Performance of Routine Health Information System Management in Liberia:

PRISM Assessment

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RBHS

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Acronyms

ANC	Antenatal Care
BPHS	Basic Package of Health Services
CBO	Capacity Building Officer
CHIS	Community Health Information System
CHO	County Health Office
CHSWT	County Health and Social Welfare Team
CHV	Community Health Volunteer
CM	Certified Midwife
DHIS	District Health Information System
DHO	District Health Officer
DHS	Demographic and Health Survey
gCHV	General Community Health Volunteer
GDP	Gross Domestic Product
GOL	Government of Liberia
HF	Health Facility
HFMC	Health Facility Management Committee
HIS	Health Information System
HMIS	Health Management Information System
ICCM	Integrate Community Case Management
LQAS	Lot Quality Assurance Sampling
LISGIS	Liberia Institute of Statistics and Geo-information Services
MNCH	Maternal, Newborn and Child Health
MOHSW	Ministry of Health and Social Welfare
NACP	National AIDS Control Program

NFP	Not-for-profit
NGO	Non-Governmental Organization
NHP	National Health Plan
NLTCP	National Leprosy and Tuberculosis Control Program
OBAT	Organizational and Behavioral Assessment Tool
OIC	Officer in Charge
PBF	Performance Based Financing
PMIS	Pharmaceutical Management Information System
PRISM	Performance of Routine Information System Management
PRS	Poverty Reduction Strategy
RBHS	Rebuilding Basic Health Services
RHIS	Routine Health Information System
TB	Tuberculosis
TTM	Trained Traditional Midwife

Executive Summary

This document reflects the joint efforts of Rebuilding Basic Health Services (RBHS), funded by the United States Agency for International Development, and Liberia's Ministry of Health and Social Welfare (MOHSW) to assess the performance of health management information systems (HMIS) in Liberia. RBHS is supporting the MOHSW in health service delivery, health systems strengthening, and behavior change communication activities. With an emphasis on health systems strengthening and capacity building, RBHS has been providing substantial support to the MHOSW in scaling up of HMIS and improving health system and human capacities.

In April 2012, the MOHSW in collaboration with RBHS undertook a comprehensive assessment of the current HMIS which will inform the development of a strategic and operational plan for strengthening the HMIS and monitoring and evaluation program in Liberia. The assessment was conducted in the counties of Bong, Nimba, Lofa and Grand Bassa. All of the four county health offices and a random sample of 76 health facilities (19 health facilities per county) were surveyed, and about 360 health managers and staff from these institutions were interviewed using the Performance of Routine Information System Management (PRISM) framework and tools. The PRISM framework promotes strengthening of HMIS performance (i.e., better data quality and improved information use by addressing technical, organizational, and behavioral factors affecting HMIS data quality and use for health service performance improvement).

The assessment shows strengths, weaknesses and gaps of the HMIS both at county health office and health facility levels. Major strengths of the HMIS in Liberia included availability of standardized ledgers and integrated reporting forms, established reporting channels and timelines, and District Health Information System (DHIS) software installed and in use at the county health offices. In addition, monitoring and evaluation structures and staff with data collection and transmission responsibility are in place in all of the county health offices.

However, there is limited capacity to perform data quality assurance and data analysis in the county health offices and health facilities. Even if DHIS2 can provide data analysis options, the monitoring and evaluation staff is not able to access all aspects of it. Though performance targets have been set and monitoring plans were developed, they are not actively used for monitoring facility performance. HMIS performance improvement challenges in Liberia relate mostly to improving data accuracy and competencies to analyze, interpret, and use HMIS data at all levels.

Even though all county health offices and health facilities have had two or more supervisory visits in the past three months, data quality checks have not been institutionalized. Data quality varies from facility to facility depending on supporting partners. Data accuracy ranges from 38% in August 2011 to 46% in February 2012. Ninety one percent of the health facilities submitted monthly report to the county health offices, and seventy five percent of them were submitted within the reporting period. In general, HMIS information use is relatively low both at the county and facility levels; data are collected mainly for reporting. Less than 20% of health facilities received feedback on their monthly reports. Evidence of use of HMIS findings in routine

meeting discussions and decision making process were observed in less than 39% of the facilities.

In support of the diagnostic aspects of HMIS the assessment also looked at the behavioral and organizational determinants. A considerable gap was observed between perceived competence to perform HMIS tasks among staff and actual ability for performing those tasks. HMIS tasks in terms of checking data quality, analysis and use of information are limited both at county health office and health facility levels. In regard to organizational factors, the assessment showed limited use of monitoring plans, and absence of training plans, supervision reports and feedbacks.

This assessment provided in-sight into various aspects of HIMIS in the four counties to be capitalized or needing further intervention to improve. The findings serve as baseline for future comparisons to ascertain progress towards HMIS performance improvement.

Introduction

Reliable and timely health information is one of the foundations of effective health service management and public health action. Like other aspects of the health care system, the health management information system (HMIS) in Liberia was desecrated during the civil war. Considering the crucial role that HMIS would play in the successful implementation of the national health policy, the Ministry of Health and Social Welfare (MOHSW) has placed rebuilding HMIS as a top priority.1 The Ministry has developed HMIS policy and a five-year HMIS strategy and implementation plan for 2008-2012. The HMIS policy is primarily focused on providing reliable, relevant, up-to-date, and complete information for health managers at health facility, county, and national levels.

Generation and use of quality health information at the facility and county levels is in line with the decentralization process of the MOHSW. It is important to manage health systems more closely at the level of service delivery. This shift in functions between the central and peripheral levels calls for in-depth capacity building and improvement of information systems, with changing data collection, processing, analysis, and dissemination requirements. Health sector reforms, such as performance-based financing, require standardization and high quality information. The national level needs to strengthen its stewardship role and provide guidelines, standards, and systems for smooth implementation of such systems.

The country has made progress in improving the HMIS since 2007. The MOHSW has given due emphasis to standardization and integrated HMIS. Integrated recording and reporting forms have been developed and distributed to the facilities. Liberia has introduced the District Health Information System (DHIS) software for collecting and aggregating health statistics at the national level. Initially DHIS 1.4 database was rolled out to all the county health offices and switched to DHIS 2.4 in 2011. Routine health data is submitted by the counties to the central MOHSW through the DHIS on monthly basis. The DHIS was used for the development of the 10-year National Health Policy and Plan Situation Analysis 2011-2021. The MOHSW is also using DHIS to monitor performance in the PBF indicators.

The Rebuilding Basic Health Services (RBHS) project (funded by the U.S. Agency for International Development) has been providing substantial support to the MOHSW in scaling up HMIS and improving health system and human capacities. Currently, RBHS is working with the MOHSW to undertake a comprehensive capacity assessment at the central MOHSW and county health offices. Part of this capacity assessment is a comprehensive assessment of the current HMIS and development of a strategic and operational plan for strengthening the HMIS and monitoring and evaluation program.

In April 2012, the HMIS assessment was conducted in four counties in Liberia using the Performance of Routine Information System Management (PRISM) framework and tools. The PRISM framework promotes strengthening of HMIS performance (i.e., better data quality and improved information use by addressing technical, organizational, and behavioral factors

[1] MOHSW. 2009. *National Health Information System Policy*.

affecting HMIS data quality and use for health service performance improvement). The information obtained provided insight regarding the technical, behavioral, and organizational factors that have influenced performance of the Liberia HMIS. The following questions guided the assessment:

- What is the level of HMIS performance (quality of data and information use)?
- What are the major factors affecting HMIS performance?
    - Are the HMIS processes (data collection, transmission, analysis, feedback, etc.) in place and adequate to perform HMIS tasks?
    - Are adequate resources (forms, register, finance, training, etc.) available to perform HMIS tasks?
    - What is the level of HMIS task competence?
    - What is the quality of supervision?
- Is there promotion of a culture of information?
- Are HMIS management functions performing at an adequate level?

Background

General Overview and Demography

Liberia is the oldest republic in Africa. It is a relatively small nation with a population of 3.95 million covering 111,369 square kilometers. It is located in West Africa and is neighbored by Sierra Leone, Guinea, and Côte d'Ivoire. Administratively, Liberia is divided into 15 political subdivisions (counties). The capital city, Monrovia, is in the south-western region in Montserrado County.

The 2008 Liberia National Population and Housing Census reported an estimated population growth rate of 2.1%.[2] Fifty-two percent of the population is 19 years of age or younger, and the average life expectancy at birth is 59 years. Of the 15 administrative counties, the "big six" (Montserrado, Nimba, Bong, Lofa, Grand Bassa, and Margibi) account for 75 percent of the total population. Massive population displacement in rural areas during the war has led to accelerated urbanization. Close to half of the population (47%) lives in urban communities, with one-third of the entire population residing in the capital of Monrovia.

Socio-economic Situation

The 14-year long civil war that lasted from 1989-2003 has devastated all forms of infrastructure, including health systems, and caused an economic collapse from which Liberia is emerging. According to the International Monetary Fund World Economic Outlook, Liberia's 2010 estimated per-capita gross domestic product (GDP) was U.S.$262.[3] More than half of the population lives in poverty with approximately one-quarter living in extreme poverty. Liberia ranks at the bottom of the Human Development Index, 162 out of 169 countries in 2010. Productive capacity and sustained economic growth are affected by high unemployment, low literacy, poor health, and absence of basic infrastructure such as roads, water, sewage, and electrical services.

Education remains one of the development challenges for Liberia. The Liberia Demographic and Health Survey reported that the majority of Liberians have little education, with an adult literacy rate of 55%. Females are much less educated than males. Fifty-six percent of females and 39% of males are illiterate, and 25% of females and 26% of males have only primary education.

The country launched The Poverty Reduction Strategy (PRS) in 2007 in order to move toward rapid, inclusive, and sustainable growth and development during the period of 2008-2011.4 The PRS argues that achievement of this goal would have a positive effect on all other sectors.

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[2] Liberia Institute of Statistics and Geo-information Services (LISGS). 2008. *2008 National Population and Housing Census.* Monrovia.
[3] International Monitory Fund. 2012. *World Economic Outlook*. Available at www.imf.org/external/pubs/ft/weo/2012/01/pdf/text.pdf
[4] Republic of Liberia. 2008. *Poverty Reduction Strategy*.

