Liberian Health Information System & ICT Strategic Plan 2016-2021

2016-2021



FOREWORD

The goal of the 2016-2021 Investment Plan is to ensure Liberians have access to safe and quality health services, a robust health emergency risk management system, and an enabling environment that restores trust in the government's ability to provide services. Good health statistics are a critical resource for monitoring and evaluation of the 2015-2021 Investment Plan for Building a Resilient Health System. Data to inform the output, outcome and impact indicators will be obtained mainly from the National HIS including the routine health information system, population and facility-based surveys and related activities such as national program assessments. Therefore, increased and regular investment in the health information system is a critical need for a country like Liberia, with a growing demand for quality health information. In recognition of this, global initiatives under our global partners like USAID, CDC, UNFPA, UNICEF, EU, WHO and World Bank have been working towards strengthening the Health Information Systems (HIS) in all countries, especially the developing world.

We are presenting here the Second HIS strategic Plan which reflects the great efforts and solid cooperation among concerned stakeholders that were brought together by MOH in order to harness efforts to strengthen the Liberia's health information system. This was achieved through increased coordination and integration of health information from all programs and health system interventions. The continued collaboration will contribute to reduced duplication in collection of data and creation of a central repository for data to facilitate easy retrieval, analysis, dissemination and utilization.

This Health Information Strategy is a product of collaborative efforts by health institutions (health departments, national programs, and county health staff), and health related data producers, especially the Liberia Institute of Statistics and Geo-Information Services (LISGIS), and Ministry of Finance and Development Planning. This joint document provides an overview of the HIS vision, goals and strategies that respond to the findings and gaps of the six components of the HMN framework assessed in a multi-sectoral group comprising of practitioners from the Ministry of Health and Social Welfare, bilateral organizations, UN development partners, and non-governmental organizations. The Core Team consulted widely, and it is hoped that this document will address all information needs across the various health related sectors and consumers for the next five years. This joint document provides an overview of the HIS vision, goals and strategies that respond to the findings and gaps of the six components of the HMN framework and ICT Infrastructure assessed in July 2015 and covers the expectations of the country for HIS improvements and reforms. I believe that the HIS Strategic Plan will be used by national institutions involved in health and by external development partners as a guide for their activities and investments in the monitoring and evaluation of health sector performance. In addition to being a policy initiative, the document presents a key business strategy for the health sector, as improved health information management is an integral part of achieving better health outcomes for all Liberians.

I would like to acknowledge the Bureau of Vital Statistics under the Department of Planning, Research and Human Development, for taking the lead in the development of this strategy, as well as the great efforts and contributions of all members of the HIS stakeholder working group.

Hon Dr. Bernice T. Dahn, BSC., MD., MPH Minister of Health

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Mrs. Yah Zolia Deputy Minister, Planning, Research & Development Ministry of Health

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ACRONYMS

ACCEL Academic Consortium for Combating Ebola in Liberia

CBIS Community-Based Information System
CEBS Community event-based surveillance

CDC Centers for Disease Control
CHAI Clinton Health Access Initiative

CHO County Health Officer

CHSWT County Health and Social Welfare Team

CHT County Health Team
CHW Community Health Worker
CMO Chief Medical Officer

CSH Collaborative Support for Health

DHIS2 District Health Information Software version 2

DHO District Health Officer

DSIS Disease Surveillance Information System

DSO District Surveillance Officer

eDEWS Electronic Disease Early Warning System

EOC Emergency Operation Center

EVD Ebola Viral Disease

EPR Epidemic Preparedness and Response

ETU Ebola Treatment Unit

EWARNEarly Warning and Alert Response Network **FMIS**Financial Management Information System **gCHV**General Community Health Volunteer

GDL Global Development Lab

GIS Geographical Information System

GOL Government of Liberia
GPS Global Positioning System

HF Health Facility

HIS Health information system
HIV Human immunodeficiency virus
HMER HMIS, M&E, and Research

HMIS Health management information system

HMN Health Metrics Network

HRISHuman Resource Information SystemHSCCHealth Sector Coordination CommitteeICDInternational Classification of Diseases

ICT Information and Communication Technologies
IDSR Integrated Disease Surveillance and Response

IHR International Health Regulations (2005)

IMCInternational Medical CorpsIMSIncident Management SystemIPCInfection Prevention and controlITUInformation Technology Unit

iHRIS Integrated Human Resource Information System

JHU Johns Hopkins University
LAN Local Area Network

LISGIS Liberia Institute of Statistic and Geo-Information Services

LMIS Logistics Management Information System

M&E Monitoring and evaluation
MIA Ministry of Internal Affairs

mHERO Mobile Health Worker Electronic Response and Outreach

MOA Ministry of Agriculture MOH Ministry of Health

MOHSW Ministry of Health and Social Welfare

MOE Ministry of Education

MOGCSP Ministry of Gender, Children, and Social Protection

NGO Non-governmental organization

NHSWFPP The National Health and Social Welfare Financing Policy and Plan

OIC Officer In Charge

PACS Partnership for Advancing Community Based Services

PCI Project Concern International
PCR Polymerase Chain Reaction

PHC Primary Health Care
PIH Partners in Health

RBHS Rebuilding Basic Health Services

QA Quality Assurance
QI Quality Improvement

RITE Rapid Isolation and Treatment Ebola

RRT Rapid Response Team

SOP Standard Operation ProceduresSQS Standard Quality ServicesTOT Training of trainers

TWG Technical Working Group

UN United Nations

UNDP United Nations Development Programme

UNICEF United Nations Children Fund

UNMEER UN Mission for Ebola Emergency Response

USAID United States Agency for International Development

WHO World Health Organization

1 INTRODUCTION

1.1 Background and Rationale

In the aftermath of the Ebola crisis, strengthening the National Health Information System (HIS) has been recognized by the Ministry of Health as one of the key interventions of the Investment Plan for Building a Resilient Health System. Indeed, during the Ebola epidemic it became clear that the fragmentation of the current health information system made it impossible to have the "right information at the right time and in the right place". Many HIS subsystems, such as HMIS and DSIS were not interconnected, and various stakeholders did not coordinate and contributed even further to the fragmentation by setting up separate reporting systems.

Based on the National HIS Strategy and Implementation Plan of 2009 and on the National Investment Plan for Resilience of 2015, and on the lessons learned from the Ebola crisis, the Ministry of Health decided to conduct a comprehensive HIS strategic and operational planning with a particular focus on leadership and coordination.

1.2 The Assessment & Strategy Development Process

The HIS strategic planning process involved a range of steps, which were systematically conducted to build broad-based consensus among key stakeholders inside and outside the Ministry of Health. The process was implemented in four stages. First, a one-day meeting was held to mark the launch the HIS strategy development process. All HIS stakeholders were invited to discuss leadership and coordination, and to reach consensus on the methodology, processes and tools of strategic planning. The second stage was the assessment stage, which included the development of HIS assessment tools as well as an assessment workshop with all the stakeholders. The third stage was to conduct a HIS Strategic Planning workshop, again with the stakeholders, where the assessment results were presented and formed the basis for the identification of strategic objectives and interventions. Also, priority interventions were identified and costed, and put together into a two year operational plan. Lastly, the HIS strategic and operational plan was validated by the Health Sector Coordination Committee (HSCC), and senior management committee led by the Minister of Health. The whole process took 4-5 months.

1.2.1 Leadership and Coordination

The HIS strategy development used three coordination mechanisms: (1) a Core Team constituted by around 10 HIS professionals from MOH as well as from technical agencies; (2) the HMER Technical Working Group; and (3) Health Sector Coordinating Committee (HSCC). The HSCC serves as the highest decision making body in the health sector. Chaired by the Minister of Health, it is comprised of senior MOH managers, representatives of the Ministry of Finance and of Economic Planning and Development, country representatives of United Nations agencies and of major donors active in the health sector, civil society, and non-governmental organizations representatives. The HSCC served as the Steering Committee (SC) that validates both the HIS Strategic Plan 2016-2021 as well as the costed operational plan for 2015-2017. The HMER Technical Working Group (TWG) was created under the Chairmanship of the Coordinator for HMER and the Assistant Minister for Vital Statistics with wide participation from all programs and departments (see Annex A). This group varied in size and organization as the process moved from assessment through strategic planning activities. This group contained appropriately qualified staff from the offices and programs that are in a position to contribute to the design of the information system improvements, and then eventually will take the responsibility for implementing strategies and activities that fall in their functional areas of work. The day to day technical management and coordination of the process was provided by a small core team created under the coordination of the Coordinator of the HMER Unit within the Department of Policy, Planning, and Research in the MOH. The Core Team was made up of MOH/HMER professionals as well as short and long-term Technical Advisors provided by USAID-MEASURE Evaluation, USAID-CSH, CDC, UNICEF, WHO, and the Last Mile Project.

1.2.2 Stakeholders Consultation

To have a shared and broader vision of a more resilient, coherent, integrated, efficient and useful HIS system, stakeholder consultation was conducted in two ways: (1) one-on-one meetings with partners, and (2) joint meetings. Individual meetings were held with MOH program directors; with donors such as USAID, CDC, UNICEF, and WHO; and with technical partners including CHAI, GEMS, PACS, CSH, DELIVER, IntraHealth, and eHealth Africa. During the first week of the strategic planning process a one day meeting was held on June 26, 2015 at the Emergency Operations Center (EOC), with all major stakeholders to agree on the methodology, processes, and tools used for assessing the Liberian HIS. The meeting was highly representative of all internal and external stakeholders. The Assistant Minister of Vital Statistics Mr. Wesseh chaired the meeting. During the meeting it was agreed as a first step in this process to conduct an assessment of the current HIS in Liberia, based on consensus building between the stakeholders, to serve as a baseline for the strategic and operational planning process.

1.2.3 Assessment tool development and workshop

To carry out the general HIS assessment, the Core Team used the framework, tool, and methodology provided by the Health Metrics Network (HMN) framework, version 4. The framework enables all partners to harmonize and align their efforts around a shared vision of a sound and effective national health information system. The HMN Assessment Tool provides a universally agreed upon standard for guiding the collection, reporting and use of health information by countries and global agencies. The questionnaire was slightly contextualized by adding specific questions mainly to the "resources" section to suit the current HIS situation in Liberia. To strengthen the policy, planning and coordination section of the questionnaire, questions on governance and partnership were adapted from MEASURE Evaluation Capacity Assessment Tool (MECAT). MECAT is a generic data collection tool that captures various dimensions of capacity: organizational, technical, and behavioral. Acknowledging that the HMN tool was not strong in assessing in depth the underlying HIS ICT infrastructure, the team developed a specific HIS ICT Infrastructure Assessment Tool (ICTIAT) and conducted a separate survey using this tool to complement the findings from the HMN tool.

At the end of July 2015, a two-day workshop was organized by the MoH which brought together health information producers and users from various institutions (central MoH departments, implementing partners, 15 County Health Officers, health development partners, and LISGIS,) to assess the national health information system. The workshop was conducted using the contextualized HMN assessment tool, based on standards for the development of the national health information system, with technical support provided by MEASURE Evaluation. Six components of the HIS were assessed: resources, indicators, data sources, data management, information products, and dissemination and use.

1.2.4 Strategic Planning Workshop

The HIS Strategic Planning workshop was held on September 22-24 2015 with the following objectives:

- To assess the current HIS problems as identified during the assessment stage
- To make an inventory of ongoing and planned HIS strengthening interventions in Liberia.
- To develop consensus around a common vision around the HIS
- To prioritize interventions for the period 2015-2021
- To develop a 2015-2017 operational plan

A total of 100 participants from MOH, donors, and implementing partners (the "stakeholders") attended the workshop and were divided into seven smaller groups to provide inputs into specific sections of the Strategic Plan documents. The seven groups were:

- 1. Disease Surveillance Information System (DSIS)
- 2. Laboratory Information System (LIS)
- 3. Health Management Information System (HMIS) and Electrical Medical Records (EMR)
- 4. Logistic Mgmt Information System (LMIS) and Human Resource Information System (HRIS)
- 5. Community Based Information System (CBIS)
- 6. Information and Communication Technology (ICT) and Geographic Information System (GIS)
- 7. Research and Financial Management Information System (FMIS)

Each of the seven groups reviewed the priority problem statements ordered by HIS Component and decided which problems were important enough to carry over into the intervention design. The seven groups provided inputs to the following sections of the Strategic and Operational Plan: (1) HIS vision and objectives; (2) Strategic interventions; and (3) Operational interventions and activities.

1.2.5 Prioritization Workshop

During the strategic planning workshop, a total of 73 strategic interventions were identified and all but two were planned to start implementation in the first two years, and all but 6 were planned to start in the first year. Therefore a prioritization workshop was held in December 16-17 in Buchanan to prioritize the 73 interventions in the strategic plan. A total of 50 participants attended the workshop which included members from MOH, CDC, USAID, WHO, and relevant implementing partners. The workshop consisted mainly of group work sessions. Groups were placed in seven teams representing most of the HIS sub systems. Each group was tasked with the responsibility to: (1) set the bench mark for each systems, and update the current interventions; (2) review the expected vision, mission, and objectives HIS Strategic plan; (3) revisit the HIS problems and proposed interventions; (4) score interventions in terms of priority; and (5) select interventions that would go into an operational plan. For the prioritization the following criteria were used: (1) implemented over the next two years; (2) cost; (3) sustainability; and (4) uncertainty of desired effect. The workshop managed to:

- (1) prioritize 30 interventions for 2016 that scored highest based on the prioritization criteria
- (2) reduce strategic objectives from 21 to 17
- (3) reduce strategic interventions from 73 to 68

Participants expressed difficulty in developing a 5-year plan due to the drop-off in committed funding starting Year 3. This drop-off was referenced as the primary motivation for stacking key interventions in the first two years. Tied to this, was a basic lack of coordination between the MOH, partners, and donor agencies. To respond to the deficiencies in coordination, all groups discussed the need for a dedicated coordination mechanism and governance in the form the existing HMER TWG, for which subgroups for each subsystem should be created. To guide interventions, each subsystem also developed milestones for each year shown in Annex E. All groups shared a need for sustained capacity building in basic ICT, data analysis, data management, data use, and visualization competencies.

1.2.6 Drafting of the HIS Strategic and Operational Plan

The Core Team, based on the inputs of the stakeholders, drafted the 2016-2021 HIS Strategic Plan and the costed 2015-2017 Operational Plan. The plan is divided into three chapters with the first chapter giving the background information, strategy development process, situational analysis of HIS. The second chapter addresses the vision, mission, and principles of the HIS strategic plan. Chapter three presents the objectives, strategic interventions, phased implementation plan, electronic HIS architecture, resources required for implementing the strategic plan, and the monitoring and evaluation plan. Other detailed information is provided in the annexes.

1.2.7 Validation Meeting

The drafted 2015-2021 HIS Strategic Plan and 2015-2017 Operational Plan were presented to the HSCC for validation in February 2016.

1.3 Stakeholders of the Health Information System

1.3.1 Stakeholders of the Health Information System within the Ministry of Health

The stakeholder for HIS within the Ministry of Health can be broadly divided into two groups: (1) stakeholders at the central level and (2) stakeholders at the county level. The central level includes the various departments, which are directly involved in implementation or overseeing the implementation of planned strategies and plans. They also include the vertical disease programs (MCH, malaria, Tuberculosis and Leprosy, HIV/AIDS, NCD, etc.). The county level includes the County Health Offices, the District Health Offices, the Health Facilities (health centers and hospitals), and the Community Health Workers and Volunteers.

1.3.2 Other Government Stakeholders outside the Ministry of Health

The concept of health information system is not limited only to the health sector, since health information is generated and used by a variety of different organizations and institutions. These include LISGIS, other sectoral ministries, the private sector and many development agencies

Liberia Institute of Statistics and Geo-Information Services (LISGIS)

LISGIS is the other key institution for data collection and basic analysis, with offices in all counties. LISGIS is the national bureau of statistics which has a national strategy for the development of statistics, conducts the census and surveys, and is responsible for the analysis and dissemination of statistics. LISGIS conducted the housing and population census in 2008 (next will be in 2018) and large health surveys, in close collaboration with the MOHSW including the LDHS 2007 and 2013, as well as Malaria Indicator surveys in 2007, 2009 and 2011. The quality of the field work by LISGIS is good, but the analytical capacity is still limited. Maintaining and strengthening the capacity of LISGIS to conduct high quality surveys in collaboration with MOH is required.

Key Line ministries involved in issues that affect health of Liberians:

- Ministry of Justice: Takes over the responsibility for revitalization of registration of births and deaths especially at community level from Ministry of Health
- The Ministry of Gender and Development is responsible for gender main-streaming. It also keeps track of cases of domestic/ sexual violence
- Ministry of Education: Caters for the school health program and is responsible for the health training in schools
- Ministry of Finance: Financial resources for health are often mobilized through this ministry.
- Ministry of Water: This ministry has information system on distribution of water sources in the country

1.3.3 Additional Key Partners

Development Partners:

Development Partners also participate in production and utilization of health data. They do so through provision of technical, financial and/or material support. There are multilateral partners and bilateral partners. Multilateral partners involved in health include WHO, UNICEF, UNFPA, UNAIDS, UNHCR, the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and the Global Alliance for Vaccines and Immunization (GAVI). The main bilateral partners in Liberia are USAID, CDC, JICA, Swiss Cooperation, Irish Aid, DFID, French Cooperation, and GIZ.

Implementing Partners (IPs)

Non-Governmental Organizations (NGOs) such as Johns Hopkins University, Africare, CARE, IRC, Last Mile Health, are operational at national, district and community levels. Other IPs are better known under their project name such as CSH, PACS, DELIVER, PACS, MCSP are involved in health service delivery and therefore contribute to production and utilization of health data.

Academia:

A vast range of research on health is organized and many times carried out by the academia including universities with medical-related courses or by students attached to these universities. University of Liberia (Social Science Research) national ethics committee has played a big role in conducting research on health issues. Research organizations like The Liberian Institute of Biomedical Research (LIBR) manage and implement most biomedical research conducted in the country.

Private Sector:

Privately owned healthcare providers (including traditional healers), pharmaceutical suppliers and pharmacies, advocacy groups, corporations, and other stakeholders are a sizeable and growing segment of the health care sector in Liberia. Identifying and engaging appropriate stakeholders in the private sector to provide input into the health information system, and use the resulting information to improve service delivery and health of their clients.

1.4 Liberia HIS Problems & Constraints

As indicated earlier, the Liberian Health Information System was assessed using a combination of assessment tools and methodologies. It was based on HMN framework which divides the health information system in six components: (1) HIS resources; (2) Indicators; (3) Data Sources; (4) data management; (5) information products; and (6) Dissemination and use.

The HIS TWG reviewed around 234 questions related to various components of the health system scoring the performance of each HIS components out of a maximum score of 3. Generally, the performance of the current HIS in Liberia was found to be inadequate. With an unsatisfactory resource environment for HIS (policy and planning, financing as well as institutions and human resource), there is limited capacity among program managers to analyze data and use information for program improvement and resource allocation. Although there is reasonable performance in terms of capacity of the data platform, some of the data sources (including vital registration, health and disease records, health services records, human records and financial records) require special attention. The assessment has revealed reasonable performance in terms of capacity to generate information products (with exception of generation of information products related to risk factors for health) along with quality of those products in terms of the data collection methods, timeliness of the products, consistency, representativeness, disaggregation and estimation methods (with an exception of periodicity).

Based on the assessment of the components the following areas were identified for improvement. For full details on the findings of the HIS assessment, the reader is referred to annexes D, J and L.

1.4.1 Data Management

There is no written set of procedures for data management including presentation, visualization and dissemination for target audiences, and these are implemented throughout the country. A metadata dictionary providing comprehensive definitions about the data does not exist, and only a limited number of staff at national level and county levels are competent in routine data management (queries, merging, data cleaning, and aggregation).

1.4.2 HIS Infrastructure

As internet is the main channel of data transmission, the ICT assessment found very limited internet coverage and the quasi inexistence of ICT policies documents in place to guide the use of Internet at work, the network security,

computer maintenance, data backup and disaster recovery, etc. at central MOH level as well as at county level. In terms of human resources there is great need of skilled ICT staff and at the MOH central level, there is an important need for computer programmers, database administrator, network security and Linux systems administrators.

1.4.3 Health Legislation and coordination

The current National Public Health Law (like the 1976 National Public Health Law) does not adequately cover aspects of vital registration, notifiable diseases, private sector data, confidentiality and fundamental principles of official statistics. There is a national HMER committee but due to limited resources and competing priorities, is not fully functional.

1.4.4 Health and Disease Records (Including Surveillance)

HIS assessment results revealed that health and disease records (including surveillance) are *present but not adequate*, and that not all key epidemic-prone diseases and diseases targeted for eradication and/or elimination have appropriate case definitions established. Moreover, not all cases can be reported using the current reporting format. The current disease surveillance information system that is used to identify disease outbreaks for rapid response is paper-based

1.4.5 HIS Institutions, Human Resources and Finance

In regard to HIS institutions, human resources and financing, the assessment has revealed that the Ministry of Health does not have adequate capacity in core health information sciences, including epidemiology, demography, statistics, and ICT. Capacity of the Liberia Institute of Statistics and Geographic Information System on demography, statistics, ICT at national, county and districts was evaluated as not adequate. The HIS assessment has revealed that finances are *present but not adequate*. National HIS and LISGIS budget-line items are still limited and do not allow for adequate function of all relevant data sources.

1.4.6 Census

Liberia conducted its Population and Housing census in 2008 and published results are currently available. HIS Assessment results revealed that the content of census data is *highly adequate*, meaning that mortality questions on estimating both child and adult mortality were included in the 2008 census. This is particularly important because the civil registration in the country covers less than 50% of deaths (2015 HIS Assessment). This means that at the moment there is no reliable and functional vital registration system. The only problem is that a post enumeration survey (PES) was never completed to assess the quality of the 2008 census data.

1.4.7 Vital Registration

The HIS assessment revealed that there is no national system in place to capture coverage of deaths registered through civil registration; and there is limited capacity to implement data collection, process the data, and analyze the data from civil registration or Demographic Surveillance System (DSS) at all levels. According to the 2015 Liberia Health Assessment Report birth registration among under-5 children has increased to 25% in the last 5 years and death registration is still below 2% even though the Liberian Public Health Law of 1976 mandates the MOH to register all deaths within 24 hours after their occurrence. The ICD-10 classification is not used for cause of death registration. Demographic Surveillance System (DSS) sites have not been developed.

1.4.8 Resource Records

There is inadequate and inconsistent tracking of health system finances including program budgets and expenditures at the county levels; there is inadequate tracking of procured and distributed health system

commodities including pharmaceuticals; the tracking system of health work force (HR database) has certain shortcomings:

- It is not integrated with (linked to) FMIS
- The private sector health providers are not systematically inventoried and tracked.
- Community health workers are not systematically inventoried and tracked.

1.4.9 Research studies

Research information can play an important role in ensuring support for health service delivery and health system strengthening. While the MOH has a Research Unit under the Bureau of Vital Statistics, it lacks institutionalization within the framework of the National HIS in Liberia: (1) no research policy nor strategy; (2) no research regulation nor legislation; (3) no research coordination between health programs and Academic institutions; and (4) weak human resource capacity for research.

1.4.10 Information Products, Risk Factors

The overall performance was poor (40 percent). It was noted that indicators for measuring risk factors are not collected on a regular basis in Liberia. It follows that the HIS may not have adequate high quality information regarding risk factors for health to be used for decision making.

1.4.11 Analysis, dissemination, and use of information

Implementation of data analysis and use of information is "present but not adequate". Demand for data from managers is ad-hoc, usually as a result of external pressure and such demand does not follow a proper channel. Regular meetings held with stakeholders to share information, review relevant activities and impact are mainly organized at central and county levels but very limited use of data for patient management at the facility level.

2 LIBERIA HIS VISION, MISSION AND PRINCIPLES

The vision for a strong national health information system is a direct result of the National Health Plan (2011) and the Investment Plan for Building a Resilient Health System in Liberia (2015-2021). These foundational documents outline the need for a robust health information system capable of providing evidence for decision-making, monitor and evaluate programmatic functions, and assessing the health status of the population.

Understanding the internal relations and rationale driving the Health Information System is valuable to identify actions and roadmap toward a more efficient and functioning health system. Learning from others disciplines such as Enterprise Architecture (EA), developed over the last 20 years to guide planning, development and management of complex systems in all sectors can help in achieving such a task. The Enterprise Architecture is a comprehensive description of all the key elements and relationships that make up the Liberian health system. Therefore, concomitant with the development of a HIS strategic plan, the Ministry of Health, with technical assistance of MEASURE Evaluation, developed a first outline of the Liberia HIS Enterprise Architecture (see Annex K). Combined with the vision of the National Investment Plan, this document outlines the mission and goals of the Liberian health information system between 2016 and 2021.

2.1 Vision statement

The Health System of Liberia is supported by a comprehensive and interoperable Health Information System, leading to improved health outcomes for individuals and communities in Liberia.

2.2 HIS Goal Statement

By 2021, the National Health Information System of Liberia will produce quality data and information used in support of the health system functions at all levels, with a solid governance and management structure, using appropriate information and communication technology, including data confidentiality and security, at an affordable cost to the Government of Liberia. The five year goals for each subsystem as defined by technical subgroups are:

2.2.1 HIS Subsystems Goal Statements

HIS subsystems are defined as the major population-based or institutional information sources comprising the health information system. These subsystems include both paper-based and electronic systems to collect, manage, analyze, and use data; as well as the resources required to operate and maintain the system.

2.2.1.1 HMIS- Health Management Information System

Update the core indicators, and realign with the M&E needs of the country. HMIS will also retrain workers as part of the ongoing supportive supervision and monitoring, and extend utilization and data use of the web-platform to the district level, and the paper-based system to the facility level

2.2.1.2 CBIS- Community-Based Information System

Establish a community based information system in all counties to provide information for community level programs, assess the health status and service delivery in communities, and monitor and evaluate the community health worker and volunteer programs. Within 5 years, CBIS will be integrated into the DHIS2 platform and mHealth pilots will be piloted to improve training and data use.

2.2.1.3 HRIS- Human Resources Information System

Full utilization on HRIS at all levels in tracking the recruitment and human resource allocation of all public and private sector health workers, including trainings, production, and interoperability between mHERO and FMIS.

2.2.1.4 DSIS- Disease Surveillance Information System

Develop a system which is able to detect, report, and manage the time-sensitive information needs of priority disease in the country. The system will also have a streamlined information flow from the entire country integrated within or interoperable with DHIS2

2.2.1.5 LMIS-Logistics Management Information System

Routine tracking of supplies at the county, district, health facility and community level to inform resource allocation and procurement, and prevent the depletion of essential medicines and IPC commodities. The system would also be able to interoperate with the broader HIS.

2.2.1.6 LIS- Laboratory Information System

Develop a universal and functional laboratory information system at all major public health laboratories, which is fully interoperable with or integrated into DHIS2.

2.2.1.7 FMIS - Financial Management Information System

Strengthen and integrate financial information from all sources-donors, local authorities, user fees, etc. into the HIS and institutionalize National Health Accounts and other key sector monitoring tools such as Public Expenditure Reviews, and Benefit Incidence Analysis.

2.2.1.8 <u>Health Research</u>

Strengthen capacity to conduct translational research on the health status of populations and public health conditions not captured by routine HIS systems.

2.3 Principles and Desired Characteristics (based on 2009 HIS policy)

2.2.2 Adherence to International Standards

This strategic plan endorses the adaptation of National HIS framework to attain the international standards set by the Health Metrics Network (HMN), the first global health partnership for developing and strengthening of health information systems in low and middle income countries (LMIC). HMN seeks to achieve standardization by adopting and adapting global health information standards that are aligned to broader efforts to improve the availability and quality of statistics

2.2.3 Equity, Quality and Social Justice

The strategic plan supports the establishment and maintenance of a simple, coherent, scientifically sound and easily understandable information system tracking the degree of achievement of the MOH objectives at all levels, taking into accounts the national values of universal coverage, equity, quality and social justice.

2.2.4 Accountability

The strategic plan recognizes the need to establish clear structures in support of the system and accountability for results by well trained and motivated personnel.

2.2.5 Communication

The strategic plan strives to build a system of effective communication, using appropriate technology and feedback and dissemination to all stakeholders.

2.2.6 Decentralization

Focus is shifted from data collection to transforming data into information for management. A holistic approach that seeks for a unified and decentralized HIS will be operated and only usable information will be collected.

2.2.7 Inclusiveness

Where practical, data will be disaggregated by gender, age groups, geographical areas and social income.

3 STRATEGIES AND INTERVENTIONS FOR HIS STRENGTHENING, 2016–2021

3.1 Strategic Objectives and Benchmarks

Based on the deliberations of the stakeholders during the HIS strategic planning workshop, the following strategic objectives were identified. Short term benchmarks for each strategic objectives were developed. Monitoring and evaluation targets are listed in Section 3.9.

#	Strategic Objective	Target date	Benchmark
RES	OURCES	l .	
1	To develop and disseminate adequate legislation, policies, regulations, and standard operating procedures in support of a functional HIS at all levels of the health system.	2018	Updated legislation, policies, regulations, and SOPs available and disseminated to all stakeholders
2	To establish a functional national coordination mechanism for all relevant government institutions including financial and technical support agencies	2016	HMER Stakeholders Working group re-established and meeting on a regular basis
3	To ensure a dedicated budget for HIS implementation and operation at all levels.	2018	MOH budget includes HIS/ICT line item
4	To build HIS staff capacity to manage HIS functions and responsibilities including data collection, storage, management, analysis, research, use, and research	2020	90% of HIS targeted staff across all levels have been trained in data collection, storage, management, analysis, research and use
5	To establish appropriate ICT infrastructure at all levels including institutionalizing mHealth technologies	2020	All 15 counties meeting a 90% threshold in ICT readiness assessment. (Baseline: 38%)
DAT	A SOURCES, AND INDICATORS		
6	Develop, implement, and sustain basic functionality of LIS	2018	LIS requirements defined and electronic platform for LIS selected by end of Quarter one of 2016. 50% of targeted public health laboratories implementing a universal, functional and fully integrated web based eLIS
7	Develop implement and sustain basic functionality of DSIS	2018	All health facilities across all 15 Counties meeting the 100% threshold for early notification and response to priorities disease and public health events as per IDSR guideline.
8	Develop, implement, and sustain basic functionality of CBIS	2018	50% of targeted health facilities implementing an integrated community based Information system (verifiable by CHIS reporting coverage) All 15 Counties using integrated web based CBIS.
9	Expand HRIS functionality, indicators, and use at subnational levels	2018	iHRIS and mHero fully interoperable with other systems iHRIS data visualization and analytic capacity enhanced
10	Expand HMIS functionality, indicators, and use at subnational levels	2016	By end of 2016, eighteen (18) health district teams do data entry at district level using DHIS2 All District health teams have a dedicated HMIS personnel trained in HMIS processes and reporting.

11	Develop, implement, and sustain basic	2016	LMIS requirements defined and electronic platform for
	functionality of LMIS		LMIS selected
12	Strengthen FMIS functionality, indicators, and use at subnational levels	2019	FMIS enhanced, rolled out and used at subnational levels
13	To develop HIS architecture and adopt an interoperability framework and standards interoperability and data sharing across and beyond HIS subsystems	2017	Validated HIS architecture and disseminated SOP (by end of 2017) Pilot interoperability using existing reporting platforms of functional HIS subsystem (DHIS2, eDEWS, CBIS, iHRIS, LIS, etc)
14	To establish a mechanism to ensure information security and confidentiality	2016	ICT strategy developed and disseminated to guide security and confidentiality
DAT	A QUALITY, MANAGEMENT, DISSEMINATION AND	USE	
15	To improve data quality, dissemination, and use of information in support of health services and health system functions at all levels	2019	Developed and implemented at all reporting levels, a comprehensive data quality assurance manual /SOP
HIS S	STRATEGIC PLAN MONITORING AND EVALUATION		
16	To regularly monitor and evaluate the implementation targets of the HIS strategic plan	2018	Information products available timely and used for decision making 60% of HIS subsystems objective met as planned
17	To improve the governance, management, and coordination of health research and its translation to public health action	2016	Updated research guidelines on the processes and conduct of research for health in Liberia

3.2 Strategic Interventions

In the following pages, interventions for each of the strategic objectives are proposed for the duration of the strategic plan (July 2015 to June 2021). These interventions were put together by the participants of the strategic planning workshop, who worked in seven small groups.

