs and other health workers being posted to rural areas as a punishment and being transferred to Ho township as a reward.

Being overworked can be a common reason for low staff morale, but it does not appear to apply to Ho municipality. Ho has one of the lowest population-to-CHN ratios of the four case study districts. However, increasing the number of staff in Ho has not yielded improvements in RI performance. The study team visited several facilities whose staff had increased but were deployed in the same way; for example, the same number of outreach points would be covered but three CHNs would attend rather than two. One senior staff member confided, “Our predecessors say to us that they were doing much better than we are doing even with less staff.”

Formal supervision is erratic in the municipality, and despite a policy for quarterly visits, most facilities that the study team visited had experienced only one supervisory visit, and one facility had no visits, in 2010. Most facilities had one visit so far in 2011.

Lack of functioning submunicipal teams had direct implications for staff motivation, as the notes from a field visit to an urban facility indicate. The CHNs told the study team:

They are rather de-motivated because every individual would like to be praised but they find themselves in a situation whereby although they are working very hard to improve coverage their efforts are never seen. Instead every time they go for meetings they are lambasted for low coverage which according to them is no fault of theirs but due to the huge population estimates they are given to work with. They said even during NIDs, they are told they have not achieved their targets. This they said obviously dampens their spirit.

— Interview notes, Ho municipality

Several health staff in rural sites also reported that they believed management did not appreciate their efforts and that they would like to receive praise occasionally. In the other case study districts, praise was provided during regular review meetings and supervision visits. In Ho, the MHMT did not even have time to give individual feedback to the 39 facilities that submitted their returns (even now that the urban facilities submit a combined return) and there was no one responsible for RI performance at the submunicipal level. Feedback had to wait for the half-yearly meetings.

DATA QUALITY

Lack of confidence in data was another barrier to improving vaccination coverage. Although successive MDHS have attempted to adjust the figures in order to be more realistic, changes invariably suit some facilities more than others. As one group of CHNs explained, the most important driver for their high vaccination coverage rates was the readjustment of their population targets to a smaller and more realistic number.

The senior technical officer responsible for disease control, including the immunization program, had been in the position only for a few months. He had been concentrating on improving the quality of data collection by standardizing reporting forms and entering monthly returns for every facility on the GHS health information management system. The additional workload meant that no report for 2011 had been done that compared the number of vaccine doses by facility or submunicipality. In the absence of this information, facilities and the MHMT had no feedback about the results of their efforts.

The study team found that use of data at the facility level was highly variable, with some CHNs being aware of their target population and the size of their communities and others needing to refer to documents. At one facility the CHNs, all with several years of experience, had filled in the immunization monitor chart incorrectly.

ROUTINE IMMUNIZATION IN URBAN AREAS

The low coverage in the Ho township was a concern for the MHMT. In addition to the management and transportation challenges described above, the study team identified some additional reasons why coverage was low. Staff in several of the facilities in the township expressed concern about the underutilization of facilities. In response, they had opened new outreach sites in order to be closer to mothers in a rapidly growing city. The outreach points visited were held in the homes of community leaders. Attendance was relatively low, and the study team was told by some of the health workers that they felt it was necessary to do more promotion of the clinic locations and time and health education on the importance of vaccinations. A mother interviewed at one of the urban outreach clinics agreed:

In her opinion mothers do not attend the clinic because they do not know when and where the clinic is held. When she first moved in here and enquired, many women had no idea about what she was talking about. It is also possible that others simply do not bother. We all could do with some more education about child welfare including immunization,' she said.

— Interview notes from a woman attending an outreach clinic in Ho township

Summary

Ho municipal health service lacked many of the characteristics that were associated with improvements in RI performance in the other three case study districts. With over 200,000 people, the municipality is very large and the management structure is flat. None of the four submunicipalities had a functioning management team. With 39 separate GHS health facilities all managed directly by the MHMT, there was not the capacity to provide the regular review of performance and formal and informal supervision. As a consequence, staff morale was low and there was evidence that such basic responsibilities as regular attendance, living in the community, and maintenance of the cold chain and vaccination data were not being performed at an acceptable level.

Large municipalities with a large number of health facilities need more equipment to be effective. Ho was disadvantaged by having fewer vehicles and refrigerators than required.

The poor vaccination coverage in Ho township was a particular concern to the municipal and regional health service. Even though urban residents may live close to services and have relatively higher education, they may not use the services unless there is effective promotion and health education.

Chapter Four: Drivers of routine immunization success in Ghana

This section builds on the descriptions of the case study districts by presenting an integrated model of the drivers of district-level routine immunization (RI) improvement. To qualify as a driver, a policy, resource, action, or process had to be in place in some form in the districts that had experienced recent gains in vaccination coverage and be absent or weak in the steady district. In addition, the people interviewed by the study team had to have considered the driver to be important, and the driver had to be logically related to improved performance and to have been initiated or developed before or during this particular period of improved performance. The latter condition is important, because the current situation is driven by historical policies initiated by the Government of Ghana. Preconditions or enablers of recent changes need to be understood if the experiences of the case study districts are to be replicated.

The starting point for the model shown in Figure 29 were the conceptual maps constructed by the study team to explain why the increases in coverage and improved RI delivery had occurred in the study districts. The team's information expanded as it went from district to district. Common drivers gradually emerged and were tested against the experience in other case study districts and confirmed or rejected. The team then presented a draft model of the driver pathways to improved RI performance at the national stakeholder workshop in Accra in August 2011 and at an ARISE synthesis workshop in the United States in September 2011. Subsequent drafts benefited from participants comments and suggestions.

Figure 29 should be read from left to right. On the left are national policies and initiatives. Some of these are the responsibility of the immunization program and others are related to the entire health system.

Some national drivers directly affect how services are delivered in communities. Other national drivers act through district health service management practices that motivate health workers and engage the community, enabling improved access and utilization. Other drivers exist and act solely at the district level.

The drivers derived from this research are not meant to be a comprehensive list of what is required for a routine immunization program. They are drivers of the positive change that occurred in the case study districts 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 in different countries.

National-level drivers

A legacy of supportive health policies

The study team determined that recent improvements in RI performance in the districts could be traced back to two specific elements of the national approach to immunization: sustained political commitment and a decentralized system of service delivery. The model in Figure 29 begins with these twin foundations from which all of the other drivers originate.

Virtually every stakeholder interviewed who worked at the national level identified the decades of political commitment to preventing the killer childhood diseases as critical to understanding Ghana's successful immunization program. Unwavering support for the nation's Expanded Programme on Immunization resulted in significant investments in the procurement of essential vaccines and ancillary supplies, national and regional storage systems and logistics, and a dedicated public health workforce with primary responsibility for vaccine delivery. These achievements were made in collaboration with development partners who provided funds and technical assistance.

In addition to the critical role played by investments in immunization infrastructure, high-level political support within the Government of Ghana meant that the importance of childhood vaccines was promoted at every

opportunity. The general public was made aware of the benefits for the vaccine program from the very beginning of the EPI in 1978. Immunization services have always been free and every opportunity has been used to reinforce the messages, from politicians launching National Immunization Days, to media campaigns on local-language radio stations, and to sponsorship of “Baby Shows” in every community to celebrate healthy babies who had timely vaccinations. Child Health Week is still held every May as an occasion to promote child survival services, including immunization (Ministry of Health & Ghana Health Service, 2010). In all four study districts, the study team heard that knowledge and support of immunization was nearly universal. Had this not been the case, districts would have had to employ very different strategies to improve the utilization of vaccination services.

Ghana’s EPI has also been thoroughly integrated into the country’s distinctive model of decentralization (Bossert & Beauvais, 2002). The district health services are managed by the Ghana Health Service and not the district assemblies or the government appointed chief executive director of district administration. This arrangement ensures greater accountability in the funding and standards of health care.

The political power of communities means that health services are answerable to communities, but also that communities have an obligation and expectation to be involved in their health services. Decentralization also places political power at the grass roots. Each settlement is part of a unit that has representation in the District Assembly, and there are clear communication channels from the community to national government. Each director of district health services gives regular reports to the Assembly. National health plans and reviews are based on a process that starts at half-yearly meetings held at subdistricts and districts.

Because public and primary health care and much of secondary hospital care is provided at the district level, the Ministry of Health (MOH) has had a policy since the 1990s to strengthen district health service management. One strategy for strengthening services has been to invest in building districts’ public health capacity by requiring that all district directors of health services have public health qualifications.

A political commitment to decentralized service delivery also leads to support for strategies to bring health services close to the people. The extensive use of monthly child welfare clinics to outreach points as the primary mode for RI delivery is a reflection of this commitment. The use of community-based volunteers to assist in promoting the CWCs is also consistent with a decentralized approach that values community engagement. In 1998, Ghana extended this approach by adopting the Community Health Planning and Services (CHPS) policy, which aims to place a clinic and nurse in every underserved community.

Table 5 summarizes a chronology of national policies and initiatives that have influenced RI performance. National initiatives prior to 2004 have been implemented throughout the country. This legacy of policies resulted in the high-performing immunization program that existed in 2005 and still benefits district programs. More recent policies have not been fully adopted and are only beginning to impact district RI services.

Figure 29: Drivers and pathways to improved district routine immunization performance, Ghana case studies