Health Systems in Liberia

Table 1. Health status of Liberia	
Life expectancy at birth[5]	*59 years*
Contraceptive prevalence[6]	*11% of women aged 15-49*
Total fertility rate[6]	*5.2 births/women*
Infant mortality rate[6]	*71/1,000 live births*
Under five mortality rate[6]	*110/1,000 live births*
Maternal mortality[6]	*994/100,000 live births*
HIV seroprevalence[6]	*1.5% (1.8% female, 1.2% male)*
Health expenditure[7]	*15% of GDP*

Revitalizing the health system was one of the focus areas of the PRS. Liberia's health services have been severely disrupted by years of conflict and destruction. Of the 293 public health facilities operating before the war, 242 were deemed nonfunctional at the end of the war due to destruction and looting.[8] In response to the post-war health challenges, the MOHSW, with assistance from donors and international nongovernmental organizations (NGOs), embarked on rebuilding the health system. Building on the PRS the MOHSW revised the National Health Policy and developed a four-year transitional National Health Plan (NHP) for 2007-2011. Key features of the 2007 NHP included[9]:

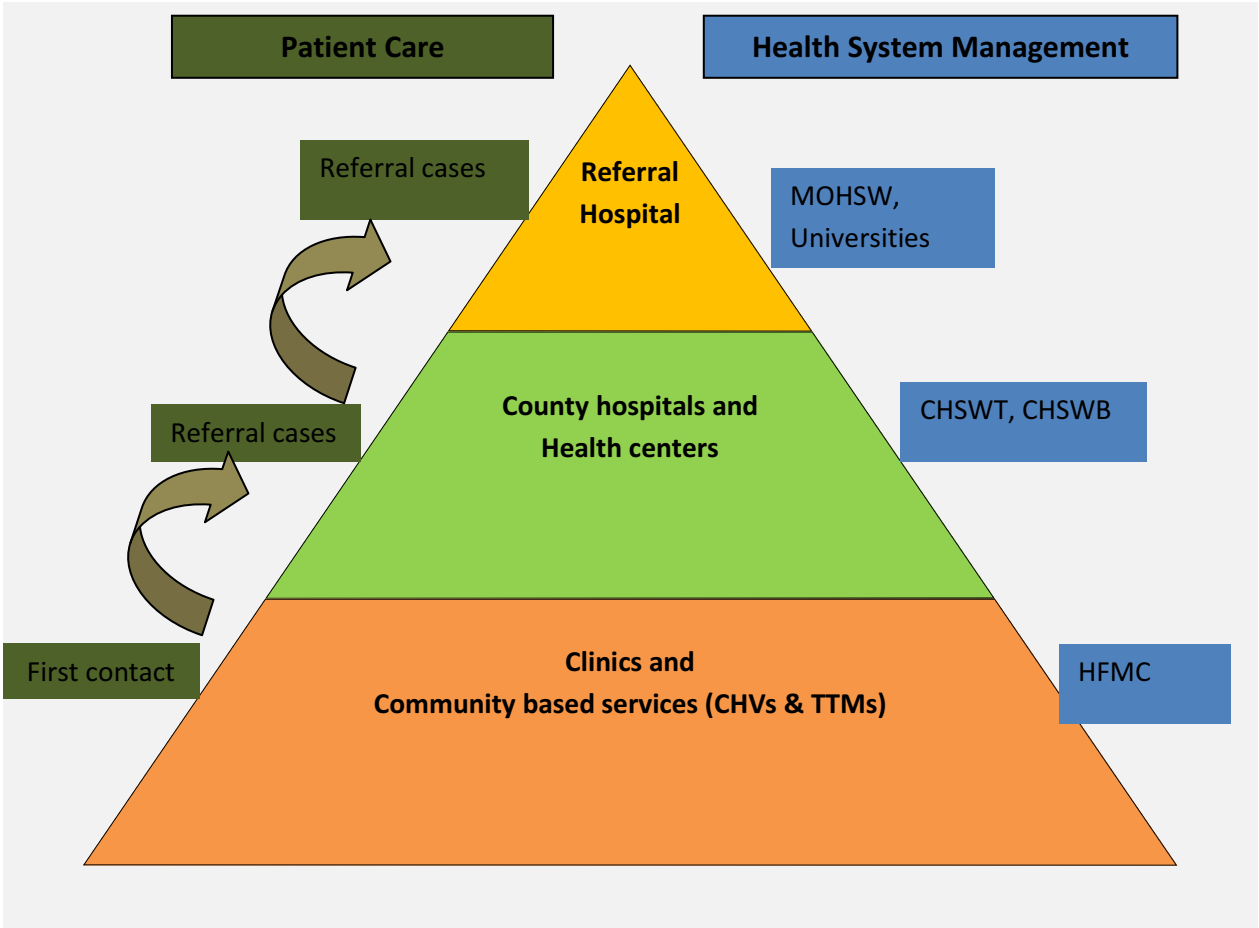
- Decentralization of the health sector, with County Health Teams given greater authority over health facilities;
- Acknowledged three tiers of care—primary, secondary, and tertiary;
- Suspended user fees at the primary and secondary level, although user fees remain at the tertiary level; and
- To progressively increase Liberian government health spending to eventually meet the Abuja target of 15% of the national budget.

As the 2007 plan came to a close, the MOHSW recently developed another 10-year health and social welfare policy and plan (2011-2021).

The Basic Package of Health Services (BPHS) is the cornerstone of the national health plan. It defines the minimum package of standardized prevention and treatment services. The health system in Liberia is organized into three tiers of service delivery: primary, secondary, and tertiary (Figure 1). The primary level of care consists of community-based services and clinics that provide health promotion, education, and basic curative care. The secondary level of service delivery is composed of health centers and county hospitals. The tertiary level has exclusively referral functions and is teaching and learning oriented.

[5] UNDP, 2010. *Human Development Report*.
[6] MOHSW & Macro, Inc. 2007. *Liberia Demographic and Health Survey*.
[7] MOHSW, 2009. *Liberia National Health Account*.
[8] National Transitional Government of Liberia. 2004. *Joint Needs Assessment Report*. Monrovia: National Transitional Government of Liberia.
[9] MOHSW. 2007. *National Health Policy: National Health Plan 2007-2011*. Monrovia.

Figure 1.Organization of the Health System in Liberia



Since the initiation of the BPHS, there has been remarkable progress in the provision of health services across the country.[10] Recent health surveys in Liberia show significant improvements in some areas, for example in child mortality, which now stands at 41/1,000. However, maternal mortality remains very high, at 994 deaths per 100,000 live births.[6] Malaria and diarrhea, which are endemic in Liberia, are a major cause of morbidity and important contributors to under-five mortality. HIV prevalence at 1.5% poses a threat to the population of which 47% live in urban area. According to the Liberia Demographic and Health Survey the total fertility rate is 5.2 and the contraceptive prevalence rate is just 11%. Among married women, 47% had a need for birth spacing or limiting but only a quarter of that need was met.

Despite the success of the BPHS, rural health service delivery remains a big challenge; more than 75% of households are located outside of facility catchment areas. The MOHSW envisioned bridging the gap where facilities were lacking with community health volunteers. Community health activities are rapidly being scaled up in all counties which intend to change the lives of the

[10] MOHSW. 2011. *2010 Annual Report: Presented to the National Legislature Republic of Liberia.* (p.1)

most vulnerable in the communities. "But community health volunteers were poorly trained, poorly motivated, and difficult to retain. The aspiration of Liberia's 2008 National Strategy and Policy for Community Health Services—envisioning a range of high quality primary care services delivered by teams of well-supervised community volunteers—was poorly matched to the requirement that community health volunteers be 'unsalaried volunteers."[11]

National HMIS Policy/Strategy

The National Health Policy places HMIS as one of the essential building blocks of the national health system. Thus, the policy stated that HMIS will be strengthened in order to better collect, organize, and maintain relevant data in a timely fashion.[1] It intends to establish HMIS that have capacity to produce reports related to health sector development, including the analysis of trends, in order to understand the evolution of the health sector over time. The goal of the HMIS, as stated in the policy document, is to contribute to the evidence-based decision making in the health sector. The objectives are: 1) to generate quality information in a timely manner and 2) to ensure the use of information in planning and management of health services.

The policy stresses HMIS to be designed in a way that is consistent with the decentralized health and social welfare structure.[12] It encourages the use of data for decision making by the officials in charge of different levels of care. At the facility level, staff are expected to review their monthly HMIS reports so that they can monitor their own performances. Detailed disaggregated data will be generated by the system at the county level to guide the decision making on programmatic and operational issues. The central MOHSW is expected to consolidate and aggregate data to inform policymaking, planning, resource allocation, and operational oversight. The policy also indicated that feedback must be provided to those who collect and provide data. Feedback on the monthly reports must reach the recipients before the deadline for submitting the next report.

Significant progress has been reported in the rollout of the new HMIS policy and plan. The MOHSW identified 33 indicators to monitor implementation of national health policy of which 10 are considered as milestone indicators. At county level a total of 36 indicators are identified covering BPHS, human resources, support system, infrastructure, finance, partners, MNCH, reproductive health and disease control.[13] Committed to improving data quality, the MOHSW HMIS Unit developed, piloted, and printed harmonized health facility ledgers. The Ministry also developed and distributed a new integrated health sector reporting form in late 2011. Moreover, training and capacity building of MOHSW staff in the areas of data collection, collation, analysis, and standardization at national and sub-national levels have been undertaken in order to strengthen reporting. "It is envisaged that these tools will facilitate the improvement in HMIS and provide reliable, timely, and useful data for prompt interventions and decision making."

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[11] Lee, Patrick, et al. 2011. An Analysis of Liberia's 2007 National Health Policy: Lessons for Health Systems Strengthening and Chronic Disease Care in Poor, Post-conflict Countries. *Global Health Journal* 7:37. Available at www.ncbi.nlm.nih.gov/pmc/articles/PMC3201890/.

[12] Liberia Ministry of Health and Social Welfare. *National Health and Social Welfare Policy and Plan 2011-2021*.

[13] MOHSW. 2009. Health Management Information System: Strategy and Implementation Plan 2008-2012.

Liberia has recently introduced DHIS software for collecting and aggregating health statistics at the national level. Routine health data is submitted to the central MOHSW through the DHIS on a monthly basis. The county health offices are expected to generate electronic reports and distribute hard copies to county health team members and health facilities. The coverage of routine health facility reporting and data quality is expected to improve with the introduction of the DHIS software, the National Health Information Strategy and Policy, and the standardization of reporting instruments.

PRISM Conceptual Framework

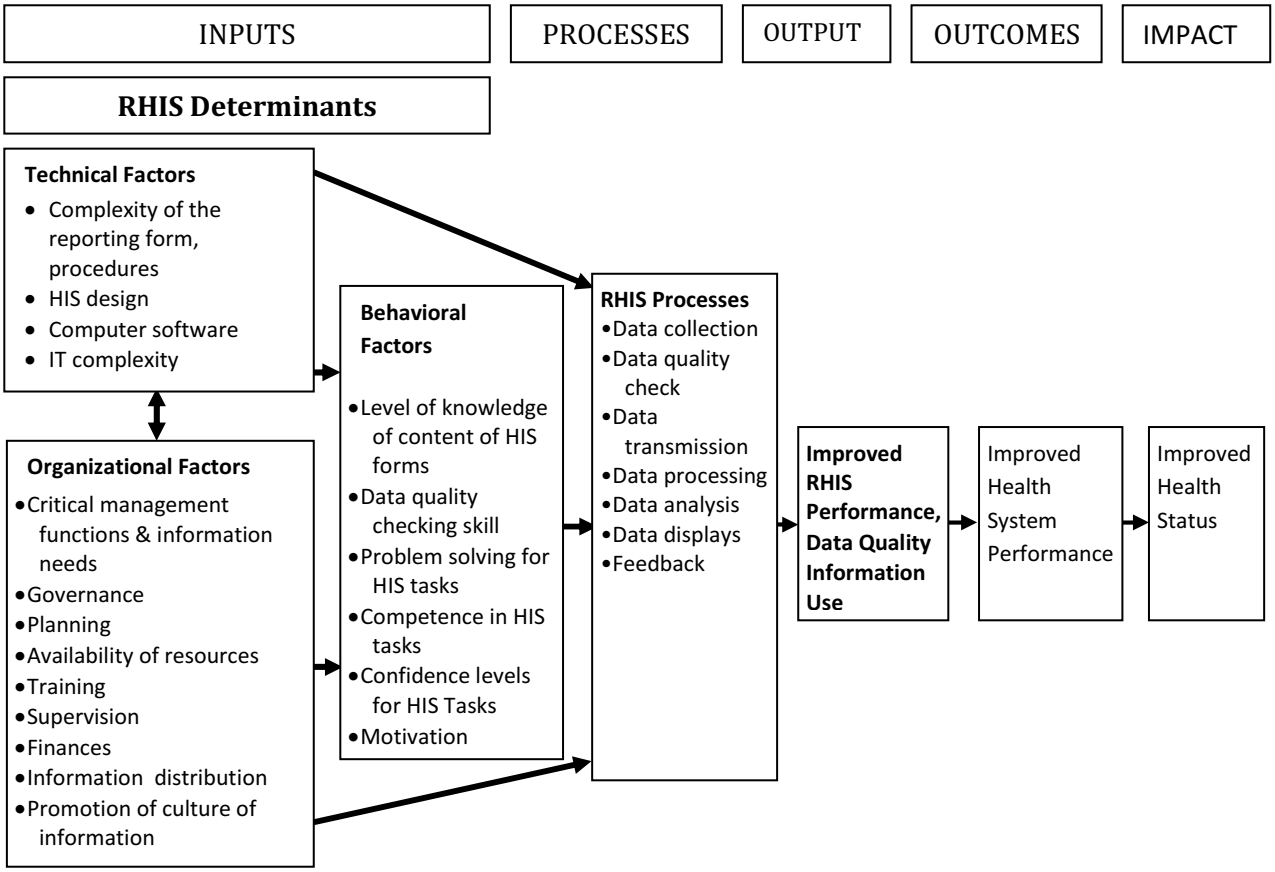
The PRISM Framework (Figure 2) defines the various components of routine health information systems (RHIS) and their linkages to produce better quality data and continuous use of information, leading to better health system performance and, consequently, better health outcomes. The PRISM framework asserts that RHIS performance (better quality data and continuous use of information) is a function of better RHIS processes and their behavioral, technical, and organizational determinants.[14] The framework posits that these three factors have direct and indirect effects on RHIS processes, which in turn affect RHIS performance.

