

PAPER HEALTH REGISTERS PROJECT CASE STUDY:

GHANA'S SIMPLIFIED REGISTERS

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EXECUTIVE SUMMARY

During the past 15 years, Ghana has made significant efforts to expand primary health care services and in turn improve maternal and child health. The Community-Based Health Planning and Services (CHPS) program constructed health posts in rural areas and moved nurses from sub-district health centers out into the communities. Studies of CHPS have demonstrated positive outcomes for infant mortality and family planning, but particularly in rural populations, many barriers to accessing primary health care remain.

The Mobile Technology for Community Health (MoTeCH) project was initiated in 2009 to address gaps in patient knowledge of maternal and child health and simplify documenting and reporting workflows for CHPS nurses. During its initial development, the MoTeCH team recognized that the paper health registers nurses were using to document care were inefficient, inconsistent, and didn't support important patient care needs. Prior to implementing the mobile components of MoTeCH, the team developed a set of five Simplified Registers (SR) to standardize documentation in the districts where MoTeCH was to be implemented.

The SR encompass family planning, maternal health, child health, outreach, and consulting room care. Development involved engagement of stakeholders at all levels of Ghana's health system, from national leaders to frontline workers. They were piloted in two districts in the Upper East Region beginning in 2010. Various efforts have expanded implementation of the SR to districts in three additional regions. There is not yet a national commitment to using the SR, and regions are responsible for maintaining SR use once their individual implementations are complete.

The SR have been enthusiastically accepted by CHPS zone health workers. Qualitative feedback indicates that time needed to document in and report from the registers has decreased. Workers are also better informed about patients' medical histories and more easily able to identify immunization and antenatal care defaulters. These gains are attributed to the consolidation of up to two dozen registers into five and the specific format used in the SR. Implementers question whether further consolidation could be possible by harmonizing the reports CHPS zones must submit to district health authorities. No quantitative evaluations of the SR have been conducted to date. Still, users and implementers feel the tools are valuable and could be replicated elsewhere.

COUNTRY PROFILE: GHANA

Population (2012): 25,366,000

GNI (PPI \$, 2012):
\$1,910

Life Expectancy (2011):
(M/F) 65/62 years

Fertility Rate (2011):
4.1

Top cause of under-5 mortality (2010):

1. Malaria
2. Prematurity
3. Other non-communicable diseases

DTP3 Coverage (2010):
90%

(WHO 2013; WHO 2014)



PURPOSE

This report summarizes work conducted by the University of Washington’s Global Health Strategic Analysis and Research Training Program (START) team in response to the Bill and Melinda Gates Foundation’s (the Foundation) work order *Paper Health Register Project*. Even as many health information systems worldwide move toward electronic and mobile models, paper health registers continue to be relevant tools in many low-resource settings. Case studies were identified to fill gaps in knowledge about best practices for implementation and use of paper health registers. Innovative register systems in Ethiopia, Ghana, South Africa, Uganda, and Uruguay illuminate opportunities for improving paper health register systems and identify approaches to both strengthen support for patient care and optimize reporting mechanisms. This case study is one of five case studies developed in response to the work order.



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BACKGROUND

DATA IN PRIMARY HEALTH CARE

The importance of primary health care was highlighted in the World Health Organization's (WHO's) 1978 Declaration of Alma Ata, which called for countries to provide primary health care to elevate the health of all populations (WHO 1978). Since that time, studies of various designs in regions across the world have demonstrated that greater access to primary care is related to a host of positive outcomes (Rao and Pilot 2014). At the highest level, data on primary care is necessary to understand its impact on the health status of populations. It is also used to evaluate the success of programs, such as the percentage of children who have received their first three doses of diphtheria, tetanus, and pertussis vaccine (DTP).

Primary care should encompass common, ongoing health care services addressing a community's main health needs, including maternal and child health care (WHO 1978). A variety of data on maternal and child health service utilization and outcomes, including statistics on family planning methods, pregnancies, birth outcomes, child growth, and other aspects of maternal and child health, could be collected. From the national to the provider level, reliable maternal and child health primary care data can play many roles. Ideally, this data would be used to inform policy decisions, including allocation of staff and resources for related services.

Data is also needed at a local level. Identifying patients in need of care, such as women due for antenatal appointments or vaccine defaulters, allows clinics to broaden their coverage and deliver more primary care services. And of course data is critical at the provider level to deliver informed care, for example knowing which vaccinations a child has already received.

Currently, primary care data is used extensively in the realm of maternal and child health to evaluate programs and compare countries' progress on various health goals. However, a large portion of this data comes from population-based surveys, such as WHO's Expanded Programme on Immunization coverage surveys (WHO 2005), and not the routine primary care data collected through provider registers. Use of data for defaulter tracing varies based on the tools available and their design, as well as characteristics of the health system (Shidende 2013). Point-of-care data usage is also heavily dependent on the tools available and the initiative of individual providers.

GHANA

GEOGRAPHY, POLITICS AND DEMOGRAPHICS

Ghana is a coastal country in West Africa with a stable democracy and a growing economy. It is a unitary presidential constitutional republic. The country is divided into ten administrative regions, which are further divided into 216 districts.

In 1957, Ghana became the first African country to gain independence from its colonial ruler. Between 1966 and 1981, six different governments followed, instigated by military interventions and attempts at democratic elections. This was followed by a suspension of the constitution and a ban of political parties. This major political shift resulted in an economic downturn throughout the 1980s. A constitution allowing a multi-party political system was re-instituted in 1992, and presidential elections have been



held every four years since then. Ghana is now considered to be a stable democracy. However, its history of political and economic instability has left the country with serious infrastructure challenges, especially in the northern regions.

Ghana's population is 51% female, with 43% of individuals considered to be in a dependent age group (<15-years-old or ≥65-years-old) (Ghana Statistical Service 2012). Urban-dwellers account for 52% of the population (WHO 2013). On the United Nations' Human Development Index, Ghana is classified as having Medium Human Development, ranked at 135 of 185 countries (United Nations Development Programme 2013). Using the multidimensional poverty index, 43% of Ghana's population is considered impoverished, with 11% experiencing extreme poverty. Seventy-two percent of rural residents live in poverty, compared to 28% of urban residents. The three northernmost regions of the country are the poorest (Ghana Statistical Service 2013).

HEALTH SYSTEM

Historically, Ghana's health and health system have demonstrated inequality between regions. Public health infrastructure was quite varied across the country. For example in 1993, 59% of water was drawn from unsafe sources in the Northern Region, versus only 10% in Greater Accra (Horton 2001). In 1998, the infant mortality rate was 70 per 100 live births in northern Ghana, versus 41 per 1000 live births in Greater Accra (Horton 2001). The three northernmost regions also had the highest under-5 mortality rates in both the 2000 and 2010 censuses (Ghana Statistical Service 2013). These types of disparities define the major challenges for providing health services to very different populations, with varying levels of infrastructure.