HIS Sub- Components	HIS Strategic Objectives	Proposed Strategic Interventions
		1.1. Develop, implement, and disseminate SOPs and policy guidelines for all HIS functions including health research, ICT infrastructure, and HIS subsystems
Legislation, Policy & Planning	SO1 To develop and disseminate adequate legislation, policies, regulations, and standard operating procedures in support	1.2. Establish mechanisms to ensure compliance with legislation adopting International Health Regulations.
	of a functional HIS at all levels of the health system	1.3. Develop, strengthen and ensure compliance of legislation on information sharing regarding health workforce, publishing of OFM financial statements, NHA reports, Aid tracking, and other relevant statistical data among public health sector, private sector and health insurance companies

	1.4. Review and update the current legislation like the 1976 Public Health Law, National Public Health Law, and data sharing policies to cover vital registration, notifiable diseases, private sector data, confidentiality and fundamental principles of official statistics, private health sector health care providers etc.
	2.1. Establish coordination mechanisms between MOH, line ministries, private sector, and other government agencies to improve coordination on data sharing and development of the broader HIS
SO2 To establish a functional national coordination for all relevant government institutions including financial and technical support agencies	2.2. Establish a HMER TWG and subgroups to ensure participation of all subsystem and crosscutting stakeholders and coordinate subsystem development, piloting, implementation, interoperability and evaluation
	2.3. Develop and implement clear communications policy within MOH, and for linking MOH with other organizations for data sharing and knowledge management
	2.4. Establish research partnerships and collaboration among research stakeholders to enhance the implementation of national standards, accreditation and quality assurance on research for health
SO3 To ensure a dedicated budget for HIS implementation	3.1. Advocate that budget line items are included MOH, and County Budgets to cover HIS and ICT costs
and operation at all levels	3.2. Advocate for 2% of health budget to cover health research financing
SO4 To build HIS staff capacity to manage HIS functions and responsibilities including data collection, storage, management, analysis, use; and health research	4.1. Strengthen the technical capacity of staff involved in the HIS through in-service training in ICT, including competencies in: use and maintenance, GIS, health informatics capacity building (training, coaching, mentoring) especially in the area of developing and maintaining technology for health information exchange 4.2. Strengthen the technical capacity of all users of HIS in MOH in basic competencies though inservice training on data management, analysis, use of information, ethics, GIS and the design and
	national coordination for all relevant government institutions including financial and technical support agencies SO3 To ensure a dedicated budget for HIS implementation and operation at all levels SO4 To build HIS staff capacity to manage HIS functions and responsibilities including data collection, storage, management,

		4.3. Strengthen institutional capacities of pre-service programs through curriculum development and resource mobilization for various research activities; including epidemiology, biostatistics, HIS, laboratory system and software development
		4.4. Recruit and train epidemiologists, biostatisticians, demographers, data clerks, database administrators, computer programmers, lab technicians to increase capacity of the HIS workforce
		5.1. Procure critical ICT assets, including hardware and software requirements, appropriate for operating the HIS subsystems
ICT Infrastructure	SO5 To establish appropriate ICT infrastructure at all levels including institutionalizing mHealth technologies	5.2. Develop an ICT strategy to guide acquisition, internet usage, data back-up, manage computer resources, maintenance, and disposal of ICT equipment at all levels
		5.3. Ensure adequate access and maintenance of electricity and internet for operation of HIS subsystems at all levels
		6.1. Establish an LIS to support basic functionality in all national and regional labs
LIS	SO6 Develop, implement, and sustain basic functionality of LIS	6.2. Improve the flow of data in the laboratory information system, including receipt of case data at the laboratories, and sample results at facilities and counties
		7.1. Design and develop tools to support eWARN and IDSR functions
DSIS	SO7 Develop implement and sustain basic functionality of DSIS	7.2. Expand functionality of electronic systems to include broader outbreak functions, and interoperability with laboratory systems and the broader health information system
		7.3. Improve information on disease burden of the population through comprehensive surveillance and routine risk assessments
CDIC	SO8 Develop, implement, and	8.1. Develop, implement, and sustain basic functionality of CBIS
CBIS	sustain basic functionality of CBIS	8.2. Improve capacity to monitor the CHW program and provide feedback at all levels

		9.1. Expand HRIS functionality, indicators, and use at all levels
HRIS	SO9 Expand HRIS functionality, indicators, and use at subnational	9.2. Develop tools such as mHero to establish two- way engagement with the health workforce
	levels	9.3. Extend use of HRIS for performance management, monitoring training and competencies, and reporting on socioeconomic status of the health workforce
	SO10 Expand HMIS functionality,	10.1. Expand HMIS functionality at all levels, including improving accessibility of the DHIS2 webportal to districts
HMIS	indicators, and use at subnational levels	10.2. Update core indicators to reflect national M&E plan and MOH strategies
		10.3. Develop and disseminate HMIS Data Reference book
	SO11 Develop, implement, and sustain basic functionality of LMIS	11.1. Develop, implement, and sustain basic functionality of LMIS
LMIS	and physical assets database	11.2. Ensure LMIS covers community level commodities
		11.3. Develop a separate database on infrastructure (building and equipment) based on the master facility list
	SO12 Develop, implement, and sustain basic functionality of FMIS	12.1.Establish point-to-point connections between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll
FMIS		12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis
		12.3. Establish and ensure regular update of tracking database on Partner's projects
		12.4. Strengthen capacity of central, county and facility-based financial managers to track expenditures via FMIS
	SO13 To develop HIS architecture and adopt an interoperability	13.1. Establish necessary software linkages and standardization of data sources for interoperability
HIS Architecture	framework for the HIS system	13.2. Procure and establish necessary hardware and software for interoperability
		13.3. Develop and validate a HIS architecture and interoperability roadmap and use case prioritization

		for system integration between DSIS, LIS, FMIS, iHRIS, CSA, HMIS, CBIS, and LMIS
		13.4. Develop master facility registries and universal patient IDs to improve patient tracking
		13.5. Identify areas for the use of appropriate mHealth interventions and develop a mHealth strategy and SOP for all levels
		14.1. Develop a strategy to guide data acquisition, security, DRP, confidentiality, IPR rights and disposal at all levels
	SO14 To establish a mechanism to	14.2. Address key MOH ICT security vulnerabilities
Data Management	ensure information security and confidentiality	14.3. Develop meta data dictionary for all HIS data sources based on national and international standards and requirements
		14.4. Establish a central data warehouse at MOH HQ and County Levels
		15.1. Develop and implement a standardized system for data quality assurance and feedback at all levels
	SO15 To improve quality, dissemination, and use of	15.2. Develop and implement performance based indicators that capture the usage and display of maps and graphs at the counties, districts and facilities
Data		15.3. Institutionalize and strengthen "research to practice" activities among decision makers
Dissemination and Use	services and health system functions at all levels	15.4. Establish routine dissemination paths for actionable information products and health research (e.g. dashboards, reports, population surveys) to internal and external stakeholders in a timely manner for decision making and alerting the public of emerging health issues
		15.5. Improve dissemination of National Health Accounts (NHA) findings to MOH staff and wider stakeholders group
Monitoring &	SO16 To regularly monitor and	16.1. Continuous monitoring and evaluation of the Strategic Plan and Operational Plan against the milestones
Evaluation	targets of the HIS strategic plan	16.2. Monitor and evaluate partner work plans and compare against HIS milestones and provide accountability
Dissemination and Use Monitoring &	dissemination, and use of information in support of health services and health system functions at all levels SO16 To regularly monitor and evaluate the implementation	for data quality assurance and feedback at all least 15.2. Develop and implement performance base indicators that capture the usage and display of maps and graphs at the counties, districts and facilities 15.3. Institutionalize and strengthen "research to practice" activities among decision makers 15.4. Establish routine dissemination paths for actionable information products and health rese (e.g. dashboards, reports, population surveys) to internal and external stakeholders in a timely manner for decision making and alerting the purof emerging health issues 15.5. Improve dissemination of National Health Accounts (NHA) findings to MOH staff and wide stakeholders group 16.1. Continuous monitoring and evaluation of Strategic Plan and Operational Plan against the milestones 16.2. Monitor and evaluate partner work plans a compare against HIS milestones and provide

Research

S017 To improve the governance, management, and coordination of health research and its translation to public health action

- 17.1. Develop research strategy plan to identify, prioritize, fund and execute public health research
- 17.2. Strengthen MOH ownership, leadership, and conduct of the design and implementation of population based surveys and health research
- 17.3. Establish a situational awareness room to integrate streams of information and serve as a center for data science for the MOH

3.3 Phased Implementation Plan

Participants of the HIS strategic planning workshops have phased the strategic interventions over the five years into a phased implementation plan (see Annex F).

Each intervention has start and completion dates which indicate the time frame during which the implementation of the intervention is ongoing. The generation of the defined immediate bench marks and milestones signals the successful completion of the intervention, and can be used as a progress indicator for monitoring purposes. In addition, for each intervention an office was defined as responsible for the implementation of the intervention. Obviously, there will be other offices, departments, programs and institutions collaborating on the intervention, in addition to the responsible office. Also, the plan has columns indicating the priority rank, as well as the potential funding sources.

This Strategic Phased Implementation Plan will be used during subsequent discussions with stakeholders within the health system and with donors in order to confirm interest, responsibilities for implementation, and technical and financial support. The Plan also provided the basis for developing the Operational Plan July 2015 – June 2017, as well as for monitoring the implementation of the HIS Strategic Plan (see 3.9 HIS Strategy M&E Plan).

The HIS Strategic Plan has been provisionally costed in 2016 USD for the full 5-year timeframe using gross estimates based on planned activities. These cost estimates will be further detailed under the costed operational plans to be reviewed and updated annually.

3.4 Operational Plan July 2015 – June 2017

The Operational Plan has prioritized 53 out of 68 strategic interventions and activities to be implemented in the first two fiscal years (see details Annex G). The high number of prioritized interventions is due to the fact that the approved work plans of most HIS relevant partners have already started implementing some of the prioritized interventions. The most important issue is how to coordinate all these partners that are already implementing the prioritized interventions.

3.5 HIS architecture

Based on the Liberia HIS Enterprise Architecture document (see Annex K), various interventions have been identified in the HIS strategic plan to improve the integration of the various HIS subsystems.

The MOH in Liberia produces a certain amount of data mostly collected in silos with little to no integration. Part of the health data collected is coming from entities external to the MOH. A good example are the human resource and financial data that are manually reconciled from the Civil Servant Agency (CSA) database called CSMS and the Integrated Financial Management Information System (IFMIS) of the Ministry of Finance and Development Planning (MOFDP). The Liberia HIS Architecture document reveals that these fragmented data are produced by a very fragmented application architecture operating in parallel with close to no data exchange. The MOH Department

and unit often needs to manually extract the data from one application and load it to another to update their records. The data storage varies from paper based to MS Excel spreadsheet, MS Access databases and various Database Resource Management Systems (DBRMS) such as Microsoft SQL, Mysql and PostgreSQL servers.

More recently, open web-based applications have been developed, such as DHIS2, iHRIS, and Norming PSA, with an excellent potential for system integration through the development of Health Information Exchange (HIE) protocols. The hardware, software, LAN, and telecommunication system used by HMIS and source-specific databases will be made more user-friendly. Impediments to interoperability, involving language, interface, or data structure, will be taken into account at the outset. HMIS users will be able to access required information in the predefined required format through simple menu-driven procedures.

3.6 HIS Resource Requirements

3.6.1 Human Resources

Quality of health data produced by the HIS and its use for decision making are function of several factors that include clear definition of indicators, appropriate data collection tools, robust software and most importantly, adequately trained health information personnel. The human resource factor is critical to any successful HIS as all other factors depend on the capacity of personnel to develop, review, adapt, implement, monitor and evaluate the National HIS and its subsystems. At each level of the health system, adequate and qualified health information personnel shall be available. Clerks that are responsible for coding and compiling data at health facilities should be adequately trained and should have a good appreciation of health concepts. The same applies to health information officers with a statistical but not a health background. Coding, validation, analysis, reporting and dissemination of health data and information require some level of understanding of epidemiology. Developing the capacity of the health system to deliver on the actions in this strategy requires a significant and sustained investment in human resources. At the minimum, the following new positions are required at the MOH Headquarters:

- Demographers
- Biostatistics/Statisticians
- Database Administrators
- Computer Programmers
- GIS Specialists

Using the information from Health Workers census, a human resource structure for the health information system from the health facility all the way up to the headquarters shall be developed outlining the number of staff required at each level, including their qualifications and experience, and career path. This will help to define minimum staff requirements for the optimal functioning

3.6.2 ICT infrastructure

Information and Communication Technology (ICT) tools and devices can facilitate most HIS processes such as health information collection, analysis, dissemination, and use. The HIS architecture document (Annex K) explains the role of ICT in the overall work process of a modern health system or a health institution. But ICT cannot work without the infrastructure which includes utilities such as electricity and internet connectivity, hardware and software, appropriate building to house this equipment, as well as maintenance and troubleshooting capacity.

The ICT Infrastructure Assessment Report of 2015 (see aAnex L) shows that there are major ICT infrastructure deficiencies that will need to be addressed to ensure full ICT support to HIS. The strategic plan includes interventions to address this situation.

3.6.3 Organizational infrastructure

To ensure smooth operations, the MOH organizational set-up dealing with the HIS falls mainly under the Department of Planning which has two bureaus:

- The Bureau of Vital Statistics including the ICT/GIS Unit, the Birth and Death Registration Unit, and the HMIS, M&E, and Research (HMER) Division. The HMER Division has three units:
 - o HMIS unit in charge of the Routine Health Information System (RHIS)
 - o The Monitoring and Evaluation Unit
 - o The Research Unit
- The Bureau of Policy and Planning, including the Human Resources and the Health Financing Units Some of the HIS subsystems, such as the DSIS, the HRIS, and the LMIS, currently fall under other Departments such as Administration and Health Services.

3.6.4 Financial Resources

The HIS assessment showed that National HIS and LISGIS budget line items are limited and do not allow to ensure full functionality of the National HIS. The Investment Plan for Building a Resilient Health System (2015-2021) calls for the design and development of a sustainable health financing system, and allocates substantial funds (US\$ 6M over the next six years) to HIS and communications. Further study is required to examine in detail the funding of the HIS strategic plan interventions, through the HMER Technical Working Group (TWG).

3.7 Critical Assumptions and Risks

In developing this strategy a number of risks and assumptions were identified and the proposed mitigation measures highlighted.

Prioritization on building a basic foundation:

A key assumption validated through the baseline assessment was importance of prioritization on development of a strong foundation for the HIS rather than undertaking important but complex subsystems. This assumption shifts focus onto development of coordination and process mechanisms; core architecture; ICT infrastructure; and the fundamental information systems required to support the National Health Plan and National Investment Plan. However, this precluded objectives around electronic medical records, vital statistics systems, and integration of private sector data. These issues will be revisited yearly during the HIS Strategic Plan monitoring and evaluation.

External funding and sustainability:

Currently, AID Development Partners provide most of the funding for HIS activities in Liberia. Any significant reduction of this support would negatively affect the implementation of this Plan. Given the above, there is an urgent need for a shift in funding modalities. Primarily, MOH should focus on securing increased funding from the Government of Liberia (GoL).

Partnership commitment and capacity:

Successful implementation will require a stronger multi-sectoral coordination involving partners from public and private sectors and civil society. Provision of strong leadership, governance and co-ordination across government, combined with effective coordination of all stakeholders by MOH, is vital to the achievement of the outcomes under this HIS Strategic Plan. HMER TWG, with the support of key Government and ADPs, should undertake continuous advocacy to ensure wide political commitment towards the implementation of this Strategic Plan

Coordination of the HIS Organizational Infrastructure:

While most HIS operational units are managed by the Department of Planning, various subsystems are in other MOH departments and Vital Events registration in mainly managed by a separate institute (LISGIS). In order to build an integrated and interoperable HIS, coordination of these various HIS subsystems will be required. It is hoped that the National HMER TWG can ensure this function (see 3.8).

3.8 Mechanisms for Coordination

Overall coordination of HIS will be the responsibility of the MOH. Whereas implementation of the HIS strategic plan will be carried out in a participatory manner using already existing structures and frameworks under the HIS subsystems at all levels of implementation. These will include all the line ministries like Ministry of Finance and Development Planning involved in HIS sub-systems, and NGOs involved in delivery of health services. Other HIS stakeholder institutions will include LISGIS, County Health Teams, and Universities. It is expected that support, both technical and financial will come from Development partners including UN agencies (WHO, UNICEF, UNFPA), USAID, CDC, DANIDA/SIDA and various HIS technical partners including MEASURE Evaluation, Johns Hopkins University, CSH, IntraHealth, eHealth Africa, and many others.

3.8.1 National HMER Coordination Committee

The role and functions of the HMERCC is to provide policy direction and leadership for the development and implementation of Health Management Information System, Monitoring and Evaluation framework and Research Policy. The HMERCC meets once in every quarter to discuss plans, key activities, implementation and challenges related to Health Information System (HIS), Monitoring and Evaluation (M&E), research, and vital registration to feed into the Health Sector Coordination Commitee. The HMERCC is chaired by the Assistant Minister of Vital Statistics, and attended by donor agencies, UN partners, and key technical partners. See Annex N for the terms of reference for this group.

3.8.2 National HMER Technical Working Group

The National HMER Technical Working Group (HMER TWF) is the committee responsible for overseeing and coordinating the implementation of the HIS strategic plan. The role and functions of the Technical Working Group are to provide technical recommendations, and the development and implementation of the national health information system, ICT infrastructure, health research, and monitoring and evaluation of health programs and population interventions.

This committee will be chaired by MOH Coordinator for the HMER units, and attended by unit heads, MOH data managers, civil and academic institutions, and technical partners. It will also be comprised of a representative from each of the HIS subsystem Committees (such as CBIS and DSIS), and will function as the HIS secretariat, responsible for determining technical decisions as required. A provisional list of HMER TWG members is presented in Annex A. See Annex N for the terms of reference for this group.

3.8.3 HIS Subsystem Committees (subgroups) or Task Forces

The already existing technical subgroups such as DSIS technical committee and the CBIS M&E technical working group, will continue their original roles of technical guidance within the respective HIS sub-systems. Similar committees, where not yet formed, will be set up by the rest of the HIS sub-systems. All the HIS sub-systems will be expected to participate in the National HMER TWG.

3.9 M&E of the Implementation of HIS Strategic and Operational Plans

Monitoring of the HIS Strategic and Operational Plan will be accomplished through regular technical support supervision on all aspects of HIS implementation at all levels. Data Quality Audits (DQA) will be carried out at points of data collection, collation and analysis by technical staff of the respective sectors/ institutions. This will be included in the strategic plan. Meetings to report and review progress will be conducted. Each stakeholder will be responsible for producing and sharing relevant reports and information on a regular basis as agreed upon by the HMER TWG. These reports should be accessible upon request of the various stakeholders. A mid-term and final evaluation exercise will also be conducted to assess the extent to which the objectives will have been achieved. The M&E matrix shown in Table 2 below details the indicators and targets that will enable monitoring and self-assessment of progress towards results and facilitate reporting on HIS performance.

A set of core health sector indicators for monitoring health programs is currently being identified and endorsed by the national health information stakeholders. The implementation of the HIS strategy will be measured by the capability of the HIS to supply adequate data to address all core health sector indicators. The HMER TWG will be responsible for ensuring that an M & E plan with clear activities is developed. More specifically, the following key M & E activities will be carried out to ensure that the operationalization of the strategy is on course.

- Health information personnel at the facility, county, and HMER Unit will produce monthly progress reports
 to share successes and challenges experienced during HIS strategy implementation. These reports will form
 part of the HMER TWG items for discussion during their regular meetings. Feedback will be provided on the
 reports as a way of improving data collection, quality control, timeliness and completeness.
- Regular review meetings will be the starting point for ensuring implementation of HIS activities as prioritized
 by the strategic framework. The HMER TWG will conduct such meetings on quarterly basis while the Senior
 Management Meetings will meet on monthly basis, or more frequently, as demanded by the situation.
 During these meetings, the respective health information units will submit regular reports to provide
 updates on implementation progress and challenges met.
- Quarterly monitoring and supervision visits shall be conducted by HMER Unit staff to selected data
 collection and storage sites (health facilities, county health offices) with a standard checklist to assess
 compliance of each with minimum standards set regarding a good health information system. Visits shall
 be well planned in-advance. During the visits, interviews will be conducted with all stakeholders to look into
 the various health information processes including data collection, quality control, processing, analysis,
 presentation, dissemination and utilization.
- An evaluation will be conducted three years following the roll out to take stock of achievements and challenges in the implementation of the HIS strategy with a purpose to make sure the HIS is capable of producing all the information required for monitoring nationally and internationally agreed health goals.

Table 2: Monitoring & Evaluation framework; 2021 Targets

#	Objectives of the HIS Strategic Plan	Target	Data	Frequency of	Responsible
	ordered by HIS component	Indicator	Source	Data	Office
				collection	
RES	OURCES				
1	To develop and disseminate	Updated legislation,	Program	Annually	HMER Unit
	adequate legislation, policies,	policies, regulations,	Reports		
	regulations, and standard operating	and SOPs available			
	procedures in support of a	and disseminated to			
	functional HIS at all levels of the	all stakeholders			
	health system.				
2	To establish a functional national	HMER Stakeholders	TWG	Quarterly	HMER Unit
	coordination mechanism for all	Working group re-	Minutes		

	relevant government institutions including financial and technical	established and meeting on a regular			
	support agencies	basis			
3	To ensure a dedicated budget for HIS implementation and operation	MOH budget includes HIS/ICT line item	Costed MOH work	Annual	HMER Unit/OFA
	at all levels.		plan		
4	To build HIS staff capacity to manage HIS functions and responsibilities including data collection, storage, management, analysis, research and use	90% of HIS targeted staff across all levels have been trained in data collection, storage, management, analysis, research and	Program Reports	Quarterly	HMER Unit
5	To establish appropriate ICT infrastructure at all levels	All 15 counties meet a 90% threshold in ICT readiness assessment. (nb. Baseline: 38%)	Assessment Report	Quarterly	ICT Unit
DAT	A SOURCES, AND INDICATORS	(I .	
6	Develop, implement, and sustain basic functionality of LIS	LIS requirements defined and functional and fully integrated web based eLIS implemented at all public health facilities	Facility Reports	Quarterly	National Reference Lab
7	Develop implement and sustain basic functionality of DSIS	All health facilities across all 15 Counties meeting the 100% threshold for early notification, and data quality audits of case investigations meet standards	Surveillance Reports, data quality audits	Quarterly	DPC Unit
8	Develop, implement, and sustain basic functionality of CBIS	100% of health facilities with CHSS implementing an integrated community based Information system (verifiable by CHIS reporting coverage) All 15 Counties using integrated web based CBIS.	Program Reports	Quarterly	Community Health Division
9	Expand HRIS functionality, indicators, and use at subnational levels	iHRIS and mHero fully interoperable with other systems iHRIS data visualization and analytic capacity enhanced	Program Reports	Annually	HMER Unit
10	Expand HMIS functionality, indicators, and use at subnational levels	All health district teams do data entry at district level using DHIS2	HMIS Reports	Quarterly	HMIS Unit

		T	1		1
		All District health teams have a dedicated HMIS personnel trained in HMIS processes and reporting.			
11	Develop, implement, and sustain basic functionality of LMIS	LMIS requirements and forms defined and electronic platform for LMIS developed and implemented	Program Reports	Annually	HMER Unit
12	Strengthen FMIS functionality, indicators, and use at subnational levels	FMIS enhanced, rolled out and used at subnational levels, and used for tracking real time payments via interoperability			
13	To develop HIS architecture and adopt an interoperability framework for the HIS system including mHealth	Develop key HIE functions to support interoperability using existing reporting platforms of functional HIS subsystem (DHIS2, eDEWS, CBIS, iHRIS, LIS, etc)	Program Reports	Annually	ICT Unit
14	To establish a mechanism to ensure information security and confidentiality	ICT strategy implemented and data security policy and procedures in place	Program Reports	Annually	ICT Unit
DAT	A QUALITY, MANAGEMENT, DISSEMIN	NATION AND USE			
15	To improve quality, dissemination, and use of information in support of health services and health system functions at all levels	Developed and implemented at all reporting levels, a comprehensive data quality assurance manual and timely information products	Data Quality Reports PRISM assessment	Quarterly In 2018	HMIS Unit
HIS	STRATEGIC PLAN MONITORING AND E				
16	To regularly monitor and evaluate the implementation targets of the HIS strategic plan	100% of HIS subsystems objective met as planned	Review Reports	Annually	HMER Unit
17	To improve the governance, management, and coordination of health research and its translation to public health action	Updated research guidelines on the processes and conduct of research for health in Liberia	HMER Report	Once	Research Unit

4 CONCLUSION

In the aftermath of the Ebola epidemic, which struck the country in 2014-2015, and responding to urgent need to fight the fragmentation of health information system in Liberia, a HIS Strategic Plan 2016-2021 was developed in follow-up of the previous one. The HIS strategic plan is well aligned with the National Health Plan and proposes the

development of a functional, integrated and sustainable HIS able to support the management of the health services at county level and below, as well as the implementation of national policy goals, such as those outlined in the Health Investment Plan for a Resilient Health System, as well as the Sustainable Development Goals (SDGs). It proposes 17 strategic objectives and 56 interventions spread over five years. An HIS Operational Plan was developed for 2016-2017 and includes 53 costed interventions to be implemented in the next two years.

The development of this HIS Strategic and Operational Plan has been possible thanks to leadership and coordination in the MOH and the collaboration of all HIS stakeholders throughout the whole process. It is hoped that this same spirit of commitment can continue during the implementation of the plan in the coming five years. The HMER TWG, which gathers both government and external partners, has the mandate to coordinate, monitor, and evaluate the implementation of the HIS strategic and operational plans.

ANNEX A: MEMBERS OF THE HMER STAKEHOLDER WORKING GROUP AND THE HSCC

1.1 HMER Core Group

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		Name	Position	Organization
	1	Luke L. Bawo	HMER Coordinator	Ministry of Health
	2	Stephen Gbanyan Jr	Director, HMIS	Ministry of Health
	3	George P. Jacobs	Director, M&E	Ministry of Health
	4	Nelson K. Dunbar	Director, Research	Ministry of Health
	5	Beatrice Y. Lah	Director, IT	Ministry of Health
	6 Mike Mulbah M&E Officer		Ministry of Health	
	7	Patrick K. Konwloh	Deputy Director, HMIS	Ministry of Health
	8	Dikena Jackson	Focal Point, DSIS	Ministry of Health
	9	Jerome Korvah	Focal Point, CBIS	Ministry of Health
	10	Sando Fahnbulleh	Focal Point, LIS	Ministry of Health
	11	Rodney Cummings	Focal Point, HRIS	Ministry of Health
	12	Kpakama Kromah	Focal Point, LMIS	Ministry of Health
	15	Adu Boateng	Acting M&E Director	Ministry of Finance
	16	Jaclyn Carlsen	ICT Advisor	USAID
	17	Carl Kinkade	HIS Advisor	CDC
	18	Tashrik Ahmed	Country Director HIS3	Johns Hopkins University
	19	Tom Kirsch	Professor	Johns Hopkins University
	20	Theo Lippeveld	MOH-HIS Advisor	MEASURE Evaluation
	21	Walter Obiero	MOH-ICB Advisor	MEASURE Evaluation
	22	Alexander Blidi	M&E Director	Collaborative Support for Health
	23	Gonza Namulanda	HIS Advisor	CDC

1.2 HMER Technical Working Group

_	111	TER Technical Wol	iking Group	
		Name	Position	Organization
	1	Yah M. Zolia	Deputy Minister	Ministry of Health
	2	C. Sanford Wesseh	Assistant Minister	Ministry of Health
	3	Dr. Saye D. Baaro	Assistant Minister	Ministry of Health
	4	Luke L. Bawo	HMER Coordinator	Ministry of Health
	5	Stephen Gbanyan Jr	Director, HMIS	Ministry of Health
	6	George P. Jacobs	Director, M&E	Ministry of Health
	7	Nelson K. Dunbar	Director, Research	Ministry of Health
	8	Beatrice Y. Lah	Director, IT	Ministry of Health

9	Mike Mulbah	M&E Officer	Ministry of Health
10	Patrick K. Konwloh	Deputy Director, HMIS	Ministry of Health
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12	Jerome Korvah	Focal Point, CBIS	Ministry of Health
13	Sando Fahnbulleh	Focal Point, LIS	Ministry of Health
14	Rodney Cummings	Focal Point, HRIS	Ministry of Health
15	Kpakama Kromah	Focal Point, LMIS	Ministry of Health
16	Colleen Parker	Research Assistant	Ministry of Health
17	Mohamed K. Dunbar	Research Assistant	Ministry of Health
18	Tamba Boima	Director, CHSD	Ministry of Health
19	Dr. Philip K. Sabor	Director	Ministry of Health
20	Moses Dhama	CHT	Ministry of Health
21	Dominic F. Togba	Manager	Ministry of Health
22	Princess Reeves	CHT	Ministry of Health
23	Gayflor A.Z Kolnbah	Lofa	Ministry of Health
24	Mauren K. Dubor	Data Manger	Ministry of Health
25	Clement K. Tay	Webmaster	Ministry of Health
26	Rita K. Kiawoin	Research Assistant	Ministry of Health
27	Roland J. Nyamene	M&E Officer	Ministry of Health
28	S. Turnurlah Varpilall	Ministry of Health/TA	Ministry of Health
29	Jane S. Kerkob Sr.	M&E Officer	Ministry of Health
30	Hellen Greene-Bonnie	HMIS	Ministry of Health
31	Ernest Goryfon	Ministry of Health	Ministry of Health
32	Jennifer Lyungquist	TD/HF	Ministry of Health
33	Sophie T. Pamer	Manager	Ministry of Health
34	David C. Korboi	M&E/IT	Ministry of Health
35	Levi Hinneh	M&E Officer	Ministry of Health
36	Charlesetta B. Neor	M&E Assistant	Ministry of Health
37	Rose W. Seton	M&E Analyst	Ministry of Finance
38	Adu Boateng	Acting M&E Director	Ministry of Finance
39	Barbara J. Dickerson	Deputy Mission	USAID
40	Ben Zinner	Health Officer	USAID
41	Jaclyn Carlsen	ICT Advisor	USAID
42	Mike Catalano	ICT	USAID
43	Edna Jonas	Health Advisor	USAID
44	Tomas Gibb	GDL	USAID
45	Desmond Williams	CDC Country Director	CDC
46	Carl Kinkade	HIS Advisor	CDC
47	John Saindon	Laboratory Advisor	CDC
48	Emily Weston	IDSR	CDC

49	Julie Shaffner	IDSR	CDC
50	Yolonda Froemar	Community Officer	CDC
51	Alex Gasasira	WHO Representative	
52	Emmanuel Musa	Deputy WHO Representative	WHO
53	Esther Hamblion	Epidemiologist	WHO
54	David Kiongo	Data Manager	WHO
55	Funsho Adebayo	Community Officer	WHO
56	Eric D. Johnson	Economist	WHO
57	Ariste Bukheni	ISM	WHO
58	Mesfin	Health Policy	WHO
59	Philimena Raftery	Lab Advisor	WHO
60	Orla Condell	Lab Advisor	WHO
61	Tashrik Ahmed	Country Director HIS3	Johns Hopkins University
62	David Peters	Professor	Johns Hopkins University
63	Tom Kirsch	Professor	Johns Hopkins University
64	Romain Tohouri	MOH-IT Advisor	MEASURE Evaluation
65	Theo Lippeveld	MOH-HIS Advisor	MEASURE Evaluation
66	Walter Obiero	MOH-ICB Advisor	MEASURE Evaluation
67	Rose Macauley	Country Representative	John Snow Incorporated
68	Lionel Buku Welson	IT Specialist	John Snow Incorporated
69	Nellie Ghusayni	Health Officer	International Medical Corps
70	Avi Kenny	M&E Director	Last Mile Health
71	Janani Veluchamy	M&E National Policy Manager	Last Mile Health
72	Mike Chmura	Director	FIO
73	Tertius Eksteen	Director	PhaseOne
74	Knut Staring	Coordinator	University of Oslo
75	Leah McManus	Program officer	IntraHealth
76	Ryan Burbach	Deputy Country Rector	IMC
77	Julius Mattai	MIS/GIS Specialist	UNOPS
78	Yusuf Babaye	Country Director	DELIVER
79	Joachim W. Teh II	AL	DELIVER
80	Victor Koelami	ICT	HC3
81	Anna Helland	Country Director	JHUCCP
82	Franz van Roenne	Team Leader/Appraisal	GIZ
83	Corivina Witte	Consultant	GIZ
84	Sjoerd Postma	Chief of Party	Collaborative Support for Health
85	Dr. Garfee Williams	Deputy Chief of Party	Collaborative Support for Health
86	Floride Niyuhire	Deputy Chief of Party	Collaborative Support for Health
87	Alexander Blidi	M&E Director	Collaborative Support for Health
88	Arthur Loryoun	SC Advisor	Collaborative Support for Health

89	Vera Mussah	Director	Collaborative Support for Health
90	Felix E. Kelley	HRH Advisor	Collaborative Support for Health
91	Ernest Gaie	Country Director	Africare
92	Denise Brandt	Country Director	JHPIEGO
93	Wilfred Ballah	M&E Officer	JHPIEGO
94	Dr. Aline Simey-Kafer	Senior Health Advisor	UNICEF
95	Dr. Yulia Widiaf	MCH Officer	UNICEF
96	Lee Kironget	UNICEF	UNICEF
97	Olivia Elee	Program Director	eHealth
98	Sharif Arafa	Medical Officer	IOM
99	Rawi Ibrahim	Health Officer	IOM
100	Alfred S. Drobia	M&E Advisor	IRC
101	Cate Oswold	Partnership and Policy	PIH
102	Christine Wasunna	Director, Lab	ACCEL
103	T. Woibah Suwo	M&E Officer	UNFPA
104	Warner Assambi	Country Director	Global Communities
105	Dilevi Hinneh	M&E Manager	NMCP

ANNEX B: GLOSSARY OF TERMS USED IN THE HMN HIS STRATEGIC PLANNING PROCESS

	L'ELAINING PROCESS
TERM	DEFINITION
HMN Framework	A document produced by the Health Metrics Network Secretariat and Technical Advisory Group presenting the basic principles and steps of HIS Strategic Plans
HIS Strategy Roadmap	A detailed plan of the steps and products to be undertaken and produced in formulating the HIS Strategy and Plan
HIS Assessment (HMN)	A process involving the response of a "Key Informant Group" to a series of questions about the current functionality and performance of various categories of health information and its use. The assessment is supported with a spreadsheet tool that facilitates the entry and analysis of the responses of the Informant Group in order to determine the average degree of performance or difficulty currently being experienced across the categories and questions in the opinion of the Informant Group.
HIS Assessment Item or Question	An individual assessment question within an HIS Assessment Category pertaining to current HIS functionality and performance, generally provided with an array of "vignettes" reflecting
	degree of functionality and performance against recognized standards
Key Assessment Items	A selection of HIS assessment items (questions) that are felt to be critical and representative
or Questions	of entire HIS categories of the assessment, such that they should be addressed within the HIS strategy whether or not their HIS function is give priority
Validated HIS	A set of HIS assessment questions for which the total and average score has been checked,
Assessment Result	validated or corrected
HIS Component	Categories of health information as addressed by the HMN HIS Assessment. There are six main categories: HIS Resources, Indicators, Data Sources, Data Management, Information Products, Dissemination and Use.
Health Subsystem	An important type of health information generation and use in support of the "Building Blocks" of the national health system and its services and sub-systems. Eight Health Subsystems have been defined for use within the HMN HIS Strategic Planning Process: Leadership and Governance (Stewardship), Financing, Health Workforce, Drugs and Supplies, Facilities and Technical Equipment, Public Health and Surveillance, PHC and District Services, and Hospital Services
Priority HIS Component	An HIS Component or Health Subsystem which is given a priority for strategic improvement
or Health Subsystem	because of poor assessment results and other criteria.
HIS Problem	A defined problem statement derived from one or more low-scoring HIS Assessment questions. Some HIS problems have quantified indicators. HIS problems become the subject of intervention design for HIS performance improvement.
HIS Problem Indicator	A definitive measure, generally quantitative, of the extent of an HIS problem.
Indicators	A quantitative measure of the level and trend of a health problem, of health determinants, service or support system performance (coverage, quality, client satisfaction) and health resource availability, allocation and use. In relation to the health information system and its sub-systems, indicators can be used to measure similar attributes including coverage (of reporting), quality (of data), timeliness, use, availability of required resources and the presence of constraints and underlying causes of poor performance and utilization of the HIS, including assessment scores.
Priority Health Problem	A health problem given a priority for reduction and control by a Government and its Ministry of Health
Health Development Strategy	A national strategy for reducing one or more priority health problems and developing its health services and support systems
Essential Public Health	A specific education, prevention, detection or case management service aimed at reducing
Service	one or more priority health problem
Essential Health	One of a set of nationally defined indicators of priority health problems, essential public
Indicator	health services and essential resources. An important input to the HIS Strategic Planning

process is the current list of national core health indicators monitored by the health sector and services
A graphic and narrative description of the features and functionality desired from the national health information system, its subsystems, and HIS Components at the end of the HIS Strategy Implementation period, usually covering one or two plan periods (5 to 10 years)
Activities currently underway or planned which will have an impact on the performance and use of the HIS and its various subsystems and HIS Components. A listing of such HIS strengthening efforts is produced early in the HIS SP process in order to recognize those efforts and include them and their resources within the HIS Strategy and Plan
A statement that defines in a quantifiable and time-limited manner the amount of performance improvement or problem reduction desired for an entire HIS Component or Health Subsystem. Objectives are usually defined using the same indicators as used in the HIS Problem Statement.
Ideas for reducing HIS problems and improving HIS Component performance devised by the HIS SWG for each priority Health Subsystem and HIS Component.
A process of identifying the underlying problems and constraints affecting a Health Subsystem and HIS Component which contribute to the problems in that component which helps the subgroups to generate ideas for HIS interventions.
A factor or constraint that contributes to performance problems within an HIS Component.
The overall set of strategic interventions defined for addressing the problems affecting all the priority HIS Components and Health Sub-systems, along with the implementation activities, and necessary resources required.
The entire set of HIS strategic interventions placed onto a time line and into the sequence in which they will be implemented, across the entire HIS Strategy implementation period.
A process carried out by technical working groups assigned to each priority HIS Component for devising the technical specifications and design of the various interventions being proposed for strengthening each Component.
A time-phased set of activities, products and responsibilities that reflects the implementation work needed to implement the proposed strategic interventions.
A specific product of an implementation activity that signals the activity has been successfully completed
An especially important implementation product that signals that a sequence of implementation activities have been successfully implemented.
The Office or Officer that has assumed responsibility for implementing one or a set of HIS implementation activities.
A detailed costing of the array of implementation activities, including the implications of strategy implementation for both development costs and routine service operational costs.
Costs of carrying out the development of strategic interventions, generally of a one-time nature and as such could be met from the Government's development budget or from donor support
Additional routine costs incurred because of the strengthening efforts; i.e. tasks and services carried out on a routine basis. To the extent that the HIS strategy increases the routine costs (such as through additional HIS staff salaries), theincreases are estimated in the costing step.
Two table of indicators that together reflect the more important HIS functional problems, objectives for improvement, progress in implementation of the plan of activities, availability of critical resources, and ultimately the level of priority HIS subsystem performance, and together represent the levels and methods of HIS Strategy Monitoring and Evaluation, including frequency and data sources.