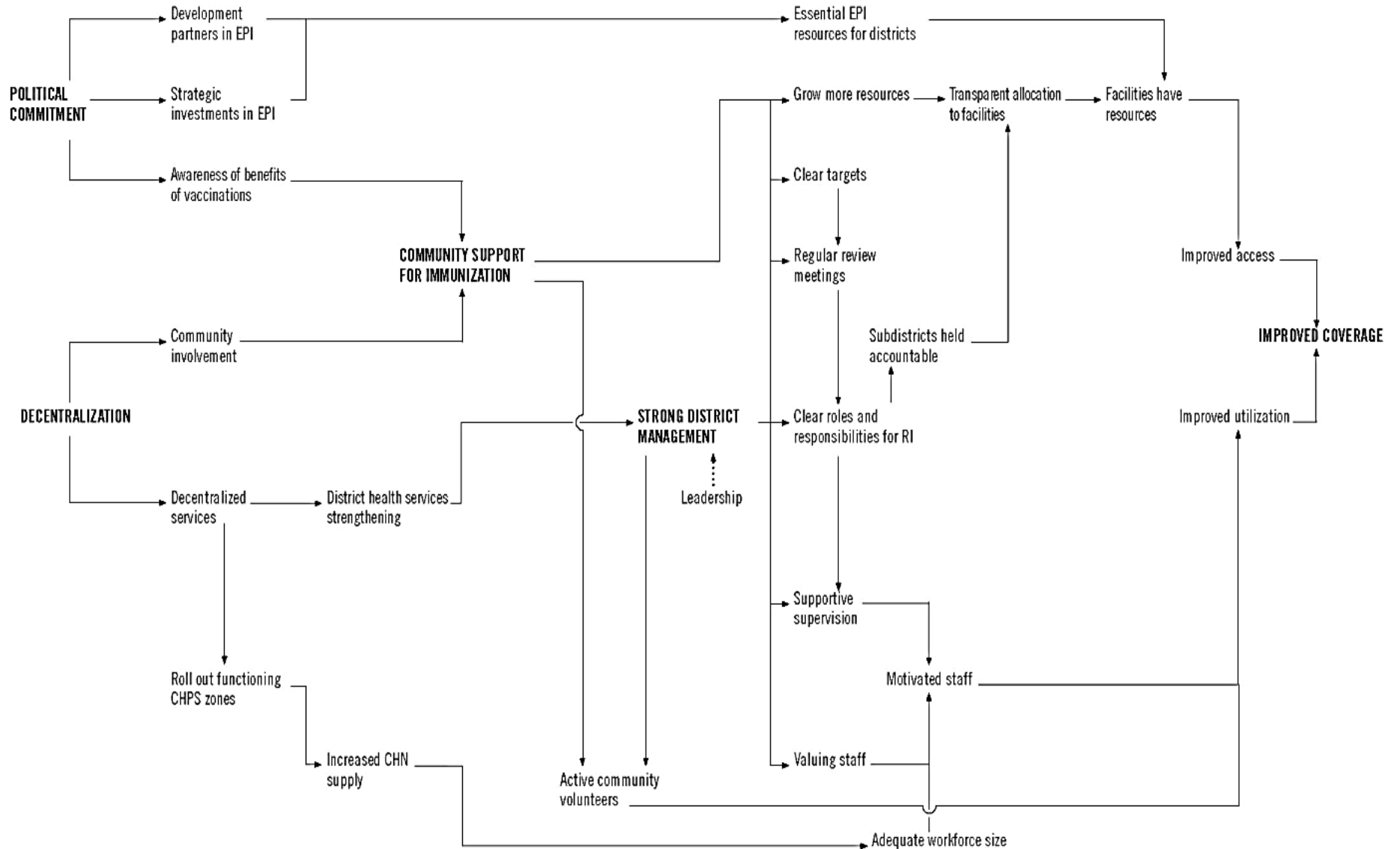


Table 5: Chronology of national-level policies and initiatives that enabled successful district-level implementation of routine immunization

<p>Long-standing policies (prior to 2000)</p>	<ul style="list-style-type: none"> • High-level political commitment for immunizations • National Immunization Days and Baby Shows promoted immunizations, engaged communities, and built capacity • Selection and use of community health volunteers for guinea worm eradication • Strengthening decentralized district health systems, including public health training for directors • Use of outreach points as sites for vaccination clinics
<p>Early change policies (initiated 2000 to 2004)</p>	<ul style="list-style-type: none"> • Investment in the supply chain to provide a consistent flow of vaccines to the regions; upgrading of district and facility cold chain equipment • Donor funds provided flexible funding for strategic improvements (training, vehicles, injection safety equipment, resources to access communities in hard-to-reach areas) • CHPS policy adopted
<p>Recent policies (initiated 2005 to 2008)</p>	<ul style="list-style-type: none"> • Increase in the number of field technicians and community health nurses employed because of increased numbers trained in regions • Special funding given to districts to support transport costs for outreach clinics and home visits (ended 2008) • Additional resources to districts for vehicles and motorbikes
<p>Emerging policies (initiated 2009 to present)</p>	<ul style="list-style-type: none"> • National Health Insurance Scheme offering a new source of income for preventative health

Impact of national-level inputs on district RI performance

Ideally, national-level inputs benefit all districts equally. In the ARISE case studies, this was not always the case. Sometimes the national inputs were, for whatever reason, not distributed to all districts. In other cases, districts varied in their capacity to make effective use of the inputs they received.

This section discusses three essential inputs provided by the national government: 1) essential EPI resources to the district, 2) adequate number of qualified vaccinators, and 3) access to transportation assets, such as pick-up trucks, motorbikes, and boats. Informants from the national and district levels regularly cited these inputs as important contributors to RI performance. The following section reviews the extent to which each of the four districts received these inputs and describes how their provision drove improvements.

ESSENTIAL EPI RESOURCES

A critical input for an effective national immunization program is a coordinated and reliable supply chain that extends from international procurement to central storage, and from there to regional depots, and then out to the districts. Key informants at the national level identified one of the important drivers of Ghana’s success in RI as the “automatic” supply chain. Of course, nothing in health service delivery is automatic, but the EPI supply system in Ghana does perform at a high level (Ghana Health Service, 2010).

The study team heard equally positive reports in every case study district. Regional supply officers collect vaccines from one of several national cold rooms placed in strategic locations around the country. Each district collected vaccine supplies from a regional cold room. Not a single district reported having experienced a

national or regional shortage or a stock-out at the regional level that affected its RI services for more than one month. All district cold rooms observed were adequately stocked with cold chain equipment, vaccines, and ancillary equipment.

The provision of the cold chain equipment at every fixed vaccination site is another essential part of district capacity to improve RI performance. Refrigerators, freezers, carrier boxes, and similar items are supplied directly by the national government or indirectly through donors. District and facility teams could attempt to compensate for the lack of equipment at fixed vaccination sites, but if equipment were not available, the services offered at that site were necessarily limited. Ho municipality — the study’s “steady” comparison — was the only district that had many health facilities without refrigerators. One of the improving districts had sites missing refrigerators; however, these facilities were supported by larger health centers or subdistricts that sent vaccines and CHNs for scheduled vaccination clinics. In the steady district, facilities without refrigerators were responsible for acquiring the supplies and running the clinics on their own. The two other districts had adequate equipment in all health centers although some CHPS were without equipment or reliable power. Many of the CHPS facilities that the team visited lacked cold chain equipment or a suitable power source.

TRANSPORTATION ASSETS

Districts need transport assets to offer RI services. All districts need vehicles to collect supplies from the regional cold room, access hard-to-reach areas, and conduct outreach. Almost all pick-up trucks and motorbikes are provided by the national government, either directly or through external funds. District managers have very recently been given the authority to acquire vehicles through lease purchase arrangements using internally generated funds (IGF). Only one of the four study districts had acquired a pick-up truck with its own funds, and none of the districts had purchased its own motorbikes.

Two of the four study districts provide several examples of how relying on public transport, using borrowed vehicles, leasing vehicles, or using unsafe vehicles introduces an unacceptable risk of delaying supply or leaving entire communities without immunization.

The trunk road linking the district capital of Krachi West to the regional capital of Ho is still rough in parts, but until 2006 it was extremely bad. Every month, officers from the district had to make the long trip to collect vaccine supplies. They used a badly maintained vehicle that could not withstand the conditions and needed frequent repairs. Each month the team was never sure whether the journey would be possible. Since there were only two ferry crossings a day, delays often involved an unplanned overnight stay. Road upgrades helped improve this situation somewhat, but what was even more important was the acquisition of better vehicles made possible through external donor funding.

During the early years of the new century, the Krachi districts received special funds from WHO and UNICEF to purchase boats and motors to reach island populations who had no health services (Diamenu and Eshetu, 2005). These transportation resources enabled quarterly visits to the islands, bringing RI services to many children who would not have been vaccinated elsewhere. The local boats available for leasing were not considered safe for health workers, many of whom cannot swim.

Although the purchase of boats and motors was important, their maintenance is the responsibility of district health service management. Currently, the Krachi West health service needs another motor. One has been damaged, and safety demands that the boats carry an extra motor. Failing to obtain funds elsewhere, the DHMT has made an arrangement with a local NGO to borrow a motor as needed.

A hard-to-reach area deep in a forest reserve in Ho municipality defeated available transport assets. In the interviews, team members heard about a failed effort to reach these communities, numbering several thousand residents, with a hired pick-up. The truck became hopelessly bogged down, leaving the health team to spend an unscheduled night in the forest and putting at risk the arrangements to maintain the vaccines. The DHMT told us that he will not attempt another outreach until there are funds to lease a suitable vehicle.

Two high-performing districts benefited from basing vehicles in subdistricts. Although these vehicles were not dedicated for RI, they were used for outreach and to collect vaccines from the district. A member of the Asikuma-Oboden-Brakwa health management team explained why they moved vehicles to subdistricts:

From 2003 to 2008 there was a decline in coverage, and this was related to the process of outreach. Cars were used for outreach and these came from the district. The district planned and managed outreach services and it often took a long time to get to sites, and when the cars arrived, women would already be in the fields at work.
— Interview notes, Asikuma-Oboden-Brakwa

The Ghana Health Service (GHS) purchased new motorbikes for all of the districts in 2010, greatly increasing the number of health facilities with transport. Although Ho municipality received 22 new motorbikes, it continued to be the only district with fewer motorbikes than health facilities.

National inputs of transport assets to districts are necessary, especially to offer a basic RI service that ensures regular supply and services to all outreach sites and hard-to-reach areas. However, providing vehicles is not sufficient. If vaccine coverage is to increase, good district-level management is required to make appropriate use of these assets.

SUPPLY AND EMPLOYMENT OF A VACCINATION WORKFORCE

The vaccination workforce in Ghana consists primarily of community health nurses. In health centers, reproductive health units and hospitals around the country, CHNs provide vaccinations on demand during child welfare clinics and in periodic intensive activities such as mop-ups. CHNs' other duties include helping with health education, growth monitoring and nutrition education, family planning, and school health programs. In some districts, CHNs are also involved in treating minor ailments and providing antenatal care.

CHNs are a vital element of Ghana's primary and preventative health strategy. Following the adoption of the CHPS policy, the community health nursing curriculum was modified and new training schools opened in order to meet the increasing demand for CHNs to staff CHPS. There is now a training school in all but one region, and a steady increase in the number of graduates has kept pace with the ambitious targets, from graduating fewer than 1,000 nurses in 2006 to 2,000 in 2010. All graduates are guaranteed employment in the GHS and are posted to regions and then assigned to districts. Salaries do not come from district budgets. The Human Resources Strategic Plan for the Health Sector 2007 projects a constant need for 12,934 CHNs from 2006 to 2011 (Ghana Health Workforce Observatory, 2011). A calculation based on the 2010 provisional population estimate of 24.2 million yields a population-to-CHN ratio of 1,871:1.