Health care is delivered by both private and public entities in Ghana. The Ministry of Health exercises oversight over the entire system, including setting policies and guidelines for the country. In the public health sector, the Ghana Health Service (GHS) is the main service provider. GHS also oversees monitoring and evaluation of key programs (WHO 2002). Ghana relies on public resources, internally generated funds, financial credits, and donor support to finance health spending. In 2003, government spending accounted for 47% of funds spent on health care, and support from non-governmental organizations and outside donors accounted for nearly 27% of funds spent on health care (WHO 2002).

GHS is structured according to a three-tiered system, with regional, district, and sub-district elements (WHO 2002). Service points in the three-tiered system include central teaching hospitals at the tertiary level, region and district hospitals at the secondary level, and acute care clinic and the Community-Based Health Planning and Services (CHPS) initiative at the primary level (Adimazoya 2014). Based on 2008 data, Ghana has 1.1 physicians, 7.2 nurses, and 2.6 midwives per 10,000 population, putting it somewhat above the median proportion of nurses and midwives for African countries (WHO 2014).

The CHPS initiative moved primary care from sub-district health centers into the villages. The Declaration of Alma Ata highlighted the importance of community-based primary care and became a key pillar of Ghana's health policy (Awoonor-Williams, Sory et al. 2013). When health services are delivered in the community, patients do not need to make the very long journey to the nearest district or regional health facility. This increase in accessibility can mean better access to preventative care, such as antenatal care and immunizations, and basic life-saving interventions, such as oral rehydration therapy (Rao and Pilot 2014). In addition, the services provided at a community level can be more culturally appropriate. Particularly in Ghana, which has numerous different tribes and ethnic groups,



decentralization of health care can be an effective strategy to accommodate cultural heterogeneity.

CHPS has become one of Ghana's primary vehicles for moving toward Millennium Development Goals 4 and 5, which call for reductions in child mortality and improved maternal health. The program was intended to provide preventive care and minor clinical care at the community level (Adimazoya 2014). This strategy had a rural focus, as these communities face the greatest difficulties in reaching the health facilities that already exist at the district level. Clinical nurses were reassigned to be community health officers (CHOs). CHOs were assigned to clusters of communities, with approximately one nurse serving a population of 5,000 people (Adimazoya 2014). The role of CHOs was to provide doorstep care, visiting the homes of community members to provide them with essential preventive and primary health services. Notably, male volunteers also participate in family planning, basic medical services, and supporting the CHOs.

CHPS began as a research initiative in the Upper East Region (UER). The Navrongo Health Research Centre in Navrongo, UER piloted this model from 1994 to 1996. Community members were consulted to ensure the plan was socially acceptable (Awoonor-Williams, Sory et al. 2013). An additional effectiveness study was conducted in Navrongo, UER from 1996 to 2003. In this pilot, 37 communities were assigned to one of four intervention and control combinations in a factorial study of the effectiveness of CHOs and male volunteers. Both sets of workers were found to be important for family planning/fertility and childhood mortality (Awoonor-Williams, Sory et al. 2013). As results of the CHPS program began to show progress, a replication study of the CHPS model (including male volunteers) was performed in Nkwanta, in the Volta region, from 1998 to 2004. After successful replication in Nkwanta, a district in each region was chosen for replication.

The replication studies in each region were successful, and CHPS was adopted as national policy in 1999. Ghana has been working since 2000 to scale-up the program (Nyonator, Awoonor-Williams et al. 2005). Scale-up is going faster in the UER, where it started, than in other regions, with five times the coverage in the UER versus other regions (Awoonor-Williams, Sory et al. 2013). Planning activities and the capital investments to create health posts for the CHOs have outpaced moving services into communities (Nyonator, Awoonor-Williams et al. 2005).

Ghana's investment in health has yielded improvements. Between the 2000 and 2010 censuses, large drops in under-5 mortality were seen across all regions. Under-5 mortality in the UER, which experienced one of the more modest declines during this period, decreased from 179 per 1,000 live births in 2000 to 128 per 1,000 live births in 2010 (Ghana Statistical Service 2013). Potentially preventable neonatal death is a significant factor in under-5 mortality, with prematurity, birth asphyxia, and neonatal sepsis comprising 33% of under-5 mortality (WHO 2013). Ghana's maternal mortality ratio also declined in the first part of the century, dropping from 538 in 2000 to 409 in 2008 (Hogan, Foreman et al. 2010). Poverty plays a role in both under-5 mortality and maternal mortality. Access to care and knowledge of healthy behaviors are both often lacking, particularly in the poorest areas such as those in northern Ghana (Ghana Statistical Service 2013).

PRIMARY HEALTH CARE DATA

Although much of the data used to evaluate Ghana's health status comes from special survey or census efforts, primary care data is routinely reported through Ghana's health system. Particularly in rural areas, data is collected in paper health registers. In the CHPS model, much of the primary care data is



collected outside the context of a clinic visit. Being able to quickly and accurately capture data while in the field is a critical need that Ghana's registers must currently fulfill. On a monthly basis, nurses complete reports, which are sent to the district health authorities. At the district, GHS staff enter data into the District Health Information Management System (DHIMS), the GHS computerized reporting system. Some communities are able to enter data directly into DHIMS, but sites documenting on paper complete intermediate paper reports. Reporting is inherently difficult for areas using paper registers, because at some point the information needs to go into DHIMS (Antwi-Agyei and Hodgson 2014). District data are aggregated at the regional level, which in turn report up to the national level.

MOTECH

The Mobile Technology for Community Health (MoTeCH) initiative aims to empower communities to improve health through mobile technology (Yeji 2014). MoTeCH Ghana was founded by the Grameen Foundation and Columbia University's Mailman School of Public Health, both with initial funding from the Bill & Melinda Gates Foundation. Observing a gap in health information for pregnant women and mothers of young children, MoTeCH developed an application for mobile devices to deliver timely information and reminders on antenatal care, postnatal care, and child health (Macleod, Phillips et al. 2012). A complementary system was designed for nurses, with forms to enter encounter information, queries to identify defaulters, and streamlined district reporting (Macleod, Phillips et al. 2012). The mobile forms were designed as an expedited reporting mechanism, drastically decreasing the time workers had to devote to compiling reports each month, as well as increasing the accuracy of the reported data (Yeji 2014). The Columbia University team developed an evaluation component for the project (Stone 2014). MoTeCH partnered with GHS, and the project was officially launched in 2009 (Macleod, Phillips et al. 2012).

MoTeCH chose the UER for its pilot implementation. The UER is considered the poorest region in Ghana and is predominantly rural (Macleod, Phillips et al. 2012). MoTeCH's principal investigator had ties to the UER (Stone 2014), and the UER is also home to the Navrongo Health Research Centre, which originally developed CHPS. The original evaluation plan for MoTeCH involved randomizing CHPS zones, and the UER was a region with a sufficiently high number of functional CHPS zones to power the evaluation (Stone 2014). The Kassena-Nankana East and Kassena-Nankana West districts within the UER were chosen as the pilot districts, with the mobile technology only introduced in Kassena-Nankana West. Kassena-Nankana East served as a mobile-free control community (Macleod, Phillips et al. 2012, Adimazoya 2014).