HIS Strategic Plan Document	A document prepared through the HIS Strategic Planning Process presenting the proposed strategic interventions, implementation plan and resource requirements for review and approval by the Steering Committee and policy-makers of Ministries and Departments associated with HIS improvement, and with potential donors and technical cooperation agencies.
Monitoring	Monitoring: the routine process of data collection and measurement of progress toward program objectives
Evaluation	Evaluation: the use of specific study designs and special studies to measure the extent to which changes in desired health outcomes are attributable to a program's interventions.
Supervision	Supervision: the process of directing and supporting staff so that they may effectively perform their duties.
Infant Mortality Rate:	The estimated annual number of deaths of infants under 12 months in a given year per 1,000 live births in that same year
Under 5 Mortality Rate	The estimated annual number of deaths of children under 5 years in a given year per 1,000 live births in that same year
Maternal Mortality Ratio	Number of maternal deaths during given time period per 100 000 live-births during same time period
Survey	Systematic collection of information from a defined population, usually by means of interviews or questionnaires administered to a sample of units in the population (e.g. person, youth, adults etc.)
HIS	It is the acronym for the Health Information System, the overall set of data management systems for supporting disease surveillance, services reporting and monitoring (both basic and special programs), and an array of administrative support and resource management functions
HMIS	It is the acronym for the Health Management Information System, a set of formats, procedures and databases for recording, analyzing and reporting the services provided from the basic health facilities (health posts, centers and district hospitals), operated by both the government and NGOs.
Inputs	Resources which may be financial, human, technical, material and time required to undertake activities, some of which are provided by stakeholders other than the government, such as international donors, program participants, communities, non-governmental organizations or other groups.
Objective	The desired result that a policy, program, service or project seeks to achieve, usually stated in terms of health or system performance improvement
Outputs	Time-bound measurable or describable changes produced by a program. The term "deliverables" is also used for outputs. Concrete results to be produced through sound management of inputs and activities, which are necessary to achieve the program's purposes.
Outcome	Results of a program or project, usually expressed in terms of change in health status or the performance of the health services.
NRVA	The NRVA is a national exercise in data collection on risk and vulnerability factors that affect the Afghan population. The main objective of NRVA is to gather information to update and guide policy-making decisions in development programmes and to improve the efficacy of sectoral interventions.
Balanced Score Card	A multi-dimensional framework for describing, implementing and managing strategy at all levels of an enterprise by linking objectives, initiatives, and measures to an organization's strategy. As applied in the health services in Afghanistan, it provides a uniform framework to objectively assess the performance and progress of its contracted NGOs.
Demographic Surveillance System (DSS	DSS is a large scale demographic survey to providing reliable annual estimates of birth rate, death rate and other fertility and mortality indicators at the national and sub-national levels.

ANNEX C: NATIONAL CORE HEALTH INDICATORS

Note: The core indicators below are in draft form. The MOH is currently revising the core indicators to reflect available routine data sources or surveys, and align with standard indicators from the Sustainable Development Goals were applicable. For updated indicators please refer to the National M&E Plan or the HMER unit.

Impact Indicators

- 1 Neonatal mortality per 1,000 live births
- 2 Infant mortality rate per 1000 live births
- 3 Under-5 mortality rate per 1000 live births
- 4 Maternal mortality ratio per 100,000 live births
- 5 Number of new HIV infections per 1,000
- 6 TB incidence rate
- 7 Malaria incidence per 1,000
- 8 Hepatitis B incidence per 100,000 population
- 9 Mortality rate from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases
- 10 Suicide mortality rate
- 11 Death rate due to traffic road accidents
- 12 Adolescent birth rate per 1,000 women Fraction of the population protected against catastrophic/impoverishing out-of-pocket health
- 13 expenditure
- 14 Mortality rate attributed to household and ambient air pollution
 - Mortality rate attributed to hazardous
- 15 chemicals, water and soil pollution and contamination

Outcome indicators

- 16 Percentage of infants fully immunized
- 17 Percentage of pregnant mothers attending 4 ANC visits
- 18 Percentage of deliveries attended by skilled personnel
- 19 Percentage of pregnant mothers receiving IPT-3
- 20 TB case detection rate (all forms)
- 21 Percentage of HIV positive pregnant women who received antiretroviral treatment
- 22 Total Couple Years Protection (All methods)
- 23 Number of people requiring specific interventions against NTDs
- 24 Treatment coverage for substance abuse disorders
- 25 Alcohol per capita consumption
 - Percentage of women of reproductive age
- 26 (aged 15-49) who have their need for family planning satisfied with modern methods
 - Coverage of tracer interventions (e.g. child full immunization, antiretroviral therapy, tuberculosis
- 27 treatment, hypertension treatment, skilled attendant at birth, etc.)
- 28 Prevalence of tobacco use 15 years +

Output Indicators

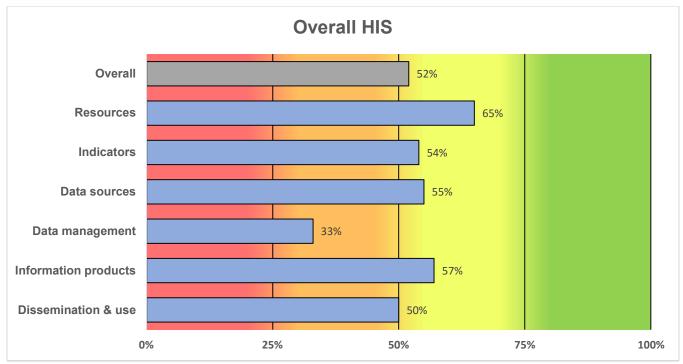
- 29 Percentage of population living within 5 km from the nearest health facility
- 30 Proportion of counties with public health risks and resources mapped
- 31 Percentage of new / re-emerging health events responded to within 48 hours as per IHR regulations
- 32 Functional Health facilities per 10,000 persons
- 33 Percentage of health facilities with all utilities, ready to provide services (water, electricity)
- 34 Percentage of counties with funded outbreak preparedness and response plans
- Percentage of counties reporting information using event based surveillance

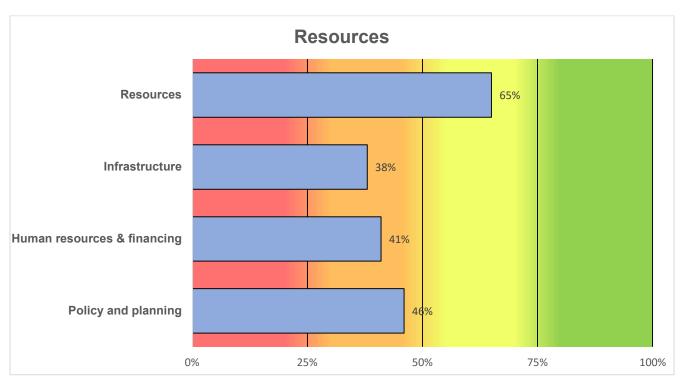
 Percentage of health facilities with no stock-outs of tracer drugs during a given period (amoxicillin,
- 36 cotrimoxazole, paracetamol, ORS, iron folate, ACT, FP commodity)
- 37 OPD consultations per inhabitant per year
- 38 Percentage of facilities practicing IPC according to standards
- 39 Percentage of attributes of thirteen core capacities that have been attained at a specfic point in time

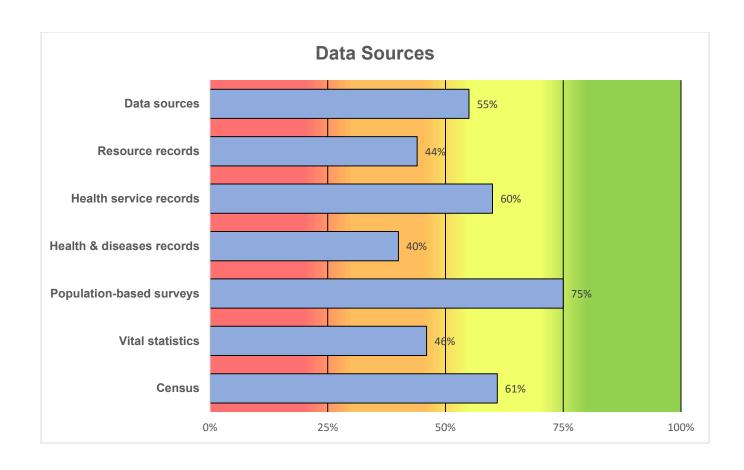
Inputs and processes

- 40 Skilled health workforce (physicians, nurses, midwives, physician assistants) per 10,000 persons
- 41 Number of blood units collected
- 42 Percentage of counties with harmonized data collection systems (HMIS with LMIS, FMIS, iHRIS, CBIS)
- 43 Percentage of timely, accurate and complete HIS reports submitted to MOH during the year
- 44 Percentage of communities with two or more community health volunteers
- 45 Proportion of health facility with functional community health committees
- 46 Counties with functional stakeholders forums (County health boards)
- 47 Per capita public health expenditure in USD
- 48 Public expenditure in health as % of total public expenditure
- 49 Out of pocket payment for health as a share of current expenditure on health

ANNEX D: LIBERIA HIS ASSESSMENT SCORES BY HIS COMPONENT







ANNEX E: MILESTONES AND INTERVENTION PHASING FOR HIS SUBSYSTEMS

Health Information System Laboratory Information System (LIS)	Year 1 Select the laboratory that will host the LIS; Begin developing training around computer literacy; Decide the software and hardware for the LIS that will link with the HIS plan; Develop plan to roll-out system	Year 2 Selected LIS pilot; training is implemented; data interoperable with HIS; focus on patient care, and aggregate data because this is where you identify your hotspots. Hardware will be installed and software should be developed.	Year 3 Roll out to clinical and public health laboratories. Continue linkage with HIS. Grow upon software and hardware. develop	Year 4 Similar to Year 3. Risk highlighted: a lot of current funding does not extend beyond Year 2.	Year 5 LIS rolls into clinical and public health labs; A regional approach; it's 10-15 years to put every clinic on line; Full integration with HIS and all components; Universal LIS; should not be fragmented between facilities, and this goes with hardware and software support.
Community Based Information System (CBIS)	19% of CHWs recruited; Develop, validate, and pilot test tools for data collection, data quality assurance (DQA), and personnel tracking; Create SOP for data flow; TOT for master trainers; Develop feedback mechanisms, between central MOH and CHT; Procure and set up laptops for data clerks; Build CBIS modules of DHIS2 for health data	Additional 24% CHWs recruited (43% total); Full roll out of tools for data collection, DQA, and personnel tracking; Pilot test CBIS data flow;: Training of end users (CHSs and CHWs);Develop feedback mechanisms between CHT and health facilitators;Develop and pilot test mHealth tools;: Build CBIS modules of iHRIS (for personnel data)	Additional 37% CHWs recruited (80% total); Full roll out of tools for data collection, DQA, and personnel tracking; Refine data flow SQP; 80% of CHWs and CHSSs trained; Develop feedback mechanisms between health facilities and CHSSs and CHWs; Depending on pilot test results, potentially scale up mHealth tools; Full usage of DHIS2 and iHRIS for CBIS	Additional 17% CHWs recruited (97% total); Full roll out of tools for data collection, DQA, and personnel tracking; Refine data flow SQP; 97% of CHWs and CHSSs trained; Refine feedback mechanisms; Depending on pilot test results, potentially scale up mHealth tools; If needed, refine CBIS modules of DHIS2 and iHRIS	Additional 3% CHWs recruited (100% total); Full roll out of tools for data collection, DQA, and personnel tracking; Refine data flow SQP;100% of CHWs and CHSSs trained; Refine feedback mechanisms; Depending on pilot test results, potentially scale up mHealth tools; If needed, refine CBIS modules of DHIS2 and iHRIS

Health Management and Information Systems (HMIS)	100% all 15 counties have access to DHIS2; Train both counties and district M&E staff about data quality. Encourage feedback mechanism at all levels; Standardized report tools available at all reporting levels; The system will increase the capacity by 5% in Year 1 to 95% total; The system will encourage 10% increase in data usage for action at all levels in Year 1.60% total; To guide the use of ICT at MOH HQ and county levels procure ICT equipment at	100% all 15 counties have access to DHIS2; Train both counties and district M&E staff about data quality. Encourage feedback mechanism at all levels; Make internal connectivity available at all levels; System will remain at 95%; The system will encourage 10% increase in data usage for action at all levels. 70% total; To guide the use of ICT at MOH HQ and county levels procure ICT equipment at both county and central levels	100% all 15 counties have access to DHIS2; Ensure 18 health districts teams do data entry using DHIS2; Train both counties and district M&E staff about data quality; Encourage feedback mechanism at all levels; Making internal connectivity available at all levels; System will remain at 95%; The system will encourage 10% increase in data usage for action at all levels. 80% total	100% all 15 counties have access to DHIS2. Ensure 18 health districts team do data entry using DHIS2; M&E staff fully trained in data quality mechanism; Make available reporting materials and intermittent internet connectivity at 96 districts (?);The system will maintain; The system will encourage 10% increase in data usage for action at all levels. 90% total; To guide the use of ICT at MOH HQ and county levels procure ICT equipment at both county and central levels.	100% all 15 counties have access to DHIS2. Ensure 91 (?) health districts team do data entry using DHIS2; M&E staff fully trained in data quality mechanism; Reporting tools and internet connectivity at all levels available all of the time; M&E staff capacity fully built to use data for decision making at all levels; The system will encourage 10% increase in data usage for action at all levels. 100% total; To guide the use of ICT at MOH HQ and county levels procure ICT
Human Resource	both county and central levels. DHIS2 to update to incorporate CHMIS. Finalize and adopt draft iHRIS policy, includes	Report-generation for strategic decision making;	Monitoring and supervision ongoing;	Continued M&E of iHRIS and training	equipment at both county and central levels Full utilization and integration of iHRIS into
Information System (HRIS)	SOPs; Training and equipping entral HR; mHero and iHris fully integrated; Data analysis done on current reports; iHRIS rolled out at county level; National health workforce census report used to update iHRIS records; Provision of training and equipment for counties	Training on iHRIS data analysis; Supervision and monitoring; iHRIS and mHero fully interoperable with other subsystems (PSA norming, DHIS2)	County HROs trained to develop and send out SMS via mHero to healthworkers; iHRIS external interoperability (CSA,iFMIS, Regulatory)		the health system

Disease	Finalize SOPs; written by	Adherence/adoption of	All information flows fully	Continue to ensure long	Universal
Surveillance	surveillance TWG (HMER,	SOPs by CSO, DSO, OIC,	implemented (vertical and	term/stable funding;	adoption/regulatory
Information	IPs, etc); Supervision of	gCHV; Identify long	horizontal flows); Unique	Training ongoing;	environment &
System (DSIS)	adherence by SOPs;	term/stable funding	patient code fully	Supervision/monitoring	policy/SOPs; Full
	Weekly bulleting and	sources for system; Agree	evaluated; Supervision	ongoing; Surveillance	representation of
	outbreak notification.	on elements of unique	and monitoring ongoing;	TWG assess first three	community; Timely
	Confirmation reported	patient code and begin	Training ongoing;	years and take corrective	reporting of
	by all counties from all	pilot; Use evaluation of	eDews/LIS interoperable	action	outbreak/routine
	communities;	eDews to enhance system;	for information/action;		reporting/credible
	Standardization of health	Integrate CEBS into	eDews reporting into		reporting; Fully
	facilities; Paper based	surveillance reporting	DHIS2WG monitoring and		interoperability with all
	interoperablility to link	system (eDews?);	actively evaluation all		sub-systems (LIS, HMIS,
	specimen to case is	Orientation/refresher	surveillance activities; All		LMIS, HRIS, etc); DHIS2
	established; Assessment	trainings – MOH and	outbreak activities		final warehouse/flexibility;
	of interoperability	partners (ongoing);	supported by DSIS		Sustainability in terms of
	between eDews and LIS;	Supervision and			HR/Technology; Capacity
	Identify HR at county	monitoring ongoing;			at all levels to analyze and
	level for surveillance and	More timely			use at all levels; Predict
	response; Funding for	identification/action to			future disease outbreaks;
	team of developers; Epi	new PH threats			Governance/coordination
	focal point in all counties;				(ministry-wide)
	Basic training in data use,				surveillance technical
	management and ethics;				working groups have the
	Comparison of HMIS				capacity to integrate all
	indicators; Establish TWG				data streams and provide
	on surveillance;				ministry-wide governance;
	Completion of eDews				Have clear SOPs with
	pilot and evaluation				effective implementation;
					Data are available for
					treatment and evaluating
					case and response and
					case tracking

Logistic Management Information System (LMIS)	Review the current LMIS tools; Define requirements and select electronic platform for LMIS; Develop LMIS; Integration LMIS into overall HIS; Pilot LMIS in selected institutions	requirements at levels for	Provide adequate logistics and HR to maintain the system; Continue incremental roll-out of LMIS	Complete roll-out of LMIS in all institutions; Define the necessary framework for the process; Identify resources for procurement; Integrate automated system into the national platform	
Internet/Com munication Technologies	Internet connectivity at MOH, CHTs, labs and HFs	Fully established ICT governance structure; trained and efficient ICT management and support team	Fully established and functional enterprise integrated GIS at a central level	Cellular connectivity at all health facilities; Trained ICT workforce	Internet at central MOH, counties, and tertiary health facilities. Central MOH has integrated GIS capabilities. mHealth operations are supported by ICT coordination team

ANNEX F: HIS PHASED IMPLEMENTATION PLAN 2016-2021

	HIS Strategic Objectives	Proposed Strategic Interventions	2016	2017	2018	2019	2020	2021	MOH Unit In Charge	External Partners	Govt Funded	External Funded
	te adequate and standard a functional HIS ystem	I.1. Develop, implement, and disseminate SOPs and policy guidelines for all HIS functions including health research, ICT infrastructure, and HIS subsystems I.2. Establish mechanisms to ensure compliance with legislation							HMER Unit, Legal Unit	All Partners	Yes	Yes
bu	te adequate and standard a functional l	.2. Establish mechanisms to ensure compliance with legislation dopting International Health Regulations.							HME, Legal Unit, CHSD	None committed	Yes	No
Legislation, Policy & Planning	develop and disseminate adec 7, policies, regulations, and sta ocedures in support of a func all levels of the health system	1.3. Develop, strengthen and ensure compliance of legislation on information sharing regarding health workforce, publishing of OFM financial statements, NHA reports, Aid tracking, and other relevant statistical data among public health sector, private sector and health insurance companies							OFU	None committed	Yes	Yes
Legislation,	To tion	1.4. Review and update the current legislation like the 1976 Public Health Law, National Public Health Law, and data sharing policies to cover vital registration, notifiable diseases, private sector data, confidentiality and fundamental principles of official statistics, private health sector health care providers etc							HMER Unit	None committed	Yes	No
	SO1 SO1 legisla	1.5. Develop policy to enhance the implementation of national standards, accreditation and quality assurance on research for health							Research Unit	None committed	Yes	Yes
ation	functional national or all relevant cutions including	2.1.Establish coordination mechanisms between HMER and MOH units, line ministries, and other government agencies to improve coordination on data sharing, development, and implementation of HIS subsystems including census, FMIS, and HRIS							HMER Unit	JHU, CSH, WHO, UNICEF	Yes	No
Partnership & Coordination		2.2. Establish a HMER TWG and subgroups to ensure participation of all subsystem stakeholders and coordinate subsystem development, piloting, implementation and evaluation							HMER Unit	All partners	Yes	No
ກership &	establish a ordination f nment instin ncial and te	2.3. Develop and implement clear communications policy within MOH, and for linking MOH with other organizations for data sharing and knowledge management							HMER Unit	WHO, JHU	Yes	Yes
Partı	SO2 To esta coordin governme financial	2.4. Establish research partnerships and collaboration among research stakeholders to enhance the implementation of national standards, accreditation and quality assurance on research for health							Research Unit	JHU	Yes	Yes

	o ensure a budget for HIS entation and n at all levels	3.1. Advocate that budget line items are included MOH, and County Budgets to cover HIS and ICT costs			ICT Unit	None committed	Yes	No
د Financing	SO3 To ensure a dedicated budget for HIS implementation and operation at all levels	3.2. Advocate for 2% of health budget to cover health research financing			Research Unit	None committed	Yes	No
HS Institutions Human Resource &	staff capacity to manage HIS sponsibilities including data ige, management, analysis, earch and use	4.1. Strengthen the technical capacity of staff involved in the HIS through in-service training in ICT, including competencies in: use and maintenance, GIS, health informatics capacity building (training, coaching, mentoring) especially in the area of developing and maintaining technology for health information exchange			HMER Unit, ICT	WHO, UNICEF, eHealth, PACS	Yes	Yes
titutions Huı	IIS staff capacity to manage HI responsibilities including data orage, management, analysis, research and use	4.2 Strengthen the technical capacity of all users of HIS in MOH in basic competencies in data management, analysis, use of information, ethics, GIS and the design and conduct of health research			HMER Unit,	JHU, Emory, WHO, UNICEF, WHO, eHealth, CDC	Yes	Yes
HIS Ins	O4 To build HIS staff capacity to manage HIS functions and responsibilities including data collection, storage, management, analysis, research and use	4.3.Strengthen institutional capacities of pre-service programs through curriculum development and resource mobilization for various research activities; including epidemiology, biostatistics, HIS,laboratory system and software development			HMER Unit, ICT Unit	JHU, WHO	Yes	Yes
	SO4 To build HIS functions and recollection, stora	4.4. Recruit and train epidemiologists, biostatisticians, demographers, data clerks, database administrators, computer programmers, lab technicians to increase capacity of the HIS workforce			HR Unit, HMER, ICT Unit	WHO, CSH, eHealth, PACS	Yes	Yes
ıre	sh TT : all	5.1. Procure critical ICT assets, including hardware and software requirements, appropriate for operating the HIS subsystems			ICT Unit	eHealth, WHO, CSH, PACS	Yes	Yes
HIS Infrastructure	SO5 To establish appropriate ICT infrastructure at all levels including	5.2. Develop an ICT strategy to guide acquisition, internet usage, data back-up, manage computer resources, maintenance, and disposal of ICT equipment at all levels			ICT Unit	CSH. eHealth	Yes	Yes
HIS Ir	SO5 appr infrast	5.3. Ensure adequate access and maintenance of electricity and internet for operation of HIS subsystems at all levels			ICT Unit,HMER Unit, HFU, OFM, PBF	eHealth, WHO, PACS	Yes	Yes

TIS	SO6 Develop, implement, and sustain basic functionality of LIS	6.1. Establish an LIS to support basic functionality in all national and regional labs				HMER Unit, Naf. Ref.Lab	ACCEL, WHO, CDC	Yes	Yes
	SO6 Do implema sustair functiona	6.2. Improve the flow of data in the laboratory information system, including receipt of case data at the laboratories, and sample results at facilities and counties				HMER Unit, Naf. Ref.Lab	ACCEL, WHO, CDC	Yes	Yes
	ent	7.1. Design and develop tools to support eWARN and IDSR functions				HMER, DPC	WHO, JHU	Yes	Yes
DSIS	SO7 Develop implement and sustain basic functionality of DSIS	7.2. Expand functionality of electronic systems to include broader outbreak functions, and interoperability with laboratory systems and the health information system				HMER,DPC	WHO,JHU		
Ğ	evelo _l d sust tional	7.3. Train and supervise users on the e-tool and broader DSIS				HMER, DPC	WHO, JHU	Yes	Yes
	SO7 D an func	7.4. Improve information on disease burden of the population through comprehensive surveillance and routine risk assessments				HMER, DPC	JHU	Yes	Yes
CBIS	SO8 Develop, implement, and sustain basic functionality of CBIS	8.1. Develop, implement, and sustain basic functionality of CBIS				HMER	LMH, PACS, UNICEF	Yes	Yes
i)	SO8 D implem sustaii functional	8.2. Improve capacity to monitor the CHW program and provide feedback at all levels				HMER	LMH, PACS, UNICEF	Yes	Yes
	HRIS ity, nd use I levels	9.1. Expand HRIS functionality, indicators, and use at subnational levels				HMER, HR Unit	CSH, CHAI	Yes	Yes
HRIS	SO9 Expand HRIS functionality, ndicators, and use t subnational level	9.2. Develop tools such as mHero to establish two-way engagement with the health workforce				HMER, HR Unit	CSH, IntraHealth, UNICEF	Yes	Yes
	SO9 Expand HRIS functionality, indicators, and use at subnational levels	9.3. Extend use of HRIS for performance management, monitoring training and competencies, and reporting on socioeconomic status of the health workforce				HMER,HR Unit	CSH, UNICEF	Yes	Yes
	HMIS .y, use at	10.1. Expand HMIS functionality at all levels, including improving accessibility of the DHIS2 web-portal to districts				HMER Unit	CSH	Yes	Yes
HMIS	SO10 Expand HMIS functionality, indicators, and use at subnational levels	10.2. Update core indicators to reflect national M&E plan and MOH strategies				HMER Unit	CSH, UNICEF	Yes	Yes
	SO1 fi indica sub	10.3. Develop and disseminate HMIS Data Reference book				HMER Unit	CSH, UNICEF	Yes	Yes

	elop, and isic ty of	11.1. Develop, implement, and sustain basic functionality of LMIS		HMER Unit	CSH	Yes	Yes
LMIS	SO11 Develop, implement, and sustain basic functionality of	11.2. Ensure LMIS covers community level commodities		HMER Unit	CSH, PACS, LMH	Yes	Yes
	SC imi ss	11.3. Develop a database on infrastructure (building and equipment) based on the master facility list		Infrastructure Dir	None committed	Yes	Yes
	lement, sic 'MIS	12.1.Establish point-to-point connections between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll		HRU, HMER Unit, CSA, MFDP	CSH, CHAI	Yes	Yes
FMIS	SO12 Develop, implement, and sustain basic functionality of FMIS	12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis		HFU, HMIS, PBF	None committed	Yes	No
	2 Deve and si inction	12.3. Establish and ensure regular update of tracking database on Partners'projects		Ext AID Coor- dination Unit	JHU	Yes	No
	SO1	12.4.Strengthen capacity of central, county and facility-based financial managers to track expenditures via FMIS		OFU	None committed	Yes	Yes
	ure y n	13.1. Establish necessary software linkages and standardization of data sources for interoperability		ICT Unit	None committed	Yes	Yes
	architecture pperability IIS system	13.2. Procure and establish necessary hardware and software for interoperability		ICT Unit	None committed	Yes	Yes
IS Architecture	HIS herc	13.3. Develop and validate a HIS architecture and interoperability roadmap and use case prioritization for system integration between DSIS, LIS, FMIS, iHRIS, CSA, HMIS, CBIS, and LMIS		ICT Unit	eHealth, JHU, CDC	Yes	Yes
HIS	To develop adopt an ir nework for tl	13.4. Develop master facility registries and universal patient IDs to improve patient tracking		ICT Unit	WHO	Yes	Yes
	SO13 T and fram	13.5.Identify areas for the use of appropriate mHealth interventions and develop a mHealth strategy and SOP for all levels		ICT Unit	WHO, IntrahealthFIO	Yes	Yes

	7	14.1. Develop a strategy to guide data acquisition, security, DRP, confidentiality, IPR rights and disposal at all levels		HMER Unit	WHO	Yes	Yes
ي ا	a and	14.2. Address key MOH ICT security vulnerabilities		ICT Unit	eHealth	Yes	Yes
Data Management	SO14 To establish a mechanism to ensure information security and confidentiality	14.3. Develop meta data dictionary for all HIS data sources based on national and international standards and requirements		HMER Unit,	CSH, UNICEF	Yes	Yes
ata Ma	014 To schanisi matior confid	14.4. Establish a central data warehouse at MOH HQ and County Levels		HMER Unit	CSH	Yes	Yes
	SC me info	14.5 Build MOH capacity to manage all data generation processes including data collection, analysis, reporting, and analysis.		HMER Unit	CSH, UNICEF, eHealth, JHU	Yes	Yes
	tion	15.1. Develop and implement a standardized system for data quality assurance at all levels		HMER unit	CSH, PACS, WHO	Yes	Yes
and Use	quality, f informat ces and he all levels	15.2. Develop and implement performance based indicators that capture the usage and display of maps and graphs at the counties, districts and facilities		HMER unit	CSH, WHO, JHU	Yes	Yes
ation	rrove ouse o servic	15.3. Institutionalize and strengthen "research to practice" activities among decision makers		HMER unit	JHU	Yes	Yes
Data Dissemination and Use	SO15 To improve quality, dissemination, and use of information in support of health services and health system functions at all levels	15.4. Establish routine dissemination paths for actionable information products and health research (e.g. dashboards, reports, population surveys) to internal and external stakeholders in a timely manner for decision making and alerting the public of an emerging health issue		HMER unit	CSH, JHU, WHO, PACS	Yes	Yes
	diss in su	15.5 Improve dissemination of National Health Accounts (NHA) findings to MOH staff and wider stakeholders group		OFA	None committed	Yes	Yes
Monitoring & Evaluation	SO16 To regularly monitor and evaluate the implementation targets of the HIS strategic plan	16.1. Continuous monitoring and evaluation of the Strategic Plan and Operational Plan against the milestones		HMER Unit	CSH, JHU	Yes	Yes
Monitoring	SO16 7 monitor ar implemer of the HIS	16.2. Monitor and evaluate partner work plans and compare against HIS milestones and provide accountability		HMER Unit	JHU	Yes	No
	ove ce, and of	17.1. Develop research strategy plan to identify, prioritize, fund and execute public health research		HMER Unit	CSH	Yes	Yes
Research	S017 To improve the governance, management, and coordination of	17.2 Strengthen MOH ownership, leadership, and conduct of the design and implementation of population based surveys and health research		HMER Unit	JHU	Yes	Yes
	S017 the cmana	17.3 Establish a situational awareness room to integrate streams of information and serve as a center for data science for the MOH		HMER Unit	JHU	Yes	Yes

LUC Charterie Obientiane			Estima	ted Cost			Takal
HIS Strategic Objectives	2016	2017	2018	2019	2020	2021	Total
SO1 To develop and disseminate adequate legislation, policies, regulations, and standard operating procedures in support of a functional HIS at all levels of the health system SO2 To establish a functional national	\$200,000	\$100,000	\$50,000	\$50,000	\$50,000	\$50,000	\$500,000
coordination for all relevant government institutions including financial and technical support agencies	\$600,000	\$300,000	\$200,000	\$100,000	\$100,000	\$100,000	\$1,400,000
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels SO4 To build HIS staff capacity to manage HIS	\$20,000	\$20,000	\$10,000	\$-	\$-	\$-	\$50,000
functions and responsibilities including data collection, storage, management, analysis, use; and health research	\$3,000,000	\$2,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$9,000,000
SO5 To establish appropriate ICT infrastructure at all levels including institutionalizing mHealth technologies	\$3,500,000	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000	\$3,000,000	\$18,500,000
SO6 Develop, implement, and sustain basic functionality of LIS	\$750,000	\$500,000	\$300,000	\$300,000	\$500,000	\$500,000	\$2,850,000
SO7 Develop implement and sustain basic functionality of DSIS	\$600,000	\$500,000	\$300,000	\$300,000	\$500,000	\$500,000	\$2,700,000
SO8 Develop, implement, and sustain basic functionality of CBIS	\$450,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,450,000
SO9 Expand HRIS functionality, indicators, and use at subnational levels	\$300,000	\$150,000	\$150,000	\$150,000	\$150,000	\$150,000	\$1,050,000
SO10 Expand HMIS functionality, indicators, and use at subnational levels	\$200,000	\$300,000	\$150,000	\$200,000	\$200,000	\$200,000	\$1,250,000
SO11 Develop, implement, and sustain basic functionality of LMIS and physical assets database	\$500,000	\$300,000	\$200,000	\$200,000	\$200,000	\$200,000	\$1,600,000
SO12 Develop, implement, and sustain basic functionality of FMIS	\$150,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$650,000
SO13 To develop HIS architecture and adopt an interoperability framework for the HIS system	\$900,000	\$1,200,000	\$750,000	\$500,000	\$300,000	\$300,000	\$3,950,000
SO14 To establish a mechanism to ensure information security and confidentiality	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$250,000	\$1,500,000

Total	\$13,020,000	\$9,820,000	\$7,210,000	\$6,900,000	\$7,100,000	\$7,100,000	\$51,150,000
management, and coordination of health research and its translation to public health action	\$650,000	\$300,000	\$300,000	\$300,000	\$300,000	\$300,000	\$2,150,000
SO16 To regularly monitor and evaluate the implementation targets of the HIS strategic plan S017 To improve the governance,	\$200,000	\$100,000	\$50,000	\$50,000	\$50,000	\$50,000	\$500,000
SO15 To improve quality, dissemination, and use of information in support of health services and health system functions at all levels	\$750,000	\$500,000	\$200,000	\$200,000	\$200,000	\$200,000	\$2,050,000

Annex G: HIS 2015-2017 Operational Plan and Budget

Note: The operational plan is reviewed frequently by subgroups and the HMER TWG, and as such is a living document. Please refer to the HMER unit for updates, changes cost estimates and stakeholders, and details on cost inputs and funding scope.