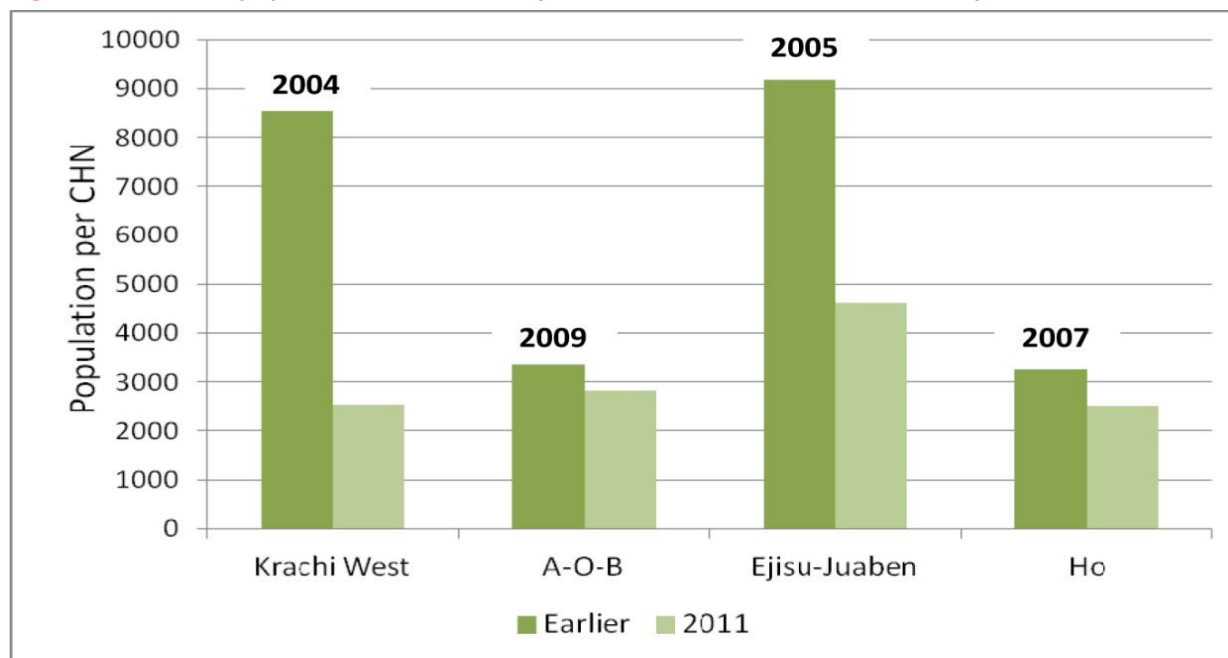
The districts that the study team focused on benefited from an increase in the numbers of CHNs in recent years. This is illustrated in Figure 30 using historical data provided by the DHMTs. Where information was available, population-to-CHN ratios in 2004 and 2005 ranged from 8,000:1 to 9,000:1. The greatest growth was in Krachi West, which was able to retain its existing workforce and then build the workforce after East Krachi formed a separate district. Between 2004 and 2011, the district experienced a doubling of the number of CHNs and a considerable drop in the population served per nurse.

At the time of the fieldwork, the study team estimated that Krachi West and Ho municipality had a population-to-CHN ratio of roughly 2,500:1 and A-O-B had a ratio of 2,800:1. A-O-B had welcomed 13 more CHNs the week before the team visit; these were not included in these figures, but they substantially reduced the number of people per CHN. Ejisu-Juaben had a significantly higher population-to-CHN ratio of 4,361:1.

Drawing simple connections between CHN staffing levels and RI performance is difficult, because there is scope for complementary staff to augment the work of CHNs. Ejisu-Juaben, which had proportionately fewer CHNs, depended on community health volunteers to assist with weighing and recording during CWCs. The municipality also had three field technicians who regularly conducted CWCs themselves. In A-O-B, field technicians at each subdistrict, health extension workers, health assistants, and nursing students assisted the CHNs.

It is noteworthy that Ho municipality, which had the lowest proportion of infants vaccinated, also had the lowest population-to-CHN ratio. Increased staffing did not improve performance because other strategies to manage staff were not in place. Based on the study’s results, it would seem that a population-to-CHN ratio of 2,500 is desirable, but it is not a guarantee of success. Districts have considerable scope to increase or impede the effectiveness of CHNs as drivers of improved vaccine coverage.

Figure 30: Ratio of population to community health nurses over time, case study districts



District health service management drivers

During the fieldwork, the study team observed how essential good management practices were to improving RI performance. This is illustrated in the model of drivers (Figure 29) by the central position of “strong district management” and the drivers that it activates, such as “clear targets” and “valuing staff.” The investment by the MOH and the GHS in strengthening district health services through the 1990s is responsible for the capacity of district health management teams to have such a significant influence.

The strengths and weakness of management in each case study district have already been presented. This section synthesizes the impact of different management practices on improved vaccine coverage. Specifically, it examines practices related to 1) leadership and functioning management teams, 2) financial management, and 3) motivating the vaccination workforce. In fact, these three areas of practice are mutually reinforcing and together result in improved service delivery in communities. This section describes differences and commonalities in strategies employed and the effectiveness of those strategies across the four districts. By comparing and contrasting the practices and outcomes, it draws conclusions about:

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

Leadership and effective management

The study team spent considerable time distinguishing between relative roles of inspirational leadership and quality management. Researchers concluded that leadership vested in one person (typically the DDHS) can inspire a common vision and institute innovative practices, but these will be sustained only if the leader also creates strong district and subdistrict management structures. In Figure 29, the arrow running from leadership to functioning district management is dashed to represent its limited effectiveness.

The study team came to this conclusion after reflecting on the legacy of leadership in Ejisu-Juaben and Ho municipalities. Ejisu-Juaben had two district directors of health services through the 1980s and 1990s who created strong reproductive and child health units within government hospitals and health centers. They also forged links with communities, a system of community-based volunteers that is still viable, and lasting partnerships with NGOs and researchers. Those legacies have been used by the current director, herself a talented manager, to continue to improve RI performance in a new, resource-constrained environment.

The study team also noted that the current difficulties faced in the steady district are not due to the lack of a leader with a vision. The current director has an impressive career record of successful innovation; the difficulties in Ho municipality are caused by a lack of submunicipal management structures and shortages of essential EPI resources at some health facilities.

Effective district and subdistrict management

The study team found that effective health teams had these elements in common: clear roles and responsibilities; performance-based targets; and regular review meetings. If these, and the human resource management practices discussed below, are in place, RI performance will improve. Access to services would increase and communities would be more likely to use services.

CLEAR ROLES AND RESPONSIBILITIES

Each district and subdistrict must have someone responsible for the RI program. All four districts had the necessary positions filled in their DHMT. In the three districts with recent improvement, the lines of responsibility were also clear at the subdistrict.

In Krachi West, the responsibility for RI services at the subdistrict rested with the in-charge staff member, usually a medical assistant. It is telling that the poorest performing subdistrict in Krachi West was the one that was supported by the DHMT and operated out of the district office. This “subdistrict” did not have an in-charge, and the district public health nurse attempted to compensate for the lack of leadership by giving daily direction to the CHNs and midwife. In the other Krachi West subdistricts, the medical assistants were very aware of the workings of their immunization programs and expected to be held accountable at the quarterly review meetings.

In Ejisu-Juaben and A-O-B, the day-to-day responsibility for immunization rested with the field technicians (sometimes called disease control officers) or the in-charge staff member of the RCH unit. Most field technicians were male. They rode the facility motorbike and took responsibility for the cold room. Lines of responsibility could potentially be blurred since the CHNs were supervised through a nursing hierarchy and the field technicians would report to the disease control manager. The study team did not see any evidence that this caused a problem in these two districts, because in both cases the district public health nurse and the disease control officer both place a high priority on RI and worked as a team.

Ho, the steady district, did not have an effective submunicipal structure. CHNs shared the responsibility for RI and, as one study team member noted, when something is everyone’s job, nobody does it. This is the only district where the study team observed temperature charts that were not up to date.

Frontline workers also need clear roles and responsibilities regarding RI. In two improving study districts, the introduction of change started with a review of job descriptions. Management emphasized that the role of a CHN was to work with the community to promote and maintain health and reduce communicable disease.

One of the main responsibilities of a CHN was to immunize every child, using all of the tools at hand: mobilization and health education, monthly CWCs, home visits, defaulter tracing, and mop-ups.

Informants from DHMTs and staff at health facilities explained that CHNs were motivated when they clearly understood that RI was part of their job description. For example, the DDHS in A-O-B, before embarking on his program of reform, identified that staff motivation was weak. His first action was to show CHNs that according to their job descriptions, they were responsible for the health of their communities. The A-O-B strategy built on that responsibility by assigning a health team, led by a CHN, to every community. The study team observed another example of the use of job descriptions in Ho. At one health facility, a highly committed CHN made a number of improvements in service delivery in a short period. One of her first acts was to post job descriptions as a tool to justify her reforms.

PERFORMANCE-BASED TARGETS AND REGULAR REVIEW MEETINGS

There was a clear association between use of performance data and improving vaccination coverage. Each of the improving districts had institutionalized or revitalized monthly or quarterly meetings at which performance data was reported and discussed. In Figure 29, this relationship is illustrated by having good management, enabling clear targets, and regular review meetings; but the clear targets improve staff motivation only through the adoption of regular meetings. CHNs in all districts had targets in the form of the expected number of infants to be vaccinated each month, but only in the improving districts did CHNs expect to be held accountable for reaching those targets. Decisions taken at review meetings or meetings held at subdistricts or facilities before or after district meetings would result in additional actions to increase the number of doses given. These actions were usually to intensify home visits or defaulter tracing, or to open new outreach points.

The data that were almost universally used during these regular reviews was the simple comparison of the number of doses administered in one month with the number of doses in the previous month. Only the DHMT used cumulative totals. When subdistricts were unlikely to reach annual or semiannual targets, districts would initiate a mop-up exercise. Mop-ups required additional workers to assist the resident health team to visit each house to locate children who had never been immunized or children whose immunizations were not up to date.

Staff at health facilities were not able to interpret numbers more complex than monthly doses in a way that was meaningful for their practice. Monitoring charts were displayed in almost every facility visited, but none of the CHNs or field technicians interviewed spontaneously referred to them or their returns when discussing their immunization activities. Only about half of the health workers interviewed knew their target number of infants and the population in their catchment without referring to documents.

The study team regularly asked health workers to explain the pervasive phenomenon of fewer penta1 doses than penta3 doses. Health staff at facilities (and many members of DHMTs) were rarely able to give a plausible explanation or even recognize it as an anomaly, revealing their poor ability to deduce meaning from numbers. Usually when pressed to explain why it occurred, they would say that women in their communities left the area for delivery and the immediate postpartum period. However, movement of women to and from the communities should balance out. Although in some places close to a district hospital, many babies may have received a first penta dose during a postnatal visit, this could not explain the discrepancy in all cases.

Despite shortcomings in the interpretation of data, for the purposes of improving RI, monthly doses by facility or subdistrict combined with a credible estimate of total district population was sufficient for making decisions that led to improved vaccination coverage. The study team did not see evidence of more sophisticated data analysis in the three case study districts with recent improvements.