Mobile technology is inherently limited by a variety of factors, including network coverage, electricity access, affordability, and knowledge of device use. During the pilot, the mobile network was found to be very poor in some areas, preventing nurses from uploading the information they had entered through the mobile forms (Yeji 2014). Nurses were also dissatisfied with the additional burden of entering data into the mobile forms (Grameen Foundation 2012, Stone 2014).

The original MoTeCH project in the UER is no longer active. Delays during implementation compromised the evaluation plan, and the Gates Foundation cut funding to the project. The Grameen Foundation sought and obtained new funding to initiate MoTeCH in other districts in Ghana (Stone 2014). During its time in the UER, MoTeCH developed and piloted a set of consolidated registers for primary care use in



CHPS zones. Those tools, known as the Simplified Registers (SR) are the focus of this case study.

SIMPLIFIED REGISTERS

DEVELOPMENT

MOTIVATING CHANGE

A study of the slow scale-up of CHPS in regions outside the UER indicated “support systems for expanding CHPS, maintaining operations, and leading the program development process” were among the difficulties regions faced (Awoonor-Williams, Sory et al. 2013). The assortment of health services CHPS nurses were intended to provide were accompanied by a demanding and cumbersome health information management system. Nurses in the CHPS zones targeted by MoTeCH were documenting services in 15 to 24 different registers (Adimazoya 2014). For maternity care alone, there was a register for antenatal care, one for delivery, and one for postnatal care (Stone 2014). Having so many registers made it difficult to identify which patients needed follow-up, and nurses spent up to a week each month compiling data from the registers to report to the district (Adimazoya 2014).

In addition to the excessive number of registers, there was also a lack of standardization of registers. Official GHS registers were in use in some areas but often reflected multiple, conflicting time periods (Stone 2014). The official registers are comprehensive and usually not in need of supplementation (Antwi-Agyei and Hodgson 2014), although some facilities have introduced additional data requirements based on local needs (Adimazoya 2014). Official registers are driven by individual programs, not the patient experience, which has led to duplication across registers of the data being captured (Antwi-Agyei and Hodgson 2014, Wood 2014). The information can be disjointed and not allow providers to see the continuum of care for an individual patient (Adimazoya 2014). Register proliferation can also be attributed to registers introduced by non-governmental organizations for their specific purposes (Stone 2014).

Many official registers were also physically difficult to use (Adimazoya 2014). Some books were too large and unwieldy to take into the field, and in others the text was too small and packed together to read. Problems with the registers’ designs likely contributed to nurses’ reluctance to use them. In some cases, an inability to manage the register during delivery of community-based services prevented needed data from being captured.

These various factors together contributed to a sub-par register environment, including lack of uniformity in data, low data quality, and poor efficiency (Adimazoya 2014, Stone 2014). CHPS had aspired to provide primary care in communities, but the extensive data processing times and cumbersome registers contributed to CHOs staying close to their posts (Yeji 2014). MoTeCH’s interest in mobile-based reporting provided the needed impetus for change (Stone 2014). In the early days of the project, the MoTeCH team toured numerous rural clinics in the UER. They asked the nurses to show them their registers, hoping that if mothers were not getting the care they needed, the registers would somehow reflect that. The goal was to build a system that could extract that information from the registers into the mobile application to improve maternal health care services (Wood 2014). To accomplish this, the data being collected needed to be standardized such that it could all be uniformly



recorded on the same set of mobile forms, which would also facilitate reporting up to the districts (Stone 2014).

During MoTeCH's clinic visits, unofficial registers, made with a personally bought notebook and ruler, were more commonly used than official registers (Stone 2014). Unofficial registers may lead to greater mistakes or omissions in data collected and reported, for example due to dropped columns (Antwi-Agyei and Hodgson 2014). Doorstep care is a domain where unofficial registers are particularly common, which presents problems, because nurses need to transfer information from their unofficial registers to official registers in the clinic (Antwi-Agyei and Hodgson 2014). However, at one of the MoTeCH team's most memorable clinic visits, the nurses pulled out a large stack of official registers, and then one nurse showed them the unofficial register she had created (Wood 2014). It was more useful to her, because she had focused it on the core elements she regularly needed for patient care. Her unofficial register became the inspiration to consolidate the official registers into the SR (Wood 2014).

BUILDING SUPPORT

With GHS support, MoTeCH pursued broad stakeholder buy-in at the national, regional, district, and local levels. MoTeCH wanted to ensure that this innovation was not seen as an outside intervention (Yeji 2014). Part of the MoTeCH team was based at the UER regional health authority with GHS. When the need to standardize the registers arose, GHS was supportive, and MoTeCH and GHS were easily able to partner during SR development (Stone 2014). The CHOs engaged in the day-to-day use of the registers were crucial to the success of the SR by providing input on what should remain in the registers and what should be removed (Yeji 2014). Their involvement in the stakeholder meetings is credited with the positive response the SR have met with during implementation (Antwi-Agyei and Hodgson 2014, Yeji 2014).

While nurse involvement was critical to the design of the registers, adoption was ultimately a top-down mandate (Wood 2014), reinforcing the importance of engaging district and regional leadership. Engagement occurred largely through collaborative meetings during which the SR were designed and refined. Stakeholders were also consulted individually at various points throughout the project (Stone 2014). At the district level, district health directors; district health supervisors, who were often public health nurses; health information officers; and sub-district leaders were engaged. The Regional Director of Health Services, Health Information Officer, and CHPS Coordinator represented the UER's interests (Stone 2014, Yeji 2014). National involvement was also necessary. The head of Ghana's Centre for Health Information Management participated in an eight-hour meeting with the MoTeCH team, during which they reviewed the SR line-by-line before sign-off was granted. The head of the Policy, Planning, Monitoring, and Evaluation national office also sat on MoTeCH's strategic advisory committee to stay informed about its activities (Stone 2014).

DEVELOPING THE REGISTERS

The SR is a set of five primary care registers for use by CHOs. The five registers are the Maternal Health Register, Child Health Register, Family Planning Register, Consulting Room Register, and School/Home/Community Visit Register (Stone, Schmitt et al. 2010). Images of the SR pages as of November 2011, the format at the end of the pilot phase in the Upper East Region, can be seen in Appendix 1.



MoTeCH approached SR development by identifying and attempting to resolve a number of the issues encountered when using registers. The SR sought to “collapse” the program-specific nature of the official registers and their inherent duplication (Antwi-Agyei and Hodgson 2014). This was an iterative process (Wood 2014), guided primarily by national policy and, to a much lesser degree, WHO protocols (Adimazoya 2014). The 17 reports that CHPS zone nurses are required to complete served as a minimum data set (Wood 2014).