Dunnaged Internacial and AutoMan	2015	2016	2017	Implementing	Est.
Proposed Interventions and Activities	Q3 Q4 Q1	Q2 Q3 Q4	Q1 Q2 MoH Lead	Partners	Cost
LEGISLATION, POLICY AND PLANNING					
SO1 To develop and disseminate adequate legislation, policies, regulations, and standard operating p	rocedure	s in supp	ort of a function	nal HIS at all lev	els of
1.1. Develop, implement, and disseminate SOPs and policy guidelines for all HIS functions including health resea	arch, ICT in	frastructu	re, and HIS subsy	stems	
1.1.1 Identify all the processes, functions or operations that occur within research, ICT and each HIS subsystems			HMER	CSH	\$ 6,000
1.1.2 Draft scope of work for developing SOPS and policies for research, ICT and each HIS subsystems			HMER	CSH	\$ 15,000
1.1.3 Identify the best individuals/consultants to lead the development of SOPs and policy guidelines			HMER	PACS; LMH; UNICEF; JHU: ACCEL	\$ -
1.1.4 Hire a consultants for 3 months each for research, ICT, and HIS subsystems to develop the SOPs and policy guidelines			HMER	HIS TWG	\$ 270,000
1.1.5 Pilot and revise the SOPs			HMER	CSH	\$ 15,000
1.1.6 Train the focal persons for research, ICT and HIS subsystems on SOPs and Policy guidelines			HMER	N/A	\$ -
1.1.7 Print and distribute 100 copies for research, 100 for ICT and 100 for each HIS subsystems			HMER	None	\$ 3,000
1.1.8 Establish a sub committee under HMER to govern the development and implementation of legislation and guidelines on research for health			Legal, Research	N/A	\$ -
Establish an evaluation and review system to be certain that over time all the steps of an SOP are still correct and appropriate for the production system			HMER	N/A	\$ -
1.1.10 SOPs for how laboratory results are sent to the Ministry; data management at the laboratory and data flow of lab results to the MoH			Lab, DPC, HMER	WHO	\$ 10,000
1.1.11 Development of SOPs for the operation of eDEWS for end users and for managerial purposes			DPC, HMER	WHO	\$ 10,000
1.1.12 SOPs and policy guidelines for mHero and iHRIS			Admin, HMER	IntraHealth; CHAI; UNICEF	\$ 10,000
1.2 Establish mechanisms to ensure compliance with legislation adopting International Health Regulations					
1.2.1 Defining how training occurs for international reporting of laboratory data under IHR			Lab, DPC, HMER	WHO	\$ 10,000
1.3 Develop, strengthen and ensure compliance of legislation on information sharing regarding health workforce, p	publishing	of OFM fi	nancial statements	s, NHA reports, A	id
1.3.1 Data sharing agreements between iHRIS and RapidPro			Admin, HMER	IntraHealth	\$ 10,000
1.3.2 Print and disseminate community health policy and strategic plan 1.4. Review and update the current legislation like the 1976 Public Health Law, National Public Health Law, and da	ta charing	policios te	Admin, HMER		\$ 10,000
diseases, private sector data, confidentiality and fundamental principles of official statistics, private health sector	_	-	_	iration, notinable	
1.4.1 Take inventory of the existing legislation about statistics related to health and HIS including the review of International Health Regulations (IHR)	nealth care	providers	Legal, HMER	None	\$ 30,000
Relevant ministries (e.g. Health, Justice Finance) review improve and enact revised or draft new legislation and regulations to establish an enabling legal	1				
1.4.2 and regulatory framework for the HIS (including private sector reporting, & notifiable diseases			Legal, HMER	None	\$ 17,000
1.4.3 Adopt the revised/new regulations by senior MOH staff			Legal, HMER	N/A	\$ -
1.4.4 Consult with LMDC on how to improve on HMIS reporting			Legal, HMER	N/A	\$ -
1.4.5 Print and distribute revised legislations			Legal, HMER	None	\$ 1,000
PARTNERSHIP AND COORDINATION					
SO2 To establish a functional national coordination for all relevant government institutions including					
2.1.Establish coordination mechanisms between HMER and MOH units, line ministries, and other government age	ncies to im	prove coc	ordination on data	Snaring, develop	ment,
and implementation of HIS subsystems including census, FMIS, and HRIS			LIMED		A 4 000
2.1.1 Revise the SoW of the existing Inter-Ministerial Committee to include coordination of information systems development Appoint a liaison Officer and focal person for each HIS subsystem in the MoH to coordinate with other ministries and provide update on HIS development			HMER	JHU	\$ 1,000
2.1.2 strategies and activities			HMER	TWG	\$ -
2.1.3 Development and implementation of the HIS Strategy			HMER	MEASURE, JHU, CSH	\$ 300,000
2.2. Establish a HMER TWG and subgroups to ensure participation of all subsystem stakeholders and coordinate s	subsystem	developm	ent, piloting, impl	ementation and	
evaluation					
2.2.1 Revise and approve the ToR for HMER TWG			HMER	JHU	\$ 9,000

2.2.3 HMER TWG drafts TOR for subgroups		HMER	JHU	\$ -
2.2.4 Conduct HMER TWG meetings		HMER	JHU	\$ -
2.2.5 Establish mHero Working Group		HIS TWG	IntraHealth	\$ -
2.2.6 Assisting with the LIS subgroup under the One Health project; Develop a concept note for how LIS will happen across ministries		Lab, HMER	WHO	\$ 1,000
2.2.7 Liase with DPC (CEBS working group) to ensure harmonization between CEBS and CBIS		CHSD	LMH	\$ 15,000
2.2.8 Facilitate coordination between CBIS and LMIS and ensure community commodities are included in LMIS when appropriate		OHOD	LMH	\$ 5,000
2.2.9 Conduct LMIS partners mapping and establish LMIS technical working group		SCMU. HMER	CSH	\$ -
		,	WHO, ACCEL,	*
2.2.10 Establish a HMER technical subgroup for laboratory information systems		HMER, Lab	eHealth, JHU	\$ -
2.2.11 Support for DSIS subgroup to report to both HMER and NSTCC TWGs		HIS TWG	JHU, WHO	\$ -
2.2.12 Draft TOR for interoperability and hold routine meetings		HMER	None	\$ 200,000
2.2.13 Involved in the coordination of the HMER LIS subgroup		HIS TWG	WHO lab, ACCEL, eHealth. CSH	\$ -
2.2.14 Support for CBIS M&E Subgroup		HIS TWG	PACS, UNICEF, LMH	\$ -
2.2.15 Support for LIS, ICT, Interoperability, DSIS subgroups		HIS TWG	eHealth	\$ -
2.2.16 Set up and facilitate functioning of iHRIS TWG among the HR unit and HMER to establish processes of updating and reviewing iHRIS functionality		HIS TWG	CHAI	\$ -
2.2.17 Conduct interoperability partners mapping and establish interoperability Leadership Team		HMER	JHU, CSH	\$ 1,000
2.2.18 Develop the ToR for Interoperability Leadership Team		HMER	JHU, CSH	\$ 1,000
2.2.21 Conduct a meeting of HRH TWG to validate the content and outline of the reports		HMER	N/A	\$ -
2.2.22 Conduct interoperability Leadership Team meetings regularly and report to HMERTWG		HMER	JHU, CSH	\$ 1,000
2.3. Develop and implement clear communications policy within MOH, and for linking MOH with other organizations for data	sharing and know	/ledge mar	agement	
2.3.1 Establish MOU for data sharing between ministries and subsystems		HMER	None	\$ 30,000
2.3.2 Establishing data sharing agreements and SOPs between counties, labs, and central MOH		LIMED 1 - I	WHO	\$ 10,000
2.3.2 Establishing data sharing agreements and 30°Fs between counties, labs, and central worn		HMER, Lab	WHO	Ψ 10,000
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procureme devices or smartphones, and institutionalization of mobile data collection devices		adequate i	nternet bandwidt	h, GPS
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procureme devices or smartphones, and institutionalization of mobile data collection devices 3.1.1 Develop a support policy that informs users of the standard services provided by the ICT Office, and the roles and responsibilities in dealing with non-standard product issues		adequate i	internet bandwidt	h, GPS
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procureme devices or smartphones, and institutionalization of mobile data collection devices 3.1.1 Develop a support policy that informs users of the standard services provided by the ICT Office, and the roles and responsibilities in dealing with non-standard product issues 3.1.2 Print and Disseminate ICT SOPs		adequate i	nternet bandwidt N/A N/A	h, GPS \$ - \$ -
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procureme devices or smartphones, and institutionalization of mobile data collection devices 3.1.1 Develop a support policy that informs users of the standard services provided by the ICT Office, and the roles and responsibilities in dealing with non-standard product issues 3.1.2 Print and Disseminate ICT SOPs 3.1.3 Contribute to the development of eHealth Strategy		adequate i	nternet bandwidt N/A N/A N/A	\$ - \$ - \$ -
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procureme devices or smartphones, and institutionalization of mobile data collection devices 3.1.1 Develop a support policy that informs users of the standard services provided by the ICT Office, and the roles and responsibilities in dealing with non-standard product issues 3.1.2 Print and Disseminate ICT SOPs 3.1.3 Contribute to the development of eHealth Strategy 3.1.4 Engage CIO Regime on eHealth Strategy		adequate i ICT ICT ICT ICT ICT	nternet bandwidt N/A N/A N/A N/A	\$ - \$ - \$ - \$ -
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procuremed devices or smartphones, and institutionalization of mobile data collection devices 3.1.1 Develop a support policy that informs users of the standard services provided by the ICT Office, and the roles and responsibilities in dealing with non-standard product issues 3.1.2 Print and Disseminate ICT SOPs 3.1.3 Contribute to the development of eHealth Strategy 3.1.4 Engage CIO Regime on eHealth Strategy 3.1.5 Advocate for "Free Local Traffic" for MOH Hosted Services (under the Liberia Internet Exchange Point)		adequate i	N/A N/A N/A N/A N/A N/A	\$ - \$ - \$ - \$ - \$ -
SO3 To ensure a dedicated budget for HIS implementation and operation at all levels 3.1. Advocate for development and implementation of an ICT budget policy that will facilitate increased budget for procuremed devices or smartphones, and institutionalization of mobile data collection devices 3.1.1 Develop a support policy that informs users of the standard services provided by the ICT Office, and the roles and responsibilities in dealing with non-standard product issues 3.1.2 Print and Disseminate ICT SOPs 3.1.3 Contribute to the development of eHealth Strategy 3.1.4 Engage CIO Regime on eHealth Strategy 3.1.5 Advocate for "Free Local Traffic" for MOH Hosted Services (under the Liberia Internet Exchange Point) 3.1.6 Develop and implement ICT Governance structure within the MOH		adequate i	N/A	\$ - \$ - \$ - \$ - \$ - \$ - \$ - \$ -
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Develop position description for all current and future IT positions to enable the Ministry to consistently understand and source staff and third party assistance based upon skillsets.	ICT	None	\$ 15,000
4.1.6 Very large that can be communicated to leadership during the annual budget lifecycle.	ICT	None	\$ 15,000
4.1.7 4.1.7 Autor and the arrival of the arrival during definition during the arrival and arrival of the arri	HMER, DPC,	WHO	\$ 7,000
4.1.8 Provide in-service training on health informatics, networking, maintenance, and developing technology for HIE	ICT ICT, HMER, Admin	eHealth, Intrahealth	\$ 82,000
4.1.9 HIS training will be conducted for MCHT, DHTs and OICs to improve data quality of HMIS and LMIS	HMER	JICA, CSH	\$ 75,000
4.1.10 Develop basic competencies in ICT equipment and software for lab staff; mentoring for the NRL and all EVD testing labs, desk officers, and lab staff	Lab. HMER	WHO, ACCEL	\$ 110,000
4.2 Strengthen the technical capacity of all users of HIS in MOH in basic competencies in data management, analysis, use of i	nformation, ethics, GIS and		
of health research	, , ,	3	
4.2.1 Update/develop the inventory of HIS-related curriculum and courses being conducted	HMER	None	\$ 5,000
4.2.2 Review in-service training material with all existing training partners and coordinate the development of standard HIS curricula and materials based on the defined needs (with an especial emphasis on "Data Use" and "evidence-based decision making" skills	HMER	JHU, CSH	\$ -
4.2.3 Define a 2-year overall HIS training plan with a special emphasis on community, facility and provincial levels (who and what), which confirms sources of resource support and the responsible departments, programs and implementers.	HMER	None	\$ 28,000
4.2.4 Develop curricula for in-service training	DPC, HMER	JHU, CSH	\$ 10,000
4.2.5 Pilot in-service short courses with core MOH staff	DPC, HMER	JHU, CSH	\$ 10,000
4.2.6 Provide short term training for 20 health managers on research methodologies, analysis and report writing at central and county levels	Research	None	\$ 14,000
4.2.7 Provide short term training for 15 health managers on use of statistical packages and technical writing at all levels	Research	None	\$ 11,000
4.2.8 Training in data sciences, including data management, use, analysis, and ethics for national and county health workers	HMER, DPC, HR	JHU, Cuttington, CSH	\$ 341,000
4.2.9 Organize continuing in-service learning on data use at the health facility and county levels	HMER	CSH, PACS	\$ -
4.2.10 Sponsor 5 persons from HMER Unit to receive short courses in health database design and development including TB, malaria, pharmacy, healthcare financing, HIV programs	HMIS, Research, M&E	CSH UNDP WHO WOLRD BANK	\$ 38,000
4.2.11 Provide long term training for 10 research related officers on research methodologies, analysis and report writing at all levels (MPHs, MSC, PHD, DrPH)	Research	None	#########
4.2.12 Implement a leading and facilitating QI course for leaders	M&E	CSH	\$ 1,000
4.2.13 Provide training to program staff on the use of data for programme management	HMIS	CSH	\$ 1,000
4.2.14 Provide training to CHTs and DHTs on the use of data for programme management	HMIS	UNICEF	\$ 5,000
4.2.15 Assess competency needs for lab staff, and provide training to lab desk officers in data quality concepts, disease specific data SOPs, basic excel and Access use	Lab	WHO, eHealth, ACCEL	\$ 7,000
4.2.16 Workshop for extracting qualitative data from the eDEWS; presenting the data; and disseminating the information to decision-makers	HMER, DPC	WHO	\$ 14,000
4.2.17 Provide the research unit with related resources (equipment, statistical packages, reference materials)	Research	None	\$ 17,000
4.2.18 Develop and implement training and mentoring approaches for Directors, senior staff in supporting and leading research	Research	None	\$ 25,000
4.2.19 Provide in-service HMIS training for staff at all levels: (1) Assess Competencies, (2) Select staff, (3) Develop course curriculum and (4) provide ongoing mentorship for HMIS Staff	HMIS	CSH	\$ 18,000
4.2.20 Training of HMIS, county, central levels managers on the usage of information for decision making	HMIS	CSH, WHO	\$ 20,000
4.3.Strengthen institutional capacities of pre-service programs through curriculum development and resource mobilization fo	or various research activitie	s; including epide	emiology,
biostatistics, HIS,laboratory system and software development			
4.3.1 Organize a curriculum development workshop among preservice institutions to enhance institutional capacities various research designs	Research	None	\$ 25,000
4.3.2 Build consensus among research institutions to promote the roll out of proposed Research curriculum	Research	N/A	\$ 3,000
4.3.3 Advocate and Mobilize resources to implement newly developed Research Operational Plan	Research	N/A	\$ -
4.3.4 Align the pre-service curriculum for the lab schools to align with needs for HIS	HMER	WHO, JHU	\$ 60,000
4.3.5 Design Masters programs to produce Health managers at the County level who are efficient in management of HIS management	HMER	CHAI	\$ 60,000
4.3.6 Work with Universities and colleges to provide trainings in health information sciences	HMIS	CSH	\$ 15,000
4.3.7 Provide professional development or pre-service training for HMIS staff in health information sciences (ie: HIS, Epidemiology, health informatics, bio statistics, etc)	HMIS	CSH	\$ 320,000
4.4. Increase capacity of HIS administration and management at MOH national and county levels by recruiting: epidemiologist	ts, biostaticians, demograp	hers, data clerks,	
database administrators, computer programmers, lab technicians			
4.4.1 Develop human resources plan to identify the number and skillset of cadres needed to implement and maintain the HIS strategy	HMER	None	\$ 60,000
4.4.2 Present HR needs to HMERCC and HSCC for validation and resource mobilization	HMER	None	\$ -
4.4.3 Recruit and build capacity to develop eDEWS pilot	HMER	WHO	\$ 100,000
4.4.4 Recruitment of lab desk officers for public health laboratories (1 per each lab)	HMER, Lab	eHealth	\$ 100,000
HIS INFRASTRUCTURE			

SO5 To establish appropriate ICT infrastructure at all levels including institutionalizing mHealth technologies			
5.1. Construct the critical ICT backbone infrastructure, including hardware and software requirements, appropriate for operating	ng the HIS subsystems		
5.1.1 Develop ICT Infrastructure standards (ICT SOPs) that enable the Ministry to effectively and efficiently develop and maintain solutions	ICT	None	\$ 8,000
5.1.2 Develop hardware standards that allow the ministry to purchase servers, personal computing, peripherals and mobile devices in a cost effective manner; and to manage and maintain their components across asset lifecycles	ICT	None	\$ -
Develop supported software standards for server operating systems (OS), personal computing OS, mobile device OS, internet browser, email and IM, office	ICT	None	\$ -
productivity, anti malware, antivirus and other business enabling applications and stacks Implement an ICT infrastructure which provides users with a secure, continuous and effective ICT foundation that enables the MOH to achieve its mission	ICT	None	\$ -
through the use of technology Conduct a peeds analysis to develop an end state vision for the ministry's ICT Infrastructure to understand the gap between current capabilities and the			· ·
5.1.5 Occurrent all existing ICT infrastructure assets, their viability and location including, but not limited to conditioned space, servers, routers, switches, wireless	ICT	None	\$ 5,000
5.1.6 access points, network cabling, laptops, desktops, printers, and external storage devices. Ensure inclusion of items hosted by donors, partners and industry	ICT	None	\$ -
to create a complete accounting. Develop a three year hardware and peripheral infrastructure equipment forecast based upon existing and planned health applications, data storage,			
5.1.7 beverby a time year naroware and peripheral illinastructure equipment forecast based upon existing and planned health applications, data storage, Government growth and disaster recovery requirements	ICT	None	\$ 5,000
5.1.8 Document all software licenses and maintenance agreements for Ministry assets to include those managed by donors, partners and industry	ICT	None	\$ -
5.1.9 Develop a 2 year software license and maintenance agreement forecast based upon existing and planned health applications, disaster recovery, and known licensing gaps and risks	ICT	None	\$ 2,000
5.1.10 Develop an ICT Infrastructure Procurement Plan that supports acquisition (procurement) of ICT equipment based on organization's need and not individual	ICT	None	\$ 3,000
staff preference. 5.1.11 Construct conditioned space across the ministry's footprint which can support centralized and distributed use of technology across the country.	ICT	None	\$ 50,000
Implement a primary data center (to include the re-design and upgrade MOH server room (s) and disaster recovery) to house the Ministry's technology			
5.1.12 assets and ensure ongoing operations.	ICT	None	\$ 100,000
5.1.13 Construct small conditioned spaces at one MOH peripheral office in(Bomi, Bong, Grand Bassa, Nimba, River Gee)	ICT	None	\$ 200,000
5.1.14 Construct small conditioned spaces at one MOH peripheral office in (Monsterrado, Lofa, Cape Mount, River Cess, Maryland)	ICT	None	\$ 200,000
5.1.15 Construct small conditioned spaces at one MOH peripheral office in (Margibi, Gbarpolu, Grand Gedeh, Sinoe, Grand Kru)	ICT	None	\$ 200,000
5.1.16 Develop a mobile device strategy to ensure constant, consistent communications while managing ministerial costs and liabilities	ICT	None	\$ 5,000
5.1.17 Implement an enterprise Anti-virus system that provides systems, applications and data security against viruses, malware, adware, spyware, etc.	ICT	None	\$ 25,000
5.1.18 Implement an enterprise email system that enables all ministry staff to leverage the power of electronic and mobile communications	ICT	None	\$ 10,000
5.1.19 Implement a corporate messaging system, which enables real-time communications with staff in physical locations, and those working throughout the	ICT	None	\$ 100,000
country. 5.1.20 Implement a Customer Relationship Management system, to track segments of people (citizens, healthcare workers, supporting staff, partners) and promote	ICT	None	\$ 20,000
government to citizen communications Implement a project management solution which enables the ICT Department to plan, evaluate and track the health of projects completed in-house or on their behalf	ICT	None	\$ 50,000
5.1.22 Design and implement a ministry intranet which enables staff to share information internally, improve productivity and communications between its members	ICT	None	\$ 100,000
5.1.23 Design and implement an internet presence (MOH Website and content management systems (CMS)) which supports government to citizen	ICT	None	\$ 25,000
communications, promotes ministry objectives, and aligns with greater Government of Liberia eGov strategies			
5.1.24 Develop GIS capacity at all levels within the MOH. F.1.05 Hire/Recruit Technical Assistant to facilitate development Enterprise GIS (that includes the development and implementation of a HIS GIS	ICT	None	\$ 21,000
5.1.25 Integration/interoperability platform) at MOH HQ	ICT	None	\$ 50,000
5.1.26 Conduct HIS GIS integration/interoperability needs assessment	ICT	None	\$ 10,000
5.1.27 Develop and Implement Enterprise GIS at MOH HQ	ICT	None	\$ 15,000
5.1.28 Procure and distribute mobile handset for MOH HQ, CHTs and all public health facilities to facilitate communication at all levels	ICT	None	\$ 75,000
5.1.29 Develop directory for MOH HQ, CHTs and all public health facilities	ICT	None	\$ 1,000
5.1.30 Print and disseminate MOH Directory	ICT	None	\$ 7,000
5.1.31 Establish a Data Governance Structure (data stewardship - custodian & steward - Policies, SOPs, etc.)	ICT	None	\$ 10,000
5.1.32 Develop and maintain data security structure (eg: privacies, confidentiality and intellectual property rights (IPR))	ICT	None	\$ 5,000
5.1.33 Support the Design/Development and implementation of Information Systems (eg: create databases and associated tools).	ICT	None	\$ 25,000
5.1.34 Implement a business intelligence product which enables the ministry to evaluate and analyze health data to identify trends, impacts, perform predictive	ICT	None	\$ 30,000
analysis and maximize the value of its data 5.1.35 Procure/develop and implement a Document/Content Management System (to capture unstructured/semi-structure data)	ICT	None	\$ 20,000
5.1.36 Establish an Enterprise Data Architecture	ICT	None	\$ 10,000
5.1.37 Develop and Implement Data Quality Management Systems (i.e. quality control/quality assurance (QAQC), etc.)	ICT	None	\$ 30,000
5.1.38 Produce Quarterly News Letters (eg: hard & soft copies)	ICT	None	\$ 3,000
5.1.39 Produce Statistical Bulletins (eg: hard & soft copies)	ICT	None	\$ 5,000
5.1.40 Produce Maps and Infographics (eg. hard & soft copies)	ICT	None	\$ 5,000
5.1.40 Produce maps and intographics (eg: nard & soft copies) 5.1.41 Provide Web Service, including email, calendar, hosting, etc	ICT	None	\$ 5,000

5.1.42 Conduct situational analysis on health research related infrastructures at central and County levels	ICT	None	\$ 1,000
5.1.43 Procure and distribute health research related equipment at central and county levels	ICT	None	\$ 25,000
5.1.44 Procure hardware for staff involved in HMIS, M&E, and Research	ICT, HMER,	PACS, CSH, eHealth	\$ 120,000
5.1.45 Procure hardware for surveillance staff	Admin DPC, ICT	WHO	\$ 100,000
5.1.46 Procurement for eDEWS pilot	HMER, DPC	WHO	\$ 94,000
5.1.47 Build MoH Server room, back-up, and security	ICT	eHealth	\$ 150,000
5.1.48 Procure hardware and software for pilot implementation	HMER, Lab	ACCEL	\$ 13,000
5.1.49 National rollout: procurement of ICT assets	HMER, DPC	N/A	\$ 100,000
5.1.50 Training District health staff on the use of HMIS reporting tools and DHIS2	HMIS	CSH	\$ 4,000
5.1.51 Procure new server for the DHIS2	HMIS	None	\$ 2,000
5.1.52 Procure back-up server for the DHIS2	HMER	None	\$ 2,000
5.1.53 Conduct periodic ICT maintenance at all levels	HMER	CSH	\$ 20,000
5.2. Develop an ICT strategy to guide acquisition, internet usage, data back-up, manage computer resources, maintenance, an	d disposal of ICT equipme	ent at all levels	
5.2.1 Hire/Recruit Technical Assistance (TA) to facilitate the development ICT Strategy	ICT	CSH	\$ 90,000
5.2.2 Recruit Technical Assistance (TA) to facilitate the development ICT SOPs and Strategy	ICT	None	\$ 180,000
5.2.3 Conduct consultative stakeholders workshop (stakeholders analysis) for ICT Strategy development	ICT	None	\$ 42,000
5.2.4 Develop a IT Disaster Recovery (ITDR) strategy that protects Liberia's health data and ensures continuity of operations	ICT	N/A	\$ -
5.2.5 Circulate and Validate Draft ICT/ITDR Strategy	ICT	N/A	\$ -
5.2.6 Print and Disseminate final ICT Strategy	ICT	None	\$ 1,000
5.2.7 Implement ICT/ITDR Strategy through the conduct of several change management activities (i.e. awareness, training, etc)	ICT	None	\$ 39,000
5.2.8 Evaluate the implementation of the ICT Strategy	ICT, M&E	None	\$ 30,000
5.2.9 Circulate and Validate Draft ICT Policies	ICT	None	\$ -
5.2.10 Print and Disseminate final ICT Policies	ICT	None	\$ 2,000
5.3. Ensure adequate access to electricity and internet for management of FMIS, HRIS, LMIS, HMIS, and LIS at all levels			
5.3.1 Conduct a baseline analysis of MOH data network access and performance, and create a future state design for all MOH buildings	ICT	None	\$ 5,000
5.3.2 Conduct a baseline analysis of hospital and clinic network access designs and performance, and create a future state to integrate these locations into a greater health data ecosystem	ICT	None	\$ 10,000
5.3.3 Construct a MOH HQ network, to include the Emergency Operations Center, to establish a basis for high speed connectivity	ICT	eHealth	\$ 150,000
5.3.4 Construct high speed networks at one MOH peripheral office in (Bomi, Bong, Grand Bassa, Nimba, River Gee	ICT	eHealth	\$ 250,000
5.3.5 Construct high speed networks at one MOH peripheral office in (Monsterrado, Lofa, Cape Mount, River Cess, Maryland))	ICT	eHealth	\$ 250,000
5.3.6 Construct high speed networks at one MOH peripheral office in (Margibi, Gbarpolu, Grand Gedeh, Sinoe, Grand Kru)	ICT	eHealth	\$ 250,000
5.3.7 ICT assessment at all public health labs	HMER, Lab	eHealth	\$ 8,000
5.3.8 Construct high speed networks at each public health labs	ICT	eHealth	\$ 24,000
SO6 Develop, implement, and sustain basic functionality of LIS			
6.1 Implement an eLIS to support basic functionality in all public health labs			
6.1.1 Document the requirements for the electronic platform	HMER, Lab	WHO, ACCEL, eHealth	\$ 30,000
6.1.2 Select and validate choice of eLIS platform	HMER, Lab		
6.1.3 Develop unique identification system to track patients and labs throughout the LIS	HMER, Lab		
6.1.4 Develop an eLIS at Tappitta	HMER, Lab	ACCEL	\$ 108,000
6.1.5 Pilot the eLIS system at the national reference lab	HMER, Lab	ACCEL	\$ 30,000
6.1.6 Evaluate the pilot and make necessary adjustments to software	HMER, Lab	ACCEL	\$ 51,000
6.1.7 Develop national rollout plan for rollout to other public health labs	HMER, Lab	ACCEL	\$ 30,000
6.1.8 Develop capacity to query laboratory data (among other data) to identify health status of a given group on an ad hoc basis, to use for monitoring and evaluations	HMER, Lab	None	\$ 60,000
6.1.9 Ongoing support for data use of laboratory information for DSIS	HMER, Lab	WHO	\$ 9,000
6.1.10 Printing and dissemination of laboratory paper forms, provision of binders, ledgers, etc	HMER, Lab	WHO	\$ 4,000
6.1.11 Develop ICT capacity building and maintenance plan and align with national ICT strategy	HMER, Lab	None	\$ 20,000
6.1.12 Basic ICT capacity training	HMER, Lab	ACCEL	\$ 3,000
Develop a database of managers ,lab technicians, support staff and non-MoH stakeholders specific to Labs within iHRIS, that will permit real-time	HMER. Lab	WHO, ACCEL	\$ 5,000

6.1.14 Inservice training of lab data managers and lab technicians in basic data use, analysis, and quality control	HMER, Lab	WHO	\$ 78,000
6.1.15 Ongoing mentorship and on-site assistance	HMER, Lab	WHO	\$ 119,000
Develop/expand national standard curriculum/quidelines for pre-service laboratory schools with competencies designed to meet current needs of the LIS			
6.1.16 and laboratory system in general. (For example train lab professionals to enter results directly into electronic record)	HMER, Lab	WHO	\$ 7,00
6.1.17 Identify, recruit, and train additional workers including lab technicians, data clerks, data managers to use and maintain LIS system	HMER, Lab	WHO, eHealth	\$ 180,00
6.1.18 Develop plan to absorb data managers under MOH	HMER, Lab	None	\$ 1,00
6.1.19 Develop and SOPs to clarify the information flow from the health facilities, within the lab, and to the ministry	HMER, Lab	ACCEL	\$ 7,00
6.1.20 Establish administrative backbone of LIS, including indicators (from WHO Stepwise accreditation) and SOPs (for job descriptions, basic lab register, standard lab requisition form and others).	HMER, Lab	WHO	\$ 8,00
6.1.21 Contribute to nationwide laboratory strategy, of which LIS is one component	HMER, Lab	JHU, WHO, ACCEL	\$ 1,000
6.2 Improve the flow of data in the LIS, including receipt of case data at the laboratories, and sample results in the facilities and c	counties		
6.2.1 Develop mechanisms for feedback of lab data to the health facility	HMER, Lab	ACCEL	
6.2.2 Conduct refresher training to riders, health facilities, and labs on the proper labelling of specimens	HMER, Lab	WHO	\$ 14,00
6.2.3 Build into LIS a mechanism to link DHIS2	HMER, Lab	ACCEL	
SO7 Develop, implement, and sustain basic functionality of DSIS			
7.1. Design and develop tools to support eWARN and IHR functions			
7.1.1 Pilot: Map needs requirements	DPC	WHO	\$ 180,000
7.1.2 Pilot: Develop basic functionality	HMER, DPC	WHO	\$
7.1.3 Pilot: Pilot test eDEWS	HMER, DPC	WHO	\$
7.1.4 Develop evaluation framework	HMER, DPC	WHO	\$
7.1.5 Comprehensive evaluation of pilot results, including comparison to paper, HMIS, and assessment of timeliness, completeness, and translation to public health action	HMER, DPC	WHO	\$
7.1.6 Implement recommendations from evaluation	HMER, DPC	WHO	\$ 10,000
7.1.7 Assessment of ICT maintenance outlays, processes, and absorption of eWARN development by MOH	HMER, DPC		\$ 5,000
7.1.8 Select platform for national rollout	HMER, DPC	HMER TWG	\$
7.1.9 Comprehensive evaluation of pilot results, including comparison to paper, HMIS, and assessment of timeliness, completeness, and translation to public health action	M&E, DPC	JHU, WHO	\$ 16,000
7.1.10 National rollout: Expand local developer team	HMER, DPC	None	\$ 20,000
7.1.11 National Rollout: Enhancement based on additional requirements or recommendations	HMER, DPC	None	\$ 3,000
7.1.12 National Rollout: Train point of contact at health facilities, DSOs, CSOs, DHOs, ZSOs, M&E team,	HMER, DPC	None	\$ 50,000
7.1.13 National rollout: Train secondary point of contact (alternate HF POC)	HMER, DPC	None	\$ 20,000
7.1.14 National rollout: Administrative training (end users)	HMER, DPC	None	\$ 4,000
7.1.15 National rollout: Data management training	HMER, DPC	None	\$ 8,000
7.1.16 Chart the key public health surveillance decisions to be made at national level.	DPC, HMER	JHU	\$ 11,000
7.2. Expand functionality of electronic systems to include broader outbreak functions, and interoperability with laboratory system	ns and the broader healt	n information sy	stem
7.2.1 Identify business requirements for expanded functionality in Phase 3	HMER, DPC	None	\$ 10,000
7.2.2 Develop a concept note for new requirements for expanded functionalities	HMER, DPC	None	\$ 5,000
7.2.3 Develop use cases and mockups	HMER, DPC	None	\$ 30,000
7.2.4 Develop interoperability with LIS (see HIE operational plan) - Connections	HMER, DPC	None	\$ 20,000
7.2.5 Assess flow of CBIS data into DSIS	HMER, DPC, CHSD	None	\$ 14,00
7.2.6 Assessment of information system to support OneHealth	HMER, DPC	None	\$ 20,00
7.2.7 Workload analysis of forms	HMER, DPC	None	\$ 8,00
7.2.8 Review of forms for patient IDs	HMER, DPC	None	\$ 3,00
7.3. Improve information on disease status in the country	, ,		
7.3.1 Conduct routine reviews for comprehensive surveillance, including quarterly and annual reviews	DPC, HMER	None	\$ 18,00
7.3.2 Routine monitoring and evaluation of data completeness, timeliness, and use of forms and etools	DPC, HMER	None	\$ 9,00
7.3.3 Provide ongoing mentorship in basic data management of DSIS paper-based forms	DPC, HMER	None	\$ 2,00
7.3.4 Integration of local and international data streams (weather predictions, environmental health, population shifts) to predict disease trends in epidemic simulations	DPC, HMER	None	\$ 12,00
7.3.5 Develop capacity for syndromic data use in social media to predict outbreaks	DPC, HMER	None	\$ 20,00

7.3.7 Complete integration of VHF Epi-Info, contact tracing forms, and other legacy data into a dataset for retrospective analysis in coordination with MOH, WHO			DPC, HMER	WHO, JHU	\$ 30,000
7.3.8 and CDC Support the Survivor Networks database management, by assisting the development and use of a database to track clinical and psychosocial needs of the Ebola survivors.			DPC, HMER	JHU	\$ 30,000
SO8 Develop, implement, and sustain basic functionality of CBIS					
8.1. Develop, implement, and sustain basic functionality of CBIS					
8.1.1 Hold validation workshop for CBIS tools and SOPs			HMER	LMH	\$ 21,000
8.1.2 Incorporate community data discussion into CHT quarterly stakeholder review meetings			CHSD	LMH. UNICEF	\$ -
8.1.3 Organize monthly HFDC meetings that include CBIS data review to provide feedback to communities			CHSD	None	\$ 3.000
8.1.4 Collaborate with SCMU to create standardized community logistic and supply chain management forms that will feed into LMIS			CHSD	LMH, UNICEF, CSH	\$ 15,000
8.1.5 Support staff (1 person) for CBIS management at central level			HMER	LMH	\$ 18,000
8.1.6 Recruit and deploy additional data entry clerks for all counties to support CBIS functioning in 15 counties			HMER, CHSD	None	\$ 24,000
8.1.7 Develop integrated CBIS TOT training package for CHTs (including data clerks)			HMER, CHSD	LMH	\$ 29,000
8.1.8 Train master trainers to train CHTs on CBIS			HMER, CHSD	LMH	\$ 3,000
8.1.9 Train CHTs on integrated CBIS package			HMER, CHSD		\$ 46,000
8.1.10 Collaborate with CHSD training to develop CHW/CHSS data collection/reporting training package			HMER, CHSD	LMH, UNICEP, PACS	\$ 75,000
8.1.11 Print indicator definitions and guidelines			HMER, CHSD	PACS	\$ 2,000
8.1.12 Print and supply data collection and reporting forms to counties and health facilities			HMER, CHSD	LMH, UNICEF	\$ 58,000
8.1.13 Develop, standardize and validate minimum set of indicators (including community births and deaths) in collaboration with programs				LMH, UNICEF, PACS	\$ -
8.1.14 Develop indicator definitions and guidelines for community health in collaboration with programs			HMER, CHSD		\$ -
8.1.15 Develop quality assurance and quality improvement guidelines for CBIS			HMER, CHSD	None	\$ 10,000
8.1.16 Create guidelines for CBIS data review, including performance management and decision making, at all levels			HMER, CHSD		\$ -
8.1.17 Develop quarterly CBIS dashboard and customize by audience			HMER, CHSD	None	\$ 15,000
8.1.18 Develop M&E strategic plan including mid-term evaluation plan			HMER, CHSD	LMH	\$ 4,000
8.1.19 Monitoring & Supervision (Quarterly)			HMER, CHSD	None	\$ 4,000
8.2. Improve capacity to monitor the CHW program and provide feedback at all levels					
8.2.1 Roll out cascade training on integrated CBIS package from CHTs to districts and health facilities			HMER	LMH, UNICEF?	\$ 116,000
SO9 Expand HRIS functionality, indicators, and use at subnational levels					
9.1. Expand HRIS functionality, indicators, and use at subnational levels					
Review current legislation that exists related to HIS and ICT and make recommendations for the integration and enforcement of use of Human Resources			HMER	None	\$ 1,000
Information Systems Review draft HRIS policy for amendment to feed into the National HR policy and plan, considering cost implications to Ministry's Investment plan. 5					
9.1.2 participants (3 Directors, Personnel, HR. Policy & Planning, HRIS focal person)			HMER	None	\$ 3,000
9.1.3 Develop an outline SOPs for iHRIS and mHero.			HMER	None	\$ 6,000
9.1.4 Hire a consultant to develop the SOPs			HMER	None	\$ 7,000
9.1.5 Validate the newly develop SOPs			HMER	None	\$ 1,000
9.1.6 Conduct health workforce census and in-depth mapping of HRIS stakeholders			HMER	None	\$ 1,000
9.1.7 Training of 30 Central and County HROs including Private & Autonomous Hospital HRO's on iHRIS, including SOP for one week			HMER	CHAI	\$ 10,000
9.1.8 Training and mentoring of county HROs on the use of iHRIS			HMER	CSH	\$ 9,000
9.1.9 Retraining MOH HR staff at Central and Country levels to improve skills development for use of iHRIS (tracking, report generation, analysis, HR dashboard, etc.) to explore the full functionality of iHRIS			HMER	CSH	\$ 1,000
9.1.10 Conduct training in core strategic HR functions and HR Records Management at Central and Country levels			HMER	CSH	\$ 3,000
9.1.11 Provide support for full functionality of the iHRIS at county level for tracking HCWs and providing reports for HR decision-making			HMER	CSH	\$ -
9.1.12 Assess iHRIS design and Architecture to incorporate MOH HWP critical indicators			HMER	CHAI	\$ -
9.1.13 Conduct one day meeting of HRH TWG to identification of statistical data that is relevant to the management and planning of the health workforce;			HMER	CHAI	\$ -
9.1.14 Conduct one day meeting of HRH TWG to identification reports and modules that utilize population data to customize in iHRIS for health workforce analysis			HMER	N/A	\$ -
9.2 Develop tools such as mHero to establish two-way engagement with the health workforce					
9.2.1 Develop community health workers database			Admin, HMER	UNICEF	\$ 50,000
9.2.2 Use mHero to validate the records in HRIS			HMER	UNICEF	\$ 10,000
		ue of the l			,
9.3 Extend use of HRIS for performance management, monitoring training and competencies, and reporting on socioe	conomic stat	us or me i	lealli wuni	orce	
9.3 Extend use of HRIS for performance management, monitoring training and competencies, and reporting on socioe 9.3.1 Create and approve a legislation that allows HRIS to be utilized for performance management activities	conomic stat	us or the r	HR, HMER,	None	\$ 10,000