The essential driver of success is that progress toward the target number of doses was discussed in formal face-to-face meetings held either once a month or once a quarter. Meetings of this type are sometimes described as “naming and shaming.” However, the people interviewed did not see the meetings that way. When a field technician was asked if he felt shame when his subdistrict did not perform well, he replied, “You do not feel

shamed. You feel disturbed. Why others obtained this and I did not, so you are eager to go back” (A-O-B interview notes).

The interaction with peers at review meetings was just as important as the interaction with management. The Ejisu-Juaben director stated that the monthly meetings served as forums to help people share success stories. She gave an example of the Bomfa submunicipality adopting defaulter tracing and home visits after hearing about how it was done in the Kwaso submunicipality. The study team heard similar examples of peer learning in the other two improving districts.

Financial resource management

Sustaining or expanding RI services requires good district financial management, including securing funding, allocating funding transparently, and transferring the responsibility for spending money to the subdistricts and health facilities.

District health budgets are protected through the MOF, but all of the district directors interviewed reported that the core funding was not sufficient to cover costs of conducting RI outreach. The only external support currently available to all districts came through health impact rapid delivery (HIRD) funding — a flexible funding source for activities to address maternal and child health. Most of the directors were reluctant to use some or any HIRD funds for outreach. They preferred to reserve HIRD money for training programs or for intensive RI activities, such as mop-ups.

Therefore, directors needed to attract money from other sources. A direct application to a large NGO or bilateral donor is not an option, because districts have to go through appropriate channels in the MOH to receive these funds. Of the four districts, only Krachi West had noticeably benefited from specific injections of donor funding for RI, and that had been the purchase of boats 10 years earlier. The recent improvements in A-O-B and Ejisu-Juaben corresponded with the withdrawal of external funding.

A few informants with experience working at the national level reported that outstanding directors attracted money through internal advocacy. They advance their arguments for additional resources through the regional and national offices, emphasizing why their claim is of strategic importance. Basing their appeals on data and evidence-based proposals increases the chances of success. None of the current directors in the case study districts used this approach.

What the three directors of the improving districts had in common was that they looked within their district to obtain additional resources. A key informant with decades of experience in managing innovation in Ghana’s district health services told the research team that a good manager attracts resources; a weak manager wastes the resources he has.” Attracting resources can mean doing more with what is available. The Krachi West DDHS formed a strong partnership with the District Assembly, which gave the health service considerable financial and in-kind support. The DHMT also partnered with NGOs in the community. Although this did not result in receiving more money, it did lead to access to an outboard motor and additional staff for health education. Both Ejisu-Juaben and Krachi West used health facilities’ IGF to finance outreach and other activities that strengthened RI. Ejisu-Juaben worked closely with government and private hospitals, gaining greater access to mothers. Some of these sites hosted CHNs and were expected to supervise and support them.

The study team also found that transparent allocation of resources was an equally important driver of RI improvement, because it created the trust needed to unite teams around a common vision. All three improving districts used their regular meetings to make decisions about the use of special funding. In Ejisu-Juaben, there was a collective decision on which submunicipalities should be targeted for mop-ups using resources provided by the District Assembly. In A-O-B, cash prizes were awarded to high-performing individuals based on the data presented at the monthly meetings. A decision also was made at the monthly meetings to increase the monthly fuel allocation for each motorbike.

A powerful driver of improved RI performance was in transferring the control of funds from the district DHMT to the subdistricts and health facilities. As discussed earlier, inputs from the national government were

used more effectively if they were deployed to the facilities. Health teams also needed capacity to purchase fuel, pay for public transport, or arrange for minor maintenance. The mechanisms included imprest accounts, quarterly allowances, or the authority to use IGF. All of these mechanisms required that facility staff prepare budgets and conform to requirements for acquitting the funds, but the record keeping was not onerous. None of the informants mentioned reporting on the use of funds to be problematic. What informants reported was that the movement of money to the facilities enabled health teams to undertake their required duties and to take up other opportunities.

Shifting money to subdistricts and health facilities increased efficiency and motivation and resulted in more communities providing services more regularly. A member of the DHMT in Krachi West said that delegation to subdistricts had facilitated improved performance through reduced delays because subdistricts have their own imprest funds, motorbikes are maintained and repaired locally, and minor disputes are resolved locally. Many CHNs said that having control of the T&T (transport and travel) money locally was a key driver in improvements. In contrast, CHNs and in-charges in the steady district reported that they did not know how the amount of money they were given for T&T was derived, and a number of facilities did not have their own motorbikes or cold chain equipment.

Managing a routine immunization workforce

Virtually all members of the DHMTs in the three districts that had recent RI improvements named their hard working, motivated staff as one of the most important factors contributing to this change. In these districts, the study team saw similar levels of commitment. CHNs left for outreach clinics at dawn to meet mothers before they went to the fields. They carted vaccine carriers on home visits, gave health education talks, and asked after women who did not attend vaccination sessions.

The study team met several committed CHNs in the steady district who also had an obvious passion for their work, but this was not the common attitude. In Ho municipality, health workers' lack of commitment to their jobs was the most common barrier mentioned by the MHMT to improving coverage.

Each district had its own ways of supporting, encouraging, and motivating staff, but there were some common strategies that the study team considered to be drivers. If these practices are instituted in other districts, they are likely to have similar impact. The team discussed in the previous subsection the importance of clearly defining roles and responsibilities and having an unambiguous target or expectation of work that is widely understood; the study team was regularly told that these management practices improve staff motivation. Two additional practices were important for staff motivation: formal and informal supportive supervision, and tangible demonstrations of their value to the health service. These two practices were mutually reinforcing.

SUPPORTIVE SUPERVISION

Supervision is necessary to ensure that services are delivered correctly. It is a necessary adjunct to clear expectations of roles and responsibilities. The study team found that quality supervision did not just happen during formal visits with checklists and feedback sessions. In fact, some CHNs and field technicians considered the regular performance review meetings to be the equivalent of a supervision visit. When researchers asked about supervision, they would respond by talking about the meetings. Nevertheless, meetings did not substitute for formal on-site supervisory visits. In the three districts with recent improvements, supervision occurred regularly every quarter, usually with all members of the DHMT participating. The frequency of supervisory visits was reported to have improved in Ho recently, but some facilities reported not having any visits in 2010 and only one in the first six months of 2011.

Equally important to the formal visits were frequent informal visits and phone calls. These were common in the improving districts, particularly by either the public health nurse or the DDHS. The personal engagement between health center staff and management (particularly the DDHS) about the quality of their work was an important driver of staff motivation that led to improved performance.

A medical assistant from an improving district explained the positive aspects of visits:

The subdistrict staff is always happy to see the supervisors. They help to keep them up to date with new methods, new forms and new techniques. This is especially good when changes have been made to the way that RI is handled. Even though the supervisors come often to help, they are always available by phone, and the subdistrict staff will call them often.

— Interview notes from an A-O-B health center

Routine immunization was raised during most visits by management to facilities. Study team members were told that supervisors would look at the refrigerator and supplies and review the registration books and tally sheets. Upcoming changes to vaccine administration or storage procedures may be discussed, but most supervisory visits did not involve observation of the vaccine administration.

In interviews, management and fieldworkers were much more likely to identify the review meetings as a driver of performance than supervision. Formal and informal contact was a vehicle to reiterate issues brought up at the review meetings and to reinforce the personal engagement of management.

VALUING VACCINATORS

Another management practice that drove improved performance was the demonstration that management valued the work of community health nurses. In each district, the study team asked CHNs (in English) what motivated them to do their work. This question was usually interpreted to mean whether they were given financial rewards or incentives. Such payments did occur, but they were of fairly small value or not directly tied to performance. Krachi West distributed extra funding in the form of top-ups to salaries and as cash prizes made annually for the best performing staff members and facilities. In Ejisu-Juaben, it was expected that staff could keep any T&T money that they did not need for their duties, although this flexibility had largely disappeared since the facilities started to pay T&T. Annual bonuses were given in several districts. No cash payments were mentioned in Ho municipality.

More often than providing cash payments, improving districts provided in-kind expressions of appreciation, which management teams explicitly viewed as a strategy to improve performance. Such expressions included paying for accommodation in the district capital when staff went for meetings; providing two new uniforms a year; holding an end-of-year staff party; awarding prizes, such as wall clocks and small televisions; and providing meals or refreshment during meetings. Appreciation also was expressed by mentoring junior staff, supporting applications for further study or bank loans, and giving CHNs opportunities to attend regional meetings and workshops. The A-O-B director told the research team that managing staff well was the most important factor to improve immunization coverage. He described the methods he used:

We have had an explosion in number of CHNs in this district. CHNs like working here. I help with career development, school applications, loan applications, facilitating work-life balance of those who live away from husbands. The regional director sends staff on request and the mission hospital often has CHNs in training. Once the CHNs in training find out about the A-O-B district team, they lobby to join the A-O-B system. Districts do not have a specific quota assigned by the region but the region has a quota. As long as salaries do not come out of the district budget this is a good strategy for us. — Interview notes from A-O-B

The Krachi West director also named valuing staff as a driver of improved performance. For him, removing the minor annoyances that workers experienced on their jobs was an important motivator.

Summary of district health service management drivers

The study team was struck by the ingenuity that managers displayed to improve performance. The introduction of regular meetings to review progress sounds like such a simple intervention, but when combined with clear targets, facility-based authority and resources to make local decisions, and regular praise and supportive correction, it adds up to a powerful driver to motivate staff to increase vaccination coverage. In all three

improving districts, motivation strategies involved the personal involvement of the district director, backed by other members of the DHMT and subdistrict teams.

Having the director chair review meetings and conduct supervision visits is motivating for staff. However, regular monitoring and feedback and being attentive to problems, such as those that health workers experience with transport, has to be part of the culture of an organization and not just the style of a single leader.

Community-level service delivery drivers

The study team consistently saw that positive interpersonal relations between community health nurses and mothers were self-reinforcing. Many CHNs spontaneously told the researchers that they loved their jobs and believed they were saving lives. An appreciative community increases the degree of satisfaction that nurses draw from their work. Initiatives that brought services closer to communities resulted in greater appreciation by the community and more motivated staff. This virtuous cycle of good attendance and good service increased vaccination coverage through increasing the use of services. In A-O-B, for example, CHNs said that being assigned communities for which they were responsible made their job easier. The mothers in those communities informed the researchers that the nurses were friendlier since the new system was adopted. The health service management practices that have already been discussed drove some of the improvements in community-level service delivery. This section examines the drivers that made the communities more engaged with services. The most important of these drivers were involvement of community health volunteers, engagement of community leaders, one-on-one health education, and, in urban areas, promotion of services.