Operating within those constraints, the MoTeCH team tried to focus the design on capturing the information needed to achieve their primary outcomes (Wood 2014). The SR were developed with MoTeCH’s overarching goals of improving maternal and infant health in mind. The registers needed to give the nurses the ability to find patient histories, such that when a patient walked in the door, or the CHO walked in the door of a patient’s home, an identifiable medical history would be readily available. Additionally, the registers had to provide a way to track which patients were due for care and identify defaulters (Wood 2014). As part of the MoTeCH project, the design of the registers had to also support the eventual transition to reporting electronically (Stone 2014).

The five specific registers of the SR were determined by the types of care CHOs provide under the CHPS model. Immunizations and growth statistics are captured largely at child welfare clinics, which are separate from “consultations” for the treatment of ill or injured patients. Thus, the Child Health Register tracks each child’s development and immunization status longitudinally, while the Consulting Room Register is a running list of consultation encounters with diagnoses made and treatments given. The Maternal Health Register is a combination of antenatal care, birth, and postnatal care registers to provide a continuum of care. It is separated from the Family Planning Register, because while women will need to make decisions about family planning postpartum, there will be many clients needing family planning services that never access any of the other services offered by CHOs (Stone 2014).

While Ghana is home to people speaking any of 82 different languages, all government forms are in English. This includes the SR, so that while client interactions occur in the client’s language of choice, entry into the registers is done in English (Yeji 2014). Patient records can be linked across registers, including between mothers and their infants, using the MoTeCH identifier (Adimazoya 2014). Prior to the large-scale pilot, proofs of the pages that would go into the registers were printed and shown to CHOs for the feedback (Stone 2014). Initially, MoTeCH attempted to make each register book large enough that it could last a year at the average facility (Stone 2014).

IMPLEMENTATION

PLANNING THE PILOT

The SR were intended as the first phase of MoTeCH adoption, and their implementation was initially planned in the context of the MoTeCH project. The SR were introduced in the Kassena-Nankana West and Kassena-Nankana East districts in May 2010. MoTeCH did a replication pilot in the Central region’s Awutu Senya district, which has now split into Awutu Senya East and Awutu Senya West (Adimazoya 2014).

The process for SR implementation was well-specified, with planned steps for appraisal, development, piloting, implementation, and evaluation (Stone, Schmitt et al. 2010). Piloting was invaluable for the important feedback it provided (Stone 2014). In each district where MoTeCH is implemented, feedback is gathered systematically each quarter on MoTeCH as a whole (Adimazoya 2014). A cluster-randomized



trial of CHPS zones was originally planned to evaluate MoTeCH.

MoTeCH supplied new registers at the beginning of the pilot and on demand thereafter. Any nurse could contact MoTeCH directly when they needed new registers, although senior nurses and midwives took responsibility for this most frequently. MoTeCH requested nurses provide a week of notice when new registers were needed. Some smaller facilities were able to continue using the same registers for more than a year, but some larger facilities went through two or three books each year (Stone 2014). The Maternal Health and Child Health registers required extensive data transfer when switching registers so that information for ongoing patients was available in the new register (Stone 2014).

SUPPORTING IMPLEMENTATION

Training and monitoring have been the most successful sources of implementation support during the SR rollout (Adimazoya 2014, Yeji 2014). Comprehensive trainings were conducted for both the SR and mobile applications (Adimazoya 2014). For the initial SR pilot trainings, all the health workers were brought together for three days of training. MoTeCH recruited health leaders from the region and district levels to conduct the trainings, which entailed a half day of going through each register and the reporting forms (Stone 2014). There were no ongoing training sessions to train new nurses, but peer-to-peer training occurred in some CHPS zones. All the health workers were brought back together after the first year of the pilot to review updates to the SR (Stone 2014). When the expansion pilot was conducted in the Central region, the UER's Regional Health Information Manager helped with training to assist in their rollout (Stone 2014).

During the pilot, monitoring came in multiple forms. SR monitoring was done directly by MoTeCH's Columbia University team and GHS (Stone 2014). MoTeCH's Grameen Foundation team used field coordinators to monitor the mobile implementation through site visits and relationship-building with users, GHS staff, and others (Adimazoya 2014). There were also clinical monitors to support maintaining the same standards of care across the CHPS zones involved in MoTeCH (Stone 2014). Routine GHS supervisory visits continued during the pilot, as well (Adimazoya 2014). Initially, the SR monitors visited nurses every two weeks, transitioning eventually to every few months over the course of the pilot. They reinforced information from training, answered questions, and monitored how nurses were using the SR (Stone 2014). Eliciting feedback on the usability of the registers was an important component of the monitoring visits, particularly early in the pilot (Yeji 2014). Monitoring visits also included feedback for the sites on the reports previously sent to the district (Yeji 2014). Mobile component field coordinators were focused on the mobile implementation but would let the SR team know if something with the registers needed to be addressed at a particular site (Stone 2014). Clinical monitors were assigned per district and were physicians or physician assistants. Each month, clinical monitors visited facilities to check how data was entered and help users improve data collection (Adimazoya 2014).

Printed manuals with guidelines for using the SR were produced but have been tertiary to training and monitoring (Yeji 2014). Providing a manual without monitoring to ensure workers understand and follow the guidelines was judged to be ineffective. In general, manuals can be effective, but many are too bulky. Workers are more likely to use manuals if information can be summarized such that they can quickly review it (Yeji 2014).

The workflows for using the SR were intended to be standardized, but variations do exist (Adimazoya 2014, Stone 2014). In areas where the mobile nurse's application is implemented alongside the SR, there



is variation in whether nurses enter information into the mobile forms at the point of care or transfer it from the SR at a later time (Adimazoya 2014). To keep books organized, some facilities divided the registers into sections, for example using the front half of a book for one community and the back half for another community (Stone 2014).

PRELIMINARY EVALUATION AND ADJUSTMENTS

Following the first and second years of the pilot, there were large review sessions to determine what was working and what needed to change (Stone 2014). The core organization and structure of the SR were retained during these revisions (Adimazoya 2014), although some details and formatting were modified. One area of debate was which new indicators should be added. Some communities had interventions available to them through special projects, and some communities had vaccines or treatments that weren't yet available everywhere. A decision had to be reached about each indicator proposed (Stone 2014). One of the most significant changes during the pilot in the UER was the addition of fields for the rotavirus and pneumococcal immunizations after they were included in Ghana's National Immunization Programme (Adimazoya 2014, Antwi-Agyei and Hodgson 2014, Stone 2014).

The first year, the MoTeCH team surveyed CHOs using the SR and informally interviewed district and regional representatives. They received strong feedback about the bulkiness of the registers. Beyond that, changes requested were mostly minor, including increasing column width and adding indicators agreed upon by the stakeholders. National representatives reviewed the revisions, and decisions were communicated out to stakeholders (Stone 2014). After the second year of use, MoTeCH streamlined the revision process by holding an all-day meeting with national, regional, district, and local representatives. Implementation had begun in the Central region at this point, so representatives from the new location were included, as well. The large group meeting allowed stakeholders to participate in and be informed of all changes at once, relieving the back-and-forth consultation required the previous year (Stone 2014).