RHIS performance is measured by two indicators, improved data quality and continuous information use. RHIS processes have seven components that are crucial for strengthening any information system. These are: data collection, data transmission, data processing, data analysis, data display, data quality checking, and feedback. The behavioral factors consist of perception of information process vis-à-vis personal values and skills. Organizational components include organization structure, resources, procedures, support services, and culture to develop, manage, and improve RHIS processes. The PRISM framework is founded on a 'systems approach' and continuous performance improvement principles.

The assessment carried out in Liberia is based on this PRISM framework which consists of tools to assess RHIS performance; identify technical, behavioral, and organizational factors that affect RHIS; aid in designing priority interventions to improve performance; and improve quality and use of routine health data.[15]

[14] Aqil, A., Lippeveld, T., Hozumi, D. 2009. PRISM framework: a paradigm shift for designing, strengthening and evaluating routine health information systems. *Health Policy and Planning* 1-12.
[15] MEASURE Evaluation. "PRISM: Performance of Routine Information System Management Framework." Available at www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/prism.

Figure 2: PRISM Framework



Methodology

The Liberia PRISM assessment used the PRISM tools at county level as well as in a sample of health facilities in each county. The survey instrument used in the assessment was adapted from the generic PRISM tool package.[16] The diagnostic tool, facility check list, and organizational and behavioral assessment tool were used to collect information from health care facilities and county health offices. The management assessment tool was also used to collect information on a range of management support services including governance, planning, training, supervision, use of performance tools, and financial resources at county health offices. In addition, the PRISM tools were adapted to generate an understanding of community health information systems in terms of data recording, reporting, supervision, and training.

The Lot Quality Assurance Sampling (LQAS) method was used to draw a sample of health facilities. LQAS was chosen for its flexibility, rapidness, and inexpensiveness relative to other probability survey methods to assess performance using a smaller sample size. It enables local program managers to monitor whether program objectives and targets have been achieved within a specific unit of interest, and requires a modest level of external assistance. It also provides an accurate measure of health system quality at a more aggregate level (e.g., program catchment area or county). In the LQAS application, the entire program area, or catchment area, is divided into meaningful subdivisions, or "lots". Typically, the lot is defined as a program supervisory area and is classified as performing "acceptably" or "unacceptably," and "below" or "above" the defined target.

In Liberia, RBHS and the MOHSW jointly selected Bong, Lofa, Nimba, and Grand Bassa counties as program supervisory areas for the PRISM assessment. These four counties contain 36% of Liberia's population. RBHS has been providing focused health service delivery support through performance-based financing to Bong, Lofa, and Nimba counties. Improving data collection with the new HMIS is crucial for the implementation of the PBF. With the suggestion from MOHSW a fourth county, Grand Bass was included in the PRISM assessment.

Sample Selection

For each of the four counties selected for the PRISM assessment, 19 health facilities were chosen randomly among facilities that have been reporting to the MOHSW for at least the last year and a half. A sample size of 19 provides an acceptable level of error for making management decisions; at least 92% of the time, it identifies whether an HMIS performance target has been reached or whether a county is substantially below the average coverage of a program area. Multiple stages probability sampling was used to select the health facilities in each county to capture different aspects/characteristics of health facilities in Liberia. These include:

[16] Aqil A., Lippeveld T. 2009. *PRISM Tools for Assessing, Monitoring, and Evaluating RHIS Performance*. MEASURE Evaluation Project. Available at www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/prism.

1. Health facility type: For the purpose of the assessment, the health facilities were classified into two broad categories. Clinics and health centers in one category (there is not much difference between the two in relation to HMIS rollout and implementation), and hospitals in the second category. Then they were weighted by size of health facility to determine how many in each of the two broad categories of health facilities should be assessed. In most cases one hospital and 18 clinics/health centers were selected per county.

2. Supporting agencies: The health facilities were further classified into four strata based on funding sources. The health facilities were aggregated by RBHS project, other NGOs, and exclusively MOHSW supported facilities, and private facilities. The probability proportional to size method was used to randomly select the health facilities among the four categories. It assured that all health facilities were given an equal probability of being included in the assessment.

Overall, 4 county health offices, 4 hospitals, and 72 clinics or health centers were surveyed (Table 2). About 360 health staff were interviewed including county health office, CHDDs, monitoring and evaluation officers, data managers, and DHOs in the county health offices, and OIC, CMs, screener, vaccinator, and registrar in each health facility. Facilities in which staff were unavailable were replaced by the next closest health facility.

Table 2. Sample Size by County

Health Facilities Supported by	Bong	Lofa	Nimba	Grand Bassa
RBHS	8	8	13	-
Other NGO	8	8	1	-
Exclusively by the MOHSW	1	2	5	14
Private	2	1	-	5
Total Health Facilities	19	19	19	19
County Health Office	1	1	1	1

Data Collection

Data collection methods in each county included semi-structured and open-ended key informant interviews; self-assessment; field observation; review of records, reports, and plans; and group information flow mapping exercises. Twelve teams consisting of staff from RBHS, partners/NGOs, central MOHSW, and country health offices collected data from April 30 to May

5, 2012. Each county had at least three teams of assessors and a supervisory team. In addition, RBHS county coordinators were mobilized to administer and coordinate the logistics and deployment of assessors within their respective counties of assignment. They kept supervisory team members updated on the day-to-day state of affairs and implementation of the assessment. The supervisory team was designated for overall oversight of the data collection in the county including ensuring adherence to assessment protocols and guidelines as well as counter checking completeness and quality of data collection tools. The assessment teams conducted a total of over 350 interviews across the four counties. For the self-administered organizational and behavioral assessment tool, the questionnaire was administered to as many as five health workers per facility in an effort to collect data from a wide variety of staff. At the end of each visits, the assessment team debriefed the facility staff and the county health team on the general observations and experience during the visit with the promise to share the result once the report is ready.

Data Analysis

The data was entered in an Excel PRISM data entry template and descriptive analysis was conducted. The health facilities data was further analyzed using the LQAS decision table. The MOHSW and RBHS jointly set targets for 16 HMIS performance indicators (see annex 1). The assessment sought to determine whether these predetermined standards for HMIS performance in various areas are met by the health facilities. Analysis of the HMIS performance was done in two ways:

1. Overall performance estimates: looks at the average performance estimate for each indicator for all of the four counties combined. The performance estimates have a precision of ±10%, and the aggregate measure is weighted by the total number of health facilities in the four counties. Given that the number of total health facilities varies across the counties, weighting helps to adjust for these differences and provides a more accurate overall estimate of HMIS performance for each indicator.

2. County by county analysis: looks at whether each county met the predetermined HMIS performance target for each indicator. The analysis provided a binary result; a “yes” or “no” answer showing counties that met or exceeded the performance target and those that are performing below the target.

For the Organizational and Behavioral Assessment (OBAT), there are many constructs such as self-confidence level for HMIS tasks, competence level of HMIS tasks, and a culture of information, which are a composite of many dimensions. Thus, the mean score of overall constructs and its dimensions are used to compare which dimension score is lower than the other, indicating interventions for improving them. In addition, comparisons were made between the constructs and the other HMIS performance variables such as data quality and use of information. The comparative analysis among various components of the PRISM framework illustrates the strengths and weaknesses of Liberia’s HMIS. This information feeds into the MOHSW continuous efforts to improve the HMIS performance in Liberia.

PRISM Assessment Results

Mapping Liberia Health Information Systems

A mapping exercise of the current HMIS in Liberia was conducted during the training and in focus group discussions with the county health office teams. The exercise tried to identify the various HMIS that are in the country and the flow of information at each level of the health system.

Liberia's HMIS has a number of sub-systems at various levels of the health system. The civil registration and community health information system are community based. The facility-based information system comprises an integrated health services information system (HIS) and disease surveillance. The human resources information system, financial management information system, physical assets management information system, and logistics and supply chain management information system are managed at the central MOHSW.

The new HMIS strategy recognizes the need to streamline and coordinate the collection and dissemination of information and to harmonize the various program databases at the central and county level. Accordingly, the MOHSW planned to establish a central repository that compiles all HMIS sub-systems and generates comprehensive picture of Liberia's health system. In late 2011, the MOHSW developed and rolled out integrated HMIS reporting forms in all 15 counties. The new HMIS report format is comprehensive and includes maternal, newborn and child health; tuberculosis (TB); HIV/AIDS; OPD; IPD; disease surveillance; finance; and management information.

Table 3 shows that the bulk of health service delivery data flows through the integrated HMIS but there are still parallel reporting channels. The solid arrows show the use of integrated HMIS reporting formats in the Liberia health system. Health service reports are being provided through this common platform from the facility up to the MOHSW on a monthly basis. At county health offices the data manager and monitoring and evaluation officer are responsible for checking data quality, reporting completeness, entering health facility information into the electronic database (DHIS 2), and reporting to the MOHSW. In order to curb the transportation gap and facilitate timely reporting, in some areas, NGO partners collect the integrated HMIS report from the facilities on behalf of the county health office.

However, there is still parallel reporting in some facilities due to demands from programs and donors which goes against the principles of the unified HMIS (with a single reporting channel). The broken arrows in Table 3 show the presence of a different reporting format and parallel reporting systems. Disease surveillance, TB and HIV/AIDS, and pharmaceutical data are being reported in different reporting formats that are submitted to the respective focal persons at the county health office and then to the central MOHSW. These reports are not accessed or made known to the monitoring and evaluation unit at the county health office where data are compiled and entered into the DHIS.

Separate reporting emanated due to the inherent nature of surveillance data and the need to monitor and report on priority diseases on weekly basis. Although there is a provision to record

surveillance information in the integrated HMIS, it is not being completed by most health facilities. Thus, data on diseases that are under active surveillance are not being tracked in the integrated system. Pharmaceutical data are also tracked in a parallel manner throughout the different levels of the health system. Integration of pharmaceutical data in the new HMIS is under discussion.

Information is not being shared within county health offices. Hence, some program focal persons resorted to collect separate reports from facilities. In some of the visited health facilities the old TB/HIV program report forms are still being used along with the integrated HMIS form. The separate TB/HIV reports are submitted directly to TB/HIV focal persons in the county health office and then reported to the National AIDS Control Program (NACP) and National Leprosy and TB Control Program (NLTCP). Due to the duplication of reporting forms staff at some facilities fill in the separate TB/HIV form and leave the corresponding section in the integrated HMIS report blank. This created a huge work burden for the staff and compromised the appreciation and commitment of the staff towards the new reporting system. The effect of parallel reporting with multiple and redundant formats compromised data quality and increased administrative workload.

The table also shows that the community health information system is not harmonized. Multiple channels are observed in the reporting of community health activities. In some areas the community health volunteers report directly to the health facilities and these activities are reported upward through the health system as part of the integrated monthly HMIS report. There are also cases where the community activities are reported directly to the NGO partners and the donor.