Supporting community health volunteers

Community health volunteers have been part of the Ghana health system since 1989. Originating as part of disease surveillance, their roles have expanded and contracted at different rates across the country, depending on the availability of externally funded programs, research projects, and the vision of the district directors. All four study districts had community-based health volunteers who were involved in RI and National Immunization Days. In all cases, volunteers were members of the community they served. Most volunteers were men, but some were women. Community health volunteers had a high profile in their community. They frequently sat as an adviser to the chief, and it was not uncommon for volunteers to become Assembly members. All of the volunteers explained that they volunteered because they had a passion for helping their community. When CHNs talked about “difficult” communities, they meant ones in which women did not come to the clinics. Often these were communities without an active volunteer.

The most common function for volunteers in RI was to mobilize attendance at child welfare clinics. They spread the word by systematically arranging for announcements through the gong gong beater (a form of town crier) or the community public address system on the day before the clinics. In between the clinic days, they mobilized women opportunistically by talking about the clinics when they encountered women doing their daily activities. They helped to identify children who had never been immunized or whose immunizations were not current by telling CHNs about births, defaulters, and visitors to the community. The volunteer was also the most likely person to encounter women who resist immunizations for their children, so it was the volunteer who took on the time-consuming counseling to convince them that vaccines will help keep their children healthy.

Some volunteers assisted with setting up the site for the outreach clinic. Usually held under a large mango tree, the site must be swept and a table brought out for the CHN and benches or chairs for the mothers and children. Often the actual work was done by other community members, such as the mothers attending the clinic, but the volunteer was still responsible. Where there was not a volunteer, the CHN would have to move around the community to let people know the clinic had started.

Volunteers were also valuable sources of information about the community. Volunteers would locate women whose children were due for a vaccine and bring them to the clinic. They would tell the nurses about recent births in need of a BCG injection. They also participated in intensive mop-ups in which every home was visited

to locate children who needed to begin or catch up with their immunizations. All volunteers helped with mass campaigns, including National Immunization Days. Unlike for their work on NIDs, volunteers were rarely paid for their work on routine immunization.

While the study team heard in each district that some volunteers assisted the nurses during the clinic session, this was universally practiced only in Ejisu-Juaben. There, municipality volunteers were a member of the health team involved in weighing babies or record keeping. Some volunteers in A-O-B, called community-based agents (CBAs), also assisted with weighing and record keeping.

VOLUNTEERS AND PERFORMANCE

With community volunteers playing so many important roles, it was not surprising that many CHNs mentioned them as a reason for RI improvement. Almost every staff member interviewed from Ejisu-Juaben health facilities named the volunteers an important driver. In Krachi West, all but one staff member at a health facility said that they worked with volunteers and that they were useful. Most Krachi West CHNs also said that volunteers were a key driver of success. Health workers in A-O-B also commented on the helpfulness of the CBAs, but only half named the volunteers as an important driver. The study team could not ascertain if the reason for not mentioning the volunteers as drivers was because they were not as deemed important or that informants considered the restructuring initiative to be more important.

In Ho municipality, volunteers were mentioned least often. The CHNs in the three rural facilities said volunteers helped them a lot. The MDHS and urban clinic staff did not mention volunteers at all, and others said volunteers were involved only in mass campaigns and sometimes in mobilization for routine immunization.

Each district had its unique history of how community volunteers operated within the health system. In Ejisu-Juaben, the strong partnerships between the university, NGOs, and the health service resulted in the creation of a major role for volunteers as participants in the health system. Training and incentive strategies enabled volunteers to provide health services. While this was no longer as prominent as it once was, during the study visit there was a community-based malaria diagnosis and treatment research project in one submunicipality that involved over 20 volunteers as frontline health workers. Volunteers met the doctor leading the research each month. In other submunicipalities, meetings also occurred, organized by the volunteers but with field technicians or other health staff present. Minutes of the DHMT meetings revealed that subdistricts were encouraged to put on parties and give prizes to honor volunteers. Several other health activities in which volunteers participated brought in small payments. Two CBAs interviewed were inducting their children into the volunteer role.

Volunteers in one community in A-O-B district benefited from a UNICEF-funded integrated management of childhood illness (IMCI) program. They were given training and some practical assistance, such as rain gear and bicycles, to assist them in their duties. In Ho, volunteers in some communities had been trained as Child Growth Promoters through an externally funded project, and these volunteers were also the ones most active in assisting during child welfare clinics.

Health service management played an important role in fostering active volunteers. The district directors of health services in Krachi West and A-O-B included more intensive attention to volunteers as part of their reorganization or reinvigoration of public health services. In both districts, the director played a hands-on role, discussing the selection of volunteers with chiefs and attending trainings and workshops for volunteers held by the districts or subdistricts. Also in both districts, the volunteers made the formal link between the community and the health service and were members of, or even chaired, the committee health committees. In the steady district, the MHMT was arranging for new volunteers to be selected by chiefs, and the team was awaiting funding to hold a training session.

The study team was repeatedly told that volunteerism was on the decline because of the pressures on people to earn a wage. However, the fact that volunteers remain such a vital part of health service promotion and delivery suggests that volunteers are not going to disappear soon. People willing to volunteer will always be a minority,

but the case study districts illustrate that with positive encouragement and support they can be recruited and retained.

Volunteers were involved in a range of programs, and the greater the diversity of roles and greater the interaction between the health service and the volunteers, the more involved volunteers were in RI and the more likely that health staff considered them to be important partners. The study team saw that management had an important role in recognizing the contribution of volunteers and engaging them. In Figure 29 this is shown by an arrow from district management to active volunteers and another arrow from active volunteers to motivated staff.

In summary, community health volunteers exist throughout the Ghana health system and were viewed as an important contributor to recent RI performance improvement. They were valued for the practical help they gave and their knowledge of their community. Any intensification of effort by CHNs, such as setting up new outreach points, undertaking home visits, or delivering health education talks, was made easier and more effective if done alongside a community health volunteer. Volunteers were present in some communities in the steady district, but rarely mentioned in interviews as a driver to improving immunization coverage.

Engaging community leaders and other partners

The health sector can be very insular. Despite the importance of the well-known social determinants of health and the benefits of engaging the community on health issues, too often health services act independently from other parts of society. In the improving districts, the study team found that strong multisector engagement was an important factor for RI improvement. The team observed the impact of partnerships with community leaders, such as chiefs and Queen Mothers; with formal organizational structures, such as Traditional Councils; and with the District Assembly executives and members. Partnerships with hospitals and private health care providers were also important.

RI services in the study districts were delivered close to the community through static and outreach clinics. RI set a high standard for other health programs to match. When the study team asked the Traditional Council members of Krachi West if they lobbied government for improved access to vaccinations, they said no. They explained that immunization services were already delivered “everywhere.” They were lobbying for more clinics to be built and for nurses to live in the communities.

For day-to-day issues, the community volunteer maintained the link between the community and the health service. Health workers at the subdistricts and facilities reported that the volunteers knew the community and that the community would be more likely to listen to them than to people from the health service.

Nevertheless, the support of local leadership was important. As mentioned in the district reports, despite the very strong community health volunteer program in Ejisu-Juaben, one woman in charge of an RCH unit told the study team that having chiefs and Assembly members directly involved in telling women they should have their children immunized would be a powerful motivator for women who were unsure.

One of the actions the DDHS in A-O-B took to redress a trend of declining coverage rates was to re-engage communities. He told the researchers that a few opinion leaders were becoming suspicious of immunizations, considering it a political issue. He introduced community-level training and reinvigorated community health committees as a formal avenue for dialogue between the community and the health service:

The community has been involved in health activities through the training and involvement of traditional leaders, volunteers and political representatives. This interaction has helped in demystifying health issues and enhancing participation of mothers in immunization and also improved social mobilization drives. Health committees exist in almost all communities. Each committee is made up of volunteers, traditional representative, Assemblyman and unit committee members, religious leaders and teachers.

— Notes from DDHS interview, A-O-B

The districts with the greatest community engagement were those which instituted regular communication between management and traditional leaders. Although CHNs almost always had good relations with community members, it was important that chiefs had opportunities to personally meet members of the district or subdistrict management team. This increased the likelihood that problems such as clinic attendance or staff behavior would be raised and dealt with early.

District Assembly members were most commonly involved in advocating for CHPS services in their underserved communities. Some Assembly members played a more active role in delivering health messages to their people, including the importance of immunizations.

A source of friction between community leaders and the health service revolved around the issue of accommodation for health staff. With the increase in CHPS services planned, there is the expectation that communities will arrange for staff accommodation. Many communities make an effort to provide quality accommodation, but at times what is offered is not suitable. The district and subdistrict management are responsible for their staff's safety, so the managers are reluctant to insist that CHNs live in inadequate accommodation. To a health manager, it is more important that health care workers attend the clinic and other duties every day rather than living at the center. The community, on the other hand, places a high value on resident health care workers. This conflict is likely to increase as more CHPS become functional. Other strategies to fund accommodation or require communities to meet certain standards may be necessary. In the steady district, where some CHNs commute to their posts, the study team witnessed the problems that can emerge when local accommodation is not provided or is inadequate, and its negative impact on routine immunization.

As described earlier, an involved community generated resources for health services. The community provided staff accommodation and clinic infrastructure, paid for the benches and chairs used at clinics, and loaned outboard motors. Continuous engagement with community leaders was an essential management practice that was enabled by the national policies of awareness raising and decentralization.

Health education and demand creation

The high level of public awareness and support of immunization resulted from the three decades of political commitment at the national level to EPI. The study team found that awareness was a precondition for the recent improvements in performance. However, continual health education for immunization remains important when awareness and coverage is high.

In all four case study districts, the study team was told that people were very supportive of RI. From CHNs, volunteers, mothers, community leaders, and management staff, researchers heard that women knew that children who were vaccinated were protected from “childhood killer diseases.” Adults had experienced the benefits of the elimination of polio and deaths from measles. Most of the people interviewed said that no one opposed immunizations. Some mentioned that a few women had concerns regarding side effects but could always be “convinced.” Few people interviewed knew of cases of resistance to immunization on religious or political grounds; in two sites in the case study districts, there had been a history of a religious organization opposing immunizations.

With knowledge and support for immunization and support so diffuse across society, the health messages were reinforced from many channels. In fact, everyone consulted took credit for educating people about immunization. Mothers said they informed each other about the importance of vaccinations. Community volunteers proudly said that they were the ones who promoted vaccinations and convinced mothers who were reluctant or busy that they must bring their babies to the CWCs. CHNs stressed the health education that they did at community durbars and churches, at the start of every CWC, and one-on-one during the vaccinations, on home visits, and during mass campaigns. Many CHNs named intensive one-on-one health education as the reason for recent improvements in RI coverage.

The reason health education remains a driver is that when vaccination coverage is high, it is more likely that children who lack immunizations do so because their parents decided not to have them immunized.