9.3.2 Define performance standards	HR, HMER, PBF	CHAI	\$ -
9.3.3 Test the application and use of the performance standards	HR, HMER, PBF	None	\$ 6,000
9.3.4 Roll out the use of standards to the county levels	HR, HMER	None	\$ 25,000
9.3.5 Conduct a one day meeting for PCT members (20) to discuss the current in-service EPHS modules	HR	None	\$ 18,000
9.3.6 Use the approved EPHS information to populate the iHRIS database	HMER, HR	N/A	\$ -
9.3.7 Conduct a day meeting of PCT members to discuss the content and outline for core competency indicators reports	M&E, HR	None	\$ 9,000
9.3.8 Revise the HRIS policy to make HRIS a report generation tool	HMER, HR	N/A	\$ -
9.3.9 Hire a consultant for two weeks to support HR Unit determines and customize reports for end users in iHRIS	HMER, HR	None	\$ 3,000
9.3.10 Conduct one day training of all county HROs on the generation of reports	HR	None	\$ 4,000
9.3.11 Build into iHRIS a mechanism to link DHIS2	HMER, HR	None	\$ 120,000
SO10 Expand HMIS functionality, indicators, and use at subnational levels			
10.1. Expand HMIS functionality at all levels, including improving accessibility of the DHIS2 web-portal to districts			
10.1.1 Strengthen the LMDC to enforce the Public Health Law to improve reporting to HMIS of health facilities	HMIS	CSH	\$ 5,000
10.1.2 Develop HMIS Policy	HMIS	CSH	\$ 12,000
10.1.3 Institute mechanisms for accountability (Reward & Sanction)	HMIS, PBF	None	\$ 8,000
10.1.4 Install and train staff in mHero/IHRIS platform at county levels	HMIS	CSH	\$ 6,000
10.1.5 Develop SOPs and procedures for data management, data analysis, reporting and interpretation at all levels	HMIS	CSH	\$ 5,000
10.1.6 Strengthen data quality assurance at all levels	HMIS	CSH	\$ 15,000
10.1.7 Print reporting ledgers for use at facilities	HMIS	CSH	\$ 30,000
10.1.8 Institute quarterly performance review meetings at all levels	HMIS	CSH	\$ -
10.1.9 Produce and place on MOH website Annual Performance Reports	HMIS	CSH	\$ 1,000
10.1.10 Produce and publish quarterly HMIS dashboards	HMIS	CSH	\$ 1,000
10.1.11 Produce and disseminate MOH list of health facilities by location, type and HR	HMIS	CSH	\$ 1,000
10.1.12 Produce and distribute HMIS reporting forms quarterly at county, district and facility levels	HMIS	CSH	\$ 3,000
10.1.13 Develop and disseminate score card for thematic area in the DHIS2	HMIS	None	\$ 5,000
10.1.14 Support the revision of HMIS training manual	HMIS	CSH	\$ 5,000
10.2. Update core indicators to reflect national M&E plan and MOH strategies			
10.2.1 Print MoH performance indicator reference handbook for MoH core indicators	HMIS	CSH	\$ 2,000
10.2.2 Update standard indicators list	M&E	None	\$ 10,000
10.3. Develop and disseminate HMIS Data Reference book			
10.3.1 Develop and disseminate HMIS reference book /manual	HMIS	CSH	\$ 1,000
SO11 Develop, implement, and sustain basic functionality of LMIS			
11.1. Develop, implement, and sustain basic funtionality of LMIS			
11.1.1 Facilitate meetings to review, and standardize manual LMIS tools	SCMU, HMER	CSH	\$ -
11.1.2 Conduct LMIS tool testing in selected facilities, receive and accommodate feedback based on test results	SCMU, HMER	CSH	\$ -
11.1.3 Conduct validation meeting and agree on manual LMIS tools with stakeholders	SCMU, HMER	CSH	\$ -
11.1.4 Get sign-off from MOH/HIS/SCMU	SCMU, HMER	CSH	\$ -
11.1.5 Develop LMIS operational plan as sub-component of HIS, validate and sign off	SCMU, HMER	CSH	\$ -
11.1.6 Select platform for the development of eLMIS that guarantees interoperability with other HIS platforms such as DHIS2	SCMU, HMER	CSH	\$ -
11.1.7 Agree and reach consensus with all LMIS stakeholders, get Sign off on the selection of system platform (MOH/HIS unit)	SCMU, HMER	CSH	\$ -
11.1.8 Develop/revise training materials and SOPs for manual LMIS	SCMU, HMER	CSH	\$ 5,000
11.1.9 Conduct training of trainers on the revised systems and tools (manual LMIS)	SCMU, HMER	CSH	\$ 5,000
11.1.10 Plan, coordinate and facilitate LMIS rollout training to health facilities (manual LMIS)	SCMU, HMER	CSH	\$ 25,000
11.1.11 Facilitate LMIS mentorship and supportive supervision, training for county and central level supply chain supervisors	SCMU, HMER	CSH	\$ 2,000
11.1.12 Develop user manual for eLMIS	SCMU, HMER	CSH	\$ -
11.1.13 Recruit 17 LMIS data officers at central and county level	SCMU, HMER	None	\$ 170,000
11.1.14 Recruit 1 eLMIS administrator at central level	SCMU, HMER	None	\$ 15,000
11.1.15 Conduct TOT for eLMIS trainers	SCMU, HMER	CSH	\$ 6,000
11.1.16 Conduct phase I rollout training on eLMIS to LMIS data officers (County and Central)	SCMU, HMER	CSH	\$ 9,000

11.1.17 Go live (Phase I)	SCMU, HMER	CSH	\$
11.1.18 Define requirements for Phase II (eLMIS)	SCMU, HMER	CSH	\$ 30,000
11.1.19 Conduct phase II rollout (selected health facilities)	SCMU, HMER	CSH	\$ 80,000
11.1.20 Go live (Phase II)	SCMU, HMER	CSH	\$
11.1.21 Develop web-based eLMIS using selected platform (open source)	SCMU, HMER	CSH	\$ 100,000
11.1.22 Facilitate regular (weekly) meetings with development team	SCMU, HMER	CSH	\$ 100,000
11.1.23 Conduct system testing for every feature developed	SCMU, HMER	CSH	\$
11.1.24 Conduct system testing to every leadine developed	SCMU, HMER	CSH	\$ 50,000
11.1.25 Recieve and accommodate feedback (result of system testing)	SCMU, HMER	CSH	\$ 30,000
11.1.25 Procure IT infrastructures (computers, internet, server)	SCMU, HMER	Donors	\$ 10,000
11.1.20 Product It illinastructures (computers, internet, server) 11.1.27 Install and train staff in eLMIS platform (for user acceptant test)	SCMU, HMER	CSH	\$ 1,000
	SCMU, HMER	CSH	\$ 1,000
11.1.28 Conduct user acceptance testing for all features, receive and accommodate feedback 11.1.29 Production of eLMIS	SCMU, HMER	CSH	\$
			\$
11.1.30 Print and distribute LMIS tools for all facilities	SCMU, HMER	CSH	
11.1.31 Print and distribute training/user manuals	SCMU, HMER	CSH	\$ 1,000
11.1.32 Define supply chain indicators, report list to fit into HMIS and over all supply chain system by level	SCMU, HMER	CSH	\$ 1,000
11.1.33 Develop LMIS routing data quality SOPs	SCMU, HMER	CSH	\$
11.1.34 Facilitate LMIS data quality feedback meetings	SCMU, HMER	CSH	\$
11.1.35 Strengthen LMIS data quality assurance at all levels	SCMU, HMER	CSH	\$
11.2. Ensure LMIS covers community level commodities			1 .
11.2.1 Define supply chain indicators, to cover community commodities and report list to fit into LMIS and DHIS2	SCMU	CSH	\$
11.2.2 Finalize Categorization of SCM products by facility type (essential medicines, programs' commodities, IPC, laboratories, community health services)		CSH	\$
		0011	
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list		0011	
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2		COIT	
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS		CONT	
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2		0011	
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS	FMIS	None	\$ 1,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll	FMIS FMIS		\$ 1,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees		None	\$ 1,000 \$ 2,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and	FMIS	None None	\$ 1,000 \$ 2,000 \$ 6,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems	FMIS FMIS FMIS	None None Intrahealth; CHAI None	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers	FMIS FMIS	None None Intrahealth; CHAI	\$ 1,000 \$ 2,000 \$ 6,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Sommunication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis	FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF	FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer	FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.3 Define performance based indicators appropriate for counties, districts and facilities	FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.4 Establish and ensure regular update of tracking database on Partners'projects 12.4 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HELL and design new	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$ \$ 5,000 \$ 1,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.2.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new	FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that dunds are recorded before transfer 12.2.3 Define performance based indicators appropriate for counties, districts and facilities 12.3 Establish and ensure regular update of tracking database on Partners'projects Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HELL and design new	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$ \$ 1,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.4 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$ \$ 1,000 \$ 20,000 \$ 11,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.6 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.4 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.2 Train Health Financing Unit, OFM & External Aid staffer to navigate data base	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$ 5,000 \$ 11,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.2 Train Health Financing Unit, OFM & External Ald staffer to navigate data base 12.3.3 Train partner (donors, NGOs) how to use online database	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None	\$ 1,000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 11,000 \$ 4,000 \$ 25,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.1 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.2 Train Health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.3 Train partner (donors, NGOs) how to use online database 12.3.4 Pilot new platform	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None None	\$ 1,000 \$ 2,000 \$ 6,000 \$ 2,000 \$ 11,000 \$ 4,000 \$ 25,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.6 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.2.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Establish and ensure regular update of tracking database on Partners'projects 12.3.2 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.3 Train health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.4 Pilot new platform 12.3.5 Survey partners on usability of platform (Meeting & Emails) 12.4.4 Strengthen capacity of central, county and facility-based financial managers to track expenditures via FMIS	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None None	\$ 1,000 \$ 2,000 \$ 2,000 \$ 2,000 \$ 11,000 \$ 4,000 \$ 25,000
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.6 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.2.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Establish and ensure regular update of tracking database on Partners' projects 12.3.2 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track bartners' funding and project status in the health sector 12.3.3 Train health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.4 Pilot new platform 12.3.5 Survey partners on usability of platform (Meeting & Emails) 12.4.4 Strengthen capacity of central, county and facility-based financial managers to track expenditures via FMIS 12.4.1 Conduct a Workshop/Training (Small) on FMIS	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None None None	\$ 1,00 \$ 2,00 \$ 6,00 \$ 2,00 \$ 1,00 \$ 11,00 \$ 4,00 \$ 25,00 \$ 1,00
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list to activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.1 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.1 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.1 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.1 Monthly supervision of data managers 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners of tracking database 12.3.1 Fechnical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners of tracking datab	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None None CSH	\$ 1,00 \$ 2,00 \$ 6,00 \$ 2,00 \$ \$ 1,00 \$ 11,00 \$ 4,00 \$ 25,00 \$ 1,00
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list to activities outlined until 2017 02 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees 12.1.4 Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency /flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.3.2 Define performance based indicators appropriate for counties, districts and facilities 12.3.3 Train Health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.1 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.1 Train Health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.3 Train partner (donors, NGOs) how to use online database 12.3.3 Train partner (donors, NGOs) how to use online database 12.3.4 Pilot new platform 12.4.1 Conduct a Workshop/Training (Small) on FMIS 12.4.2 Recruit, orient and embed a Health Finance Advisor in the HFU (local hire) 12.4.2 Recruit, orient and embed a Health Finance Advisor in the HFU (local hire)	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None None CSH	\$ 1,00 \$ 2,00 \$ 6,00 \$ 2,00 \$ 1,00 \$ 11,00 \$ 4,00 \$ 25,00 \$ 1,00
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list to activities outlined until 2017 Q2 Sol12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1. Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2. Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3. Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.4. Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5. Monthly supervision of data managers 12.2.6. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1. Regularly monitor frequency / flow of fund to PBF 12.2.2. Ensure that funds are recorded before transfer 12.3. Establish and ensure regular update of tracking database on Partners' projects 12.3. Establish and ensure regular update of tracking database on Partners' projects 12.3. Establish and ensure regular update of tracking database on Partners' projects 12.3. Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.1. Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.1. Ten health Financing Unit, OFM & External Aid staffer to navigate data base 12.3. Train Health Financing Unit, OFM & External Aid staffer to navigate data b	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None CSH CSH CSH CSH CSH	\$ 1,00 \$ 2,00 \$ 6,00 \$ 2,00 \$ 1,00 \$ 11,00 \$ 4,00 \$ 25,00 \$ 1,00 \$ 56,00 \$ 20,00
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1.Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and IHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis to the supervision of requency / flow of fund to PBF 12.2.1 Define performance based indicators appropriate for counties, districts and facilities 12.3. Define performance based indicators appropriate for counties, districts and facilities 12.3. Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and protect status in the health sector 12.3.1 Train Health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.2 Train Partner (donors, NGOs) how to use online database 12.3.3 Survey partners on usability of platform (Meeting & Emails) 12.4.4 Strengthen capacity of central, county and facility-based financial managers to track expenditures via FMIS 12.4.1 Conduct a Workshop/Training (Small) on FMIS 12.4.2 Recruit, orient and embed a Health Finance Advisor in the HFU (local hire) 13.1 Adopt r	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None CSH CSH None None None None None None	\$ 1,00 \$ 2,00 \$ 6,00 \$ 2,00 \$ 1,00 \$ 11,00 \$ 4,00 \$ 25,00 \$ 1,00
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list No activities outlined until 2017 Q2 SO12 Develop, implement, and sustain basic functionality of FMIS 12.1. Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll 12.1.1 Meeting among Ministry and agencies involved (MOH, CSA, MFDP) to build consensus among stakeholders and identify TA and timeframe 12.1.2 Local Technical Assistant required to survey and analyze existing system and identify need for improvement 12.1.3 Local Technical Assistant required to design database to combine CSA, MFDP and iHRIS payroll of MOH employees Communication card for HFU organize meetings, workshop and training and regularly communication with parties involve in the development of FMIS and systems 12.1.5 Monthly supervision of data managers 12.2.6 Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis 12.2.1 Regularly monitor frequency / flow of fund to PBF 12.2.2 Ensure that funds are recorded before transfer 12.2.3 Define performance based indicators appropriate for counties, districts and facilities 12.3.1 Establish and ensure regular update of tracking database on Partners'projects 12.3.2 Technical Assistant required to analyze existing resource mapping survey and identify areas for improvement in conjunction with HFU and design new database to track partners' funding and project status in the health sector 12.3.3 Train health Financing Unit, OFM & External Aid staffer to navigate data base 12.3.4 Pilot new platform 12.3.5 Survey partners on usability of platform (Meeting & Emails) 12.4.4 Strengthen capacity of central, county and facility-based financial managers to track expenditures via FMIS	FMIS FMIS FMIS FMIS FMIS FMIS FMIS FMIS	None None Intrahealth; CHAI None N/A CSH CSH CSH None None None CSH CSH CSH CSH CSH	\$ 1,00 \$ 2,00 \$ 6,00 \$ 2,00 \$ 1,00 \$ 11,00 \$ 4,00 \$ 25,00 \$ 1,00 \$ 56,00 \$ 20,00

HMER, La HMER, La		\$ 36,000
		,
	b None	\$ 36,000
HMER, La	b None	\$ 36,000
ICT, HME	R None	\$ 30,000
FMIS	None	\$ 80,000
FMIS	None	\$ 80,000
FMIS	WHO	\$ 80,000
HMIS	None	\$ 5,000
between DSIS, LIS, FMIS	, iHRIS, CSA, HMIS	3, CBIS
	Intrahealth, JHU	\$ 39,000
FMIS		\$ 3,000
		\$ 3,000
		\$ 8,000
HMER		\$ 8,000
SCMU		\$ -
		\$ 5,000
		\$ 3,000
		\$ -
Timile, Bit	0.10	Ψ
HMER	None	\$ 8,000
		\$ 8,000
		\$ 40,000
		\$ 60,000
		\$ 60,000
		\$ 168,000
THVILIX	None	\$ 100,000
UMED	IntroHoolth	\$ 15,000
		\$ 15,000
HMER	PACS	\$ 75,000
ICT, HME	R CSH, WHO	\$ 13,000
ICT, HME	₹ None	\$ 60,000
ICT, HME	R N/A	\$ -
ICT, HME	R None	\$ 6,000
ICT, HME	R N/A	\$ -
ICT, HMER	R None	\$ 10,000
ICT. HMFF	₹ None	\$ 30,000
		\$ 5,000
ICT, HME	R eHealth	\$ 5,000
		\$ -
	HMIS Detween DSIS, LIS, FMIS FMIS DPC, HMER HMER SCMU HMER FMIS HMIS, DPC HMER HMER HMER HMER HMER HMER HMER HMER	HMIS None Detween DSIS, LIS, FMIS, iHRIS, CSA, HMIS Intrahealth, JHU FMIS None DPC, HMER WHO, JHU HMER None SCMU CSH HMER WHO, JHU FMIS None HMIS, DPC JHU HMER None HMIS, DPC JHU HMER None ICT, HMER None

14.3.2 Produce indicator reference book or metadata based on national and international standards				HMIS	None	\$ 1,000
14.3.3 Develop meta data strategy before embarking on evaluating, purchasing and installing complex management products				HMER, ICT	None	\$ 5,000
14.3.4 Develop products / tools necessary for effective management of meta data				HMER, ICT	None	\$ 5,000
14.3.5 Develop policies to ensure definitions, acronyms and abbreviations are interoperable				HMER, ICT	None	\$ 5,000
14.3.6 Develop procedures to ensure policies are implemented correctly				HMER, ICT	N/A	\$ -
14.3.7 Supporting all line ministries on meta data through Liberiainfo Database				HMER, ICT	UNICEF	\$ 10,000
14.4. Establish a central data warehouse at MOH HQ and County levels						
14.4.1 Design analytical reports of key indicators /results with each directorate at the central level, county and facility level				HMER	None	\$ 10,000
14.4.2 Design the data repository for holding the results of quality monitoring for reference and trend analysis by facility, NGO, county and central level				HMIS	None	\$ 8,000
14.4.3 Established a Data warehouse and develop/implement Business Intelligence (BI) Tools (eg: dashboards, maps, pivot tables).				ICT	None	\$ 50,000
SO15 To improve quality, dissemination, and use of information in support of health services and health	system	func	ions a	at all levels		
15.1. Develop and implement a standardized system for data quality assurance at all levels	-,					
15.1.1 Conduct Technical Review of HIS data quality SOPs available				HMIS	CSH	\$ 2,000
15.1.2 Review past and current quality assurance and monitoring approaches and tools to assess current QA efforts and products				HMIS	None	\$ 15,000
15.1.3 Develop a set of appropriate QA procedures and tools to be used at all levels				HMIS	CSH	\$ 15,000
15.1.4 Train relevant staff at all levels on the approved data quality assurance procedures and tools				HMIS	CSH. PACS	\$ 75,000
15.1.5 Conduct data quality assessments integrated within the MoH supervisory field visits				HMIS	None	\$ 7,000
15.1.6 Conduct data quality review meetings with partners				HMIS	None	\$ -
15.1.7 Pilot data quality platform for validation and verification of IDSR data				M&E, DPC	WHO	\$ 5,000
15.1.8 Training lab staff on data quality assurance				M&E, Lab	WHO	\$ 2,000
Conduct training workshop for county data clerks and M&E officers on the use of the data validation HMIS tool to be used for verification/validation for NON						-
15.1.9 FARA facilities				M&E	CSH	\$ 23,000
15.1.10 Provide Technical Support for counter verification/validation for FARA sub-contracts				HMIS	CSH	\$ 4,000
15.1.11 Conduct County data validation to Non FARA facilities				HMIS	CSH	\$ 80,000
15.1.12 Support the Conduct of TOT training for HMIS reporting tools (Ledgers and Forms)				HMIS	CSH	\$ 18,000
15.2. Develop and implement performance based indicators that capture the usage and display of maps and graphs at	t the cou	ınties,	distric		•	
15.2.1 Design analytical reports of key indicators /results with each directorate at the central level, county and facility level				HMIS	None	\$ 15,000
15.2.2 Design standard format for reporting and data tabulation appropriate for each level				HMIS	None	\$ 15,000
15.2.3 Print MoH performance indicator reference handbook for MoH core indicators				PBF, M&E	CSH	\$ 1,000
15.3. Institutionalize and strengthen "research to practice" activities among decision makers						
15.3.1 Inventory of completed and ongoing health evaluation and research studies				Research	None	\$ 1,000
15.3.2 Hold regularly National conference or forum for dissemination and discussion of health research and evaluation findings				Research	None	\$ 42,000
15.3.3 Develop policy briefs from the completed research and evaluation findings				Research	None	\$ -
15.3.4 Organize the conduct of annual health research symposium with involvement of stakeholders for health				Research	None	\$ -
15.3.5 Subscribe to peer review journals to enhance research publication				Research	None	\$ 5,000
15.3.6 Develop policy briefs on research findings for decision making				Research	None	\$ -
15.3.7 Produce bi-annual health sector bulletin				Research	None	\$ 5,000
15.3.8 Procure equipment and technologies to enhance use of research repository				Research, ICT	None	\$ 8,000
15.4. Establish routine dissemination paths for actionable information products and health research (e.g. dashboards	, reports	s, popu	lation	surveys) to inte	ernal and extern	al
stakeholders in a timely manner for decision making and alerting the public of an emerging health issue						
15.4.1 Design information products tailored to different audiences and a dissemination schedule				HMER	CSH, JHU	\$ 124,000
15.4.2 Design and develop "scorecards" for supportive supervision				FMIS	None	\$ 25,000
15.4.3 Develop/Adopt Reference Data and Metadata (eg: unique Identifier codes, etc.)				ICT	None	\$ 5,000
15.4.4 Design data use calendar to guide the timetable for major data collection efforts and reporting requirements.				HMER	None	\$ 7,000
15.4.5 Develop information products to facilitate lab centered analysis and dissemination paths for such products				HMER	ACCEL	\$ 5,000
15.4.6 Development of information products, specifically eDEWS dashboard to provide information on disease alerts				HMER	WHO	\$ 15,000
15.4.7 Develop information product for gCHVs/CHWs to use the data they collect				HMER, CHSD	IRC PACS	\$ 30,000
15.4.8 Increase data visibility and information use at central and county level: Institute feedback mechanism (data analysis, capacity building)				HMER	CSH, JHU	\$ 15,000
				HMER, DPC,	CSH, JHU, PACS,	\$ 100,000
15.4.9 Provide technical support to produce dashboards to integrate HMIS and other subsystems for programmatic and situational awareness uses at national level				Programs	WHO	\$ 100,000

15.4.11 Train supervisors at all levels on the feedback format and products	Research	CSH, PACS	\$ 7,000
15.4.12 Increase data visibility and information use at central and county level: data dissemination and feedback workshop for the different levels as appropriate -	HMIS	CSH	\$ 21,000
central, counties and health facilities) 15.4.13 Establish feedback mechanisms of HIS products to the health facility	HMIS	WHO	\$ 20,000
15.5. Improve dissemination of National Health Accounts (NHA) findings to MOH staff and wider stakeholders group	Tilviio	WIIO	Ψ 20,000
15.5.1 Create platform to host NHA and other expenditure reports on the system	HRF	None	\$ 4,000
15.5.2 Printing of NHA results	HRF	None	\$ 1,000
15.5.3 Disseminate NHA reports (flyers, brouchers and table to partners)	HRF	None	\$ 1,000
15.5.4 Publish every 6 month NHA reports in one or two local daily	HRF	None	\$ 1,000
SO16 To regularly monitor and evaluate the implementation targets of the HIS strategic plan			
16.1. Continuous monitoring and evaluation of the Strategic Plan and Operational Plan against the milestones			
16.1.1 Develop a detailed performance monitoring plan	M&E Unit	CSH	\$ 7,000
16.1.2 Production of monthly progress reports	M&E Unit	CSH	\$ 50,000
16.1.3 Regularly prepare HMER TWG agenda for HIS discussions	M&E Unit	JHU	\$ 10,000
16.1.4 Plan and conduct quarterly field supervision of HIS related staff in the field regarding data collection and storage	M&E Unit	None	\$ 8,000
16.1.5 Plan and conduct a mid-term review of 2016-2021 HIS Strategy Plan	M&E Unit	JHU	\$ 15,000
16.1.6 Conduct national integrated HMER capacity Assessment using MESST	M&E Unit	CSH	\$ 15,000
16.1.7 Analyze data on HIS plans to support MOH decisions on HIS design, implementation, and evaluation, and for ongoing support for discussion with partners.	M&E Unit	JHU	\$.
16.1.8 M&E of community health workforce plan	M&E Unit	LMH, PACS	\$ 2,000
16.1.9 Contribute to lab strategic plan for M&E indicators	M&E Unit	WHO	\$ 5,000
16.1.10 Support and build capacity of MOH staff to conduct routine audits of IDSR and HMIS using monitoring and evaluation frameworks and tools.	M&E Unit	CSH, JHU	\$ 45,000
16.2. Monitor and evaluate partner workplans and compare against HIS milestones	maz om	0011, 0110	ψ .0,000
16.2.1 Collect data from government and external partners on activities and plans for HIS	M&E Unit	JHU	\$ 10,000
16.2.1 Collect data from government and external partners on activities and plans for HIS 16.2.2 Conduct quarterly meetings with HIS related implementing partners	M&E,		\$ 10,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners	M&E, HMERCC	JHU None	\$ 10,000 \$ 10,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health research and it	M&E, HMERCC	None	
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality	M&E, HMERCC	None	
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health research and it	M&E, HMERCC	None	
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality	M&E, HMERCC ealth action assurance on research	None for health	\$ 10,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. 17.1 Develop Research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality. 17.1.1 Hire local consultant to conduct literature review and compile outstanding health issue that needs to be further investigated.	M&E, HMERCC ealth action assurance on research Research	for health None	\$ 10,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. 17.1 Develop Research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality of the local consultant to conduct literature review and compile outstanding health issue that needs to be further investigated 17.1.2 Conduct situational analysis to inform the development of research policy and plan, guidelines and SOPs	M&E, HMERCC ealth action assurance on research Research Research	for health None None	\$ 1,000 \$ 9,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. To be provide the governance, management, and coordination of health research and its translation to public health. To be provided the provided that the public health is translation to public health. To be provided the provided that the provided that the provided has been described and consultant to conduct literature review and compile outstanding health issue that needs to be further investigated. 17.1.2 Conduct situational analysis to inform the development of research policy and plan, guidelines and SOPs. 17.1.3 Review, Update and validate the development of research policy and plan and guidelines.	M&E,	for health None None None	\$ 1,000 \$ 9,000 \$ 30,000 \$ 21,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. 17.1 Develop Research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality. 17.1.1 Hire local consultant to conduct literature review and compile outstanding health issue that needs to be further investigated. 17.1.2 Conduct situational analysis to inform the development of research policy and plan, guidelines and SOPs. 17.1.3 Review, Update and validate the development of research policy and plan and guidelines. 17.1.4 Hold multisectoral stakeholders workshop to review and update existing research priorities for health. 17.1.5 Print and disseminate existing and new research legislations. 17.1.6 Conduct a two day research planning workshop to develop a research agenda.	M&E, HMERCC ealth action assurance on research Research Research Research Research Research	for health None None None None	\$ 1,000 \$ 9,000 \$ 30,000 \$ 21,000 \$ 1,000 \$ 7,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. 17.1 Develop Research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality. 17.1.1 Hire local consultant to conduct literature review and compile outstanding health issue that needs to be further investigated. 17.1.2 Conduct situational analysis to inform the development of research policy and plan, guidelines and SOPs. 17.1.3 Review, Update and validate the development of research policy and plan and guidelines. 17.1.4 Hold multisectoral stakeholders workshop to review and update existing research priorities for health. 17.1.5 Print and disseminate existing and new research legislations.	M&E, HMERCC ealth action assurance on research Research Research Research Research Research Research	for health None None None None None None None	\$ 1,000 \$ 9,000 \$ 30,000 \$ 21,000 \$ 1,000
16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. To improve the governance, management, and coordination of health research and its translation to public health. To improve the governance, management, and coordination of national standards, accreditation, and quality. To improve the governance review and Agenda to enhance the implementation of national standards, accreditation, and quality. To improve the governance review and compile outstanding health issue that needs to be further investigated. To improve the development of research policy and plan, guidelines and SOPs. To improve the development of research policy and plan and guidelines. The low improvement of the development of research policy and plan and guidelines. The print and disseminate existing and new research legislations. The conduct a two day research planning workshop to develop a research agenda. The print 100 copies of research and distribute to HIS partners. The print 100 copies of research and distribute to HIS partners. The chnical Review and the development of research policy and plan.	M&E, HMERCC ealth action assurance on research	for health None None None None None None None None	\$ 1,000 \$ 9,000 \$ 30,000 \$ 21,000 \$ 1,000 \$ 7,000
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S017 To improve the governance, management, and coordination of health research and its translation to public health. 17.1 Develop Research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality. 17.1.1 Hire local consultant to conduct literature review and compile outstanding health issue that needs to be further investigated. 17.1.2 Conduct situational analysis to inform the development of research policy and plan, guidelines and SOPs. 17.1.3 Review, Update and validate the development of research policy and plan and guidelines. 17.1.4 Hold multisectoral stakeholders workshop to review and update existing research priorities for health. 17.1.5 Print and disseminate existing and new research legislations. 17.1.6 Conduct a two day research planning workshop to develop a research agenda. 17.1.7 Print 100 copies of research and distribute to HIS partners. 17.1.8 Technical Review and the development of research policy and plan.	M&E, HMERCC ealth action assurance on research	for health None	\$ 1,000 \$ 9,000 \$ 30,000 \$ 21,000 \$ 7,000 \$ 1,000
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16.2.2 Conduct quarterly meetings with HIS related implementing partners S017 To improve the governance, management, and coordination of health research and its translation to public health. Translation to public health research Policy, Plan, and Agenda to enhance the implementation of national standards, accreditation, and quality. 17.1.1 Hire local consultant to conduct literature review and compile outstanding health issue that needs to be further investigated 17.1.2 Conduct situational analysis to inform the development of research policy and plan, guidelines and SOPs 17.1.3 Review, Update and validate the development of research policy and plan and guidelines 17.1.4 Hold multisectoral stakeholders workshop to review and update existing research priorities for health 17.1.5 Print and disseminate existing and new research legislations 17.1.6 Conduct a two day research planning workshop to develop a research agenda 17.1.7 Print 100 copies of research and distribute to HIS partners 17.1.8 Technical Review and the development of research policy and plan 17.2 Strengthen MOH ownership, leadership, and conduct of design and implementation of population based surveys and health 17.2.1 Conduct SARA and data quality assessment 17.2.2 Support the conduct of malaria indicator surveys 17.2.3 Support the conduct of malaria indicator surveys 17.2.4 Invesigate the Impact of EVD on gCHVs: qualitative assessment 17.2.5 Health System strengthening: A case study of the role of gCHVs in Child nutrition 17.2.6 Assessing the effectiveness of health care delivery: tracking a cohort of mother and baby pair from pregnancy through childhood 17.2.7 Support risk mapping among high risk population related to Malnutrition and poverty	M&E, HMERCC Pealth action assurance on research	None None None None None None None None	\$ 10,000 \$ 9,000 \$ 30,000 \$ 1,000 \$ 1,000 \$ 12,000 \$ 100,000 \$ 30,000 \$ 10,000
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17.3.4 Produce bi-annual health sector bulletin and dashboards			Research	JHU	\$ 50,000
17.3.6 Establish health research repository			Research	None	\$ 50,000
17.3.8 Develop cross cutting analytics to use information across different thematic areas			HMIS	None	\$ -
17.3.9 Train health managers on the use of health research repository			Research	None	\$ 50,000

Annex H: Inventory of On-Going and Planned HIS Strengthening Efforts

Note: The below inventory consist of reported activities from key partners as of February 2016. For a more up to date and comprehensive mapping please refer to the HMER unit or External AID.