It can be seen from the table that similar pieces of information are collected by different systems. Most of the information flows are in an upward direction with little or no feedback to the lower levels of the organization. Cross program data sharing is limited between specific programs or information systems. Though the monitoring and evaluation unit in the county health office generates an electronic report, they are not distributed to county health team members and health facilities. Further, currently the information system for human resources, finance, physical assets and equipment, logistics and supply chain management, and health programs is not properly integrated within the HMIS. These are important areas to provide a comprehensive view of health system performance. The focus of the current system is on service utilization only and there is an information gap on other management issues.

Table 3. Information Flow by Health System Level

Organizational Level	Type of Information Systems						
	HMIS	Community Based Health Information	TB/HIV	Surveillance	Pharmaceutical (PMIS)	Human Resource	Financial
National level (MOHSW)		MOHSW Donor	NACP/ NLTCP				
County level							
District level							
NGO partner							
Facility level							
Community level							

Levels of HMIS Performance: Data Quality and Information Use

The PRISM framework considers HMIS performance as the output of the information system. HMIS performances are measured by two indicators: (1) level of data quality and (2) continuous use of information.

Data Quality

Data quality is measured on dimensions of data accuracy, completeness, and timeliness.

Data Accuracy at Health Facilities

Checking data quality by observing records is considered to be the gold standard for measuring HMIS performance and their validity is well established.[17] To measure the accuracy of data in the Liberia HMIS assessment, a comparison was made between data contained in integrated HMIS monthly reports with those of facility registers/ledgers for six types of services. Antenatal care, penta3, family planning, assisted delivery, malaria, and OPD service utilization were purposefully selected for assessing data accuracy.

The MOHSW expected at least 75% of the health facilities to have data accuracy between 90-110% with a 10% tolerance range. Table 4 shows data accuracy varied from month to month and among the six types of data elements covered in this assessment. Overall, data accuracy was 46% in February 2012, an 8% improvement compared to 38% in August 2011. Data accuracy was 80% for normal deliveries conducted at health facilities in February 2012 which exceeded the target. In Nimba, in February 2012, the data accuracy level was above the target in all assessed indicators except for Penta3. On the contrary, in Grand Bassa all of the assessed indicators except for delivery services were below the target.

Standardized registers/ledgers have been developed by the MOHSW and put into use in the four counties. Those registers include: antenatal, postnatal, delivery, master, in-patient general, in-patient maternity, family planning temporary, and under-five or IMCI. However, the assessment team discovered that the majority of the health facilities still use a previous version or customized registers. Other problems that the team observed included improperly completed registers/ledgers and omitted immunization dates. Half of the visited health facilities (51%) reported data transfer error as a reason for the observed inaccuracy between the register and monthly reports. Arithmetic error in the registers was the second contributing factor reported by 24% of the visited health facilities.

[17] Lippeveld, T., Sauerborn, R., Bodart, C., 2000. *Design and Implementation of Health Information Systems*. Geneva: World Health Organization.

Table 4: Data Accuracy at the Health Facility Level

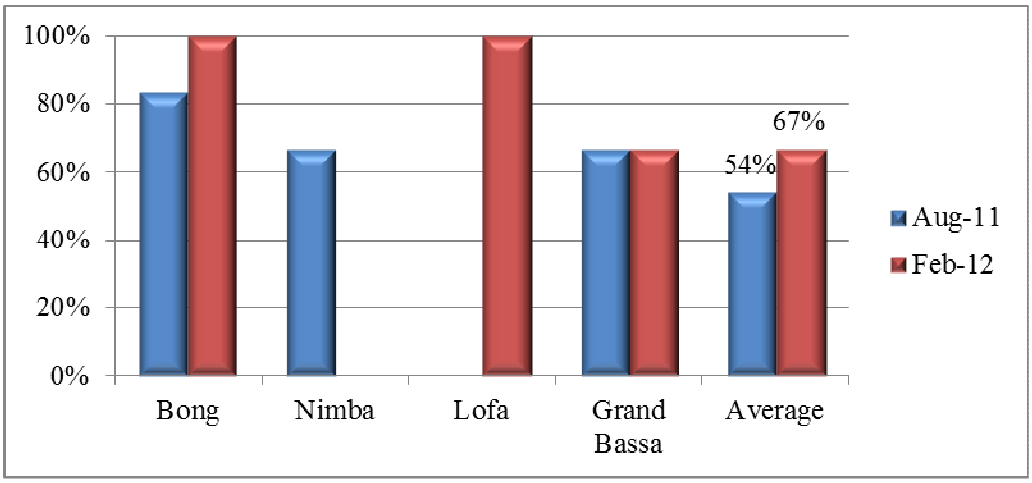
Data elements	Weighted Average		# of health facilities with matched data items between register/ledgers and report Decision Rule = 12 (75%), Sample Size =19							
			Bong		Nimba		Lofa		Grand Bassa	
	August 2011	February 2012	Aug. 2011	Feb. 2012	Aug. 2011	Feb. 2012	Aug. 2011	Feb. 2012	Aug. 2011	Feb. 2012
ANC4	41%	61%	7	8	7	13	10	15	6	6
Penta3	36%	50%	7	10	11	9	4	11	4	7
PHC head count	67%	54%	13	11	14	14	13	9	9	4
Normal deliveries conducted at health facilities	63%	80%	17	17	9	14	14	16	9	14
Children under 5 treated with ACT	50%	59%	10	12	11	12	8	12	9	7
Number of family planning pills (all types) dispensed	38%	58%	7	11	6	13	11	12	3	5
All 6 data elements	**38%**	**46%**	**7**	**7**	**9**	**12**	**7**	**9**	**4**	**4**

Data Accuracy at County Health Offices

With the introduction of the DHIS, county health offices are mandated to enter facility reports in the database, generate electronic reports, and submit them to the central MOHSW. The assessment team cross-checked the monthly electronic reports submitted by the county health teams along with the individual health facility monthly paper reports.

Overall, data accuracy between the paper reports and electronic database ranged from 54% in August 2011 to 67% in February 2012. In Bong and Lofa, February 2012 data completely matched for all of the six assessed service indicators. In Nimba, none of the data elements matched and antenatal care, Penta3, normal delivery in health facilities, children treated with ACT, and family planning data were under-reported in the DHIS2 for February 2012. The data managers reported that training provided on the second version of DHIS was not sufficient. Hence, lack of capacity at the county health office level was mentioned as a contributory factor for the observed low data accuracy level.

Figure 3. Level of data accuracy at county health offices (N_{Aug}=178, N_{Feb}= 181)



Completeness

Monthly Report Data Completeness

The completeness of the monthly reports are measured by the number of health facility reports with over 89% of the data elements filled against the total number of data elements that the facility was supposed to fill. The types of health services being provided are not uniform across the assessed health facilities. For example, some facilities do not provide family planning services. Others, like Mittal Steel in Grand Bassa, even if upgraded to the hospital level, are still providing limited services. There is no written record/documentation of services provided by each facility. Hence, identifying the number of data elements expected to be reported by each facility was a challenge for the assessment team.

The assessment result showed that 40% of health facilities did complete the monthly form before reporting to the county health office (Table 5). Monthly report data completeness declined in February by 27%. A similar trend is observed in all of the counties except Grand Bassa. In August 2011, the number of facilities with completed monthly reports exceeded the target in Bong, Nimba, and Grand Bassa, while both Bong and Nimba did not meet the 70% target in the February monthly reports.

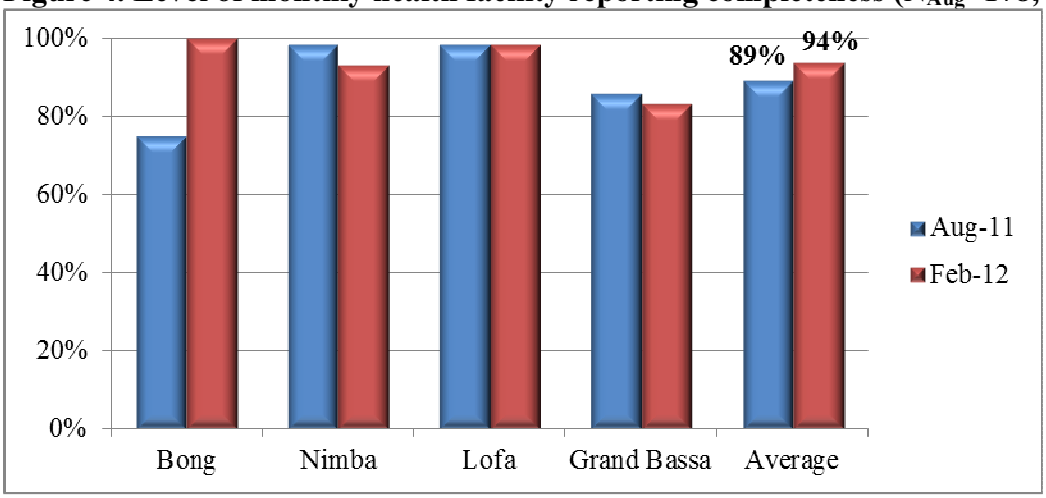
Table 5. Monthly report data completeness

Data Completeness	Weighted Average	# of facilities with ≥ 90% report completeness (as measured by reported data elements against expected)					
		Target	Sample size	Bong	Nimba	Lofa	Grand Bassa
August 2011	62%	11 (70%)	19	13	12	10	13
February 2012	35%			6	6	5	12
Overall data completeness	40%						

Monthly Health Facility Reporting Completeness

The completeness of the report at the county level was assessed by measuring how many facilities in the whole county that were supposed to report are actually reporting to the respective county health office. In the four counties, 91% of facilities were observed to be reporting (Figure 4). The report turnout in February 2012 ranged from a low of 83% in Grand Bass to a high of 100% in Bong. Less than 2% of the health facilities failed to report to the county health office in Lofa. The report completeness in Bong improved by a quarter and reached 100% coverage in February 2012.

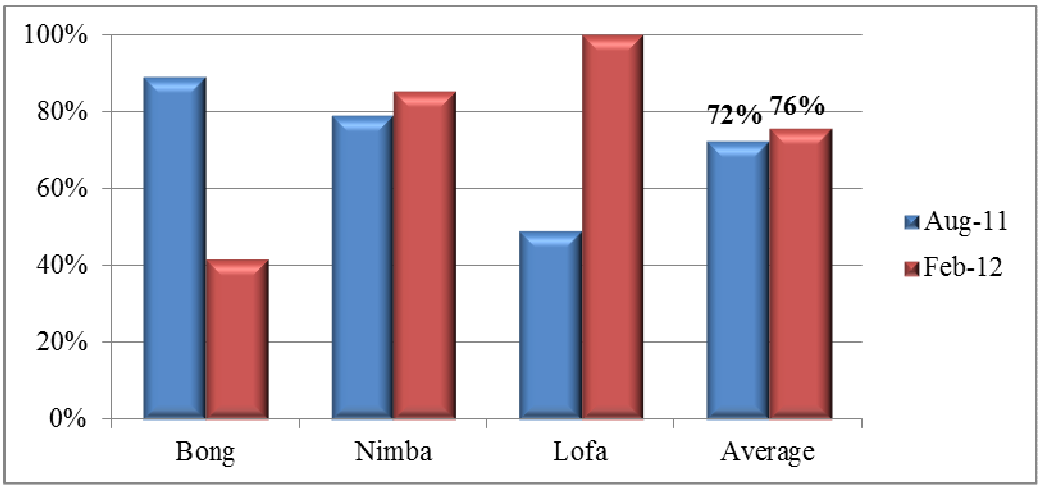
Figure 4. Level of monthly health facility reporting completeness (N_{Aug}=178, N_{Feb}= 181)



Timeliness

The accurate and timely collection and transmission of data by health facilities is crucial for making informed decisions. Timeliness is measured by the county health offices receiving facilities' reports by the predetermined deadline. In Liberia, facilities are expected to submit monthly reports to the county health office within five days after the reporting period. Bong, Nimba, and Lofa county health offices keep records of monthly report receipt dates. However, Grand Bassa county health office did not properly record report receipt dates. Hence, the report timelines result presented here (Figure 5) excludes Grand Bassa. Overall, 74% of the health facilities met the reporting deadline. Of the health facilities reporting to the county health offices in February 2012, 100% in Lofa, 85% in Nimba, and 42% in Bong met the deadline. The report timeliness declined in Bong by more than half between August 2011 and February 2012.