Knowledge of immunization is often high in communities with high coverage compared to communities where coverage is low. Failure to immunize children in communities where knowledge is limited might stem from parental concerns about side effects, religious beliefs, or rumors of conspiracies. Whatever the reason, the most effective strategy to counteract resistance is intensive health education in homes and in communities. CHNs reported that home visits were the most effective strategy for identifying families of unimmunized children and convincing them to immunize their children. When such appeals were not effective, CHNs and volunteers made an effort to elevate the social pressure to accept immunization by engaging a traditional or religious leader or acute care provider to persuade the parents.

The steady district was not any different in the importance it put on health education. However, with weaker engagement with communities, less motivated staff, and more limited transport, it is probable that health education was not conducted as vigorously as in the other study districts.

Promotion of urban services

In rural Ghana, it is almost inconceivable that women would be unaware of where and when to vaccinate their children. As described above, community volunteers are very involved in mobilizing women to attend CWCs. Where there is no volunteer, CHNs undertake a similar role. The consistent maintenance of rural outreach points also engenders a high level of community knowledge. Many outreach clinics have been held at the same place and on the same days for decades. Older women who took their children for vaccinations can still give reliable information to young women with babies. Good networks among rural health care workers mean that if a woman has antenatal care or delivers locally, her provider will tell her accurate information about vaccination services.

The study team heard from one informant that urban populations were better educated and lived closer to services, so it was not necessary to have urban strategies to promote vaccinations. Why, then, did Ho township have such a low vaccination coverage rate? Urban areas need continuous promotion of where and when services are available, but the methods to promote services used rurally are not available or effective in urban settings. In most districts, the study team heard stories about a mother who moved to a town and learned where to access vaccine services from vaccinators during Child Health Week or on National Immunization Days. Poor attendance at outreach clinics in Ho township was attributed by CHNs and mothers as due to poor promotion of the times and locations. Even some women in the small district capital of Kete-Krachi were not aware of where and when CWCs were held. Small urban centers are heterogeneous and have a high proportion of recent immigrants. Active volunteers are rare in most urban areas. Of the districts visited, only Ejisu-Juaben, which has a large urban population, had active urban volunteers. The greater need for paid employment, plus the lack of strong community structures in city neighborhoods, makes identifying and retaining volunteers more difficult. But as Ejisu-Juaben showed, it is not impossible.

The study team learned of some possible solutions appropriate to urban environments. In Krachi West, a recent initiative to hold clinics on market day was helping to overcome access problems. At the Ashanti regional health office, the study team was told that the coverage in Kumasi, Ghana's second-largest city, had recently increased substantially through offering vaccinations daily at a site near the market and through the opening of other outreach points, combined with more health promotion. Some informants suggested that local-language radio stations were the most effective means of communicating with people living in cities. In setting up new urban outreach points, it was important to map out the city to identify areas where women are not making use of existing health services. In Ejisu-Juaben, the health service realized that women from a Zongo community were not going to nearby services. After discussing the issue with local leaders, a suitable venue and time was identified for an outreach clinic to be held in their community.

Two methods tried in the study districts were not successful in improving vaccine coverage. First, hospitals in A-O-B, Ejisu-Juaben, and Ho opened CWCs in their public health units. These were popular with some women who associated hospitals with higher standards of care, but the hospital public health units were poorly integrated with the district immunization programs and did not have the capacity to trace defaulters. The public health nurse at the Ho Regional Hospital closed its child welfare clinic for those reasons.

The second unsuccessful method was tried in Ho. Because finding suitable places to hold CWCs in urban areas is challenging, CHNs approached local leaders for the use of their homes. The leaders were also supposed to inform women about scheduled clinic times. These sites have limited success, as the sites do not look like places where clinical services are given and local leaders do not have time to inform all of the mothers in the catchment.

Summary of routine immunization drivers

This study explored the reasons for RI improvement and stagnation by scrutinizing administrative records and interviewing informants within and outside of the district health services. From this data, the study team developed a model describing how the national government, district health management teams, and community leaders and volunteers all contribute to driving or inhibiting RI performance.

Table 6 summarizes the drivers into five broad groups. From the steady district, the study team learned that it is critical to have essential EPI equipment and human resources in place at the facilities that are responsible for vaccination delivery. Once those basics are met, quality management practices are needed to praise or correct the health workforce and empower health teams to be responsive to the community. Community engagement is also critical to fully vaccinate a high proportion of all infants. Districts with recent improvements put effort into supporting community health volunteers, maintained regular dialogue with community leaders, and devoted staff time to health education and promotion. Table 6 also shows the pathways linking the drivers to improved performance.

The drivers included in Table 6 are not new concepts in immunization programs. The importance of each has been recognized for 30 years. The case studies showed that in successful districts, the management team adapts well-known approaches to its own staff and communities. Each improving district faced unique challenges and opportunities. They used initiative rather than waiting for extra external funds, a training program, or a coverage survey to motivate their staff and involve communities. The final section will discuss how to foster this innovation elsewhere in Ghana and sub-Saharan Africa

Table 6: Summary of drivers and their effect on routine immunization performance, Ghana district case studies

Groupings of drivers	Specific drivers	Pathways to improved performance
Essential EPI infrastructure in health facilities	<ul style="list-style-type: none"> • National political commitment and well-functioning immunization program • Cold chain equipment and adequate transport at every health facility offering fixed services • Adequate staffing levels of vaccinators 	<ul style="list-style-type: none"> • Maintained supply chain • Capacity to expand or intensify services to the community
Clear roles and responsibilities	<ul style="list-style-type: none"> • Well-functioning district and subdistrict management structures with clear RI roles and responsibilities • Supportive supervision to ensure that individuals are capable and motivated to perform their responsibilities 	<ul style="list-style-type: none"> • Motivated staff • Maintained supply chain • Regular vaccination clinics, defaulter tracing and health education
Regular review meetings	<ul style="list-style-type: none"> • Clear performance targets • Monthly or quarterly meetings with subdistrict or facilities teams to review performance • Praise and correction of performance • Peer exchange of service delivery solutions 	<ul style="list-style-type: none"> • Motivated staff • Data informed decision making • Increased skills to improve community level service delivery
Autonomous local health teams	<ul style="list-style-type: none"> • Transparent allocation of financial and other resources to subdistricts and health facilities • System of accountability 	<ul style="list-style-type: none"> • Motivated staff • Capacity to adapt services which are appropriate to communities
Community engagement	<ul style="list-style-type: none"> • Regular interaction with community health volunteers • Good communication with traditional and political leadership • Involving communities in decisions about service delivery 	<ul style="list-style-type: none"> • Improved utilization of services • Additional capacity for mobilization, defaulter tracing and health education • Additional resources for health service delivery

Chapter Five: Discussion and conclusions

Strengths and limitations of ARISE study in Ghana

Although many reviews and evaluations of Expanded Programme on Immunization services in Africa have used mixed methods, ARISE is unique for the volume of data collected through open-ended and semi-structured interviews. For example, the rapid evaluation of the implementation of the Reaching Every District (RED) strategy in five African countries conducted only seven interviews in each country, four at district level (Ryman et al., 2010). The 2007 evaluation of RED implementation visited many more countries and districts, but the researchers did not speak with community members (USAID/IMMBasics, 2007). The ARISE study in Ghana conducted more than 100 interviews with individuals and groups, and observed at least 10 child welfare clinics and outreach sites over four weeks of fieldwork.

The mixed-methods approach enabled triangulation of results. Findings were confirmed through interviews with informants at national and regional levels and at district health administrations, district assemblies, health facilities, and communities. Reports of positive improvements were tested against documented improvements in quantitative RI system indicators, such as coverage, logistics, supply, and storage.

The second methodological strength of the study design was its focus on drivers of positive change rather than on barriers and shortcomings. The ability to make explicit comparisons and contrasts between districts with recent RI improvements and a district with no improvement was a strong methodological advance over the normal national evaluation approach, which asks only which proportion of all districts sampled demonstrated the desired practices and not which practices are associated with high performance (Ryman, et al., 2010; USAID/IMMBasics, 2007).

A persistent criticism of health service research, including research regarding RI system strengthening, is that the focus on barriers is not relevant to managers who want to identify evidence-based strategies that work (Bosch-Capblanch, et al., 2011). The methodological approaches that have informed the study design, such as realist evaluation and positive deviance, offer more nuanced understanding of how health systems work and provide more practical guidance to managers operating in the real world (Marchal, et al., 2010a; Marchal, et al., 2010b; Pawson, 2002; Pawson, et al., 2005).

The addition of a steady district as one of the case studies increased analytical rigor. Following the realist evaluation approach as well as grounded theory development, data collection and analysis were driven by intermediate theories that linked potential drivers to their context and performance outcomes. This sharpened data collection ensured that enough information was collected to test potential drivers and reduced the scope for bias.

There were limitations as well. The ARISE in-depth study methodology was intentionally designed to be non-random and is therefore not representative of districts in Ghana. The findings should not be interpreted as relating to all of Ghana's districts. Still, the case study methodology has uncovered information about recent, successful implementation of RI services in a range of specific contexts that may be relevant to at least some other districts in Ghana. Greater opportunities for generalization will come from the synthesis of all 12 ARISE case study districts from Ghana, Cameroon, and Ethiopia.

The results may be relevant only for districts that had not already achieved high performance by 2008. As shown in Figure 9, the case study districts were not among the districts with the highest penta3 coverage. Districts that reached near universal coverage earlier may have employed other drivers.

As noted, the use of a steady district to test the importance of drivers identified in the districts with recent improvements was a methodological strength of the ARISE design. The analysis highlighted many ways in which the steady district was different from the others. The steady district had more people and more health facilities. It had fewer of the essential elements of EPI infrastructure and, importantly, approximately one-third

of the population lived in the regional capital. It is legitimate to ask if it was a suitable comparison district. On the whole, the study team would argue that it was. First, not all of the improving case study districts were rural. Ejisu-Juaben municipality had the same proportion of an urban population and a similar, though not as extreme, shortage of EPI infrastructure. Ejisu-Juaben had achieved a higher coverage rate than Ho municipality using district management and community engagement practices that were very similar to those employed in the two improving districts with a smaller and largely rural population. As the steady district, Ho illustrates the urban environment in which the great majority of Ghanaians who have not been immunized or whose immunizations are not current now live.

Ghana findings in the wider context of routine immunization research and evaluation

This section examines the external validity of the study team's findings by comparing them with results from national reviews of the Ghanaian health system and EPI performance in particular, as well as with other health systems research. The greater the similarity across settings and methodologies, the more confidence can be placed in the results. The analysis is structured around the five groupings of drivers shown in Table 6.

Essential EPI infrastructure

Districts need adequate EPI infrastructure if they are to achieve and sustain high RI performance, and these inputs must come from the national level.