HIS Strategic Intervention	Partner Activities	Funder	Implementing Partner	Timeframe	Location	Beneficiary
	Work with MOH to develop 2016-2021 HIS Strategic Plan and 2015-2017 Operational Plan. Activities include conducting validation workshop and presentation of draft plans to the members of HSCC	USAID	MEASURE Evaluation	2016 Q1	National	HMER central level staff
	Support the MOH in the development of SOPs as related to CBIS	USAID	PACS; LMH; UNICEF	2016 Q3	National	Dept.of Com
	Conduct Technical Review of HIS data quality SOPs available	USAID	CSH	2016 Q2	National	HMER
	SOPs for how laboratory results are sent to the Ministry, data management at the laboratory and data flow of lab results to the MoH	EERP - WB	WHO	2016 Q2 - onging	Across lab networks	MOH lab team
1.1 Develop, implement, and disseminate SOPs and policy guidelines	Development of SOPs for the operation of eDEWS for end users for managerial purposes	WHO	WHO	2016 Q3	National	МОН
for all HIS functions including health research, ICT infrastructure, and	SOPs and policy guidelines for mHero and iHRIS	USAID	IntraHealth	2015 Q1 - 2016 Q2	National	HMIS Unit, HR/Personnel Unit
HIS subsystems	SOPs on mHERO supporting the MoH; how to use this within the Ministry; who should approve dissemination		UNICEF	2015 Q2 - ongoing		
	Contribute to iHRIS SOP with an Objective of meeting MOH - Health Worker Program(HWP) routine monitoring needs in a sustainable manner	USAID?	CHAI	TBD	National	MOH WP
	Conduct HIS validation workshop of the HIS Strategic and operational plans	USAID	CSH	2016 Q1	National	stakeholders
	Support the develoment of the HIS strategy and related documents	CDC	JHU	2015 Q3 - 2016 Q2	National	National
	Support the development and implementation of the HIS Strategy, Plan, specifically HMIS, LMIS, and iHRIS; and iFMIS in the long run	USAID	CSH	2016 Q1- 2020 Q4	Central, Bong, Loga, Nimba	
1.2 Establish mechanisms to ensure compliance with legislation adopting International Health Regulations	Define how training occurs for international reporting of laboratory data under IHR		WHO	2016 Q2 - onging	Across lab network	MOH lab team
Develop, strengthen and ensure compliance of legislation on information sharing regarding health workforce, publishing of OFM financial statements, NHA reports, Aid tracking, and other relevant	Data sharing agreements between iHRIS and RapidPro	USAID	IntraHealth	2016 Q1 - Q2	National	HMIS Unit; HR/Personnel Unit
statistical data among public health sector, private sector and health insurance companies	Print and disseminate community health policy and strategic plan		UNICEF	2016 Q3		
	Data sharing agreements between iHRIS and RapidPro	USAID	IntraHealth	2016 Q1 - Q2	National	HMIS Unit, HR/Personnel Unit
cover vital registration, notifiable diseases, private sector data, confidentiality and fundamental principles of official statistics, private health sector hea Ith care providers, etc.		No _l	partner activities reported			
2.1.Establish coordination mechanisms between HMER and MOH	Embed Strategic Information Advisor in M&E Unit	USAID	CSH	2016 Q1	National level	HMER
units, line ministries, and other government agencies to improve coordination on data sharing, development, and implementation of	Assisting with the LIS subgroup under the One Health project; Develop a concept note for how LIS will happen across ministries		WHO	2016 Q3 - unkown	Across lab network	MOH lab team
HIS subsystems including census, FMIS, and HRIS	Strengthen management and coordination capacity at districts and county levels		UNICEF	2015 Q4 - ongoing		
	Set up and facilitate functioning of iHRIS TWG among the HR unit and HMER to establish processes of updating and reviewing iHRIS functionlaity	TBD	CHAI	TBD	National	MOH HWP
	Establish mHero Working Group	USAID	IntraHealth	2016 Q2	National level	Central Level
	Support for DSIS subgroup to report to both HMER and NSTCC TWGs	WHO	WHO	2016 May	National	МОН
	Technical support to the community health M&E subgroup		UNICEF	2015 Q2 - ongoing		
	Involved in the coordination of the HMER LIS subgroup	EERP - WB	WHO	2016 Q1 - unknown	Across lab network	MOH lab team
2.2 Establish a HMER TWG and subgroups to ensure participation of	Establish a small core group to work on lab-related priorities	USAID	CSH	?	National	National
all subsystem stakeholders and coordinate subsystem development,	Support for CBIS M&E Subgroup	USAID	PACS	<u> </u>	National	HMER
piloting, implementation and evaluation	Support for LIS, ICT, Interoperability, DSIS subgroups	CDC	eHealth		National	HMER
	Procure five laptops for HMER unit	USAID	CSH	2016 Q2	National level	HMER
	Support DSIS, Interoperability, LIS, and Core subgroups	CDC	JHU	Ongoing-Q2 2016	National Level	HMER
	Support administration and alignment of the National HIS Technical Committee with the National HIS Strategy in coordination with the HMER unit of MOH	CDC	JHU	2015 Q3- 2016 Q4	National	National
	Support administration and alignment of the National Surveillance Technical Committee with IDSR roll-out in coordination with the DPC unit of MOH and CDC	CDC	JHU	2016 Q3- 2016 Q4	National	National
2.3 Develop and implement clear communications policy with MOH, and for linking MOH with other organizations for data sharing and knowledge management		No _l	partner activities reported		,	

2.4 Establish research partnerships and									
collaboration among research stakeholders to									
enhance the implementation of national standards,	No partner activities reported								
accreditation and quality assurance on research for									
health 3.1 Advocate that budget line items are included									
MOH, and County Budgets to cover HIS and ICT costs	No partner activities reported								
3.2 Advocate for 2% of health budget to cover		No r	partner activities reported						
health research financing									
	Facilitate LMIS mentorship and supportive supervision, training for county and central level supply chain supervisors	USAID	CSH	2016 Q2, 3 &4, 2017 Q1 &2	Central & County Level	Supervisors & SC staff			
4.1. Strengthen the technical capacity of staff involved in the HIS through in-service training in ICT, including competencies in: use and		WHO	WHO	2016 Q2	Bomi, Gbarpolu, Grand Bassa, Monteserrado	DPC data managers, County data managers eDEWS national focal person			
maintenance, GIS, health informatics capacity building (training, coaching, mentoring) especially in the area of developing and	Provide in-service training on health informatics, networking, maintenance, and developing technology for HIE. (questions around whether ad-hoc supervision or standardized curriculum) (Total of 40 participants for 5 days)	CDC	eHealth	2016 Q3, 2017 Q1, Q2	National				
maintaining technology for health information exchange	HIS training will be conducted for MCHT, DHTs and OICs in Montserrado County. It aims to improve data quality of HMIS and LMIS. Detailed plan is available after August 2016	JICA	JICA	TBD (FY 2016/17)	Montserrado County	MCHT, DHTs and OICs			
	Develop basic competencies in ICT equipment and software for lab staff; mentoring for the NRL and all EVD testing labs, desk officers, and lab staff	EERP - WB	WHO	2015 Q3 - ongoing	Across lab network	MOH lab team			
	Health informatics capacity building through training, coaching and mentoring for iHRIS and mHero	USAID	IntraHealth	2015 Q2 - 2016 Q2					
	Conduct training for FETP frontline	CDC	Emory	2016 Q2 - 2017 Q1	Nationwide	МоН			
	Train CHT and DHT to decentralize the use of DHIS2 to district level, improve data quality, increase the use and demand for information at county level	USAID	CSH	2016 Q2 - 2017 Q1	Bong, Lofa, Nimba	HMER			
	Implement a leading and facilitating QI course for leaders	USAID	CSH		Central, CHTs				
	\$134,000 in ongoing TA and mentorship	EERP - WB	WHO	2016 Q1 - 2017 Q1	Across lab network	lab network			
	Train MoH senior leadership in iHRIS data-driven decion-making, strategic planning for HR	USAID	CSH	2016 Q1	МОН	Central Level			
	Train national and county malaria staff on the use of malaria data for programme management	USAID	CSH	2016 Q3 - 2016 Q4	Central	NMCP			
	Data for Use and Data for Decision Training for iHRIS, DHIS2 and mHero	USAID	IntraHealth	2016 Q1 - Q2	National	HMIS Unit/ HR Personnel			
	Training county data managers in data management and reporting	USAID	PACS	2016 Q1-Q2	FARA Counties	CHT			
4.2 Strengthen the technical capacity of all users of HIS in MOH in	Capacity building including coaching and monitoring on results based management for districts and county health teams including partners		UNICEF						
basic competencies in data management, analysis, use of information,	Develop an IT curriculum for lab staff; implement training for lab staff based on procureed ICT and software in use	EERP - WB	WHO	2016 Q3	Across lab network	MOH lab team			
ethics, GIS and the design and conduct of health research	Assess competency needs for lab staff	EERP - WB	WHO	2016 Q4	Across lab network	MOH lab team			
	Assess the competencies (needs and gaps) for managing HMIS and IDSR systems, and to use data (collation, cleaning, analysis, interpretation, and dissemination) from a sample of national, county, district, and health facilities	CDC	JHU	2016 Q3	All levels	All levels			
	Provide training to lab desk officers in: data entry, data quality concepts, disease specific data SOPs, basic excel and access use	CDC	eHealth	2017 Q2	5 Regional Labs	Lab desk officers			
	Data management course for HMER, DPC, and county health teams on IDSR	CDC	JHU, Cuttington	2016 Q3	National, county, district	National, county, district			
	IDSR data analysis course for county and national level technical staff	CDC	JHU, Cuttington	2016 Q3-Q4	National, county, district	National, county, district			
	IDSR data interpretation and use course for county and national level managers and analysts	CDC	JHU, Cuttington	2016 Q4	National, county, district	National, county, district			
	Ethics in public health data security and confidentiality	CDC	JHU, Cuttington	2016 Q3-Q4	National, county, district	National, county, district			
4.3 Strengthen institutional capacity of pre-service programs through	Align the pre-service curriculum for the lab schools to align with needs for LIS	EERP - WB	WHO	2016 Q4	Across lab network	MOH lab team			
curriculum development and resource mobilization for various research activities; including epidemiology, biostatistics, HIS,	Design Masters programs to produce Health managers at the County level who are efficient in management of HIS management	TBD	CHAI	TBD	National	HIS systems			
laboratory system, and software development	Building the capacity of county and district health team to use real time data to assess bottleneck and inform decisions.		UNICEF						
	Develop ToT course with Cuttington University to aid in alignment between pre-service curriculum								

4.4. Recruit and train epidemiologists, biostatisticians, demographers, data clerks, database administrators, computer programmers, lab	Salary support for 1 admin officer for daily tasks, 1 data manager, 1 focal person, 2 developers	WHO	WHO	ongoing	National	мон
technicians to increase capacity of the HIS workforce	Strengthen capacity on mHERO - HMIS division		UNICEF			
	\$29,000 in desk officers	EERP - WB	WHO	as needed - 2017 Q1	Across lab network	lab network
	Recruitment of lab desk officers for public health laboratories (1 per each lab)	CDC	eHealth		5 Regional Labs	5 Regional Labs
	Provide operational support and TA for the MOH ICT and HIS infrastructure (laptops and software; 4 scientific stations, TV monitors, plotter for Situation Awareness room; Google accounts and Google apps)	CDC	eHealth	2017 Q1 - Q2	National	
	Provide TA to MoH ICT and MoH HIS (health information system) as needed	CDC	eHealth	2016 Q1	National	
	Procure laptops for iHRIS	USAID	CSH	2016 Q1-Q2	National & County	HROs
	Procure laptops for CHTs, districts, and health facilities as needed for gaps in FARA	USAID	PACS	2016 Q4		
	Procure ten laptops	USAID	CSH	2016 Q3	Central	HMER, NMCP
	\$22,500 in hardware/software procurement, \$7,000 in internet support	EERP - WB	WHO	2016 Q4 - 2017 Q1	Across lab network	Reference labs
5.1. Procure critical ICT assets, including hardware and software requirements, appropriate for operating the HIS subsystems	Procure ICT equipments to support the operations of mHero/iHRIS (One (1) Server for OpenInfoMan/mHero,One (1) HP LaserJet Duplex Printer/Scanner ;Three (3) Laptop Computers ;Webcams (5))	Funder	IntraHealth	2016 Q1-Q2	National	Central level (ICT Unit, HMIS Unit- mHEro Team)
	Procure ICT assets to support LIS (laptops, etc) (the exact equipment, their quantity and location is yet to be decided)	EERP - WB	WHO	2016 Q3	Across lab network	MOH lab team
	Centralized top-ups to 75 phones (\$30 per month each), 50\$ scratch cards per month for Thuraya, \$40 for each tablet per month	WHO	WHO	2016 Q1-Q2	Bomi, Gbarpolu, Grand Bassa, Montserrado	Pilot facilities
	75 android phones to HFs in pilot, 15 S4 phones, 15 Thuraya sat phones 25 tablets for DSOs, 3 tablets for MOH staff, 4 laptops county level, 1 web server, 1 sms gateway	WHO	WHO	ongoing	National	eDEWS pilot HFs, districts, countries, MOH
	Purchasing ICT infrastructure hardware inputs to sustain the operations of iHRIS and mHero	USAID	IntraHealth	2015 Q2 - 2016 Q2	National	HMIS Unit; HR/Personnel Unit
	Support MOH server infrastructure	CDC	eHealth	2017 Q1	National	
5.2. Develop an ICT strategy to guide acquisition, internet usage, data back-up, manage computer resources, maintenance, and disposal of	Provide STTA for the development of ICT policy and plan	USAID	CSH	2016 Q1 - 2016 Q3	Central	ICT Unit
ICT equipment at all levels	Develop ICT strategy and workplan to build capacity in ICT procurement, maintenance, and functions	CDC	eHealth	2017 Q1	National	HMER and ICT staff
	Provide internet connectivity support to MOH HQ	CDC	eHealth	2016 Q3, 2017 Q4, Q1, Q2	National	
	Provide internet connectivity support to nEOC	CDC	eHealth	2016 Q3, Q4, 2017 Q1, Q2	National	
5.3. Ensure adequate access and maintenance of electricity and	Provide internet connectivity suppport to priority cEOCs	CDC	eHealth	2016 Q1,Q2,Q3,Q4	cEOCs	
internet for management of FMIS, HRIS, LMIS, HMIS, and LIS at all levels	Provide internet connectivity support to identified laborabories: (1) JFK, (2) BONG, (3) TAPPITA, (4) REDEMPTION, (5) LIBR AND (6) ELWA	CDC	eHealth	2016 Q4,2017 Q1,Q2	Hospitals	
	Provision of fuel for the labs	EERP - WB	WHO	2016 Q1 - ongoing	Across lab network	MOH lab team
	Power banks (\$30) 75 phones, 15 S4s, \$30 batteries per month estimates	WHO	WHO	2016 Q1 - TBD		
	Provide internet connectivity support to each of the 15 County Health Teams (CHT)	CDC	eHealth	2017 Q1,Q2	County: All 15	County Health Teams
	Baseline/pilot implementation of BIKA Health LIS to support IDSR pathogens. Production of standard training, support, and implementation procedures	CDC	ACCEL	2016 Q1 - 2016 Q4	Public Health labs	МоН
C 1 learning and an all C to assess the said from this call is all a sublice	Select and validate the choice of LIS platform; part of working group	EERP - WB	WHO	2016 Q2	Across lab network	MOH lab team
6.1 Implement an eLIS to support basic functionality in all public health labs	Develop a basic pilot; defining requirements for the HIS pilot		WHO	2016 Q2 - ongoing	Across lab network	Laboratory network
	Implementation of lab certification, equipment integration, and standardization across all labs. Enable processes for case, patient, and inventory management within the LIS	CDC	ACCEL	2016 Q4 - 2017 Q3	Public health, reference, other labs (i.e. water quality, etc.)	МоН
6.2 Develop interoperability with LIS and DHIS2 and improve flow of information back to health facilities	As DHIS2 is defined and implemented, develop eLIS toDHIS2 data transmission procedures	CDC	ACCEL	2016 Q2 - 2017 Q3	Public health labs	МоН
	Chart the key public health surveillance decisions to be made at national level.	CDC	JHU	2016 Q1	National	National
	Map DSIS needs requirements for expanded functionality	WHO	WHO, JHU	2016 Q2-Q3	Bomi, Gbarpolu, Grand Bassa and Montserrado	Pilot facilities
	Support evaluation of DSIS	CDC	JHU	Ongoing-Q1 2017	National	National
7.1. Design and develop tools to support eWARN and IDSR functions	Data management training on use of back-end eDEWS software, data cleaning and rectification of erroneous entries, creation of backups, verification, basic server management, extracting qualitative data from the eDEWS; presenting the data; and disseminating the information to decision-makers.	WHO	WHO	TBD	Bomi, Gbarpolu, Grand Bassa and Montserrado	County data managers and District Officers in Ppilot facilities
	Pilot test eDEWS	WHO	WHO	2016 Q3 - Q4	Bomi, Gbarpolu, Grand Bassa and Montserrado	
	Build capacity of local developers	WHO	WHO	TBD	Bomi ,Gbarpolu, Grand Bassa and Montserrado	Pilot facilities

7.2 Expand functionality of electronic systems to include broader outbreak functions, and interoperability with laboratory systems and the broader health information system	Expand functionality of electronic systems to include broader outbreak functions specific to LIS. As DSIS is defined and implemented, enable outbreak capabilites to LIS, such as SMS messaging, direct equipment interfaces, automated email interfaces to enable more rapid response.	CDC	ACCEL	2017 Q1 - 2017 Q3		МоН
	Complete integration of VHF Epi-Info, contact tracing forms, and other legacy data into a dataset for retrospective analysis in coordination with MOH, WHO and CDC	CDC	JHU	2016 Q3	National	National
7.3. Improve information on disease status in the country	Support the Survivor Networks database management, by assisting the development and use of a database to track clinical and psychosocial needs of the Ebola survivors.	CDC	JHU	2015 Q3 – 2016 Q4	National	National
	Develop, implement and sustain basic functionality of CBIS		LMH	Ongoing	National	National
	Provide data collection forms and collect data		IMH	2016 Q3 - ongoing	TBD	МОН
	Participate in and support training of selected national trainers	USAID	PACS	2016 Q1 - ongoing	County: Bong, Grand Bassa Lofa, Margibi, Nimba, Rural Montserrado	national traniners
8.1 Develop, implement, and sustain basic functionality of CBIS	Develop, implement and sustain basic functionality of CBIS		UNICEF			
	Contribute to the design of community surveillance project, aligned to Strategy of Community Health Worker Program	TBD	CHAI	TBD	National	MOH HWP
	Support for developer to implement a CBIS module in DHIS2; LMH; UNICEF	USAID	PACS	2016 Q3	National	HMER Unit
	Roll out of national community-based health information system from National, County, District, Facility and to Community Levels, including training trainers and managers, producing tools and materials, supervision, mentoring, producing registers, equipment: computers and other e-devices, and reporting	USAID	PACS	2016 Q2 - ongoing	County: Bong, Grand Bassa Lofa, Margibi, Nimba, Rural Montserrado	County Heath Officers, County Trainers, County Data Managers, M&E officers
	Day to day capacity building and mentoring County, District, Facility and Community staff on CBIS (TA to MOH in CBIS to develop scorecards, M&E plans, forms, data collection tools, and other processes)	USAID	PACS	2016 Q2 - ongoing	County: Bong, Grand Bassa Lofa, Margibi, Nimba, Rural Montserrado	District Health Officers, District Surveillance Officers, Data Clerks, EHTs, EPI Supervisors, MCH Supervisors
	Develop community health workers database		UNICEF	2016 Q2		
8.2. Improve capacity to monitor the CHW program and provide	Development of CBIS M&E Framework and related research		LMH	Ongoing	Counties	Counties
feedback at all levels	Supporting MoH to generate data collection and verification and analysis; community health baseline survey, general health volunteer mapping, resilient health system study, mother newborn child health system on the impact of Ebola		UNICEF			
	Coordinate with the National Health Information System and pilot the use of new technology including Mobile live data entering by CHW onto the national system	USAID	PACS	2016 Q1 - ongoing	County:Bong, Grand Bassa Lofa, Margibi, Nimba, Rural Montserrado	CHSD Director and staff, HMIS Coordinator and officers, M&E Director and staff
9.1 Expand HRIS functionality, indicators, and use at subnational levels	Regular mentoring for: iHRIS and mHero operations, development of iHRIS and mHero management and governance documents, and implementation of iHRIS HIS Strategic Plan (includes mHero)	USAID	IntraHealth	2016 Q1-Q2	National level	HMIS Unit, HR Unit, ICT Unit
	Retraining MOH HR staff at Central and Country levels to improve skills development for use of iHRIS (tracking, report generation, analysis, HR dashboard, etc.) to explore the full functionality of iHRIS	USAID	CSH	2016 Q1 - Q2	All levels	HROs, HMER
	Conduct training in core strategic HR functions and HR Records Management at Central and Country levels	USAID	CSH	2016 Q1 - Q3	Bong, Nimba, Lofa	HROs, HMER
	Training on iHRIS to county HROs	USAID	CSH	2016 Q1	National level	Co. HR officers; M&E officers
	Mentoring to HROs in target counties	USAID	CSH			
	Provide support for full functionality of the iHRIS at county level for tracking HCWs and providing reports for HR decision-making	USAID	CSH	2016 Q3 - 2017 Q1		
	Assess iHRIS design and Architecture to incorporate MOH HWP critical indicators	TBD	CHAI	TBD	National	MOH HWP
	iHRIS/mHero Team Operational Costs: Communication credit, office supplies, ect.	USAID	IntraHealth	2016 Q1 - May	National Level	Central Level: HMIS Unit (in particular iHRIS/mHero Team)
	Support for field visits to raise awareness on mHero and provide supportive supervision for iHRIS operations	USAID	IntraHealth	2016 Q2	National level; Selected Counties (TBD)	HMIS Unit, HR Unit
	Conduct iHRIS/mHero Training of Trainers	USAID	IntraHealth	2016 Q1	National level	Central Level Trainers
	Operations support for mHero/iHRIS implementation: Communication, office supplies, ect	USAID	IntraHealth	2016 Q1-Q2	National level	HMIS Unit
9.2 Develop tools such as mHero to establish two-way engagement with the health workforce	Conduct mHero sustainability planning working sessions	USAID	IntraHealth	2016 Q2	National level	HMIS Unit, HR Unit, ICT Unit, Central Level Decision Makers
	Use mHERO to validate the records in HRIS		UNICEF			
	Development and Distribution of mHero Awareness Raising Materials	USAID	IntraHealth	2016 Q1	National level; Selected Counties (TBD)	County Health Teams
	Contribute to the design and implementation of the perfomance management system as a crucial system informing the evaluation of the Health Worker Program	TBD	CHAI	TBD	National	MOH HWP
	iHRIS/mHero Data for Decision Making Training	USAID	IntraHealth	2016 Q2	National level	HRIS Users, Central Level Decision Makers

	Customizations to iHRIS for Strategic Report Development	USAID	IntraHealth	2016 Q2	National level	HRIS Users, Central Level Decision Makers
	Explore iHRIS train and iHRIS qualify for pre service trainings in addition to in service trainings	TBD	CHAI	TBD	National	MOH HWP
	Providing the mHERO platform; pay for SMS and the technical support		UNICEF			
9.3. Extend use of HRIS for performance management, monitoring raining and competencies, and reporting on socioeconomic status of	Technical materials development for HRIS/mHero roll out (i.e. End User training); Decentralization planning, tools, ect for HRIS/Merho roll out; Conducting customizations to iHRIS for data use	USAID	IntraHealth	2015 Q2 - 2016 Q2	National level	HMIS Unit HR/Personnel Unit
the health workforce	Contribute to the adoption and design of iHRIS as a reporting tool to enhance HW welfare planning	TBD	CHAI	TBD	National	MOH HWP
	iHRIS customizations for socio-demographic and economic characteristics reports	USAID	IntraHealth	2016 Q1 - Q2	National level	HMIS Unit HR/Personnel Unit
	Set up systems for using iHRIS for routine monitoring processes in the HWP and beyond	TBD	CHAI	TBD	National	MOH HWP
	iHRIS customizations for availability, distribution, competence and skills mix reports	USAID	IntraHealth	2016 Q1 - Q2	National level	HMIS Unit HR/Personnel Unit
	Assist the MOH in implementing DHIS2	CDC	eHealth	2016 Q2	Nationa: DHIS2 Training County: 40 participants (2 per county)	
	Provide DHIS2 training	CDC	eHealth		MOH - HMER?	
	Supporting the Ministry in HMIS data collection; provided training; financial support for technical staff (will come back with more details)		UNICEF			
	Provide DHIS2 districts, internet, laptops or ICT assets as needed	USAID	PACS		FARA Counties	FARA
10.1. Expand HMIS functionality at all levels, including improving	Support the training and rollout of HMIS revised training manual	USAID	CSH	2016 Q1	National, county level	HMER
accessibility of the DHIS2 web-portal to districts	Support the Conduct of TOT training for HMIS reporting tools (Ledgers and Forms)	USAID	CSH	2016 Q1	National level	HMER
	Conduct training and rollout of HMIS reporting tools (Ledgers and Forms)	USAID	CSH	2016 Q1	Bong, Lofa, Nimba	clinicians, DHOs, data clerks, supervisors
	Provide support for county/district Quarterly review meeting	USAID	CSH	2016 Q1	Bong, Lofa, Nimba	DHT, Clinician, supervisors
	Support the Conduct of training of the reference book and rollout at county level (supported counties)	USAID	CSH	2016 Q1	National level	HMER
	Train County Data Clerks on the use of DHIS2	USAID	CSH	2016 Q1	Bong, Lofa, Nimba	M&E, data clerks
	Support the revision of HMIS training manual	USAID	CSH	2016 Q1	National level	HMER
10.2 Update core indicators to reflect national M&E plan and MOH strategies	Print MoH performance indicator reference handbook for MoH core indicators	USAID	CSH	2016 Q1	National level	HMER
10.3 Develop and disseminate HMIS Data Reference book	Support the training and rollout of HMIS revised training manual	USAID	CSH	2016 Q1 - Q3	Bong, Nimba, Lofa	HMER
	Finalize LMIS revision (processes and tools)	USAID	CSH	2016 Q2	Central	SCMU, SC Partners
	Provide training (ToT and rollout) for LMIS	USAID	CSH	2016 Q1 - Q3	Central	LMIS
	Conduct validation meeting and agree on the revised LMIS with stakeholders	USAID	CSH	2016 Q2	Central	SCMU, LMIS TWG
	Support reporting through existing LMIS system (while the system is being redesigned)	USAID	CSH	2016 Q2 - 2016 Q4	Central	LMIS
	Print copies of the redesigned LMIS tools (initial one year need nationwide; 657 health facilities)	USAID	CSH	2016 Q2	Montserrado, Bomi, Cape Mount, Margibi, G. Bassa, G. Gedeh, Bong, Nimba & Lofa	OIC, Dispensers, Pharmacists
	Support redesign and implementation, and reporting of LMIS	USAID	CSH	2016 Q1 - Q3	Central	LMIS
	Develop use case, system case and data dictionery for eLMIS (requirements defined) including facility and product master data list	USAID	CSH	2016 Q1 - Q2	Central	SCMU, HIS/HMIS
	Select open source platform for the development of eLMIS that guarantees interoperability with other HIS platforms such as DHIS2	USAID	CSH	2016 Q1 - Q2	National Level	SCMU, HIS/HMIS
	Procure IT infrastructures (computers, internet, server)	USAID	CSH	2017 Q1 - Q2	National Level	SCMU, HIS/HMIS
	Develop user manual for eLMIS	USAID	CSH	2016 Q3 - Q4	National Level	SCMU, HIS/HMIS
11.1. Develop, implement, and sustain basic functionality of LMIS	Install and train staff in eLMIS platform (for user acceptant test)	USAID	CSH	2017 Q1 - Q2	Central & County Level	SCMU, HIS/HMIS
,	Conduct user acceptance testing for all features, receive and accommodate feedback	USAID	CSH	2017 Q1	Central & County Level	SCMU, HIS/HMIS
	Piloting System	USAID	CSH	2017 Q1	Central & County Level	SCMU, HIS
	Develop LMIS operational plan as sub-component of HIS, validate and sign off	USAID	CSH	2016 Q1	National Level	SCMU, HIS/HMIS
	Develop/revise training materials and SOPs for manual LMIS	USAID	CSH	2016 Q1 - Q2	National Level	SCMU
	Conduct training of trainers on the revised systems and tools (manual LMIS)	USAID	CSH	2016 Q2	County Level	Pharmacists
	Plan, coordinate and facilitate LMIS rollout training in phases to health facilities (manual LMIS)	USAID	CSH	2016 Q2 - Q4	County Level	OIC, Dispensers, Pharmacists
	Develop supportive supervesrion tools and disseminate	USAID	CSH	2016 Q2	Central & County Level	SCMU

	Conduct phase II rollout (selected health facilities)	USAID	CSH	2017 Q2	National Level	SCMU, HIS/HMIS, HF SC staff
	Conduct TOT for eLMIS trainers	USAID	CSH	2017 Q1 &2	Central & County Level	SCMU, HIS/HMIS, Pharmacists
	Conduct phase 1 rollout training on eLMIS to data officers (County and Central)	USAID	CSH	2017 Q1 &2	Central & County Level	SCMU, HIS/HMIS, Pharmacists
	Go live (Phase I)	USAID	CSH	2017 Q1 &2	Central & County Level	SCMU, HIS/HMIS, CHT
	Finalize Categorization of SCM products by facility type (essential medicines, programs' commodities, IPC, laboratories, community health services)	USAID	CSH	2016 Q2	Central	SCMU, SC Stakeholders
	Define requirements for Phase II (eLMIS)	USAID	CSH	2017 Q1 &2	National Level	SCMU, HIS/HMIS
	Facilitate coordination between CBIS and LMIS and ensure community commodities are included		LMH	-		МОН
11.2 Ensure LMIS covers community level commodities	in LMIS when appropriate	CDC	LIVIH	TBD	National	MOH
	Categorize SCM products by facility type (essential medicines, programs' commodities, IPC, laboratories, community health services)	USAID	CSH	2016 Q1 - Q3	Central	LMIS
11.3. Develop a database on infrastructure (building and equipment) based on the master facility list		No pa	artner activities reported	<u>'</u>	'	
·	Contribute to interoperability of platforms, specfically between payroll and iHRIS	TBD	CHAI	TBD	National	MOH HWP
12.1 Establish interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS for tracking of health workers payroll	Provide technical assistance as requested for the interoperability between iHRIS, CSA and FMAS payroll system, and iFMIS	USAID	IntraHealth	2015 Q2 - 2016 Q2	National	HMIS Unit HR/Personnel Unit
12.2. Ensure that admin PBF indicators as well as data on funds transferred are recorded and tracked in HMIS on a regular basis	Provide STTA to estblish to develop the admin PBF indicators as well as data on funds transferred tracking in HMIS (DHIS2) on a regular basis	USAID	CSH	2016 Q3	National	HMER
12.3. Establish and ensure regular update of tracking database on Partner's projects	Collect data from government and external partners on activities and plans for HIS and specifically for IDSR	CDC	JHU	2016 Q1-Q3	National	National
Partner's projects 12.4.Strengthen capacity of central, county and facility-based financia	Provide training for central, county and facility-based financial managers to track expenditures via	USAID	CSH	2016 Q4	National and County	PBF unit
managers to track expenditures via FMIS	Recruit, orient and embed a Helath Finance Advisor in the HFU (local hire)	USAID	CSH	2016 Q2	National	HFU
	Provide STTA to develop (a roadmap and design) interoperatbility of information subsystems	USAID	CSH	2016 Q1	National level	HMER
13.1. Establish necessary software linkages and standardization of	Development of paper based unique ID system to aid in linkages between DSIS and LIS	EERP - WB	WHO	2016 Q2	Across lab network	MOH lab team
data sources for interoperability	Support iHRIS interoperability with RapidPro and DHIS2 following OpenHIE standards	USAID	IntraHealth	2015 Q2 - 2016 Q2	National	HMIS Unit HR/Personnel Unit
	Supporting iHRIS and RapidPro back up cloud servers for interoperability	USAID	IntraHealth	2016 Q1-Q2	National	HMIS Unit HR/Personnel Unit
13.2 Procure and establish necessary hardware and software for interoperability	Contribute to the the interoperability leadership team for intergration of LIS with other HIS components	EERP - WB	WHO	2016 Q4	Across lab network	MOH lab team
	Contribute to support interoperability of platforms keeping iHRIS at the centre	TBD	CHAI	TBD	National	MOH HWP
	Participate in activities related to the establishment of an Interoperability Leadership Team; Provide technical assistance as requested	USAID	IntraHealth	2016 Q1 - Q2	National	HMIS Unit; HR/Personnel Unit
13.3. Develop and validate a HIS architecture and interoperability	Support use case development and coordination to inform interoperability road map	CDC	JHU		National	National
roadmap and use case prioritization for system integration between DSIS, LIS, FMIS, iHRIS, CSA, HMIS, CBIS, and LMIS	Rapid assessment of health information exchange architecture	CDC	IntraHealth		National	National
DSIS, EIS, FIVIIS, ITINIS, CSA, FIVIIS, CBIS, ATU LIVIIS	Participate in activities related to the establishment of a use case prioritization processes; Provide technical assistance as requested	USAID	IntraHealth	2016 Q1-Q2	National	HMIS Unit; HR/Personnel Unit
	Developing interoperability between DSIS and LIS	EERP - WB	WHO	2016 Q4	Across lab network	MOH lab team
	Provide STTA to develop (a roadmap and design) interoperability of information subsystems	USAID	CSH			
13.4 Develop master facility registries and universal patient IDs to improve patient tracking	Explore addition of labs to the global facility registry	EERP - WB	WHO	2016 Q3	Across lab network	MOH lab team
, ,	Support the analysis and integration of the HW census into the master facility registry and iHRIS	CDC	JHU	2016 Q2	National	National
13.5 Identify areas for the appropriate use of mHealth interventions	Supporting mHERO; supporting MoH on mobile technology to validate CHW records		UNICEF	2016 Q3		
and develop a mHealth strategy and SOP for all levels	Identification of Use Cases for mHero. Development of mHero Strategy and SOPs	USAID	IntraHealth	2015 Q2 - 2016 Q2	National	HMIS Unit; HR/Personnel Unit
	Institutionalization of mobile data collection		UNICEF			
14.1. Develop a strategy to guide data acquisition, security, DRP,	Provide technical to develop strategy to guide data acquisition, security, DRP, confidentiality, IPR rights and disposal at all levels	USAID	CSH	2016 Q4	National Level	HMER
confidentiality, IPR rights and disposal at all levels	Development of MOUs for data sharing and assets	WHO	WHO	2016 Q1	National	МОН
	Developing SOPs for privacy and ethics in the lab; potentially involved in training	EERP - WB	WHO			
14.2. Address key MOH ICTit	Provide STTA for the development of ICT policy and plan	USAID	CSH	2016 Q3	National level	HMER
14.2. Address key MOH ICT security vulnerabilities	Provide antivirus software to all levels	CDC	eHealth		National	All ICT assets
14.3. Develop meta data dictionary for all HIS data sources based on	Supporting all line ministries on meta data through Liberiainfo Database		UNICEF			
national and international standards and requirements	Provide technical support to develop meta data dictionary for all HIS data sources based on national and international standards	USAID	CSH	2016 Q1	National Level	HMER