Figure 5. Level of facility report timeliness (N_{Aug}=139, N_{Feb}= 146)



Use of HMIS Information

Use of information was assessed by observing feedback provided on facility performance and through review of documents that verifies whether and how HMIS data were used in decision making processes. The use of HMIS information is measured by a series of dichotomous indicators, including: whether HMIS information was discussed in routine staff meetings; whether HMIS information was used to help make decisions; and whether updated information on various topics was displayed.

The Liberia HMIS policy and plan clearly states that feedback must be provided to those who collected and provided data. Feedback on the monthly reports must reach the recipients before the deadline for submitting the next report. Only about 20% of health facilities reported receiving any feedback on their performances from the county health offices. The MOHSW expected at least 50% of the health facilities to have evidence of written feedback provided by the county health offices. However, only Grand Bassa met this target (Table 6).

Table 6. Presence of feedback mechanism at health facility level

County	Sample Size	Target	# of HFs receiving feedback
Bong	19	7 (50%)	5
Nimba	19	7 (50%)	2
Lofa	19	7 (50%)	2
Grand Bassa	19	7 (50%)	9
Weighted Average	**76**		**20%**

At the facility level, staff is expected to review their monthly HMIS reports so that they can monitor their own performance. Eighty-four percent of the visited health facilities have routine staff meetings and of them 84% were maintaining meeting records. Table 7 shows the level of HMIS information use for performance review and decision making at these health facilities. In Nimba, health facilities demonstrated discussion on HMIS data and using findings to inform decision making which exceeded the 50% target. In Bong, while HMIS data are used in discussions during staff meetings, evidence of use of data for decision making is below 50%. Lofa and Grand Bassa did not meet the target for use of HMIS for performance review and decision making.

Table 7. HMIS information use at health facilities (HFs)

County	Sample Size	Target	# of HFs with routine staff meeting	# of HFs maintaining meeting records	# of HFs with HMIS data discussed during staff meetings	# of HFs with decisions made based on HMIS data
Bong	19	7 (50%)	18	17	8	5
Nimba	19		19	17	13	9
Lofa	19		11	9	5	4
Grand Bassa	19		16	11	6	5
Weighted Average	**76**		**83%**	**71%**	**44%**	**32%**

At the county level, all four county health offices conduct routine staff meetings, but only Nimba and Grand Bassa keep records of meetings that showed HMIS data use for performance monitoring and decision making.

Data Display

Production of summary tables, charts, graphs and maps with clear "take-home" messages is an important process for decision-makers to see data patterns and track priority areas and use in informing their decisions. Availability of tables, charts and or maps on (maternal health indicators, (2) child health indicators, (3) facility utilization, and disease surveillance indicator were assessed for understanding level of data display in the health facilities and county health offices.

Overall, 32% of the health facilities were displaying data, of them only 35% had updated data over the last three months period. Table 7 shows that child health and maternal health indicators were most commonly displayed information in health facilities. In Nimba, data on all the four indicators displayed in most of the visited health facilities, exceeding the 50% target. Followed by Grand Bassa where the three indicators except service utilization data were displayed in above 50% of the facilities. In Bong availability of child health and in Lofa maternal health data display in health facilities met the target.

Table 8. Display of data at health facilities

Types of data displayed	Weighted Average	# of health facilities displaying data (Sample size = 19 HFs per county)				
		Target	Bong	Nimba	Lofa	Grand Bassa
Maternal health	48%	7 (50%)	2	12	11	7
Child health	60%		17	16	5	8
Disease surveillance	38%		4	10	5	9
Service utilization	21%		1	8	2	3
Display of demographic data	39%		8	7	7	8
A map of catchment area	76%		16	15	15	10

The county health offices have fewer displays of data as compared to the facility level. Unlike the facility level, disease surveillance data and child health indicators were displayed in all four county health offices. Map of catchment area displayed in all the county health offices, but display of demographic information were available only in Bong and Grand Bass.

Assessment of HMIS Processes

HMIS processes are important for an information system to run smoothly in order to produce quality data and facilitate the use of information. HMIS processes include: data collection, data quality assurance, data transmission, and data processing/analysis.

The ***data collection*** process was assessed by observing availability of data collection procedure manual. Guidelines and manuals detailing all aspects of data recording, reporting, analysis, presentation, interpretation and use are essential job aids for staff that perform HMIS tasks. However, the assessment revealed that such manuals and guidelines are not available at health facility level and only Nimba and Grand Bass county health offices have HMIS procedure manual. In the absence of such job aids the level of analysis performed by facilities was limited.

The routine ***data transmission*** is more streamlined with majority of the facility data flowing to the county and then central MOHSW through a single reporting channel. Few cases of parallel reporting such as HIV/AIDS and NGO supplemental reporting forms were observed in the visited facilities. The integrated data transmission system does not yet fully capture information on community based activities.

The ***data analysis*** process was measured by reviewing reports that demonstrate facilities calculating indicators, comparing performance with targets, among services provided and over time using HMIS data. The result limited data analysis is performed both at health facility and county health office levels; only 24% health facilities perform any data analysis. All the four counties did not meet the 50% target set for presence of data analysis at health facilities. DHIS-2 presents options for users to analyze and quickly produce dashboard on performance of the county health system, benchmark performance against targets on key indicators, and monitor

progress over time. However, data analysis is not being performed by county health offices due to limited analytical capacity and skills to use DHIS-2.

Table 9. Analysis of data at health facilities

Data Analysis	Weighted Average	Decision Rule	# of HFs conducting data analysis (Sample size = 19 HFs per county)			
			Bong	Nimba	Lofa	Grand Bassa
Presence of performance targets	31%	7 (50%)	6	9	4	3
Presence of performance monitoring plan	16%		5	4	2	1
Type of data analysis performed						
Calculate indicators	16%		4	3	3	2
Comparison against targets	6%		2	2	0	1
Comparison among services	12%		6	3	0	1
Comparison over time	14%		3	3	2	3
Conduct at least two types of data analysis	14%		5	4	1	1
Do not conduct data analysis	76%		12	15	15	15

Presence of ***data quality assurance*** mechanisms was measured in two ways: (1) based on whether or not facilities received any reminder or directives concerning data accuracy, timeliness and completeness of reports from CHO, central MOHSW and/or NGO partners; (2) existence and quality of supportive supervision.

In most place written evidence of data quality assurance reminders were not observed. Respondents mentioned that the directives were mostly communicated orally either during supervision or through the phone.

Table 10. Staff perception of presence of data quality assurance mechanisms in health facilities

HMIS Processes	Weighted Average	Decision Rule	# of HFs reported receiving directives on checking data quality (Sample size = 19 HFs per county)			
			Bong	Nimba	Lofa	Grand Bassa
Presence of data accuracy check	63%	7 (50%)	14	11	11	13
Presence of report completeness check	72%		17	13	11	16
Presence of report timeliness check	85%		18	17	13	18
Data processing (>=50%)	63%		16	11	10	13

Close follow up with feedback could contribute to better data quality and improve use of information for decision making. Supportive supervision provides opportunities that could be used to improve the understanding of data and skill level in interpreting results. The assessment team found that supervision logbooks are properly kept in all the visited health facilities. The team checked the logbook to ascertain frequency of supervisions that took place during the first quarter of 2012. The result showed that 94% of the health facilities had received one or more supervisory visits from higher level over the three month period. Of which 70% confirmed that supervisors performed data quality check during supervision. However, less than 25% of the health facilities indicated that supervisors provide written feedback after supervision. The assessment team triangulated the staff responses by reviewing the logbooks for feedbacks provided during supervisions, which showed limited feedbacks recorded.

Table 11 shows the level of supportive supervisions in each county in regard to data quality check and use of HMIS data to monitor facility performances. In all four counties supervised health facilities reporting data quality check performed during supervision were above 50%. Similarly, an encouraging trend of use of HMIS data for performance monitoring during supervision was reported by more than 50% of the health facilities in all the four counties. Overall HMIS supervision quality in Bong and Nimba exceeded the target, while in Lofa and Grand Bassa it is below the minimum target set by the MOHSW.

Table 11. HMIS supervision quality (Sample size = 19 HFs per county)

Supportive supervision	Weighted Average	Decision Rule	Bong	Nimba	Lofa	Grand Bassa
Facilities reporting supervisors use checklist	91%	7 (50%)	18	19	17	14
Facilities reporting supervisors check data quality	70%		15	13	13	13
Facilities reporting supervisors use HMIS information for checking facility performance	61%		12	13	10	11
Facilities reporting supervisors assist in use of information for decision making	55%		12	13	6	12
Facilities reporting supervisors provide feedback	22%		8	5	2	2
Overall supervision quality (above 70%)	45%		12	11	5	6

Determinants of HMIS Performance

Technical Determinants

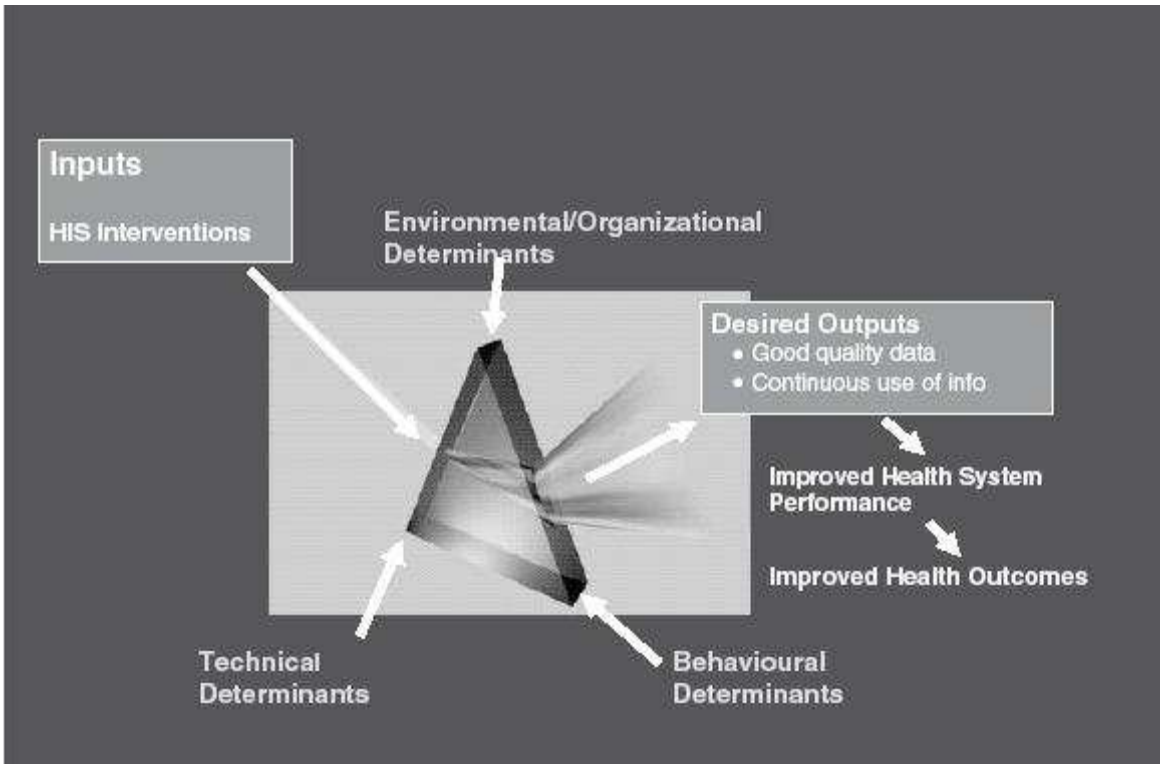
The PRISM assessment identified many technical issues that can affect HMIS performance including: availability and user friendliness of data collection forms and procedures and electronic database software, DHIS-2 capability to provide comprehensive picture of health system performance and use of information technology to create access to information for senior managers.