The Government of Ghana, along with development partners, has invested considerable time and effort to ensure that the vaccine supply chain is robust. Indeed, the study team observed that all districts were able to obtain a reliable stock of vaccines and ancillary supplies from their regional health service, with minimal experience of shortages.

Another essential immunization infrastructure need was adequate staffing. Each case study district had the full component of DHMT members to run its RI program. That is, there were no vacancies in the positions of senior disease control officer and public health nurse. It is noteworthy that the senior disease control officer position was vacant for six months in the steady district and had been filled only three months prior to when the study team conducted its fieldwork. The officer had taken up the role of EPI coordinator rather than delegating the responsibility. The numbers of community health nurses had increased in all districts, and shortages were not raised as a constraint. However, only two of the four case study districts had field technicians based at subdistricts to oversee RI and other disease control activities. Elsewhere in Ghana, securing an adequately sized workforce is a major challenge for district health services (Adjei, et al., 2010; IOB, 2011), so the case study districts may have been unusually fortunate.

The study team identified cold chain equipment in each fixed vaccination site as an essential resource. Without functioning cold chain equipment, offering regularly scheduled static and outreach clinics becomes much more complex and time consuming. About one-quarter of the fixed sites in the steady district did not have functioning cold chain equipment. In other case study districts, functioning CHPS sites lacked either the equipment or reliable power. In these cases, the CHPS did not offer their communities a better vaccination service than when they were serviced through outreach. The recent assessment of vaccine management noted deficiencies in cold chain equipment (Ghana Health Service, 2010).

Vehicles are another component of essential EPI infrastructure. Vehicles are needed to collect vaccines from the regional cold room and to mobilize teams to service hard-to-reach areas, some of which can be accessed only by boat. Subdistricts or health facilities need vehicles to collect vaccines from the district and to conduct outreach. The provision of vehicles has traditionally been the responsibility of the national government, with assistance from development partners. Recently, districts have been allowed to enter into lease purchase arrangements to acquire vehicles with internally generated funds. This increases flexibility, but risks disadvantaging districts without the capacity to earn money. In the latest medium-term health sector plan, the government recognizes the lack of adequate budgetary allocation for replacing vehicles (Government of

Ghana, 2011b). The study team found that in the steady district and also in Ejisu-Juaben, the lack of motorbikes and four-wheeled vehicles for health facilities and subdistricts is constraining the efficient delivery of outreach and supportive activities, such as home visits.

A Ghanaian analysis of district health service capacity, which was part of a multinational investigation into capacity building, used the five core capability (or 5CC) framework (Adjei, et al., 2010; IOB, 2011). The first of these competencies was termed “act and commit.” What the phrase signified was that organizations need adequate resources to perform the required actions and to be able to commit to future actions. It is this foundational EPI infrastructure that the ARISE Ghana team found to be essential in the case study districts and which, when lacking, no amount of district management skill could overcome.

Functioning district and subdistrict management

The size and complexity of the case study districts varied, but the most salient point of difference between the RI programs in the improving districts and in the steady district was in their management capabilities.

The evaluations, reports, and annual plans of Ghana’s immunization program regularly recommend improved supervision or training as a solution to system barriers or weaknesses. The district-level and community-service delivery level drivers identified by the study team were primarily achieved through good management practices that increased staff motivation and fostered team work and local problem solving.

Good management practices identified in the study were: clear roles and responsibilities; performance targets; mechanisms for rewarding and correcting staff through cash, in-kind incentives, and supportive supervision; transparency in the allocation of resources and other decisions; and the ability to attract new resources. These are not universal practices in all of the country’s districts health services. Ghana’s latest medium-term plan for the health sector states that “there is no effective staffing norm in place and the levels of staff commitment, productivity and attitude to work has been questioned in several reviews” (Government of Ghana, 2011b, p. 10).

Complex organizations such as district health services require a complex bundle of management strategies. Recent research conducted in two of the three regions that formed the ARISE study explored how hospital management used various human resource processes to encourage commitment, trust, and reciprocity between staff and management (Marchal, et al., 2010a; Marchal, et al., 2010b). The researchers found that the administrators improved hospital performance through:

- Instituting regular meetings with unit heads and requiring unit heads to hold meetings with their staff
- Explaining the rationale for change and communicating and celebrating success with staff and the wider community
- Decentralizing decision making and problem solving to units
- Providing regular rewards and opportunities for learning and promotion to high-performing staff
- Increasing visibility and accessibility of the senior management team

Other research has pointed to many of the same findings. A study of two high-performing district health services and one poor-performing service found that the successful districts had action-oriented leadership that established good two-way information flow between the DHMTs and health facilities, and worked hard to achieve objectives through innovation and “bold decisions” about using internally generated funding (Adjei, et al., 2010).

These strategies are strikingly similar to those employed by the DHMTs in the three ARISE case study districts with improving performance. They illustrate the importance of raising staff morale as an essential component of improving RI performance and the need to combine strategies that inspire and reward workers and management while also demanding accountability from them.

Conventional training and supervision are not a guarantee for good management practices. As has been noted, too great a reliance on training or the direction of supervisors can be a crutch for poor managers who wait for

external interventions before committing to changes (Adjei, et al., 2010). Many people interviewed by the study team did not mention any training program that they regarded as a driver to improving RI performance. This does not mean that the improving districts did not have a culture of learning, but that the learning occurred within and between teams at the district, with some external input from reports of practices in other districts gleaned from recently transferred staff or meetings.

Performance review and use of data

The importance of district performance review meetings held at least quarterly (or, ideally, monthly) was identified as a strong driver in all three improving districts and absent in the steady district. The 2005 and 2007 RED evaluations involving a number of African countries noted that review meetings were important and occurred in most districts at least annually (Ryman, et al., 2010; USAID/IMMBasics, 2007). Their performance stories of best practices highlighted districts that held monthly meetings.

In the improving case study districts, microplanning was done at these regular meetings, not just once a year but every month. The meetings are a reflection of the Ghanaian health sector planning process, which involves annual district meetings incorporating the district assemblies and other decentralized services, up through the regions and to the GoG and Partners Health Summit (GAVI & Government of Ghana, 2005). A motivation for regular district review meetings was to ensure that the district would be able to report good performance at the half-yearly regional meetings.

Health workers viewed the performance meetings as a form of supervision or training. In the words of one community health nurse, the use of regular informal as well as formal contact with management “kept us on our toes.”

It was at these meetings that data on the number of vaccine doses administered monthly gained meaning and became information for action to improve performance.

The study team saw many shortcomings in the development and use of immunization-related data. There was evidence of chaotic storage of monthly returns, failure to back up data, and a poor understanding at the facility, subdistrict, and, sometimes, the district level of the reasons and implications of a negative dropout between penta1 and penta3. In three of the four districts, CHNs were using hand-drawn registers to register children and record vaccinations. These problems were raised in the 2007 EPI Annual Report and data quality audits (Government of Ghana, 2008; UNICEF, 2009).

However, these shortcomings did not constrain program improvement, suggesting that quality data management and use, as recommended in many EPI reviews, may not be as necessary to performance as national and international advisers seem to believe. While efforts to improve these shortcomings may be valuable, the study team found that very simple measures meaningful to everyone — number of doses, for example — were adequate for decision making and critical for staff motivation and empowerment.

The study team was not shown written microplans for RI in the case study districts. Although management teams could articulate their tactics for achieving or maintaining high RI rates, they rarely documented them in an annual plan complete with strategies and actions. Written plans at the facility level were limited to itineraries for child welfare clinics.

Lack of reliable population denominators is a pervasive problem in RI programs and should be addressed, but this gap should not be allowed to become an excuse for limiting RI efforts. All of the district management teams expressed some dissatisfaction with the available population estimates and targets, which is understandable given the probable changes in fertility, infant mortality, and rural-to-urban migration that have occurred since the last census was taken in 2000. To their credit, DHMTs and health facility staff did not pretend that population estimates that were clearly too low were in fact accurate. Where immunization coverage rates appeared to be over 100 percent, they would use their knowledge of communities to alter the target or intensify activities to ensure that all children were being reached.

The Ghana Health Service has invested in integrated health information systems and piloted the use of PDAs to collect data at the point of care. The use of computerized health information systems for management purposes varied greatly among the case study districts and had no relation to the quality of the immunization program. While improved data collection would be of value, it is doubtful that computerization down to the subdistrict or health facility would make a positive impact on RI performance.

Autonomous subdistrict and facility teams

All district health administrations are affected by the delays and unpredictability of the disbursement of funding, especially from the GoG, and this has been identified in other studies as a barrier to improvement (Asante, Zwi, & Ho, 2006; GAVI & Government of Ghana, 2005). Financial management in Ghana, as in many low- and middle-income countries, requires flexibility, innovation, and strategic prudence (Asante, et al. , 2006).

The principal recurrent costs of the RI program for districts is for transport to outreach clinics, whether for fuel and maintenance for vehicles or for hiring private transport. District funds are also used to service some hard-to-reach areas, conduct mop-ups, and run training. Lack of funds was not raised in any district as a reason for cancelling services or supervision visits. Management in the three districts with recent improvements were adept at using the resources they had in ways that ensured that their RI programs did not suffer, including encouraging high levels of staff commitment; the study team often heard that CHNs paid for their own transport to communities. Two of these districts had made their recent increases in coverage in a context of less funding than they had a few years before. Despite the declines in funding, all three district directors of health services made it a priority to get money in the hands of their subdistrict teams to improve the efficiency of their outreach. This funding was of critical importance, and without having that authority it is doubtful that regular meetings and other motivational techniques would have made a difference.

Community engagement

Engagement of community volunteers was another important driver identified by the study team. The RED implementation evaluations also found community volunteers were a vehicle to link services with communities. All nine countries included in the 2007 evaluation had active community volunteer programs, an increase from 2005. The study team found that the tasks performed by the volunteers varied between districts and even between communities in the same district. The arrangements reflected the history of volunteers' involvement in other public health programs and the degree of interaction and support from the DHMTs. Volunteers were less prominent in urban communities, and this may be a missed opportunity, as some districts used urban volunteers effectively.

The value of the volunteers lays not in delivering RI services, but in their regular involvement in and commitment to mobilization, defaulter tracing, and opportunistic health education. In fact, research from Ghana suggests that giving too much responsibility to volunteers for direct health care provision does not improve child health and may even be detrimental (Pence, Nyarko, Phillips & Debpuur, 2007). Volunteers can be the key to the health workers' access to the community, and health workers who worked with volunteers told the study team that they could not do without them.

The national EPI plans recognized the importance of community engagement and have considered it a weakness in the system. The 2010 to 2014 comprehensive plan for immunization names one of the system weaknesses to be “minimal involvement of the private sector and community in planning and implementation of services especially outreaches.” It proposes increased advocacy and communication through training of health workers and greater engagement with community leaders and media, including through regular meetings and feedback sessions.