There was also a formal evaluation of the SR planned during the pilot in the UER. In addition to the overall evaluation of MoTeCH that had been planned, studies specifically for the SR were in the works for data quality and productivity. Baseline data were collected but no endpoint data could be obtained after the project ended prematurely (Stone 2014). Evaluation studies of the SR have not yet been replicated in the new MoTeCH implementations, although they are planned. Without these studies, it is difficult to know whether the positive qualitative feedback for the SR has translated into improved patient care or better health outcomes.

SCALING UP

The end of the MoTeCH project in the UER did not spell the end of the SR. The Ghana Essential Health Intervention Programme (GEHIP), a GHS trial program to strengthen CHPS, incorporated the registers into its own implementation, bringing SR to four additional districts in the UER in 2011, Bongo, Builsa North, Builsa South, and Garu-Tempene (Stone 2014). The expansion of the SR has been welcomed because of nurses' demand for the registers (Adimazoya 2014, Antwi-Agyei and Hodgson 2014). Considering the long-term impact of the SR, having a standardized set of documentation tools supports cross-area comparisons. The ability to analyze data and recognize trends across the UER has been recognized as one of the greatest benefits of implementing the SR (Yeji 2014). No difference in data coming from the UER has been noted at the national level (Antwi-Agyei and Hodgson 2014), and the



region's health authority can have confidence that the numbers reported for each district came from a set of standardized registers.

The Grameen Foundation is continuing to push forward the MoTeCH model in other areas of Ghana through a new Saving Lives at Birth grant, funded by a USAID, Government of Norway, Bill & Melinda Gates Foundation, Grand Challenges Canada, and World Bank consortium (Grameen Foundation). Through this grant, the SR have now also been rolled out to Ada East and Ada West in the Greater Accra region, Gomoa West and Abura-Asebu-Kwamankese in the Central region, and South Tongu in the Volta region (Adimazoya 2014). In these districts, the SR are introduced first, followed by a stabilization period of three months before the mobile technology is introduced. MoTeCH is also attempting to perform an impact evaluation of the mobile technology and SR in Gomoa West versus only the SR in Abura-Asebu-Kwamankese. No additional MoTeCH sites are planned (Adimazoya 2014).

The initial design of the SR emphasized standardization and streamlining workflows. While those characteristics are widely considered important, the collaboration that selected the specific data elements for the SR did not include region- or district-level representatives from outside the UER. Significant modifications or further consolidation have not been necessary to scale up the SR in other districts and regions thus far. However, minor revisions may be needed to secure the support of district and sub-district leaders and local workers for successful rollout (Yeji 2014).

LOOKING AHEAD

SUSTAINING SUPPORT FROM KEY STAKEHOLDERS

Like the CHPS initiative before it, the SR implementation began as a research-driven innovation in the UER. And like CHPS, national investment is needed for the SR to fulfill their potential (Yeji 2014). As the MoTeCH project ended in the UER, all maintenance activities were transitioned to the regional health authorities. MoTeCH had been responsible for procuring and distributing the registers. GHS has taken over that role in the UER. MoTeCH continues to expand in other regions, but full scale-up will require a national commitment to printing the registers, providing distribution channels, and training new users (Adimazoya 2014, Yeji 2014). At the most recent MoTeCH steering committee, GHS indicated it will consider adopting the SR nationally, but national adoption is not guaranteed (Adimazoya 2014).

The costs of printing and training are prohibitive and will be difficult to sustain without national support and a national budget. The SR are printed locally, and districts should ideally be contributing to the cost, but most are not currently able to do so (Adimazoya 2014). Historically, shortages of official registers have occurred (Antwi-Agyei and Hodgson 2014). Supplies of other registers have experienced procurement delays in the past, and there is concern that the stock of SR will not be replenished as needed (Adimazoya 2014, Yeji 2014). A mechanism is necessary to ensure that register supplies are available at the beginning of the year, as well as when needed at other times during the year (Yeji 2014).

Although mobile technology will likely meet with implementation challenges in the coming decade, the SR have a real chance of succeeding at the national level in the near-term (Antwi-Agyei and Hodgson 2014). Many registers are currently used across Ghana, and government buy-in is necessary for every facility to begin using the SR (Adimazoya 2014). Given that GEHIP expanded the SR to additional districts in the UER, there may be an opportunity for other interested regions to take up the SR prior to national investment. Grameen Foundation's continuing work has brought the SR to more districts in Ghana,



providing a basis from which regional health authorities could potentially expand the program. Ultimately, political will is necessary at a national level for the SR to move forward in a way that maximizes their effectiveness. The initial development of the SR included stakeholders only from the regions and districts where MoTeCH was piloted (Stone 2014). Few major changes have occurred since their creation, but country-wide adoption of the SR may necessitate a national workshop to determine the best standards for all of Ghana (Adimazoya 2014). With this, the SR could also be modified to fit the needs of multiple levels of the health system (Adimazoya 2014).

ONGOING MONITORING AND EVALUATION

Regular monitoring responsibilities in active SR sites in the UER were transitioned to GHS when MoTeCH finished its activities there. GHS has incorporated SR monitoring and solicitation of feedback on the SR into its monthly visits to facilities (Yeji 2014). In other regions, MoTeCH's field coordinators have begun to transition responsibilities to district GHS coordinators after the mobile application has been rolled out, and the clinical coordinators remain active. The GHS coordinators shadow the MoTeCH field coordinators as part of their transition (Adimazoya 2014). There are also periodic national evaluations for specific initiatives, for example when the national official child health registers were revised (Antwi-Agyei and Hodgson 2014). Because the SR have not yet been adopted nationally, however, the process for revising national registers does not include the SR.

Feedback on the SR is overwhelmingly positive, largely due to increased efficiency and the ability to track the continuum of care (Adimazoya 2014, Antwi-Agyei and Hodgson 2014, Yeji 2014). Data quality is also believed to have improved with the simplification of the registers, although a formal evaluation is lacking. The impression of improved data quality comes from observations at monitoring visits, user feedback, and the assessment MoTeCH conducts comparing SR-entered data to data entered in the mobile forms (Adimazoya 2014, Stone 2014, Yeji 2014). MoTeCH sites must achieve 80% accuracy of their mobile-entered data to qualify for automated reporting (Adimazoya 2014). So while the quality of the mobile data is regularly assessed, data quality of the SR themselves is still anecdotal. Moving forward, a major component of a monitoring and evaluation plan for the SR should be a measure of data quality independent of the mobile products.

If there are inadequacies in data quality, ongoing training may be beneficial and has been suggested as a solution to deficiencies observed in the mobile data. While the trainings have been systematic, more seem to be needed. The current training lasts two days, and the MoTeCH team has considered increasing it to provide more time for practice. Refresher trainings could also help address poor data quality, as could intensified monitoring (Adimazoya 2014). Long-term, if the SR are widely adopted, training should be incorporated into the nurse training program (Stone 2014).