The result showed that technical aspects of the program are generally adequate; standardized data collection ledgers and reporting forms are in place, and data flows from facility to central MOHSW level. The MOHSW identified indicator and related data sets, and developed a procedure manual guiding the data collection processes. However, the procedure manual is not widely available at health facilities as well as county health offices. The assessment team observed manuals only in Nimba and Grand Bass county health offices.

An electronic database, DHIS-2 is being used in the four county health offices. Data Managers were recruited and trained to administer the DHIS at the county health office. Computer based data is constantly flowing from the county health office to the central MOHSW. Though DHIS-2 has the capability to generate raw data pivot tables, dashboards and maps it is hardly used at the county health offices. The Data Managers in the four counties indicated that the training provided on DHIS 2 was not adequate. They also found DHIS-2 less user friendly.

Behavioral Determinants

The PRISM framework looks beyond the relationship between HMIS processes and performance, and incorporates behavioral and organizational factors that determine HMIS performance. The Liberia HMIS policy and plan is geared towards supporting and strengthening local action-oriented performance monitoring. In accomplishing this objective, a paradigm shift is required from simple reporting data and responding to the situation as instructed by higher authorities, to actually analyzing and interpreting the information on hand, and providing self-assessment and problem-solving. This requires reorienting and redirecting health workers at all levels of the system to change attitudes towards their own capacities, their jobs, and their roles in the organization; and requires organizational interventions to change the organizational values and practices to actually value and practice evidence-based decision making.

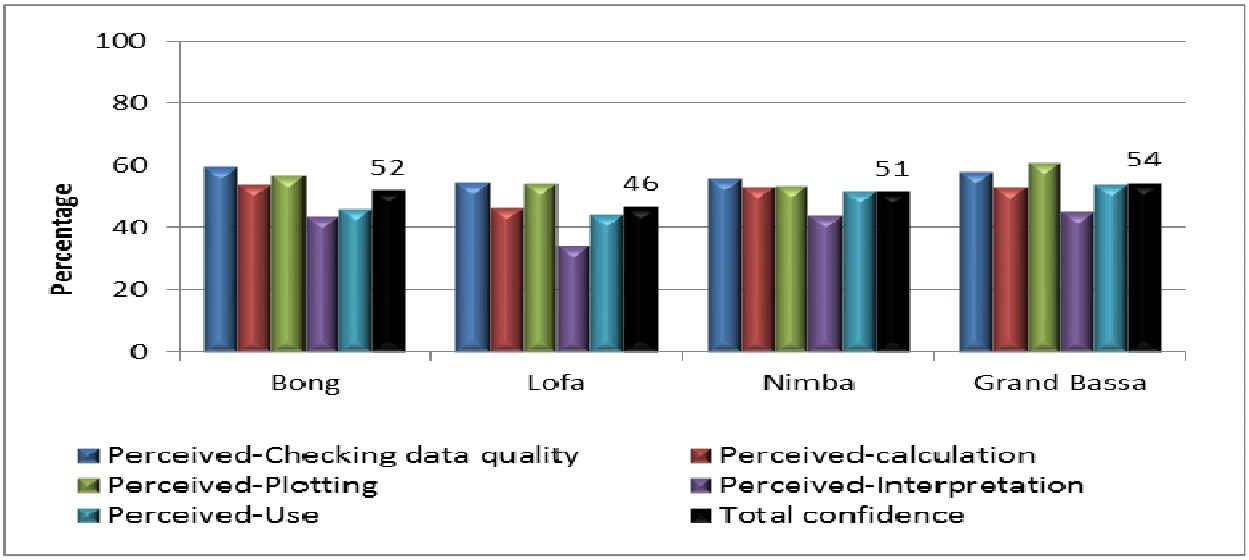


The level and role of behavioral factors such as motivation, confidence, task competency and problem solving skills were assessed in Bong, Nimba, Lofa and Grand Bassa using self-administered questionnaires. A total of 329 health facility staff and 34 county health office staff completed the self-administered questionnaires. The health staffs understanding of the rationale for including certain types of information on data collection were also measured to illustrate the level of demand for HMIS information.

Confidence or Self-efficacy Level for HMIS Tasks

Health workers confidence levels were assessed on scale of 0 to 100 from no confidence to full confidence in performing a particular HMIS task. The results showed that health facility staff are more confident in collecting data than interpreting and use. On average confidence levels of respondents for calculation, plotting, and checking data quality ranged between 51%-57%, but confidence level dropped to 49% for use of data, and to 41% for data interpretation. A similar pattern of staff confidence levels for HMIS tasks observed across the four counties. In Grand Bassa the overall staff confidence level to perform HMIS task was 54%, followed by 52% in Bong, 51% in Nimba and 46% in Lofa.

Figure 6. Comparisons among perceived confidence level for HIS Tasks (N=329)

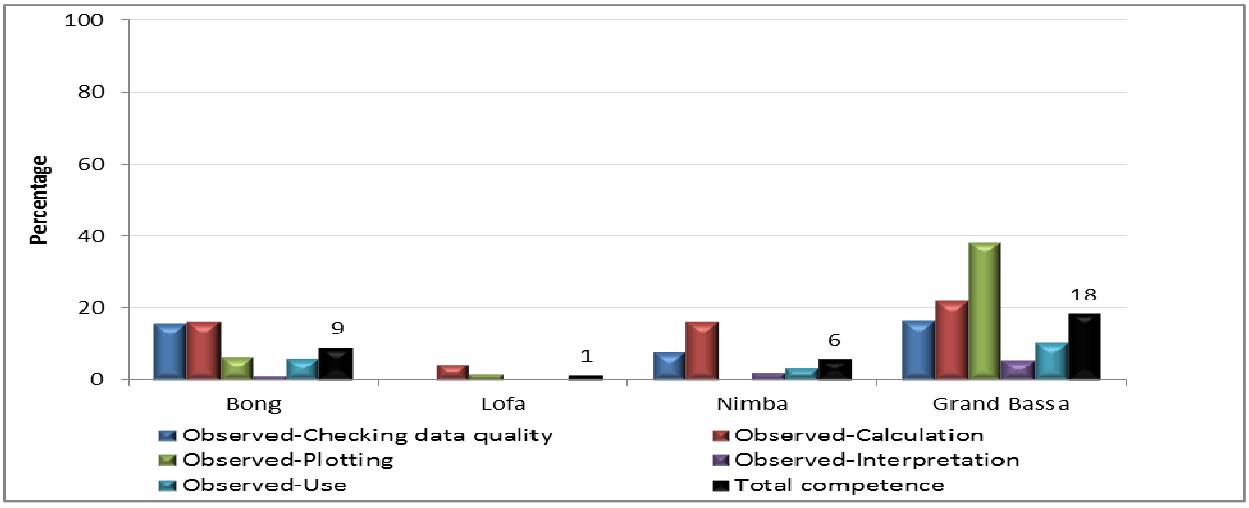


HMIS Task Competence

HMIS task competency was measured by asking respondents to solve problems with a pencil and paper test. On average, less than 10% demonstrated ability to perform data quality check, basic calculation, data plotting and interpretation, and use of information skills. This low capacity in data quality checking and performing basic calculation can be one of the contributing factors for the observed high level of data inaccuracy (between 54%-62%) in the health facilities. Also twenty four percent of the health facilities indicated arithmetic error as the reason for the observed data inaccuracy. Only 10% of respondents are aware of methods to check quality of the data collected in their facilities.

Demand for data and actual use of data for decision making among managers at both facility and county level relies heavily on their understanding of the importance of HMIS data. Twenty eight percent of the facility respondents demonstrated knowledge of the rationale for collecting disease, immunization, and population related data. Problem identification and solving are other skills that are necessary to use information and take action. Problem sets were given for the health staff to measure their capacity to identify and solve problems based on data. Thirteen percent of the respondents were able to identify problems using data, but only half of them demonstrated problem solving skills. This minimum level of problem identification and solving skills explains for a major part the limited (38%) use of information at health facilities. Information at this level is mainly collected for reporting purpose rather than for assessing facility performance or to inform the decision making process.

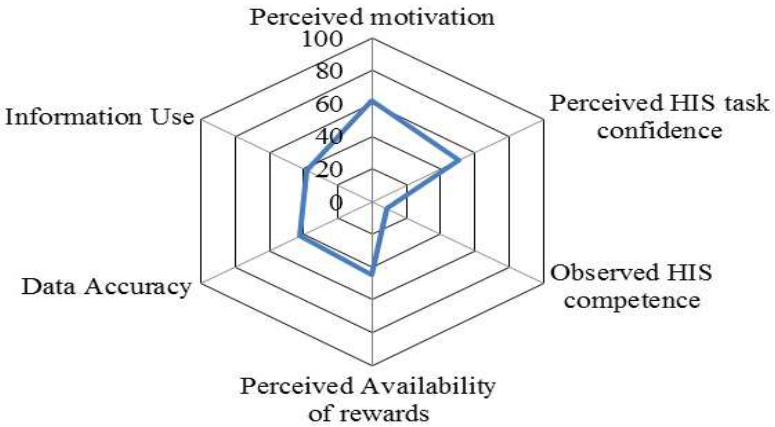
Figure 7. Comparisons among Observed HIS tasks competence (N=329)



The result also showed that the levels of health facility staff competence to perform HMIS tasks are the same across the four counties. A relatively better capacity was observed in Grand Bassa with 30% showed ability to identify problems and 38% present data in a graph, 22% performed basic calculation and 16% know how to do data quality checking. In Nimba and Lofa staff scored lower in all dimensions of HMIS task competence.

A high confidence level for performing HMIS tasks is theoretically associated with high levels of competency in HMIS tasks. However, in all assessed counties there is a gap between health facility staff confidence (51%) and competence to perform HMIS tasks (9%). These discrepancies indicate overestimation in perceived competence levels to perform HMIS tasks among staff when actual ability for performing those tasks was low.