14.4. Establish a central data warehouse at MOH HQ and County levels		No parti	ner activities reported			
	Day to day capacity building and mentoring County, District, Facility and Community staff on data quality asessments	USAID	PACS	2016 Q2 - ongoing	County Districts: Bong, Grand Bassa Lofa, Margibi, Nimba, Rural Montserrado	District Health Officers, District Surveillance Officers, Data Clerks EHTs, EPI Supervisors, MCH Supervisors
	Pilot data quality platform for validation and verification of IDSR data	WHO	WHO	2016 Q2	Bomi ,Gbarpolu, Grand Bassa and	Pilot facilities
	Training lab staff on data quality assurance	EERP - WB	WHO	2016 Q1 - ongoing	Across lab network	MOH lab team
	Conduct training workshop for county data clerks and M&E officers on the use of the data validation HMIS tool to be used for verification/validation for NON FARA facilities	USAID	CSH	2016 Q1 - Q2	Bong, Lofa, Nimba	District data clerks
5.1 Develop and implement a standardized system for data quality	Develop LMIS routine data quality SOPs	USAID	CSH	2016 Q3	National Level	SCMU, HIS/HMIS
assurance at all levels	Facilitate LMIS data quality feedback meetings	USAID	CSH	2016 Q3,4, 2017 Q1 &2	Central & County Level	SCMU, HIS/HMIS
	Strengthen LMIS data quality assurance at all levels	USAID	CSH	2016 Q3,4, 2017 Q1 &2	Central & County Level	SCMU, HIS/HMIS
	Provide Technical Support for counter verification/validation for FARA sub-contracts	USAID	CSH	Every six months	Bong, Lofa, Nimba	County M&E, HMER
	Conduct County data validation to Non FARA facilities	USAID	CSH	Quarterly	Bong, Lofa, Nimba	County M&E & Supervisors
	Support the Conduct of TOT training for HMIS reporting tools (Ledgers and Forms)	USAID	CSH	2016 Q1 - Q3	Central	HMER
	Provide STTA to support to revision of HIS standard operating procedures on data collection and					
	quality control for Health facility, County and Central level Provide technical support to develop and implement a standardized system for data quality	USAID	CSH	2016 Q2 - Q4	Bong, Nimba, Lofa	HMER
	assurance at all levels	USAID	CSH	2016 Q3	National Level	HMER
	Day to day Capacity building and mentoring in updating dash boards and producing quarterly statistical reports	USAID	PACS	2016 Q2 - ongoing	County: Bong, Grand Bassa Lofa, Margibi, Nimba, Rural Montserrado	County Heath Officers, County Surveillance Officers, County Trainers, County Data Managers M&E officers
	Provide technical support to develop quarterly scorecard for health facilities kept at county level	USAID	CSH	2016 Q3	Bong, Lofa, Nimba	M&E
15.2 Develop and implement performance based indicators that	Develop and integrate quality indicators into the HMIS and PBF	USAID	CSH	2016 Q2	Central	PBF unit
capture the usage and display of maps and graphs at the counties, districts and facilities	Increase data visibility and information use at central and county level: data dissemination and	USAID	CSH	2016 Q1 - 2020 Q1	Central, Bong, Nimba,	HMER
	feedback workshop for the different levels as appropriate - central, counties and health facilities)				Lofa	
	Establish feedback mechanisms of HIS products to the health facility	EERP - WB	WHO	2016 Q1 - ongoing	Across lab network	MOH lab team
	Determine use cases for data use between HIS subsystems for situational awareness room and dashboards at national level	CDC	JHU	2016 Q3-Q4	County	County
	Develop analysis toolkits to process and visualize data from IDSR and HMIS to inform decision making at multiple levels	CDC	JHU	2016 Q2	National	National
15.3 Institutionalize and strengthen "research to practice" activities among decision makers	Print MoH performance indicator reference handbook for MoH core indicators	USAID	CSH	2016 Q1	Central	HMER
unong desion makets	Provide technical support to Institutionalize feedback mechanisms (within MOH) regarding HIS related information flows and products	USAID	CSH	2016 Q4	National Level	HMER
.4. Establish routine dissemination paths for actionable information	Establish processes for standardized feedback of IDSR information products to districts for	CDC	JHU	2016 Q1 - Q2	County	County
products and health research (e.g. dashboards, reports, population	informing public health action Provide technical support to produce Dashboard, report at central level	USAID	CSH	2016 Q3	National Level	HMER
urveys) to internal and external stakeholders in a timely manner for decision making and alerting the public of emerging health issues	Establishing feedback mechanism for lab results; data flow from the lab to the Ministry and from	EERP - WB	WHO	2016 Q1 - unknown	Across lab network	MOH lab team
	the ministry back to the county, district and health facility level					IVIOR IAD team
	Improve DHIS2 dashboards for HMIS and CBIS at county and district	USAID	PACS	?	FARA Counties	
	Develop information product for gCHVs/CHWs to use the data they collect	USAID	PACS	?	FARA Counties	CHWS
	Chart the key public health surveillance decisions to be made at county and district level.	CDC	JHU	2016 Q1	County, district	County, district
	Develop information products to facilitate lab centered analysis and dissemination paths for such products	EERP - WB	WHO	2016 Q4	Across lab network	MOH lab team
	D. I. C. C. C. L. C. H. DEMCLIII. II. C. C.	WHO	WHO	2016 Q1 - Q2	National	Partners, DSOs, CSOs, DPC, HMI
15.5 Improve dissemination of National Health Accounts (NHA) findings to MOH staff and wider stakeholders group	Development of information products, specifically eDEWS dashboard to provide information on disease alerts					111.450
•	disease alerts Increase data visibility and information use at central and county level: Institute feedback	USAID	CSH	2016 Q1 - 2020 Q1	Bong, Nimba, Lofa	HMER
findings to MOH staff and wider stakeholders group 1.1. Continuous monitoring and evaluation of the Strategic Plan and	disease alerts Increase data visibility and information use at central and county level: Institute feedback mechanism (data analysis, capacity building)	USAID	CSH CSH	2016 Q1 - 2020 Q1 2016 Q1 - Q3	Central, Bong, Nimba,	HMER
findings to MOH staff and wider stakeholders group	disease alerts Increase data visibility and information use at central and county level: Institute feedback mechanism (data analysis, capacity building)		CSH			
findings to MOH staff and wider stakeholders group 1.1. Continuous monitoring and evaluation of the Strategic Plan and	disease alerts Increase data visibility and information use at central and county level: Institute feedback mechanism (data analysis, capacity building) Conduct national integrated HMER capacity Assessment using MESST	USAID			Central, Bong, Nimba, Lofa FARA Counties Bomi ,Gbarpolu, Grand	HMER
findings to MOH staff and wider stakeholders group 5.1. Continuous monitoring and evaluation of the Strategic Plan and	disease alerts Increase data visibility and information use at central and county level: Institute feedback mechanism (data analysis, capacity building) Conduct national integrated HMER capacity Assessment using MESST M&E of community health workforce plan	USAID	CSH PACS	2016 Q1 - Q3	Central, Bong, Nimba, Lofa FARA Counties	HMER FARA

	Evaluation of HIS pilots, projects, and scaling notably external evaluation of health information system software platforms, notably eDEWS, for appropriateness, conformity to IDSR frameworks, and quality and completeness of data.	CDC	wнo	2016 Q1- Q4	National	National
16.2. Monitor and evaluate partner work plans and compare against HIS milestones and provide accountability	Conduct annual reviews to align with partner workplans		UNICEF			
17.1. Develop research strategy plan to identify, prioritize, fund and	Technical assistance to review and finalize the development of the draft research and policy plan	USAID	CSH		National	
execute public health research	Technical Review and the development of research policy and plan	USAID	CSH	2016 Q2	National level	HMER
17.2. Strengthen MOH ownership, leadership, and conduct of the design and implementation of population based surveys and health research	Conduct baseline for community based HH and mapping		UNICEF	2015 Q3 - 2016 Q1		
17.3 Establish a situational awareness room to integrate streams of information and serve as a center for data science for the MOH	Develop algorithms to integrate data streams from IDSR and disparate HIS subsystems and external sources into a single platform	CDC	JHU	2016 Q3-Q4	National	National
	Support construction of situational awareness room, including infrastructure and hardware	CDC	eHealth	2016 Q2	National	National

Annex I – Institutional Capacity Building Action Plan

Introduction

Building the capacity of local institutions, such as Ministry of Health, NGOs, and Universities, minimizes reliance on external technical assistance, increases country ownership, and boosts the sustainability of the overall health system. This important process requires transferring *both* technical expertise and effective management capacity. These institutions, however, may not be able to meet all their needs in the short term, and external technical assistance will still be necessary.

The United States Agency for International Development's (USAID) commitment to help countries improve health outcomes through strengthened systems, specifically through capacity building, reflects in its latest efforts to promote health and development around the world. The United States Government (USG) Global Health Initiative (GHI) launched in 2009, is one of the chapters in US efforts to promote health and development around the world. The key principles of the initiative include, encouraging country ownership, investment in country led plans, and building sustainability through health systems strengthening.

Past Efforts in Capacity Building

In Liberia, MOH through support from USAID-RBHS implemented various interventions to strengthen HMIS with regard to the production of quality data and the use of HMIS information for decision making. The interventions were focused on: improving individual staff capacity; creating organizational environment conducive to the use of information for decision making; and improving the system components required for HMIS functionality. Focusing on all three levels enables the health sector to improve its performance resulting in improved health outcomes for Liberia. Enormous work in the past two years has gone into building individual staff capacity on HMIS and M&E both at HMER division of MOHSW and the county level. For example, M&E staff from 15 counties were trained in using DHIS 2, beyond data entry and transmission, to perform data verification, data analysis, and prepare graphs highlighting performance and trends in key indicators. In addition, emphasis was given to build individual staff capacity to use information for decision making. Trainings were also provided to the central level MOHSW staff on new features of DHIS2 and its reporting functionalities including: iReport and HTML report to customize reporting; and MySQL PostgreSQL to import and export data from and to DHIS. Additionally, four County M&E Officers from Lofa, Maryland, Montserrado and Nimba including one Central M&E Assistant were sent to international M&E training courses in Ethiopia and Kenya with support from RBHS, MEASURE Evaluation and UNICEF. Likewise, two central M&E staff completed training in Epidemiology and Public Health M&E respectively at master's degree level in Australia and South Africa

With the objective to build **organizational capacity** for information use and M&E, RBHS assisted county health teams to establish, organize and implement routine performance review meetings at health facilities and county levels. This is seen as important forum to practice analysis, sharing and use information for performance improvement. RBHS field staff closely mentored CHTs by supporting them with analysis of HMIS data to be presented at county health review/coordination meetings. The project has also supported the CHTs in improving quality of data by setting up data quality assurance mechanisms such as desk review of data, data quality assessments in health facilities and organizing data review

meetings. With this, the CHTs are expected to perform data quality check on monthly basis, identify missing data, extreme, inconsistent and highly sensitive values such as deaths.

The interventions implemented under the umbrella **of system building** included: facilitating migration of DHIS1.4 legacy data to DHIS2; uploading population data to DHIS2; and working on health indicator definitions using HMIS data for various programs.

In addition, the implementation of the performance based financing (PBF) provided the HMIS/M&E system the added opportunity to work toward improving and ensuring data quality and improving use of information for better service delivery. The scheme employs rigorous performance monitoring to ensure program accountability. The positive spin-off of the data verification conducted as part of the PBF is that health workers are paying more attention to the records and are taking steps to improve accuracy and completeness. The data verification exercise also expanded to non-PBF counties in an effort to promote data quality across the sector.

However, the Ebola experience, the renewed resilience health program and new HIS strategy have created a need for professional staff with technical and managerial skills to help develop the new institutional arrangements. There remains, however, an urgent need to build the capacity of the CHTs in order to ensure the fulfillment MOH's stewardship responsibilities vis-à-vis implementing NGOs at the county level. Most of the past capacity building activities happened at the Central and County level but facility and community level capacity building was limited.

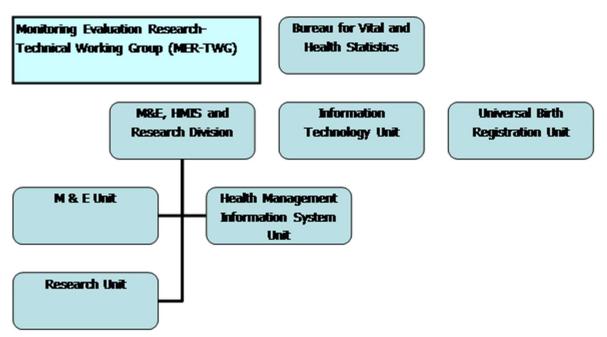
In summary, individual, system and organizational capacity building needs to happen not only at the central level, but also at the county and facility level.

Institutional Arrangement

Institutional requirements to operate a resilient HIS and facilitate the MOH's monitoring and evaluation functions at MOH headquarters are shown in figure, below.

The Department of Planning, Research and Human Development in the MOH is responsible for macro-level planning, policy development, monitoring and evaluation, research, health information systems and the dissemination of health statistics. The department consists of two Bureaus: Planning and Statistics. The Bureau of Vital Statistics, headed by an Assistant Minister, has four directorates (Vital Registry, Research, HMIS, and M&E). Three of them (HMIS, M&E, and Research) are supervised by a full-time HMER coordinator.

Information and Communication Technology (ICT) is housed in a Unit separate the Bureau of Vital Statistics, but the work on the information architecture and the development of applications is mainly handled by the HMIS unit. Disease Surveillance is managed outside the Bureau of Vital Statistics in the Disease Prevention and Control (DPC) Unit of the Health Services Department.



Source - MOSW, National monitoring and evaluation policy and strategic plan for the health sector 2012-2021

Counties also have important role to play in collecting, processing and analyzing data on health system performance and human health status. County Health Teams now consist of 15 County Health Officers (CHOs), among them one technical officer for HMIS. The County Health Teams that involve key partners in health, provide support to monitoring and evaluation activities at the county level. The county health offices also keep primary records of all HMIS subsystems on paper. However, the data of all HMIS subsystems are computerized at the county health office level and reported to MOH in electronic form to be integrated into an HMIS central repository. The county generates electronic reports and distributes them in hard copy to county health team members and health facilities.

LISGIS is the other key institution for data collection and basic analysis, with offices in all counties. LISGIS is the national bureau of statistics which has a national strategy for the development of statistics, conducts the census and surveys, and is responsible for the analysis and dissemination of statistics. National health household surveys rely on external funding, notably USAID. LISGIS conducted the housing and population census in 2008 (next will be in 2018) and large health surveys, in close collaboration with the MOHSW including the LDHS 2007 and 2013, as well as Malaria Indicator surveys in 2007, 2009 and 2011. The quality of the field work by LISGIS is good, but the analytical capacity is still limited. Maintaining and strengthening the capacity of LISGIS to conduct high quality surveys in collaboration with MOH is required.

Goal of ICB

By 2021, the National Health Information System of Liberia will produce quality data and information that is used in support of the health system functions at all levels, with a solid governance and management

structure, using appropriate information and communication technology, including data confidentiality and security, and at an affordable cost to the Government of Liberia

Specific objective for ICB:

To improve the ability of health staff and MOH's (Central, County and Facility levels)/LISGIS organizational units to perform HIS functions effectively, efficiently and sustainably

Expected Outcomes

- 1. The MoH and LISGIS are strengthened in their organizational, systemic and individual capacity.
 - 2. CHTs are strengthened in their managerial capacity, leadership and planning functions.
 - 3. Improved community level data data collection and reporting.

Analysis of Institutional Capacity Building Needs

The HIS assessment, 2015 Health System Assessment and the 2015 PRISM assessment provided a wealth of information on the major HIS institutions in the public and private sectors, HIS staff and about the utilization of data for decision making. The assessment results provided an insight into how the levels of invested effort and resources into strengthening the HIS capacities of the central government, and counties should be revived. After a thorough literature review, MOH and RBHS agreed upon the following definition of capacity-building: Capacity-building is a process of workforce development (capacity of individual health workers to meet objectives); organizational strengthening (activities to improve the structures and processes of implementing organizations); and systems strengthening (activities that enhance the formulation of policies, strategies, and operational plans of the overall health system). Focusing on all three levels enable the health sector to improve its performance resulting in improved health outcomes for Liberia. ICB action plan therefore encompasses three main activities: (1) organizational strengthening, and (2) systems strengthening, and (3) workforce development. The following sections, which supplement the broader overall HIS capacity building interventions, highlight the current problems possible actions address and to them.

Organizational level capacity-building actions

Situation: The HIS assessments revealed that data demand from senior managers and policy makers is ad-hoc, usually as a result of external pressure (e.g., questions from politicians or the media) and sometimes incomplete, and untimely. MOH central and CHOs are not able to implement an existing official policy to conduct regular meetings at health-care facilities and health-administration offices (e.g., at national, county and district levels) to review information on the HIS and take action based upon such information. There are no clear mechanisms (e.g. feedback reports, newsletters, memos, bulletins) to communicate about HIS related activities and decisions in a timely manner with relevant stakeholders involvement. An existing representative national committee in charge of HIS coordination is not functional. Within MOH, HIS related Units' structure and staffing levels are scattered within MOH, therefore leading to uncoordinated response to emerging disease outbreaks. Information and Communication Technology (ICT) is housed in a Unit separate from the Bureau of Vital Statistics, but the work on the information architecture and the development of applications is mainly handled by the HMIS unit. Disease Surveillance is being managed outside the Bureau of Vital Statistics in the Disease Prevention and Control (DPC) Unit of the Health Services Department. In addition, there are few competent staff to manage the computerized system.

Proposed Actions: Several activities are proposed to demystify data use, create a supportive data use culture, and reduce any negative connotations of data.

- 1. Identification of an 'HIS champion', a high level official who can promote HIS activities among his/her peers, to help foster an understanding about the importance of investing in quality data for policy formulation and programme decision-making.
- 2. Developing a detailed data use plan down to facility and community level; this plan should link data needs and data collection efforts with specific information products for different audiences, as well as a timetable for dissemination. It should also include activities to encourage data use, such as workshops to discuss the implications of HIS information products for programme planning and improvement.
- 3. Agree on clear organizational structure within Department with the major HIS work to inform health sector reviews located in a single Directorate and Unit, with adequate staffing
- 4. Support all 15 CHTs to develop a two year monitoring operational plan and performance targets. From PRISM assessment, Nimba and Grand Bassa CHTs were the only ones which completed the development of their M&E plan.
- 5. Operationalize the existing policy to conduct regular meetings at health care-facilities to review information on the HIS and take action based upon such information
- 6. Need to create new staff positions (database managers, network administrators, computer programmers) for ICT management

System Level Capacity Building Actions

Situation: To support the management of the HIS at the counties, districts and facility levels, policies and standards must be developed and adhered to. The assessment found that there are no written set procedures for data management including, presentation, visualization and dissemination for target audiences, and not implemented throughout the country. There are no written procedures for analysis, interpretation and reporting throughout the country. In addition, MOH has no strategy in place that links with other organizations (government, national, international, community, technical, academic) for sharing knowledge, experiences, technical expertise and best practices

Proposed Actions:

- 1. Establish data quality measurement and assurance system at all levels. Data quality plan should be written that includes guidance, reporting forms, and indicators and roll-out the data quality protocol throughout the 15 Counties
- 2. Establishing an Integrated data warehouse and Knowledge Management Portal. The MoH efforts to bring databases together need to be strengthened and coordinated with all stakeholders into a single country data warehouse with accessible databanks which would then in turn facilitate HIS activities. Once a single data warehouse is established, HMER Unit should launch Knowledge Management Portal with support from LISGIS and with appropriate funding for maintenance and development.
- 3. Through a participatory process led by CSH the following standard operation procedures/manuals/tools should be developed.
 - Data dictionaries which describe data being collected in the HIS, including details of its meaning, how it is recorded, which indicators it is used to generate, and common errors made.
 - Indicator dictionaries which describe how useful indicators for health programmes, formulas
 for generation, what interventions they can help to design, how to make interpretations, their
 relationship with related indicators and common errors made
 - User manuals for software to help develop individual level competencies in understanding and using the software.

- 4. User manuals for information analysis and use to help develop individual level competencies to understand principles of information analysis and how it can be put to support action.
- 5. User manuals for data management to help develop understanding of basic principles of information flow, data, indicators, data quality and validation.

Individual Level Capacity Building Actions

Situation: The assessment found that the Ministry of Health has no adequate and appropriate capacity in core health information sciences (epidemiology, demography, statistics, information and ICT) at national, county and district levels. LISGIS also has inadequate and appropriate capacity in statistics (demography, statistics, ICT) at all levels (National, County and District). Limited HIS capacity-building activities have taken place over the past year for HIS staff at national, county and district levels. Limited population projections are used for the estimation of coverage and planning of health services. Only 25% the national levels staffs are competent in appropriate data analysis (statistical packages, survey data, sample size, etc) and also not competent in routine data management (queries, merging, data cleaning, aggregation) but none at the county level.

Proposed Actions:

- Conduct short-term specialized courses for In-service health staff. The following specialized short-term courses for in-service health workers are recommended. The courses can be conducted within a formalized institutional setting which offers certificates from a recognized authority which the health staff can also use in their CV for career enhancement.
 - Develop training curriculum in Global HIS Trends for MOH Directors, County Officers and Senior Staff from Implementing Partners. Possible topics for this short-term course include (1) Strategic understanding of HIS, (1) Planning for HIS, (3) Technological trends in HIS, (4) Advocacy skills in HIS, (5) Institutional development for HIS.
 - Technical training on ICT that targets national, county and district technical teams.
 Possible topics include (1) Advanced use of the various software tools, including features of customization, user authorizations, system administration, etc, (2). Integration standards, data exchange and interoperability, (3) Server management, (4) Database administration, (5) Programming for HIS enhancement, (6) Managing data security.
 - Training on using GIS for public health analysis (3 days) targeting programme managers at national county district levels
 - Data management at various levels (7 days course). Possible topics include (1) concepts
 of data elements, indicators, coverage, data warehouse, etc., (2) Data management,
 including issues of information flow, data quality, addressing them (3) using HIS
 computerised tools, (4) Institutional issues around HIS at district level, including teams,
 budgets, responsibilities, processes.
 - Analysis, interpretation and use of information for local action course targeting national, county and district level health officers. Possible topics include (1) Basic concepts such as related to indicators, coverage, targets, information cycle, (2) Understanding different sources of data and their uses, (3) carrying out analysis and interpretation of data for data quality and health status, (4) report writing and dissemination, (5) putting analysis of data into use for priority areas such as counties, district and facility plans, and for programme specific analysis, (6) using Mobile technologies for reporting, and other computerised tools as required, (7) Institutional issues around HIS at district level, including teams, budgets, responsibilities, processes, (8) engaging service providers to proactively contribute to HIS development.

- Data Quality Assessments HMER Officers trained to train on data quality Key staff in all 15 counties have been trained by HMER on data quality Conduct data quality training(s) for key implementing agencies
- 2. Send health staff for formal training (6month-2years) in demography, statistics, epidemiology, research methods, and informatics.
- 3. Support south-south exchange programs

System level Strengthening Actions

Tasks and activities	Deliverables	Time	Est \$	Responsible Person	Implementing Partner
	measurement and assurance syst quality protocol throughout the 1		ta quality plan sho	ould be written that	includes guidance, reporting forms, an
Draft data quality procedures and Pilot data quality procedures and Obtain approval from HMER TWG Conduct TOT on data quality procedures and tools	tools tools drafted	and			CSH
the 15 counties					
Action 2: Establish Knowledge M with all stakeholders into a sing	_	n accessible databan	ks which would th	nen in turn facilitate	need to be strengthened and coordinate HIS activities. HMER Unit should laund
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal v	le country health repository with	n accessible databan	ks which would th	nen in turn facilitate	_
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal v Define knowledge management objectives	le country health repository with	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal v Define knowledge management objectives Describe how knowledge is to be	le country health repository with with support from LISGIS and with	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal v Define knowledge management objectives Describe how knowledge is to be dentified, captured, categorized,	le country health repository with with support from LISGIS and with	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal value Define knowledge management objectives Describe how knowledge is to be adentified, captured, categorized, presented	le country health repository with with support from LISGIS and with	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal volume Define knowledge management objectives Describe how knowledge is to be dentified, captured, categorized, presented Assess the current state of knowledge	le country health repository with with support from LISGIS and with	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal van Define knowledge management objectives Describe how knowledge is to be identified, captured, categorized, presented Assess the current state of knowledge management	ele country health repository with with support from LISGIS and with and and	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal value Define knowledge management objectives Describe how knowledge is to be identified, captured, categorized, presented Assess the current state of knowledge management Determine and Prioritize Technology	ele country health repository with with support from LISGIS and with and and	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce
Action 2: Establish Knowledge M with all stakeholders into a sing Knowledge Management Portal van Define knowledge management objectives Describe how knowledge is to be identified, captured, categorized, presented Assess the current state of knowledge management	ele country health repository with with support from LISGIS and with and edge	n accessible databan	ks which would th	nen in turn facilitate	HIS activities. HMER Unit should launce

Tasks and activities	Deliverables	Time	Est \$	Responsible Person	Implementing Partner
Action 3: Develop the following SOPS/M	lanuals				
Data dictionaries which describe data being collected in the HIS, including details of its meaning, how it is	Data Dictionary Developed	Dec 2016			CSH
recorded, which indicators it is used to generate, and common errors made	Indicator Dictionary Developed	Dec 2016			CSH
Indicator dictionaries which describe useful indicators for health programmes, formulas for generation,	Software User Manuals Developed	June 2017			CSH
what interventions they can help to design, how to make interpretations, their relationship with related indicators	User Manual for Information Analysis and Use developed	June 2016			CSH
and common errors made	User Manual for Data management Developed	June 2016			CSH
User manuals for software to help develop individual level competencies in understanding and using the software					
User manuals for information analysis and use to help develop individual level competencies to understand principles of information analysis and how it can be put to support action					
User manuals for data management to help develop understanding of basic principles of information flow, data, indicators, data quality and validation					

Organizational level Capacity Building Actions

Tasks and activities	Deliverables	Time	Est \$	Responsible Person	Implementing Partner
Action 1: Identification of an 'HIS ch importance of investing in quality da	· -	· ·	_	his/her peers, to help	o foster an understanding about the
Identify HIS Champion	■ HIS Champion identified	By end of 2015		Luke Bawo	HMER TWG will take the lead supported by JHU and CSH
· -	on. It should also include activities				mation products for different audiences implications of HIS information product
(1) Draft Data Use Plan	Data Use Plan developed	March 2015	0	Luke Bawo	CSH
(2) Share it with HMER TWG	Approved Data Use Plan	June 2015	0	Luke Bawo	CSH
(3) Roll-out Data Use Plan		July 2015		Luke Bawo	HMER Unit
Action 3: Support all 15 CHTs to deve	elop a two year HIS operational pla	an and performance	targets		
Roll-out the National HIS strategy to					CSH
the Counties					
Hold County workshops to develop					
their HIS operational plans					
Action 5: Operationalize the existing	policy to conduct regular meetings	s at health care-faci	lities to review	v information on the I	HIS and take action based upon such
information					•
Review existing policy to conduct					
regular meetings					
Develop format and tools to					
facilitate regular meetings					

Individual Level Capacity Building Actions

Tasks and activities	Deliverables	Time	Est \$	Responsible Person	Implementing Partner
Action 1: Develop Global Trends in HIS tr and reporting and data quality control. F trends in HIS, (4) Advocacy skills in HIS, (5)	Possible topics for this short-terr	n course include (2		•	
Prepare curriculum workshop materials Conduct curriculum development workshop Conduct HIS training	Training curriculum 50 persons trained per year	June 2016 August 2016		Luke Bawo	CSH
Action 2: Technical training on ICT that t including features of customization, use management, (4) Database administration	er authorizations, system admir	nistration, etc, (2)	. Integration –	standards, data ex	-
Prepare training materials Conduct ICT trainings	25 persons trained per year			Beatrice Leah	CSH
Action 3: Conduct short course training to	argeting HMER staff, LISGIS, In-G	Charge of Health F	acilities, CHOs, a	and Program Manag	ers on the followings:
First, review and revise existing curriculum for short course training Conduct following trainings: Data Management Analysis, interpretation and use of information for local action Data Quality Assessments GIS training for HMER and LISGIS staff	Short-Course curriculum reviewed 50 persons trained per year	June 2016			CSH
Data use training	Short course curriculum developer, 25 persons trained	2016-2017		Nelson Dunbar, Mike Mulbah	JHU
Data analysis training	Short course curriculum developer, 25 persons trained	2016-2017		Nelson Dunbar, Mike Mulbah	JHU

Tasks and activities	Deliverables	Time	Est \$	Responsible Person	Implementing Partner
Data management and cleaning training	Short course curriculum developer, 25 persons trained	2016-2017		Nelson Dunbar, Mike Mulbah	JHU
Ethics in public health	Short course curriculum developer, 25 persons trained	2016-2017		Nelson Dunbar, Mike Mulbah	JHU
ToT for pre-service instructors and HMER	Short course curriculum developer, 25 persons trained	2016-2017		Nelson Dunbar, Mike Mulbah	JHU
Action 4: Send health staff for formal t	raining fellowships (6month-2years) in demography,	statistics, epide	miology, research n	nethods, and informatics
a-In country training: b-Overseas training:	2 degree program fellows 1-degree program fellows			Luke Bawo	CSH
Action 5: Support south-south exchang	ge programs				
Visits to other countries with functioning HIS systems	5 HIS related staff per year				CSH



Annex J: ASSESSMENT OF THE LIBERIAN HEALTH INFORMATION SYSTEM

Report

V 1.0







DOCUMENT CONTROL

REPORT VERSION CONTROL

Version N°	Date	Revision description	Authors
#1	09/07/2015	Initial released – Including revision from MOH Liberia and USAID/GDL	 MOH Liberia: Luke Bawo Nelson Dumbar MEASURE Evaluation TA in Liberia: Theo Lippeveld Walter Obiero Romain-Rolland TOHOURI

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The following table describes who has approved this document:

Version N°	Date	Revision description	Approvers
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#2			
#3			

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The following table describes who has reviewed this document, components or the tools used collect the data:

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USAID/GDL	09/07/2015	Eric KingLungi OkokoEdna Jonas	Matthew Hulse
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ACRONYMS

C-BHIS	Community-Based Health Information System
СНО	County Health Officer
CHSWT	County Health and Social Welfare Team
CHT	County Health Team
CSH	Collaborative Support for Health
DHIS2	District Health Information Software version 2
eDEWS	electronic Disease Early Warning System
EOC	Emergency Operation Center
GDL	Global Development Lab
HIS	Health information system
HIV	Human immunodeficiency virus
HMER	HMIS, M&E, and Research
HMIS	Health management information system
ICT	Information and Communication Technologies
ICTIAT	ICT Infrastructure Assessment Tool
ITU	Information Technology Unit
iHRIS	Integrated Human Resource Information System
LAN	Local Area Network
LISGIS	Liberia Institute of Statistic and Geo-Information Services
LMIS	Logistics Management Information System
MECAT	MEASURE Evaluation Capacity Assessment Tool
M&E	Monitoring and evaluation
mHero	Mobile Health Worker Electronic Response and Outreach
MOHSW	Ministry of Health and Social Welfare
NGO	Non-governmental organization
NHSWFPP	The National Health and Social Welfare Financing Policy and Plan
OIC	Officer In Charge
PACS	Partnership for Advancing Community Based Services
RBHS	Rebuilding Basic Health Services
SMS	Short Message Service
TOT	Training of trainers
USAID	United States Agency for International Development
WAN	Wide Area Network
WLL	Wireless Local Loop

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Finally, we would like to thank USAID-DELIVER project in Liberia for all their logistic support during the incountry assessment period.

Despite our best efforts, errors may persist in the report. These must be considered the responsibility of the authors, who tried to grasp the vast nature of the Liberian situation in a relatively short period of time, and are certainly not attributable to USAID.

1 BACKGROUND INFORMATION

Health information systems (HIS) serve to strengthen public health operations by enabling management and planning. Such systems are ideally built to empower users at all levels to deliver quality health interventions, allocate resources, and respond to disease outbreaks. The West Africa Ebola outbreak highlighted significant shortcomings of the HIS in the region. If better information had been more readily available to those who needed it, more lives could have been saved and economic losses could have been avoided.

Among the most significant challenges identified has been a lack of interoperability between the many platforms and tools used before and throughout the outbreak. Traditionally, HIS subsystems and mobile health tools have been developed to suit distinct needs, including financial planning, disease surveillance, health facility reporting, individual case management, supply chain logistics, and human resources. Typically, the implementation of HIS subsystems does not harness the potential for beneficial links between them. Segregated, project-based applications, and the closed software that was used to develop them, often lead to overall national data systems that are unnecessarily limited and comparatively expensive. And without integration, critical activities suffer because of a lack of access to accurate, timely information.

Instead, the various applications used for the HIS subsystems could be designed with interoperability as a primary tenet in order to construct a functioning ecosystem of inter-locking health system building blocks that empower governments to improve health outcomes and more effectively respond to emerging threats in Liberia and beyond. This cross-cutting approach requires that the model of HIS architecture be rethought and updated, that key HIS sub-systems be expeditiously integrated, that health data interoperability standards and governance structures be agreed upon, that the institutional capacity of the Ministry of Health (MOH) to operate, maintain, and improve an integrated national HIS be systematically improved. Moreover, the development of adaptive, modular, open-source technology allows for their reuse and further integration far beyond the scope any individual health program. As the Government of Liberia begins implementing plans for rebuilding resilient health systems, with support from a number of different donors and partner organizations, there is a unique opportunity for coordinated, regional investments in the structural and technical foundations of health information systems.

2 OVERVIEW OF CURRENT HIS

2.1 Legal Mandate and Organizational Arrangements

The National Health and Social Welfare Policy (2011) mandates the Ministry of Health to adapt (a) the National Monitoring and Evaluation Policy and Strategy to accommodate the goals and agreed-upon set of indicators established by the Health and Social Welfare Policy, and (b) National Health Information System Policy and Plan to maintain a simple, coherent scientifically sound and easily understandable information system for tracking the degree of achievement. It further asserts that the Ministry will monitor adherence to the policy against the overall performance of the health and social welfare sector and the impact of development initiatives through

analysis of routine information, surveillance data, reviews and periodic survey results. The Plan emphasized that HIS will collect data in ways that will allow stakeholders to study how resources are allocated across levels of care, between central and peripheral administrative bodies, between urban and rural areas and across counties.

In 2009, the Ministry of Health published the 2009-2013 Health Information System (HIS) National Policy and Strategy document to provide a policy and strategic framework for management of health information, use of information in planning and management of health services and monitoring health sector performance.

The Department of Planning, Research and Human Development in MOH is responsible for macro-level planning, policy development, monitoring and evaluation, research, health information systems and the dissemination of health statistics. The department consists of two Bureaus: Planning and Statistics. The Bureau of Vital Statistics, headed by an Assistant Minister, has four directorates (Vital Registry, Research, HMIS, and M&E). Three of them (HMIS, M&E, and Research) are supervised by a full-time HMER coordinator.

Information and Communication Technology (ICT) is housed in a Unit separate the Bureau of Vital Statistics, but the work on the information architecture and the development of applications is mainly handled by the HMIS unit. Also, until last year, Disease Surveillance was managed outside the Bureau of Vital Statistics in the Disease Prevention and Control (DPC) Unit of the Health Services Department.

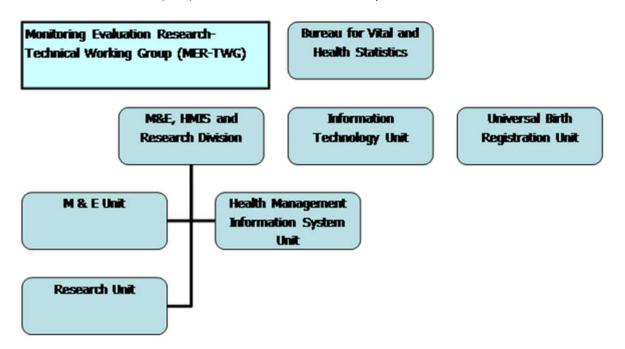


Figure 1: Source - MOSW, National monitoring and evaluation policy and strategic plan for the health sector 2012-2021

2.2 Health Information Sub-Systems

The national health information system is composed of subsystems, with data from various sources. These may include population based-surveys, census, and service delivery data from health management information systems (HMIS), as well as data from human resources information systems (HRIS), logistics management information systems (LMIS), electronic medical records (EMR), financial management information systems, laboratory information systems, disease surveillance systems, and mobile point-of-service platforms. Together, these sub-systems provide the foundation on which essential health decisions are made.

Currently most of these HIS subsystems are not interlinked. It is planned to create interoperability mechanisms using DHIS2 and mHero as platforms. For further details the reader is referred to annex 1: HIS Project Maps and to the IT assessment report.

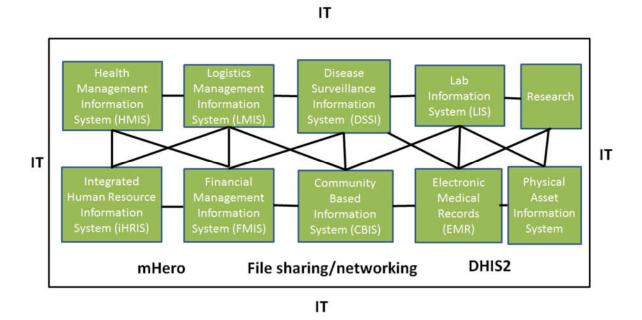


Figure 2: MOH Liberia HIS architecture

In the following paragraphs a brief description of the various subsystems is given:

2.2.1 Health Management Information System (HMIS)

The health management information system (HMIS) generates data on service delivery in health facilities and is a reporting platform for county and district health offices nationwide. Through the support of the Rebuilding Basic Health Systems (RBHS) program, the data collection system and reporting system have tremendously improved. This was achieved through building the human resource capacity and instituting an electronic operating data collection system called District Health Information System version 1.4. Later on, between 2011 and 2014, a total of 75 county level staff, including 50 M&E and data managers have been trained to use the

new Integrated Reporting Forms and the District Health Information System Version 2 (DHIS2). Some of these individuals conducted step down training for 1341 health workers in the counties.