As GHS takes over operations in implemented districts, it may be useful to consider how supervisors are selected and trained and what role they can play in enhancing use of the SR, particularly in regard to data quality. Great variation in supervisory styles and level of involvement was observed during SR implementation (Stone 2014). Using a facilitative supervision model, which has been shown to be effective in the context of Ghana's CHPS program (Aikins, Laar et al. 2013), or other supportive supervisory model for monitoring SR data quality may be a valuable maintenance phase enhancement for GHS.

Ongoing monitoring and evaluation also highlights questions about the impact of Ghana's health



workforce on the SR and whether replication in a country with a short supply of health workers would be successful. By focusing on improving worker efficiency, the SR are not inherently tied to the size of the existing health workforce, and their success does not seem to be a function of size (Wood 2014). They would be useful in populations with different ratios of health workers to population, but even as streamlined as the SR are, it's possible that health workers stretched too thin by other duties may have less time to make use of the SR. This includes not documenting completely in the SR, as well as not utilizing the SR to follow-up with clients who have missed services (Stone 2014). These factors have not come out during Ghana's implementation of the SR, but they should be kept in mind should the SR be replicated elsewhere.

UPDATING AND OPTIMIZING THE SYSTEM

With the end of the SR pilot in the UER, revisions were transitioned to the Regional Health Information Manager (Stone 2014). National SR trainings occurred in 2012 and 2013 (Yeji 2014), but the collaborative revision meetings have not continued since the end of the UER pilot (Adimazoya 2014, Yeji 2014). The collaborative updating process employed during the first two years of implementation is not possible in the absence of sufficient external funding (Stone 2014). MoTeCH collected recommendations for improving the SR during one of the national training gatherings, but if Ghana does not adopt the SR nationally, it is unclear how future updates to the SR would be coordinated. The requested updates were largely to support the current standards of practice and enhance particular workflows (Adimazoya 2014). If and when revisions do occur, monitoring needs to focus on ensuring everyone is consistently capturing the new information (Yeji 2014). Maintenance phase enhancements, including supportive supervision, may also be useful strategies to ensure effective implementation.

LESSONS LEARNED

IDENTIFYING STRENGTHS

Health worker acceptance is high due to improved efficiency. Workers have received the SR enthusiastically (Adimazoya 2014, Antwi-Agyei and Hodgson 2014, Yeji 2014), primarily because of the decrease in workload they have caused (Antwi-Agyei and Hodgson 2014). This excitement has been sustained, or even increased, as nurses have become more familiar with the registers (Yeji 2014). Time saved is among the most heralded benefits of the SR. Capturing data is expedited by having fewer registers to document in (Yeji 2014). By having a column for the services provided in a given month, reporting is streamlined and more accurate, as well (Adimazoya 2014). The five to seven days each month nurses previously spent compiling reports has decreased. With the time freed up by using the SR, nurses are able to spend more time with patients (Yeji 2014). This has been accomplished without sacrificing the completeness of the data being reported up to higher levels of the health system (Antwi-Agyei and Hodgson 2014).

The SR better support patient care. Concordant with the goals of SR development, some of the greatest benefits of the SR are in the area of patient care. Health information is tracked longitudinally, allowing nurses to look back at the care patients have received in the preceding months or years (Adimazoya 2014, Stone 2014). This aids nurses in identifying and managing health-related behaviors with their patients (Adimazoya 2014). The format of the registers makes it very clear when a patient is in need of a service, such as an antenatal care visit or an immunization, and thus clearly identifies defaulters for



maternal and newborn care (Yeji 2014). Additional incentives may be necessary to motivate nurses to follow-up on defaulters, though (Yeji 2014). Capturing the continuum of care in this way informs patient care in a way that tally sheets and aggregated, inefficient registers cannot. For example, providers can now tell how many children are fully immunized, not simply how many of a particular shot were given (Adimazoya 2014).

Use of extraneous tally sheets has decreased. Prior to the SR register consolidation, tally sheets were the “order of the day,” (Yeji 2014) relied upon heavily to produce monthly reports because there were too many registers (Adimazoya 2014, Yeji 2014). For example, immunizations generally required both a child welfare clinic register and a tally sheet, creating a “cumbersome” documentation system (Antwi-Agyei and Hodgson 2014). After SR implementation, tally sheets are still used but to a very limited extent. Namely, tally sheets are used to facilitate compiling Integrated Management of Childhood Illnesses (IMCI) and traditional birth attendant reports, which are reflected in the SR as pictures not reportable fields. The SR have proven easier to use than their tally sheet predecessors for the rest of reporting (Yeji 2014).

IDENTIFYING CHALLENGES

Populating the registers with historical data is a lengthy process. Before the SR could be put into use, the nurses had to populate them with the baseline data for their existing patients. The SR that are meant to be kept longitudinally include a column for historical data. For example, the Child Health Register is organized by month, with a column at the beginning for current growth statistics and immunizations coming into the year. To have the relevant medical history in hand when seeing a child, the child’s data needed to be gathered from the multiple old registers where it was stored and transcribed into the new Child Health Register. Doing this transfer for all patients covered by the longitudinal SR was an overwhelming amount of data entry at the beginning of the project. The data transfer problem was further exacerbated by the UER pilot beginning in the month of May. In addition to the column of historical data, GHS officials wanted the four previous months of the year completed. One day of the training was allotted to begin data transfer, but it was not enough. Nurses ended up leaving lots of blank pages at the beginning, and data transfer continued for months after the SR were introduced. Moreover, data transfer repeats at the beginning of each year when historical data from the past year must be put into the history column of the new year’s register, and additional data transfer is required during the year at sites that go through multiple registers each year. The year-to-year time required for data transfer is less than the startup time, however, because the transfer is from one old register to one new register instead of multiple old registers to one new register and because only the history column needs to be filled in (Stone 2014). The newer MoTeCH implementations attempted to shorten the initial data transfer time by reducing the number of months back-filled (Adimazoya 2014). Another potential way to decrease the data transfer time required, both at startup and year-to-year, is to skip or abbreviate historical data for some types of patients. For example, postnatal patients have almost completed their time in the Maternal Health Register and the times nurses would need to return to the historical register for their data would be limited. Antenatal patients likely have many months left of visits and should be transferred. The SR could also be introduced in January to minimize the amount of information that has to be carried over in the Child Health Register and Family Planning Register. At one point during the UER pilot, the MoTeCH team considered having data entry clerks enter the data into laptops and have the registers pre-printed with the historical information, but the cost of



printing would have been prohibitive (Stone 2014).