However, the same plan is virtually silent in relation to community health volunteers. It mentions volunteers only in relation to National Immunization Days (Ministry of Health & Ghana Health Service, 2010). Stakeholders with a national perspective who were aware of the work of volunteers spoke positively of them, but there was also a view that the program was unsustainable. There was a concern that the pool of people

willing to give their time for free was dwindling, and that it was not possible for any payments or incentives be given to volunteers for RI work. They viewed the volunteers as principally participating in the NIDs and some local promotion of CWCs. Similar views were heard in the districts, but in most cases CHNs and field technicians in the improving districts reported that volunteers were very important to RI. Two DDHS expected facilities to use IGF or other resources to provide volunteers with incentives in the form of refreshments or travel money, and there were reports of allowing volunteers to collect small monetary gifts from clients to pay for costs associated with their work.

Although community volunteers comprised the most important mechanism for district health services to engage the community, the successful districts also formed other partnerships that were critical for gaining direct support, including financial and in-kind resources, as well as indirect support in advocacy. The district directors of health services from the improving districts did not form partnerships with international NGOs. Instead, they effectively mobilized support from local partners, most particularly the district assemblies, the hospital and private health providers, and traditional leaders. These partners promoted the benefits of immunization, referred patients for immunization, and provided sites for CWCs.

Other district health service strengthening approaches

The study team's findings resonate with a strong strand of research and programmatic thinking that has emerged during the past decade. These approaches use a health systems perspective to assess and intervene to produce better health outcomes through improved service provision.

Reaching Every District approach

Several stakeholders have noted that the ARISE in-depth country studies resemble the Reaching Every District (RED) approach to improving EPI services by strengthening district health service capacity. Like RED, the ARISE study focuses on district RI systems and seeks to identify the drivers of improved performance at the district level. The research instruments collected information on RED's key components: 1) planning and management of human and financial resources, 2) supportive supervision, 3) reaching target populations, 4) community links with service delivery, and 5) monitoring and use of data for action.

The evaluations of RED implementation concluded that all five RED elements were implemented to varying degrees across the countries and that it was not possible to say which element was the most important (Ryman, et al., 2010; USAID/IMMBasics, 2007).

Table 7 shows the district-level drivers found by ARISE Ghana against the relevant RED elements. The analysis confirms that the RED approach is consistent with recent improved RI performance. Good management, community engagement (especially through community volunteers), and regular performance review meetings were critical for achieving recent improvements in the context of an existing outreach system and the essential components of district-level planning. Some of the widely promoted tools for implementing RED were not as strongly associated with the improving districts; microplanning, formal supervision, and use of the full set of data available were not drivers in the case study districts. The RED approach is proposed to be effective in all districts, regardless of the level of performance. In the ARISE Ghana study, the presence of essential EPI infrastructure at the health center level was a precondition for these good district management practices to be effective.

Strengthening health systems

Beyond recent examinations of the barriers and positive drivers in RI, another recent intellectual and programmatic discourse has been in strengthening health systems. Another assessment of Ghana's EPI used a framework of system-wide characteristics that influenced the capability of district directors of health services to make significant improvements (GAVI & Government of Ghana, 2005). These characteristics, originally devised by a McKinsey report for GAVI, identified:

- Political and financial commitment
- Physical infrastructure and equipment / reach of primary health care
- Monitoring and information system
- Management of delivery / human resources
- Social mobilization and demand creation

The study team also identified these characteristics as important. What is encouraging is that with essential, and sufficient, national inputs, districts could turn these various factors into positive drivers of performance.

The World Health Organization's four core functions of effective health systems are financing, creating resources, delivering services, and stewardship (2000). These functions also reflect the ways in which the improving districts were explicitly reforming their health services. The districts' strategies for improving RI performance include using creative ways to gain additional funding, delivering more services closer to communities, and advocating to a range of stakeholders the importance of vaccines and routine immunization.

Emerging issues

Case studies are bounded by time and place. They do not predict what will work if the context changes dramatically. However, the ARISE Ghana case studies do give some insights into how district health services will respond to emerging challenges. Five developments in national health policies will become increasingly important to RI performance in the districts:

First, with the passage of legislation in 2009, the Government of Ghana has committed itself to decentralizing health services to the district assemblies. The district directors of health services will report to the chief executive officers of their district assemblies and receive money for recurrent expenses from the Common Fund.

Second, through the National Health Insurance Scheme, the IGF of the hospitals and large health centers is increasing dramatically. District health administrations have not usually had much control of IGF of hospitals and little capacity to raise their own IGF. But as two case study districts demonstrated, if the funds can be harnessed, they represent an excellent source for covering recurrent expenses and making additional strategic investments.

To be effective in these new contexts, district directors of health services will have to be able to communicate the importance of RI, persuade district assemblies and hospital administrators to support it, and negotiate the terms of that support. These tasks will require complex management skills that go far beyond microplanning. The kind of partnership building and community engagement employed by the DHMTs the study team saw in the improving districts will be essential under this new role as an advocate for better health.

The third development will derive from the pressures that increasing urbanization will place on district RI programs. New settlements and lack of traditional social structures will require new methods of engaging with the public.

The fourth development, which began unfolding in January 2012, is the introduction of new antigens in the Ghana EPI schedule. Every link in the study team's map of drivers of improved RI performance (Figure 29) will be under new stress. There will be a need to ensure adequate vaccine supplies and adequate transport, keep staff motivated, and keep the community supportive of vaccinations. Though presenting challenges, these key drivers can also be the mechanisms that will enable district services to perform at a higher level.

Table 7: An alignment of drivers of improved routine immunization performance found by ARISE Ghana with the Reaching Every District core elements

Reaching Every District element	ARISE Ghana drivers
<p>Planning and management of resources</p>	<p>The districts with recent improvements have made significant changes to their management of staff and resources, and there were important drivers of their success. A countrywide increase in the number of CHNs was influential but not as important as good management practices.</p> <p>Planning occurs but does not take the form of microplans. Various components of planning, such as itineraries for outreach, strategies for improving coverage, maps, and coverage charts, were in evidence. Two of the three directors of district health services had undertaken a situational analysis before introducing changes.</p>
<p>Reaching target populations</p>	<p>RI services are delivered through outreach clinics in Ghana and were not a driver of recent RI performance, although they were an essential part of the context. In areas with high immunization coverage, CHNs reported that to reach children who had never been immunized or whose immunizations were not current, home visits were necessary. Urban RI performance improved when outreach services were offered at places that were convenient and acceptable.</p>
<p>Linking services with communities</p>	<p>Engaging community volunteers in RI and other health programs was a strong driver for improved services, because the volunteers assisted the CHNs through their work and through their knowledge of the community. Districts with improved performance prioritized engagement with volunteers and community leaders.</p>
<p>Supportive supervision</p>	<p>Quarterly supervision is an indicator of good management, but was not identified as a driver of RI system performance on its own. Other management practices were found to be more motivating.</p>
<p>Monitoring for action</p>	<p>Regular (monthly or quarterly) review meetings are essential. At the meetings, staff from subdistricts or facilities can present the number of vaccine doses they provided in comparison with their targets, and discussions can be encouraged among peers to promote problem solving. Data requirements for improvement are minor, and even unrealistic denominators did not deter performance in the three improving districts.</p>

The fifth development stems from Ghana's drive to promote community-based health planning and services. Delivery of services close to the community has been shown through a decade of collaborative efforts between the Ghana Health Service and outside researchers to be critical to reducing childhood mortality. Higher vaccination coverage has been the principal mechanism by which this reduction has occurred (Awoonor-Williams et al., 2004; Awoonor-Williams, et al., 2007; Nyongator, Awoonor-Williams, Phillips, Jones & Miller, 2005)

The study team's interviews with respondents from the national and district level, combined with feedback from the stakeholder workshop, where the team presented its preliminary findings, indicated that the CHPS strategy of placing a nurse and health clinic in underserved communities may help foster improvements in immunization programs. In contrast, however, the study team found that from the perspective of routine immunization, CHPS did not necessarily offer a better service than monthly child welfare clinics at outreach points. Informants from all levels were in the process of reconceptualizing what a "functioning" CHPS should include, and there was no uniformity in the services to be offered, in staffing levels, or in the rationale for establishing compounds in specific locations. The study team visited CHPS that had five or more CHNs and conducted extensive outreach programs. It also visited CHPS staffed by a single CHN who commuted from a larger health facility. Many CHPS visited did not have cold chain equipment. An expansion of CHPS, at least in the short term, is likely to put more pressure on existing health centers to support these smaller facilities in conducting routine immunizations.

Conclusions

Everyone who participated in the ARISE Ghana project, from senior officials in the Ghana Health Service to district directors and accountants, community health nurses, community volunteers, and chiefs, is committed to saving children's lives through vaccinations. The ARISE Ghana team is convinced that this widespread commitment, which has been a part of the national immunization program from its beginnings, will enable districts to meet these challenges and continue to strive to offer the best possible RI program.

The Ghana district case studies have demonstrated the importance of national, district, and community drivers to improve RI performance. Together, the drivers provide the essential inputs of vaccine supply and storage capacity, the motivated staff working as a team, the processes that deliver the vaccines to the community, and the supportive public that uses the service. They deliver the right supplies and equipment to the right people to deliver the services in the right places to reach every child.

The successful districts implemented good management practices in different ways, using what resources were available. That capacity to innovate in order to achieve a clear and common goal was what drove performance to near universal vaccination coverage.

The drivers of RI performance improvement identified in the four district-level case studies in Ghana have a number of practical policy implications for other sub-Saharan districts striving to maintain or improve immunization coverage at over 80 percent.

First, it is not sufficient to have essential EPI equipment and staff at the district level. These resources must be deployed to the health facilities responsible for vaccine administration. National governments should allocate resources based on a minimum standard that includes maintenance and replacement to ensure sustained service delivery capacity. To maintain a high level of coverage, every facility must be adequately resourced. It is no longer sufficient to concentrate solely on ensuring that adequate resources are available at the district level.

Second, further increases in RI performance depend on increased and improved investment to strengthen district health services and to build and support functioning community-based health services that have workers who are motivated to achieve targets and have access to the financial and other resources needed to act locally. Fostering good district management practices cannot be distilled into a simple checklist. District and subdistrict managers need mentoring, opportunities to learn from their peers, and recognition for introducing

innovative practices. This will be a more effective way to improve management capacity than holding workshops and developing microplans.

Third, community engagement is vital if district health services are to be able to maintain high vaccination coverage and introduce new vaccines. In the next year or two, Ghana will embark on a new phase of decentralization that will see greater control of resources by district assemblies. Increasingly, district health directors will need advocacy and negotiation skills to secure financial and political support for routine immunization outside of the traditional district health system.

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