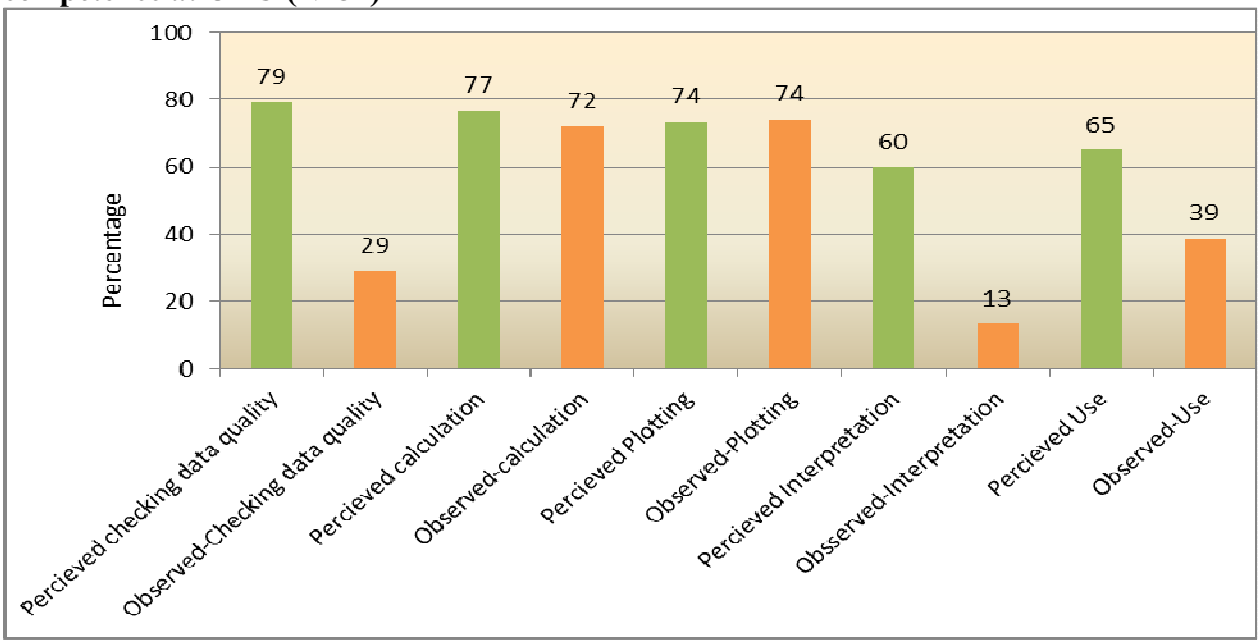
Figure 8. Comparisons among motivation, observed HMIS competence, and perceived HMIS task confidence (N=329)



Motivation to do basic HMIS tasks including data collection and reporting among health facility staff ranged from 60% in Bong, Lofa and Nimba to 65% in Grand Bassa. Health staff attaches value to data collection with the perception that data are being used for decision making. Fifty one percent of the respondents found the ledgers/registers user friendly. However, only 48% indicated the newly integrated HMIS reporting forms are easy to manage. Staff in the health facilities received minimum training on the new data collection and reporting tools. Over all, twenty eight percent of the visited health facilities indicated 75% of their staff are trained on the new tools.

The picture is a little different at the county health offices where the perceived confidence matches with the observed competence level for performing basic calculation and plotting data in charts (figure 9). Yet, similar to the health facilities, the capacity to conduct data quality assurance, to analyze/interpret and to use data is limited at the county health offices.

Figure9. Comparisons among perceived confidence level and observed HIS tasks competence at CHO (N=31)



Organizational Determinants

Organizational factors of HMIS performance relate to the management of the HMIS: rules that govern the system, the vision and leadership, roles and responsibilities, setting of incentives and providing resources. This assessment looked at the presence of mechanisms for managing HMIS functions and resources in the four county health offices.

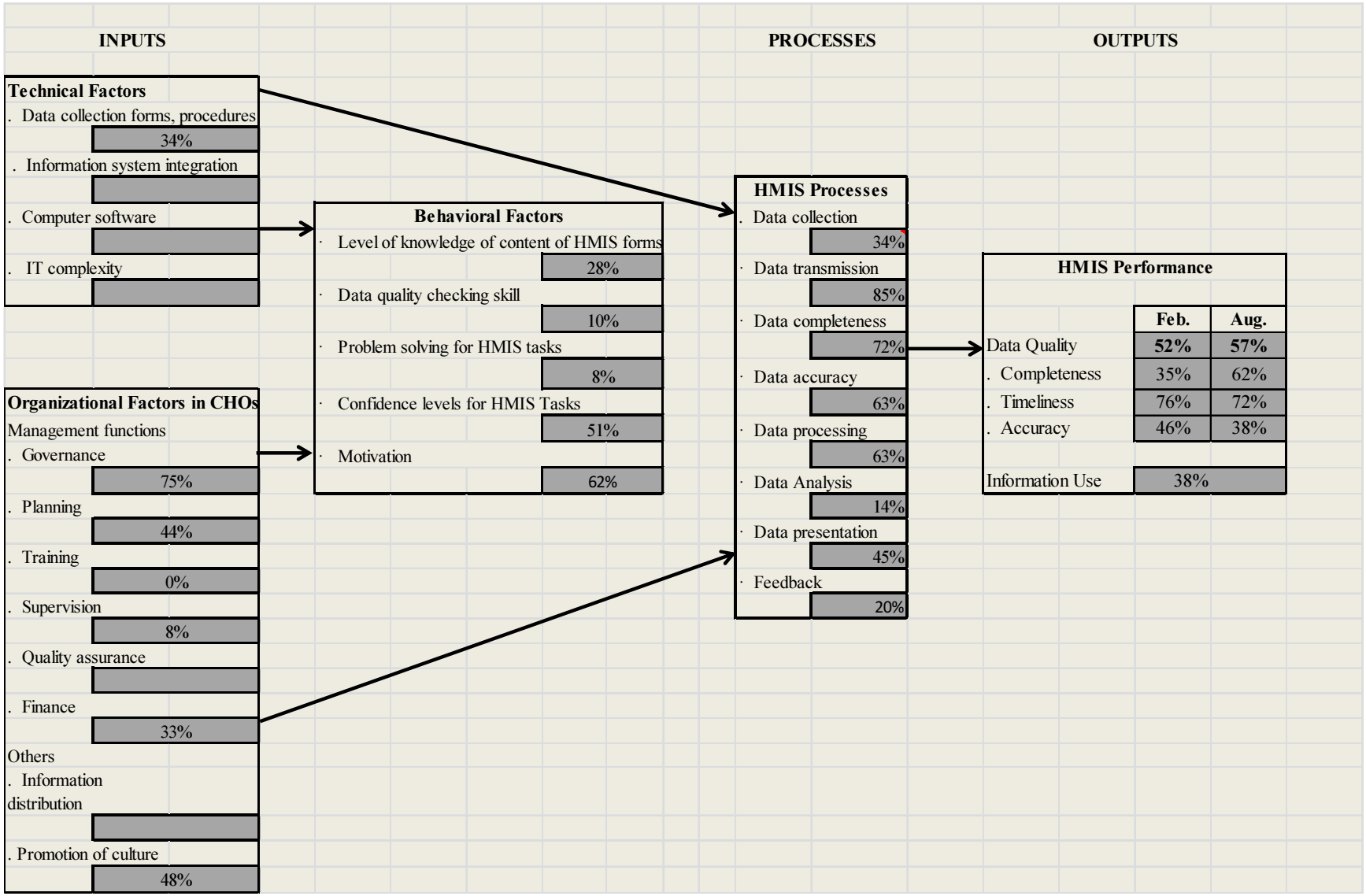
The MOHSW made HMIS unit functional by recruiting and training staff both at central and county level. The Ministry decentralized the HMIS functions to the counties by establishing

M&E units staffed by M&E officer, data manager and registrar. Roles and responsibilities are clearly defined and reporting channels established. All except Bong county health office have the necessary staffing level to perform the HMIS tasks. However, there is no coordinated training plan or schedule to build capacities of the staff to effectively perform HMIS tasks. The county health office is also mandated to cascade the training of the revised HMIS instruments to the health facilities. At the moment, only Bong and Grand Bassa CHOs have training manuals to guide the HMIS trainings.

Other aspect of HMIS management is use of HMIS in the regular monitoring of annual health plans. Subsequent to the decentralization of the HMIS functions, the county health offices are expected to develop a two year monitoring operational plan and performance targets. While Nimba and Grand Bassa county health offices completed the development of their monitoring plan only Grand Bassa has defined performance monitoring targets.

Despite absence of monitoring plans and performance targets, all the four county health offices are providing regular supportive supervision to the health facilities. However, these supervisions are taking place in ad hoc basis in the absence of supervision schedule. There is also no formal record of supervision reports. In order to motivate facility staff to improve or maintain their engagement and facilitate follow up feedback is necessary. The feedback loop at the county health office level is very weak in all four counties.

Figure9. Summary of Major Findings of HMIS Performance at Health Facility Level, N=76



Conclusion

Liberia HMIS has achieved some good results that showed that the country is on the right track in improving its routine health information system, particularly as far as technical aspects are concerned. The HMIS has been well designed with standardized indicator sets and integrated forms for data collection, and a computer program is in place for transferring the paper based system to an electronic database and perform analysis. The majority of the facility data are reported to the county and then to central MOHSW through a single reporting channel.

Yet, there are major problems with HMIS performance: low data quality and use of information. HMIS performance is adversely affected by a number of behavioral and organizational factors. For example, there is discrepancy between staff perception to perform HMIS tasks and actual ability to accomplish those tasks. HMIS competence, particularly skills to perform data quality assurance, analysis and use of information, are limited among health facility and CHSWT staff. Lack of problem identification and solving skills are other common issues observed among staff in all the four counties.

Inadequacy of training to maximize the DHIS functions, absence of training related to evidence based decision making, and lack of coordinated training plans were also some of organization level gaps observed. Despite the routine and frequent supportive supervisory visits being conducted at county and facility levels, the supervision quality was found less satisfactory. There is no documentation on supervisory reports and limited feedback is provided to the visited facilities. Cross program data sharing is also limited among services/programs.

The findings of this assessment will serve as a baseline for formulating interventions to improve the HMIS performance and for future monitoring of HMIS performance improvement in the counties.

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ANNEXES

Annex 1. HMIS Performance Indicators and Targets –Facility Level

Sr. no	Indicator	Target (in percentage)	
		County level	Facility level
1	Availability of ledgers in health facilities	90%	90%
2	Data accuracy (matching data items between register and monthly reports)		75%
3	Monthly report completeness (reported data elements against expected)	95%	70%
4	Presence of data quality checking mechanisms	75%	50%
5	Presence of performance target	70%	50%
6	Presence of performance monitoring plan	60%	50%
7	Presence of data analysis	70%	50%
8	Presence of program feedback mechanism (evidence of feedback provided to health facilities)	50%	50%
9	Availability of HMIS manuals at facility level	70%	50%
10	Presence of information display in the health facilities	70%	50%
11	Presence of routine review meeting in health facilities	70%	50%
12	Overall use of information for decision making in the routine meetings	60%	40%
13	Overall HMIS supervision quality		50%
14	Supervisors checking data quality		50%
15	Presence of supervisory feedbacks		50%
16	Facility staff trained in HMIS (percentage of facility staff trained in HMIS)		75%

Annex 2. Community Health Information System

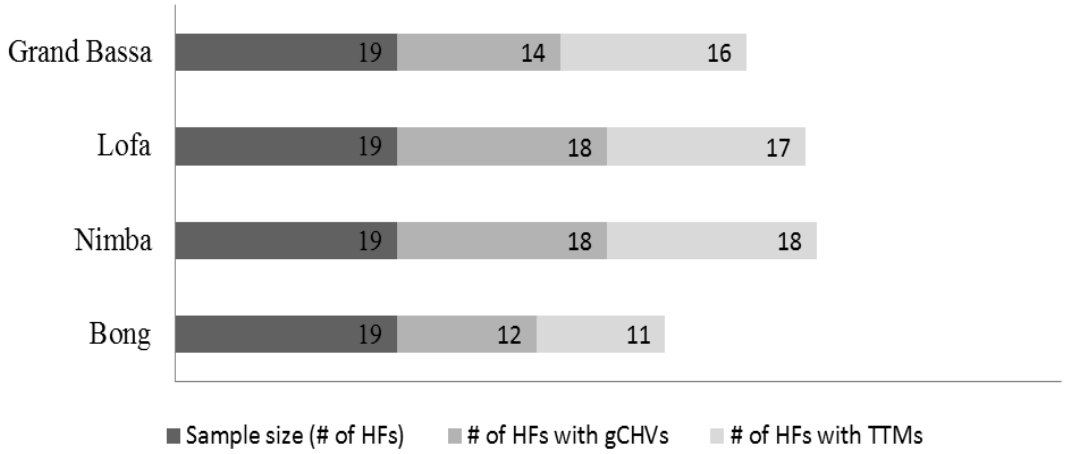
Community health services are an integral part of the Liberia primary health service delivery system. In 2008, the MOHSW developed a national community health strategy and policy with the view to ensure substantial portion of the rural population have at least minimum level of access to health by bringing health services closer to their home. Under this strategy, the MOHSW introduced two new cadres of community health volunteers: the General Community Health Volunteers (gCHVs) and the Trained Traditional Midwives (TTMs). These community health volunteers are not remunerated by the government and are expected to provide health promotion and education, early recognition, management or referral of common health problems and linking the community to facility based care.