Early feedback showed that the SRs had poor usability. During the first year of the pilot, the SR encountered significant feedback about their poor usability. Not surprisingly, despite having started with 15 to 24 registers and consolidating down to five, the SR still collected a very large volume of data. To make the register books manageable, a small font size was used. Feedback gathered during site visits clearly showed that nurses were displeased with the readability, which left the MoTeCH team trying to balance readable font size and manageable book size (Adimazoya 2014). In addition, feedback after the first year of the pilot indicated that the books were too heavy and unwieldy (Stone 2014). Although the pages were independently piloted prior to the full-scale pilot, allowing feedback on font size and format, the full books were not piloted. Showing users the whole books could have helped identify the size problem before the first year of the pilot, but having only one book of each of the five SRs printed would have been problematic for the printer (Stone 2014). After receiving this feedback during the first year of the pilot, MoTeCH made the books smaller and more manageable. Their supply expectations shifted accordingly, because they knew most facilities would now need multiple registers to get through the year. Moving forward, instead of providing one register at the beginning of the year, they provided the number of registers they projected a facility would need for the entire year (Stone 2014). Despite the revisions MoTeCH has made, the size of the registers and font size remain concerns of some users (Adimazoya 2014, Yeji 2014).

Register durability is lacking. The lack of register durability is a challenge that applies to many community-based health delivery models. In some cases, these large books are designed to be used for documentation for up to a year, and occasionally longer. The binding may fail, causing pages to fall out, or pages may become damaged and unreadable (Adimazoya 2014). Nurses in the CHPS zones routinely take their registers into the field with them. The register may be put on the back of a motorbike or taken through the rain (Yeji 2014). Of the SR, the Child Health Register saw a significant amount of wear and tear, because it was taken to child welfare clinics at various locations across the community, often multiple times each week (Stone 2014). It's possible that some data collected in the SR was lost due to the inadequate durability of the registers. The obvious solution is to create registers with more durable materials, but the cost of using higher quality materials could be significant. Another possible solution is to create carrying cases designed for the registers, although cost-effective, in-country manufacturing would need to be explored (Stone 2014).

The specific design of the SR may not be applicable in contexts other than CHPS zones. The SRs were originally designed for CHPS zones and are suited to the particular needs of that context. Different data is collected at different levels of the health system, so the SR in their current form may not be directly applicable beyond these zones. Even among CHPS zones, there is variation in size that necessitates different uses of the SR, as seen during the pilot (Stone 2014). This became clear when during the pilot phase an attempt was made to introduce the SR to health centers as a precursor to introducing the mobile components, which was done to compensate for the lack of power to evaluate the MoTeCH initiative. CHPS zones have a small core of CHOs performing a wide variety of primary care services, whereas health centers are large institutions with different departments to handle different areas of care. Introducing the SR to this environment was not successful. The Child Health and Family Planning Registers were adaptable to what the health center needed, but the Maternal Health and Consulting Room Registers weren't functional in the health center context. At the health center, antenatal clinics and delivery wards were separated, as were the consulting providers, laboratory, and dispensary. The



registers couldn't be in multiple places at once, so using them only created extra work (Stone 2014). This experience highlights the limited scope of the SR in their current form. To standardize care across levels of the health system, work would be required to adapt the SR to other contexts or create an entirely different set of registers (Stone 2014).

KEY LESSONS

Frontline workers may have already identified solutions to systemic problems. The need for the SR wasn't identified at the outset of the MoTeCH project. It was when the team discovered the extent of nonstandard data collection that they realized a paper register solution was necessary before the mobile application could be implemented. The form of that solution was inspired by a nurse's unofficial register, crafted to deliver patient care simply and efficiently. Now, the SR are the most widely-replicated piece of MoTeCH. This is an example of how important tapping into "indigenous knowledge systems" (Damtew 2013) can be to projects initiated by external organizations.

Strong collaboration among stakeholders at all levels is required for a successful paper register system. The wide collaboration MoTeCH pursued during the development and early revisions of the SR was necessary, because individuals at different levels of the health system had different priorities. For example, the Regional Health Information Manager was principally concerned about the data being reported. District health directors were more concerned with being able to follow-up with clients. And obviously, CHOs had a vested interest in ensuring the SR were easy to use (Stone 2014). Paper health registers have much expected of them, from informing patient care at the service level up to providing the information upon which to base policy at the regional and national levels. It is likely impossible that paper health registers will ever satisfy all that is demanded of them. Yet, if collaboration does not occur, registers run the risk of failing one group of stakeholders, and in turn, failing entirely. As the MoTeCH team found during their initial clinic tours, if registers do not support patient care in the way nurses require, they may be replaced with unofficial registers, which compromises the information being reported. Conversely, it's possible to consolidate registers so much that they lose sight of the indicators needed for decision-making (Curtis 2012). Ministries of health may find the need to divert funds to other mechanisms for obtaining needed data in such a case, or may simply refuse to support registers that don't satisfy reporting needs. Ultimately, the time and resources expended gaining SR buy-in from all levels of Ghana's health system helped to produce a widely accepted product.

The assumption that a system with fewer registers is better may be flawed. The idea that having more registers is inherently disorganized and having fewer registers with more indicators per book is inherently easier may be erroneous, despite being the premise upon which much of the SR project is based (Stone 2014). A variation in SR use emerged during the pilot that warrants consideration. Consolidation was definitely appreciated in some domains, such as maternal health, but it created problems in other domains. Having only one child health register, for example, meant that only one nurse could be documenting child health services at a given time. During the pilot, some facilities started using multiple copies of the registers to get around this limitation. Specific variations seen included keeping one register per community served in the CHPS zone, allowing different nurses to deliver care in different communities at the same time. Child welfare clinics prompted facilities to use multiple copies of the Child Health Register for specific age groups, for example allowing one nurse to document the services provided to infants, another to document one- to two-and-a-half-year-olds, and a third to document two-and-a-half- to five-year-olds. This adaptation of the SR model was most common in



large, busy CHPS zones (Stone 2014). Without these variations, having only a single register would have created bottlenecks in care or likely would have led to use of unofficial registers again.

Consolidating registers can only accomplish so much in the absence of corresponding consolidation of reports. MoTeCH's development of the SR focused on removing duplicative data collected and selecting the indicators most useful for patient care. The development process, however, prioritized fidelity to the reports nurses were required to complete. There were 17 reports required at the time of SR development, and there is some indication that the number of reports dropped initially but is now increasing due to programs by non-governmental partners or organizations (Yeji 2014). Separate reports are required by the many projects and agencies active in the area, often requesting the same or similar data. For example, immunizations might be necessary for both maternal and child health as well as disease control (Antwi-Agyei and Hodgson 2014). Members of the original implementation team now recognize that the SR can save only a finite amount of time, because there are still so many reports required (Wood 2014, Yeji 2014). As a next step, the reports need to be harmonized in the same way the registers were (Yeji 2014). There are multiple ways to approach this challenge. Could sites produce a single report with all necessary data that agencies could then pull from for the specific information they need (Yeji 2014)? Could DHIMS be coordinated with the SR (Adimazoya 2014)? Alternately, could health workers reconcile their data for the same indicator to ensure the data is consistent across reports (Antwi-Agyei and Hodgson 2014)? Finally, could the reports be trimmed of any data not being consumed (Wood 2014)? Dr. K. O. Antwi-Agyei indicated, "We're cognizant of the fact that if you dilute it, you will not get good data," and accordingly believed the reports require what is going to be of use (Antwi-Agyei and Hodgson 2014). Referring to Ghana's health registers, Dr. Hodgson surmised, "It's a fairly good system that's being run. Decrease the number of books, that's all that needs to be done (Antwi-Agyei and Hodgson 2014)." The Ministry of Health makes the decisions about the reports (Wood 2014), so eliminating data requested in reports would have to be done with care and wide collaboration, just as the SR consolidation was done.