In addition to the facility based health information system the Liberia PRISM assessment looked at the community health information system in the four counties. The assessment focused on establishing an understanding of the current status of the community health information system and then feed to the efforts to strengthen community HIS and monitoring and evaluation program. The diagnostic tool of the PRISM tools was adapted to assess the data collection, transmission and supportive supervision of the community health service in the 76 health facilities.

Assessment Results

Community health activities are rapidly being scaled up in all the counties. Out of the 76 health facilities covered in this assessment 82% have community health volunteers (CHVs), around 669 gCHVs and 1364 TTMs. The CHVs are more active in areas where there is strong community focused support from NGOs. In some health facilities the CHVs are not more functional once the supporting NGO phased out.

Figure 10. Presence of community health volunteers (CHVs) in the four counties



According to the recently adopted community strategy, the CHVs is supposed to provide family planning commodities, case management of most common conditions (malaria, pneumonia and diarrhea), and identify and refer severe malnutrition cases. The respondents indicated that less than 30% of the gCHVs were performing integrated community case management (ICCM), and

15% providing family planning and community based DOTS. Overall, less than 5% of the TTMs are engaged in dispensing family planning commodities.

The CHVs role also includes documenting key HMIS indicators and monitoring maternal and child deaths in their community. To facilitate this documentation and transmission of information, the MOHSW has developed and distributed standard data recording forms and registers to the CHVs through the health facilities. But community health volunteers were poorly trained. The assessment showed CHVs in 43% of the HFs have received data recording and reporting training in the past one year. The community service recording forms were observed in 20% of the health facilities and only 12% are using standard reporting forms.

The community health information system is not yet harmonized. Fifty eight percent of the visited health facilities are receiving monthly reports from the CHVs in their catchment area. Multiple channels are observed in the reporting of community health activities. In some areas the community health volunteers report directly to the health facilities and these activities are reported upward through the health system as part of the integrated monthly HMIS report. There are also cases where the community activities are reported directly to the NGO partners and the donor by passing the Ministry. In addition, separate reports on drugs and supplies distributed by the CHVs are provided to the pharmaceutical focal person at the county health office through the health facilities and then upward to the pharmaceutical unit in central MOHSW.

Liberia's 2008 National Strategy and Policy for Community Health Services envisioned a range of high quality primary care services delivered by teams of well-supervised community health volunteers. Within the health facility it is important to have a focal person primarily responsible for supervision and training the CHVs. Table 12 shows that sixty eight percent of the visited health facilities reported having CHV focal persons. In most cases the gCHVs are supervised by the Vaccinators or Nurse Aids while the CMs supervise the TTMs. However, only 23% of gCHVs and 13% of the TTMs were supervised in the last three months. Less than 55% of the health facilities conduct routine review meetings with the CHVs mostly on monthly basis. Few of the facilities have supervision plans/schedules and reports.

Table 12. Supportive supervision of Community Health Volunteers (CHVs)

County Name	Sample size (# of HFs)	# of HFs with designated staff for CHVs supervision	# of HFs with supervision plan	Percentage of CHVs supervised		# of HFs with Evidence of Feedback
				gCHVs	TTMs	
Bong	**19**	**9**	**3**	**47%**	**14%**	7
Nimba	19	13	5	60%	35%	3
Lofa	19	11	0	0%	0%	0
Grand Bassa	19	9	0	7%	4%	0
Total	**76**	**42**	**8**	**28%**	**13%**	**10**

Overall the Liberia community health information system is weak and fragmented. Primary level care facilities are intended to supervise community level services in their catchment communities, but this has proved extremely difficult, due to the long distances to reach many of the communities served by the facility. The standard recording forms developed by MOHSW are not widely used by the CHVs and the flow of reports is not clearly established as there are multiple reporting channels. CHVs have a vital role to play, not only in raising awareness of key health issues in the community, but also in providing basic health care in the community, especially in areas where health facilities are few and far between. Therefore, emphasis needs to be given to strengthen the community health information system particularly the data recording, transmission and supportive supervision, taking into consideration the fact that these are unsalaried volunteers.

Annex 3. Scope of Work: Assessment of HMIS in Liberia using PRISM tools

1 Background:

Rebuilding Basic Health Services (RBHS), funded by the United States Agency for International Development (USAID), is the US government's major project supporting Liberia's Ministry of Health and Social Welfare (MOHSW). RBHS works with the MOHSW at all levels and has major health service delivery, health systems strengthening, and behavior change communication activities. RBHS is a partnership among JSI Research & Training Institute, Inc., Jhpiego, Johns Hopkins University Center for Communication Programs (JHU/CCP), and Management Sciences for Health. This is a 5-year project that commenced in November 2008.

Under the leadership of the MOHSW, Liberia is described as a model for post-conflict health system reconstruction. As one of the MOHSW's key partners, RBHS has documented significant progress towards meeting each of its objectives over the past three years. While substantial progress has already been made in building capacity of several divisions and support systems within the MOHSW, the project will have a stronger emphasis on health systems strengthening and capacity building during the remaining two years.

RBHS is working with MOHSW to undertake a comprehensive capacity assessment at the central MOHSW and county health office. Part of this assessment is comprehensive assessment of health management information system (HMIS) to provide current status and then help develop strategic and operation plan for strengthening HMIS and monitoring and evaluation program. RBHS has been providing substantial support to MHOSW in scaling up of HMIS and improving health system and human capacities. As a lead supporting organization, RBHS continues to support MOHSW national health policy and HMIS and M&E strategic plan.

In support of Activity 2.4.3.5 of the RBHS Year 4 work plan, the HMIS consultant will work the MOHSW and RBHS staff to undertake a comprehensive assessment of Liberia MOHSW HMIS by using the well-known PRISM tools (Performance of Routine Information System Management).

2 Specific Tasks

- Review and adapt PRISM tools to adapt to Liberia MOHSW, HMIS priorities and plan in close collaboration with HMIS, M&E and Research unit
- Train group of M&E and Data officers from CHT and central HMIS and M&E unit on PRISM methodology and tools for conducting field surveys
- Develop data entry and analysis tools in MS Excel
- Conduct PRISM assessment in three RBHS focused counties: Bong, Nimba and Lofa counties. In addition, conduct PRISM survey in 2 non RBHS counties as control counties.
- Coordinate data collection and ensure quality of data collected
- Supervise data entry, data cleaning and analyze the data
- Write a draft report

3 Dates:

- April 3rd week – Adaptation of tools (in US)
- April 4th week – Planning, coordination and training
- May 1nd week – Data collection
- May 2rd week – Data entry, analysis and draft reporting writing
- May 3rd week – Finalization of PRISM assessment report (in US)

4 Deliverables

- Adapted PRISM tools and methodology and field work guide
- Data sets
- Assessment report
- Trip report

5 **Reports to:** Deputy Chief of Party and Monitoring and Evaluation Director

Annex 4. List of Facilities Visited

County	Name	Facility Type	Owner	Source of Funding
Bong				
1.	Africa Fundamental Baptist Mission	Clinic	NFP	Baptist Church
2.	Agape	Clinic	NFP	Episcopal Church
3.	Belefanai	Clinic	GOL	EU
4.	Bellemu	Clinic	GOL	USAID/RBHS
5.	Charles B. Dunbar	Hospital	GOL	EU
6.	Fenutoli	Clinic	GOL	USAID/RBHS
7.	Forquelleh	Clinic	GOL	EU
8.	Gbecohn	Clinic	GOL	EU
9.	Haindii	Clinic	GOL	USAID/RBHS
10.	Janyea	Clinic	GOL	USAID/RBHS
11.	Jorwah	Clinic	GOL	EU
12.	Kpaai	Clinic	GOL	USAID/RBHS
13.	Naama	Clinic	GOL	USAID/RBHS
14.	Palala	Clinic	GOL	EU
15.	Salala	Clinic	GOL	USAID/RBHS
16.	Sanoyea	Clinic	GOL	EU
17.	Shankpalai	Clinic	GOL	EU
18.	Zeanzue	Clinic	GOL	EU
19.	Zowienta	Clinic	GOL	EU
Lofa				
1.	Balagwalazu	Clinic	GOL	USAID/RBHS
2.	Barkedu	Clinic	GOL	USAID/RBHS
3.	Barzewein	Clinic	GOL	UASID/RBHS
4.	Bazagizia	Clinic	GOL	USAID/RBHS
5.	Bolahun	Health Center	GOL	
6.	Curran Lutheran	Hospital	NFP	UASID/RBHS
7.	Dougomai	Clinic	GOL	GOL
8.	Foya	Community Clinic	GOL	GOL
9.	Voinjama Free Pentacostal	Clinic	NFP	PNFP
10.	Gbonyea	Community Clinic	GOL	UASID/RBHS
11.	Kamatahun	Clinic	GOL	EU
12.	Kpaiyea	Clinic	GOL	UASID/RBHS
13.	Kpotomai	Clinic	GOL	
14.	Lawalazu	Clinic	GOL	Pooled Fund
15.	Nyendemolayhun	Clinic	GOL	Pooled Fund
16.	Sarkonedu	Clinic	GOL	Pooled Fund
17.	Shello	Clinic	GOL	Pooled Fund
18.	Sorlumba	Clinc	GOL	Pooled Fund
19.	Sucromo	Clinic	GOL	USAID/RBHS

County	Name	Facility Type	Owner	Source of Funding
Nimba				
1.	Bahn	Health Center		
2.	Dialla	Clinic		
3.	Duayee	Clinic		
4.	Duoplay	Clinic		
5.	Flumpa	Community Clinic		
6.	Gbeivonwea	Clinic		
7.	GCC	Clinic		
8.	Graie Clinic	Clinic		
9.	GWH	Hospital		
10.	KL Foundation	Clinic		
11.	Kpaytuo	Clinic		
12.	Mehnla	Clinic		
13.	Mid Baptist	Clinic		
14.	New Yorpea	Clinic		
15.	Saclepea	Health Center		
16.	Toweh Town	Clinic		
17.	YMCA	Clinic		
18.	Zuaplay	Clinic		
19.	Zuolay	Clinic		
Grand Bassa				
1.	Barseegiah	Clinic	GOL	
2.	Boeglay	Clinic	GOL	
3.	Brenda King	Clinic	NFP	
4.	Ceegbah			
5.	Christian Extension Ministry	Clinic	NFP	
6.	Compound #3	Clinic	GOL	Irish Aid
7.	Compound# 4	Clinic	GOL	Irish Aid
8.	Desoe	Clinic	GOL	Irish Aid
9.	Edina	Clinic	GOL	
10.	Jacob Larteh	Clinic	GOL	
11.	Joriam	Clinic	NFP	
12.	Liberia Government Hospital	Hospital	GOL	
13.	Little Bassa	Clinic	GOL	Irish Aid
14.	Little Kola	Clinic	GOL	Irish Aid
15.	Mittal steel	Hospital	PFP	Accelor Mittal (concession)
16.	Owensgrove	Clinic	GOL	Irish Aid
17.	St. John	Clinic	GOL	Irish Aid
18.	St. Peter	Health Center	NFP	Catholic Diocese
19.	Tubmanville	Clinic	GOL	Irish Aid

Annex 5. Participants of Liberia PRISM Assessment

Name	Organization	Position	Roles in Survey	Phone No.
C. Sanford Wisseh	MOHSW	Asst. Minister for Vital Statistics	Core Team	
Luke Bawo	MOHSW	Coordinator	Core Team	0886909945
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Name	Organization	Position	Roles in Survey	Phone No.
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