Consolidation has worth beyond its support of mobile technology. Although the SR are enhanced by the functionality of the mobile applications, the mobile component is not necessary (Adimazoya 2014). All but one of the districts in the UER are using the SR without the mobile forms and still seeing great benefits (Yeji 2014). The demand for the SR by frontline workers and the adoption of the SR into GEHIP is evidence of their utility. While the SR were designed specifically with the needs of Ghana's CHPS zones and the MoTeCH technology in mind, the process used to develop the SR could be useful in other settings. Tim Wood called the consolidation of the registers a "valuable exercise." He continued, "Quite often, people are collecting information that nobody ever uses (Wood 2014)." Consolidation forces stakeholders to consider which data elements really need to be tracked, which lowers the workload burden for the workers (Wood 2014). With or without mobile technology, this process has value.



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APPENDIX A: SIMPLIFIED REGISTER PAGES AS OF NOVEMBER 2011

Table with columns: Zone/Facility, Facility ID #, Sub-District, District, Year, Client identification, contact and personal information, Antenatal Care Visits, and Health Status. The table is organized into three horizontal sections, each containing a row of client information followed by a grid for antenatal care visits (AFC 1-5, ANC 1-5, MCH 1-5) and health status (M, C, N).

Figure 1. Maternal Health Register, left page



Delivery Information				Maternal Outcomes										Post-Natal Care (MOTNHS)			Post-Natal Care (MOTNHS)			Admission			Comments
Delivery Information				Maternal Outcomes										Post-Natal Care (MOTNHS)			Post-Natal Care (MOTNHS)			Admission			Comments
Delivery Information				Maternal Outcomes										Post-Natal Care (MOTNHS)			Post-Natal Care (MOTNHS)			Admission			Comments
Delivery Information				Maternal Outcomes										Post-Natal Care (MOTNHS)			Post-Natal Care (MOTNHS)			Admission			Comments
[Detailed delivery information including dates, times, and medical notes]				[Detailed maternal outcomes including blood pressure, glucose, and other clinical metrics]										[Post-natal care visits 1-3]			[Post-natal care visits 4-6]			[Admission status and dates]			[Comments]
[Detailed delivery information]				[Detailed maternal outcomes]										[Post-natal care visits 1-3]			[Post-natal care visits 4-6]			[Admission status]			[Comments]
[Detailed delivery information]				[Detailed maternal outcomes]										[Post-natal care visits 1-3]			[Post-natal care visits 4-6]			[Admission status]			[Comments]
[Detailed delivery information]				[Detailed maternal outcomes]										[Post-natal care visits 1-3]			[Post-natal care visits 4-6]			[Admission status]			[Comments]

Figure 2. Maternal Health Register, right page

Client identification, contact and personal information										Vital Signs										Diagnosis										Treatment										Referral										Cost									
Client identification, contact and personal information										Vital Signs										Diagnosis										Treatment										Referral										Cost									
Client identification, contact and personal information										Vital Signs										Diagnosis										Treatment										Referral										Cost									
Client identification, contact and personal information										Vital Signs										Diagnosis										Treatment										Referral										Cost									
[Client identification details]										[Vital signs: BP, HR, RR, Temp, Weight, Height]										[Diagnosis: S1C, S1B, S1D]										[Treatment: Prog, S1C, S1B]										[Referral: Yes, No]										[Cost: C, B, TC]									
[Client identification details]										[Vital signs: BP, HR, RR, Temp, Weight, Height]										[Diagnosis: S1C, S1B, S1D]										[Treatment: Prog, S1C, S1B]										[Referral: Yes, No]										[Cost: C, B, TC]									
[Client identification details]										[Vital signs: BP, HR, RR, Temp, Weight, Height]										[Diagnosis: S1C, S1B, S1D]										[Treatment: Prog, S1C, S1B]										[Referral: Yes, No]										[Cost: C, B, TC]									
[Client identification details]										[Vital signs: BP, HR, RR, Temp, Weight, Height]										[Diagnosis: S1C, S1B, S1D]										[Treatment: Prog, S1C, S1B]										[Referral: Yes, No]										[Cost: C, B, TC]									



Zone/Facility	Facility ID #	Sub-district	District	Year																	
Client identification, contact and personal information		History	Acceptors and Follow-up																		
Serial #	First and Surname	Sex	Date of Birth	Age Group	Location/ House Address	Married status	STC	Current method being used (Daps, Condoms, Implant, IUD, Pills, Natural, Other)													
								January	February	March	April	May	June	July	August	September	October	November	December		
Information from last visit to determine use or from another health facility or provider							Current method	Current method	Current method	Current method	Current method	Current method	Current method	Current method	Current method	Current method	Current method	Current method	Current method		
<small>QUESTIONS ABOUT FAMILY PLANNING: (ONLY THE QUESTIONS YOU ADDRESS EACH MONTH, WRITE "X" IN COLUMN 9) (YES) = "X"; "NO" = "N"; "DONT KNOW" = "DK"; "N/A" = "NA"</small>																					

Figure 6. Family Planning Register

Zone/Facility	Facility ID #	Sub-district	District	Year	Month	Number of Schools in Catchment Area														
Audience Information				Location			Health Promotion Activity		School Visits		Other Services Provided		Reterris (School Health Only)		Environmental Certificates Awarded		Support Staff (Number)		Comments	
Date	Type of Visit	Name of School or Community	Household Location, last name, and number of residents	Target Audience	Participants	Topic	Method used in activity	Materials used	Number of schools visited	Number of students	Record problems identified & what you did to address them.	Record immunizations here	Condition	Number referred	Type	Home	TSA	Other	Remarks from activity	
	S			Pre-School	Pre-School Women	CHC	Outreach						Sex Problems							
	C			P1	Women	School	Home						Sex Problems							
	H			0211	Addressed	Religious Setting							Sex Problems							
				Other	Other								Sex Problems							
	S			Pre-School	Pre-School Women	CHC	Outreach						Sex Problems							
	C			P1	Women	School	Home						Sex Problems							
	H			0211	Addressed	Religious Setting							Sex Problems							
				Other	Other								Sex Problems							
	S			Pre-School	Pre-School Women	CHC	Outreach						Sex Problems							
	C			P1	Women	School	Home						Sex Problems							
	H			0211	Addressed	Religious Setting							Sex Problems							
				Other	Other								Sex Problems							

Figure 7. School/Home/Community Visit Register