2.2.2 Logistics Management Information System

Data generated by the Logistics Management Information System (LMIS) are used to manage the supply chain for health commodities. Currently the reporting format is built into Excel Spreadsheets but, through support of USAID-Collaborative Support of Health program and Deliver, efforts are being made to make the information system more efficient. County pharmacists are expected to manage and account for physical supplies while at the same time be responsible for maintaining and reporting from this set up. According to the 2015 Health System Situation Analysis, this arrangement so far have had limited success.

2.2.3 Surveillance Information System

Data generated by the disease surveillance information system (DSIS) are_used to identify disease outbreaks, preparedness, rapid response, and surveillance information. Prior to the Ebola Epidemic, all four components were managed within the Disease Prevention and Control (DPC) Unit in the Health Services Department. All data are paper based with no established database. The 2015 Health System Situation Analysis Report states that the surveillance information system is based on notifications of suspected cases from facilities by telephone, and use of paper-based case investigation forms. Weekly summary reports are transmitted by telephone from facilities to the counties, and from the counties to the national level. Information on some of the notifiable diseases is also collected through the routine facility reports, but on a monthly basis. In general, the system has not been functioning well. Discussions are ongoing for transitioning surveillance data management responsibilities from the DPC to the HMER Unit in the Department of Planning, Research and Development. Similarly, efforts are underway to establish a comprehensive surveillance information system to track all notifiable conditions. The WHO and CDC are planning to implement (1) a multi-channel e-IDSR reporting system and alerting network, and (2) a community level trigger-driven reporting system specific to Ebola.

2.2.4 Human Resource Information System (HRIS)

This is the management system for tracking all publicly-funded health staff at the central, county and facility levels. In 2014, the MOH, with support of RBHS and IntraHealth, embarked on the development of a Human Resource Information System for health. According to the 2015 Situation Analysis Report, the iHRIS software application, an open source platform that is interoperable with the DHIS2 (proof of concept made by RBHS in 2014, has been used to develop the system.

2.2.5 Financial Management Information System (FMIS)

The Financial Management Information System (FMIS), which is Excel-based, tracks MOH budget and spending. The Ministry of Finance_has developed an integrated Financial Management System (iFMIS) for the management of financial data across the sectors.

2.2.6 Community Based Health Information System (CBHIS)

The Community Based Health Information System (CBHIS) connects community-level health services with national health system. Within the health system, the lowest tie where service is provided is at the level of the community. MOH attaches the importance of the services (preventive, curative, awareness, etc.) provided by

community level workers. In collaboration with the Community Health Services (CHS) Unit, USAID-PACS and IRC, paper versions of the collection and reporting forms and ledgers were develop and built into the DHIS2 system. Future efforts include integrating CBHIS, LMIS and HRIS to improve management of community-based health services, produce supply chain efficiency gains and reduce stock-outs.

2.2.7 Electronic Medical Records (EMR)

This system provides digitized patient and case management data for improved efficiency and decision making. The 2015 Situation Analysis Report mentions that no integrated system for the management of individual patients' record exists. Three hospitals attempted to install and manage their own separate system patients' record but challenges including inadequate HR, logistics electricity, poor data demand and use, rendered the system being under-utilized in a fragmented way. Moreover, a few implementing partners such as Save the Children and MSF have deployed OpenMRS in some health facilities. Integrating this system with DHIS2 may automate reporting requirements for health facility staff and the analysis of EMR en masse may permit syndromic disease alerting capacity.

2.2.8 Physical Asset Information System

A physical assets information system monitors the health of physical assets within the health system, such as equipment, vehicles, motorcycles etc. It helps decision makers plan spending and deliver replacement assets when needed. Data from the physical assets information system on the health of assets can be tied to logistics management information systems to assist supply chain planning.

2.2.9 Lab information system (LIS)

The Excel-based LIS is used to report reference lab diagnostic results to facilities (individual data) and to the MoH (aggregate data). The CDC future efforts aim at making it electronic-based laboratory information system. Integrating LIS with disease surveillance systems may provide redundant and earlier alerting and integrating LIS with HMIS may provide additional insight and accountability for facility level service provision analysis

2.2.10 Civil Registration and Vital Statistics Systems

The Bureau of Vital Statistics in MOHSW has the mandate to produce birth and death certificates and has a decentralized system with registration centers located in major health facilities. Laws on birth and death registration exist, but population awareness is low. In 2014, an assessment was conducted and led to a CRVS assessment & improvement plan.

2.2.11 Household Surveys and Census

Liberia Institute of Statistics and Geo-Information Services (LISGIS) is the national bureau of statistics which has a national strategy for the development of statistics, conducts the census and surveys, and is responsible for the analysis and dissemination of statistics. National health household surveys rely on external funding, notably USAID. LISGIS conducted the housing and population census in 2008 (next will be in 2018) and large health surveys, in close collaboration with the MOHSW including the LDHS 2007 and 2013, as well as Malaria Indicator surveys in 2007, 2009 and 2011.

2.2.12 Research

Ongoing public health research work, both internal and external, is managed by the Research Unit under the HMER, so that research information and results can be better integrated into the health system and shared among decision makers. A health research registration program is in discussion.

3 PURPOSE OF THE HIS ASSESSMENT

USAID's Global Development Lab requested MEASURE Evaluation assistance to provide dedicated technical and organizational support to the Liberian Ministry of Health's (MOH) Health Monitoring, Evaluation and Research (HMER) unit, within the Planning and Research Department. Two embedded advisors assisted the MOH in creating a vision for the development and integration of sustainable digital platforms to "build back better" a national Health information System (HIS) that will enable the MOH to improve overall management of routine health service provision and of disease outbreak surveillance and response.

To raise awareness about this process and ensure broad involvement of the key stakeholders, a first stakeholder introductory meeting was conducted on June 26 at the Emergency Operations Center (EOC), under the guidance of the Ministry of Health. The meeting was highly representative. The Assistant Minister of Vital Statistics Mr. Wesseh chaired the meeting. During the meeting it was agreed as a first step in this process to conduct an assessment of the current HIS in Liberia, based on consensus building between the stakeholders, to serve as a baseline for the strategic and operational planning process.

The primary objective of this assessment is to provide guidance that leads to strengthened institutional capacity of the Liberian MOH in the area of health information systems and health informatics. In order to ensure better collaboration and coordination between the Government of Liberia (GOL) and the various donors and implementing agencies, a broad-based assessment of the current situation of HIS in Liberia was completed. This assessment will lead to the development of a new Strategic HIS Plan for 2015-2021 (in follow-up of the 2009 plan) as well as an operational cost proposal for 2015-2017.

4 OBJECTIVES

4.1 General objectives

The general objective was to conduct national health information system (HIS) assessment with a view to create an understanding, establish availability, accessibility and use of quality health information that is critical for decision making in Liberia

4.2 Specific objectives:

The specific objectives of the assessment are:

- Bring stakeholders together to a conduct a self-assessment of the six components of HIS through focus group discussions
- Inform participants on the status of different subsystems of HIS
- Build consensus and support for implementing a HIS strategic plan

5 METHODOLOGY

A core team comprising of MOH HMER Unit staff and the MEASURE Evaluation team prepared the assessment tools and prepared for the stakeholders meeting.

5.1 General HIS assessment

5.1.1 Tool development

The general HIS assessment was carried out using the instrument and methodology provided by the Health Metrics Network HMN framework, version 4. The framework enables all partners to harmonize and align their efforts around a shared vision of a sound and effective national health information system (see figure 1). The HMN Assessment Tool provides a universally agreed upon standard for guiding the collection, reporting and use of health information by countries and global agencies. The questionnaire was slightly contextualized by adding specific questions mainly to the "resources" section to suit the current HIS situation in Liberia. To strengthen the policy, planning and coordination section of the questionnaire, questions on governance and partnership were adapted from MEASURE Evaluation Capacity Assessment Tool (MECAT). MECAT is a generic data collection tool that captures various dimensions of capacity: organizational, technical, and behavioral.

5.1.2 Scoring and Aggregation of results

The tool aggregates total scores for each category, compares against the maximum possible score and computes percentage rating. The scores were converted into quartiles. The category which scores fall into the lowest quartile (0-24%) was classified as "not adequate at all", the next quartile (25-49%) was classified as "present but not adequate", followed by "adequate" (50-74%) and "highly adequate" (75%-100).

5.1.3 Implementation of the HIS Assessment

The HIS assessment was conducted during a stakeholders workshop on 29-30 July 2015 in Monrovia with financial support from MEASURE Evaluation. A total of 55 participants attended the workshop.

The participants were divided into 5 groups. Each group assessed all the six components of the Health Information System. The group work was facilitated by MOH, supported by MEASURE Evaluation. Each item was scored individually by participants first, followed by a consensus score reached through group discussions. The group work was conducted in a very participatory atmosphere, and certain topics generated considerable discussion among participants. Group discussion was not for attribution.



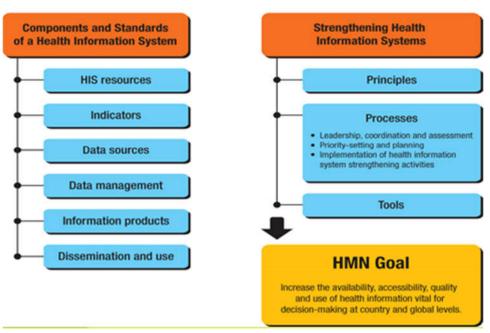


Figure 3: HMN Framework

The five groups then converged at the plenary session, and each group presented their results individually. The results were discussed at the plenary session and a consensus reached on the overall results. The results presented in this report represent the final group consensus at the plenary session. However, consensus in this case did not mean that all members of the group must have a single score.

Following the plenary session, assessment results were summarized and major findings presented to a large audience on the second day of the workshop and based on the findings, a SWOT analysis was conducted.

5.2 ICT Infrastructure assessment

5.2.1 Tool development

Acknowledging that the HMN tool was not strong in assessing in depth the underlying HIS ICT infrastructure the team developed a specific HIS ICT Infrastructure Assessment Tool (ICTIAT) and conducted a separate survey using this tool to complement the findings from the HMN tool. The ICT related results presented in the current report are mainly derived from the findings of that ICTIAT survey. The assessment intends to reveal the state of the ICT infrastructure supporting the health information system and to highlight the adequacy of the ICT resources available compared to the HIS applications and users' needs.

The ICTIAT assesses the following aspects of the infrastructure (see table 1 below) and provides a set of automated analysis to be used for reporting purpose.

Table 1: Areas assessed by level of the health system

National	County	Facility	MoH Partners
Internet Access	Office Location	Facility Location	Already implemented software
Available bandwidth	Network	Network	Planned software implementation
Hardware	Hardware	Hardware	
Governance	Governance	Governance	
Security	Security	Finance	
Maintenance	Maintenance	Security	
Human Resources	Users	Maintenance	
Software services	Connectivity	Users	
		Connectivity	

5.2.2 Implementation of the ICTIAT

The assessment process was conducted entirely by the MOH HMER and ICT unit assisted by the embedded MEASURE Evaluation TAs using an innovative approach to meet the following constraints:

- Time constraint: The embedded TA mission were limited to only 3 months
- No budget available to send enumerators in the field for data collection
- One week time frame to conduct the ICT Infrastructure assessment because of the preliminary results needed to be presented at the HIS assessment workshop organized in prelude to Liberia MOH HIS strategic planning process.
- Need to use existing already implemented solutions

To meet the above requirements the tool questions were sent to respondents using three different means depending on their location in the health information system hierarchy:

- At Central MOH head office, the respondents (ICT unit and MOH partners) received the questionnaires on the native MS Excel format of the tool
- At county level, the data managers and M&E officers responded to the survey using the Liberia MOH DHIS2 online platform (14 out of 15 respondents)
- At facility level the OICs received and replied to the light weight questions (20 questions) version of the tool via SMS messages sent and received through the mHero platform. The response rate was quite low (see table 2)

Table 2: Overview of SMS messages sent to the facilities using the mHero platform

Questionnaire	SMS Sent	Complete Answers	Aborted answers	No Reply
ICT survey	91	17	23	51
Electricity survey	68	16	17	35

The respondents took the questionnaires as a self-assessment though we had a chance to review the answers provided by 11 counties with their representatives (data managers and or M&E officers) during the HMIS data collection tools revision in Gbanga (Bong County) on August 3rd, 4th and 5th. We were also able to review the answers provided by the MOH ICT unit to enforce the validity of the data collected.

Some of the preliminary results of the ICTIAT were presented during the Liberia MOH HIS assessment workshop and taken into consideration during the SWOT analysis.

5.3 Additional HIS assessment data sources

In addition to the HMN tool, the MECAT specific questions and the ICT infrastructure assessment tool, various other documents were used as evidence based documents to strengthen, confirm and validate the various findings. Among those documents are:

- Liberia software deployment listing from USAID/GDL
- Liberia 2012 and 2014 PRISM assessments reports
- HIV integration in RHIS Liberia case study, 2013
- MOHSW. 2009. National Health Information System Policy
- Liberia Ministry of Health and Social Welfare. National Health and Social Welfare Policy and Plan 2012-2021
- Recovering from the Ebola Crisis: Summary Report

- Investment Plan for Building a Resilient Health System, Liberia 2015-2021
- Liberia 2015 Health System Assessment Report
- Information and Communications Technology Response to the Liberia Ebola Crisis
- Rebuilding Basic Health Services (RBHS)
- 2014 PRISM Assessment Report
- Ministry of Health 2014 Annual Report
- 2009 National HIS Strategy and Implementation Plan
- Community Health Management Information System documents

6 RESULTS

All results of the assessment tool have been captured in an excel spreadsheet that contains the answers to the individual questions for each component as well as summarizes the results. The spreadsheet has been added to this report in a separate file.

It should be noted that a separate Health Information System ICT Infrastructure assessment has been undertaken simultaneously and a separate report is available. Key findings of this report were included in this section.

6.1 Overall Results for HIS Components

The figure below demonstrates overall assessment results presented by different components, according to HMN methodology. Each component is described in detail in the following sections.

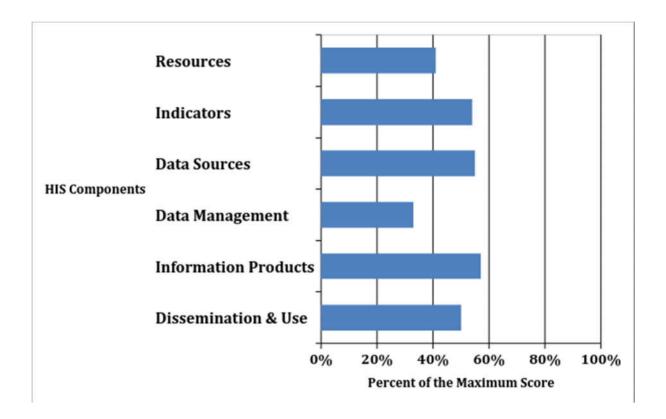


Figure 4: Summary results by different HIS components

6.2 Resources

The overall score for the Resources section, which consists of the information categories Policy and planning, HIS Institutions, Human Resources and Financing, and HIS infrastructure was 41%, equivalent to "present but not adequate".

Table 3 Scores for the Resource Categories

Categories	Score out of 100	Result
Policy and Planning	44%	Present but not adequate
HIS institutions, human resources and financing	41%	Present but not adequate
HIS Infrastructure	38%	Present but not adequate
Overall	41%	Present but not adequate

6.2.1 HIS coordination, planning and policies

Strengthening the health information system and making it more resilient depends upon how Liberia's key units and institutions function and interact. These include the MOH HMER unit, disease surveillance and control units, the Liberia Institute of Statistics and Geo-Information Services (LISGIS), donors, and implementing partners. The Department of Planning, Research and Human Development in MOH is responsible for macro-level planning, policy development, monitoring and evaluation, research, health information system and the dissemination of health statistics. The department consists of two Bureaus: Planning and Statistics. The Bureau of Vital Statistics, headed by an Assistant Minister, has four directorates (Vital Registry, Research, HMIS, and M&E). The bureau is mandated to produce birth and death certificates, collect, compile and disseminate health information (data), supervise health research, and monitor health programs in the country.

Institutional assessment was conducted to identify constraints that may undermine policy or hamper the implementation of key strategies for developing a resilient Health Information System. The HIS assessment results have revealed that policies and planning strategies are present but not adequate. The most recent 2009 HIS strategic plan is outdated and does not cover all the major data sources described in the HMN Framework (censuses, civil registration, population surveys, individual records, service records and resource records) and it is not fully implemented at the national level. The existing legislative framework does not cover all HIS key aspects. It only covers vital registration and notifiable diseases, but does not cover private sector data including social insurance, data confidentiality, and fundamental principles of official statistics. Regulations and procedures for turning the fundamental principles of official statistics into good practices, and for ensuring the integrity of national statistical services exist, but are not yet disseminated and implemented systematically. Moreover, there are inadequate mechanisms for legislative enforcement (score 1.3).

LISGIS and the Ministry of Health have established coordination mechanisms (e.g., a task force on health statistics) with the involvement of multi-sectorial groups. The co-ordination meetings are held occasionally on an ad-hoc basis (score 2.0). There is an official policy to conduct regular meetings at national, county and health care facility level to review information for corrective actions, but as of this writing, is only partially implemented.

There is a national HMER committee but due to limited resources and competing priorities, is not fully functional. The HIS stakeholder working group (WG) was recently established under the leadership of Assistant Minister for Vital Registration, Ministry of Health. The WG is represented by different institutions and has convened two times, with the specific purpose to conduct HIS assessment and develop 2016-2021 HIS strategic plan. It is envisaged that this Stakeholder WG will transform into a national HMER TWG, which will be empowered to take a leading role in HIS strengthening activities. Such activities include establishing clear mechanisms (e.g. feedback reports, newsletters, memos, bulletins) to communicate HIS related activities and decisions in a timely manner to relevant stakeholders; map out all HIS stakeholders working in the same geographical and technical areas and lastly; share knowledge, experiences, technical expertise and best practices.

6.2.2 HIS institutions, human resources and financing

Improvements in the national HIS cannot be achieved unless attention is given to the training, deployment, remuneration and career development of human resources at all levels. At the national level, skilled epidemiologists, statisticians and demographers are needed to oversee data standards for quality, management, and collection, and to ensure the appropriate collection, analysis and utilization of information. At the county, district and facility levels, health information staff should be accountable for data collection, reporting and analysis. Deploying health information officers within large facilities and districts (as well as at higher levels of the health-care system) results in significant improvements in the quality of data reported and in the understanding of its importance by health-care workers.

In regard to HIS institutions, human resources and financing, the assessment has revealed that the Ministry of Health does not have adequate capacity in core health information sciences, including epidemiology, demography, statistics, and ICT. Capacity of the Liberia Institute of Statistics and Geographic Information System on demography, statistics, ICT at national, county and districts was evaluated as not adequate (**score 0.7**). However, Liberia has in place standard operating procedures that define roles and responsibilities related to HIS functions, but they were developed with external technical support. Liberia also has a focal person among HIS-staff in-charge of advocacy, communication and social mobilization, but the person is not well trained for these functions. More than 50% of health offices at county level have a designated and staffed full-time health information officer position.

Capacity building assistance including providing training workshops targeting specific cadres of staff and specific knowledge bases and skill sets have been limited. There has been limited capacity-building activities over the past years for staff at the national LISGIS office on ICT, statistics, software and database maintenance, and at the county levels and health-facility staff (data managers, registrar, OICs, etc) on data collection, self-assessment, analysis and presentation (score 1.1). Moreover, assistance (regular mentoring, in service training, etc) is not available to health and HIS staff at national and county levels in designing, managing and supporting databases and software. The recently concluded RBHS project acknowledged that while substantial achievements have been produced in a relatively short period (score 1.0), capacity-building will continue to need more support beyond the life of RBHS. In this spirit, RBHS report continued, USAID and the MOHSW awarded a project in 2014 called Collaborative Support for Health (CSH) to bolster capacities at all levels of the health system, including communities, local organizations, CHSWTs, and the central MOHSW. These recommendations will be led by the MOHSW and can be supported by CSH and partnerships.

Following the civil war, and the Ebola Virus Disease (EVD) outbreak of 2014, Liberia is faced with serious, but not insurmountable challenges to improve health services financing and delivery and to ultimately contribute to the improvement of the health status of the population. The National Health and Social Welfare Financing Policy and Plan (NHSWFPP) 2011-2021 was developed with the goal of ensuring affordable health services and preventing catastrophic household costs. The NHSWFPP proposes a mix of health funding including sustainable government financing, predictable donor support, affordable user fees for selected services, mechanisms for risk pooling and appropriation from value-added tax. The NHSWFPP outlined a cost of USD 72.3 million in 2013 increasing to USD 129.9 million in 2021 for the management and provision of health services (not accounting for

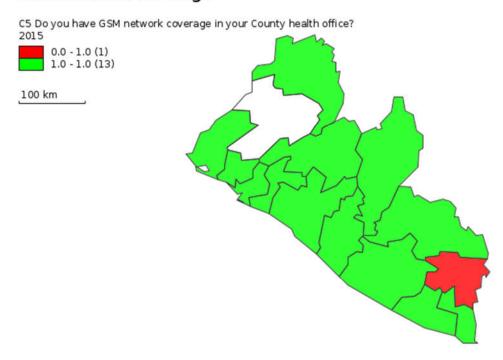
inflation), equating to less than half of the estimated cost for the provision of the EPHS. In 2015, the HIS assessment has revealed that finances are *present but not adequate*. National HIS and LISGIS budget-line items are still limited and do not allow for adequate function of all relevant data sources (**score 0.9**). According to the 2015 Investment Plan, the appropriation to the health sector from the GOL more than tripled from USD 18.7 million in FY 2007/08 to USD 63 million in FY 2014/15. But Liberia has yet to meet the Abuja target of "allocating at least 15% of their annual budget to improve the health sector".

6.2.3 HIS Infrastructure

HIS infrastructure score is very low (41%) as compared to other section of the resource component (see table on page 14).

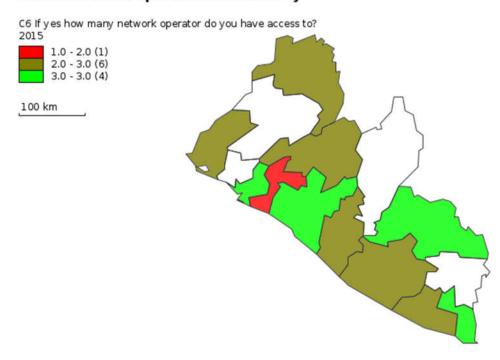
The support for ICT equipment and maintenance is the least under HIS infrastructure. The ICT assessment report (separately) has a thorough definition of the ICT infrastructure but ICT infrastructure consist of a technical physical base of hardware, software, communications technologies, and data applications. Infrastructure can be referred to as the backbone in health information system and when designed and implemented effectively, it can aid in data sharing; provide visual tools like dashboards link population and environmental information with disease outbreaks; and is an effective electronic means for data capture, storage, interpretation and management.

GSM Network Coverage



The ICT assessment report shows that less than 10% of the counties know their GPS coordinates while this is far better at facility level with more than 35%. Internet is nowadays the main channel for data transmission and communication and its availability in developing countries is directly correlated to the mobile network coverage. The assessment reveals that only one-third of the counties have access to more than two mobile network operator while the Internet connection bandwidth is inadequate for more than 55% of all assessed institutions at county level. Less than 70% of assessed facilities have GSM network coverage. The working stations are needed to process and enter the data into the HIS sub-systems but their number are highly inadequate according to 100% of the health institutions assessed. They reported that the number of available computers was insufficient to perform their work and in fact 33% of the computers are aged more than 3 years, furthermore 38% of the computers in use at county level are personal computers. Another major finding is the quasi inexistence of ICT policies documents in place to guide the use of Internet at work, the network security, computer maintenance, data backup and disaster recovery, etc. at central MOH level as well as at county level. This lack of ICT policy has a direct impact on the security of the data collected and stored locally: only 29% of computers at central MOH HQ are equipped with updated antiviruses and only 6% of the computers at county level have updated antiviruses and most of them are free antiviruses; 62% of the counties already reported loss of hardware; 38% of counties perform backup on external hard drives and finally the MOH Central HQ server room scores only 20% compliance with international standards with only 6% of the servers benefiting from the a backup system.

GSM Network operator availability



In term of human resources there is great need of skilled staff at county level where only 8% of them have more than one data manager and none of the counties have IT staff. At central level also there is an important need for computer programmers, database administrator, network security and Linux systems administrators.

And finally most of this ICT infrastructure can difficultly work if there is no electricity available to power the various devices needed to properly operate the system. The assessment revealed that only 58% of the facilities have access to 18 hours of electricity per day across the county and most of it powered by generator (50%), solar panel (31%) and combination of generators and solar panels (13%). The national electricity company is only providing electricity to 6% of the facilities. At county level and central level the power is mainly produced by generators.

In addition, the basic materials such as recording forms, paper, pencils and other supplies that are needed for recording health services and disease information at the facility level are present but not adequate. There are "stock-outs" of recording forms, paper, pencils and other supplies, which affect the recording of required information. Recently, MOH reviewed all the HMIS tools to match the core indicators. For more detailed assessment on HIS infrastructure, please refer to a separate ICT assessment report (see annex 2).

6.3 Indicators

The Health Sector has a comprehensive over 150-program level and a 39 well defined core indicator set. This list of essential indicators was agreed upon by consensus building, including the vertical programs (HIV in 2013) as well as the donors. These core indicators are contained in the 2015 Investment Plan. As such, the HIS assessment revealed that indicators are *adequate*, meaning national minimum core indicators have been identified for national and county levels, covering all categories of health indicators (determinants of health; health system inputs, outputs, and outcomes; and health status). In addition, at least 50% of the health-related MDG indicators are included in the minimum core indicator set.

Table 4: Score for Indicator Component

Categories	Score out of 100	Result
Indicators	54% (8.1/15)	Adequate

The weakest point in relation to the indicators is their lack of selection methodology to ensure that the indicators are responsive to explicit criteria including usefulness, scientific soundness, reliability, representativeness, feasibility and accessibility (score 1.1). Furthermore, reporting on these minimum core indicators is irregular and incomplete (score 1.3). Most routine indicators were harmonized by MOH, with close collaboration and input from vertical programs and other partners. However, population figures used by the MOH are different from LISGIS, showing poor harmonization efforts between MOH and LISGIS. Currently, after the Ebola outbreak, there is limited collaboration among partners, which has resulted in a resurgence of vertical data collection systems.

6.4 Data Sources

To function effectively, HIS requires a conglomeration of various sources that are carefully coordinated to produce timely and reliable information spanning the inputs, processes, outputs, outcomes and impact of the entire health system. These data sources include *population-based* sources that generate data on all individuals within defined populations and can include total population counts (such as the census and civil registration) and data on representative populations or subpopulations (such as household and other population surveys). Others are *Institution-based data* sources that generate data as a result of administrative and operational activities. These include individual records, service records, and resource records. Each of the six data sources

was evaluated against the following characteristics: content, capacity and practices, dissemination, integration and use.

According to the HIS Assessment results (see table 3), overall data sources are *adequate*, with population based surveys scoring *highly adequate* but health and disease records, vital statistics and resource records *not adequate at all*.

Table 5: Scores for the Categories of Data Sources Component

Data Source	Contents	Capacity & Practices	Dissemination	Integration and use	Total
Census	Highly adequate 76% (2.3 / 3)	Adequate 56% (5.0 / 9)	Adequate 63% (7.6 / 12)	Adequate 51% (1.5 / 3)	Adequate 61%
Vital statistics	Present but not adequate 33% (3.0 / 9)	Present but not adequate 32% (7.6 / 24)	Adequate 70% (2.1 / 3)	Adequate 51% (1.5 / 3)	Present but not adequate 46%
Population-based surveys	Highly adequate 75% (6.8 / 9)	Highly adequate 77% (9.2 / 12)	Adequate 74% (4.5 / 6)	Adequate 73% (4.4 / 6)	Adequate 75%
Health and disease records (incl. surveillance)	Adequate 56% (5.0 / 9)	Present but not adequate 43% (9.0 / 21)	Not adequate at all 23% (0.7 / 3)	Present but not adequate 38% (2.3 / 6)	Present but not adequate 40%
Health service records	Highly adequate 79% (4.7 / 6)	Present but not adequate 49% (5.9 / 12)	Adequate 58% (3.5 / 6)	Adequate 56% (5.0 / 9)	Adequate 60%
Resource records	Adequate 51% (12.3 / 24)	Present but not adequate 49% (16.2 / 33)	Present but not adequate 35% (2.1 / 6)	Present but not adequate 42% (5.1 / 12)	Present but not adequate 44%
Total					Adequate 55%

6.4.1 *Census*

The gold standard is that a census should be carried out at least once every 10 years with results made available within 2 years of the data being collected. To assess census-data quality, it is standard practice to conduct a post enumeration survey (PES) during which the census questionnaire is re-administered to a small sample of the

population. If civil registration captures less than 90% of deaths, then including fertility and mortality topics in a population census is particularly important.

Liberia conducted its Population and Housing census in 2008 and published results are currently available. HIS Assessment results revealed that the content of census data is *highly adequate*, meaning that mortality questions on estimating both child and adult mortality were included in the 2008 census. This is particularly important because the civil registration in the country covers less than 90% of deaths. The only problem is that a post enumeration survey (PES) was never completed to assess the quality of the 2008 census data. However, evaluation of completeness of adult mortality data from the 2008 census has been undertaken and the results published along with the published mortality statistics. The 2008 census report with descriptive statistics was produced after 2 years and available to the public, including county level administrative offices. There are accurate population projections by age and sex and they are available for districts. Public access to census micro-data is available on request with restrictions. Finally, Liberia has adequate capacity to (1) implement data collection; and (2) process the data; but not to analyze the census data.

6.4.2 Vital Statistics

The HIS assessment revealed that vital statistics are *present but not adequate*, with an overall score of 46%. There is no national system in place to capture coverage of deaths registered through civil registration; and there is limited capacity to implement data collection, process the data, and analyze the data from civil registration or Demographic Surveillance System (DSS) at all levels. According to the 2015 Liberia Health Assessment Report birth registration among under-5 children has increased to 25% in the last 5 years and death registration is still below 2% even though the Liberian Public Health Law of 1976 mandates the MOH to register all deaths within 24 hours after their occurrence. The ICD-10 classification is not used for cause of death registration. Demographic Surveillance System (DSS) sites have not been developed.

6.4.3 Population-based surveys

Population-based surveys received an overall score of 75%, equivalent to "highly adequate" indicating that in the past 5 years, a nationally representative survey has been conducted and it measured the percentage of the relevant population receiving key maternal and child health services (e.g., family planning, antenatal care, professionally attended deliveries, immunization). The survey also provided sufficiently precise and accurate estimates of infant and under-5 mortality. The most recent LDHS was conducted by LISGIS in close collaboration with the MOH in 2013..

However, in the past 5 years no population-based surveys have been conducted to measure the prevalence of some priority non-communicable disease/health problems such as disability, mental illness, hypertension, diabetes, accidents, violence and leading risk factors (e.g., smoking, drug use, diet, physical inactivity). Liberia has limited capacity to: (1) conduct household surveys (including sample design and field work); (2) process the data; and (3) analyze the data.

6.4.4 Health & Disease Records (including Surveillance)

HIS assessment results reveal that health and disease records (including surveillance) are *present but not adequate*, and that not all key epidemic-prone diseases and diseases targeted for eradication and/or elimination have appropriate case definitions established. Moreover, not all cases can be reported using the current reporting format. The current disease surveillance information system that is used to identify disease outbreaks for rapid response is paper-based.

The HIS assessment has revealed the following underlying problem causes:

- Mapping of only a few specific at-risk populations (e.g., populations with high levels of malnutrition and poverty) and of general population exposed to specific risks (e.g., vectors, and environmental and industrial pollution) is in place;
- Limited capacity to: (1) diagnose and record cases of notifiable diseases; (2) report and transmit timely and complete data on these diseases; and (3) analyze and act upon the data for outbreak response and planning of public health intervention;
- Only between 25% to 75% of health workers making primary diagnoses can correctly cite the case definitions of the majority of notifiable diseases;
- Less than 25% of investigated outbreaks have laboratory results. The Lab Information System used to report reference laboratory diagnostic results to individual facilities and aggregate data to MOH is Excelbased,
- No International Statistical Classification of Diseases and Related Health Problems (ICD) is currently being used for reporting hospital discharge diagnoses
- No surveillance data on epidemic-prone diseases are disseminated and fed back through regularly published weekly, monthly or quarterly bulletins
- Less than 75% of epidemics noted at county or national levels are first detected at district level
- It is only at the national and the counties do we find a clear definition for each disease every time an epidemic situation or a situation requiring response occurs.

However, the MOH with the support from both CDC and WHO is planning to strengthen the disease surveillance through establishing an electronic disease early warning system (eDEWS), a Community Event-Based Surveillance (CEBS) and an Electronic Laboratory Information System (eLIS).

6.4.5 Health Service Records

Health records capture information on the number of clients provided with various services and on the commodities used. The national HIS should capture service statistics from the private sector as well as communities and civil society organizations.

Heath Service Records also known as HMIS received an overall score of 60%, equivalent to "adequate". Data derived from health service records are usually used to estimate coverage of services (e.g. immunization, antenatal, delivery services and etc.). There is also an integrated health service based information system that brings together data from all public and a few private facilities. In 2012 Liberia started using District Health Information System version 2 (DHIS2) to collect, validate, analyze, and present aggregate statistical data, tailored to integrated health information management activities.

In the last 5 years there has been at least 1 attempt to evaluating the performance of HMIS in the country. In 2012 and 2014, RBHS in collaboration with MOH conducted a PRISM assessment of the HMIS in terms of quality of data and use of information. The PRISM assessment result recorded improvements in HMIS performance in both production of quality data and use of information for decision making at county as well as 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 DHIS2 software installed and in use at the county health offices. The PRISM assessment report further states that in terms of HMIS process, the collection and transmission of data were proceeding very well with effective verification of data quality during inspections and desk reviews. Significant improvement was also observed at the CHTs in performing data analysis with increased skill levels on using DHIS2.

However the HIS assessment has revealed the following shortcomings:

- There is failure to receive full information from all private care providers
- Only between 1% 9% of districts have a cadre of trained health information staff who have at least 2
 years of specialized training in HMIS and are in place,
- Between 25–49% of health workers in health facilities (clinics and hospitals) receive regular training in health information that is either integrated into continuing education or through in-service training in the public sector
- The mechanisms of supervision, adequate and timely feedback to subordinate levels on their performance are not well established,
- Degree to which counties compile their own monthly/quarterly and annual summary reports, disaggregated by health facility is not adequate,
- Degree to which managers and analysts at national and county levels frequently use findings from surveys, civil registration (or other vital statistics systems) to assess the validity of clinic-based data is also not adequate

The other weak link in the HMIS is the paper-based Community-Based Information System (CBHIS) that manages and connects community-level health system to the DHIS2. MOH through the support of Partnership for Advancing Community Based Services (PACS) is in the process of fine tuning the design of the CBHIS and deploying it nationwide. PACS also intends to work with Deliver on LMIS so that it also covers community based

commodities. At the central MOH, the Policy on Community Health and the Community Health Roadmap will be revised by the end of 2015. Based on those revisions the CBHIS will be fine-tuned including indicators, data collection tools, supervision, training, and community engagements materials. CBHIS data will be integrated with the facility based DHIS2 data. The CBHIS data are another opportunity for using the mHERO platform for SMS-Based messaging, reporting, and conducting real-time surveys. For example, the 2015 ICT assessment among health facilities used the mHERO platform.

6.4.6 Resource Records

Resource records received an overall score of 44%, equivalent to "present but not adequate". The item looked at the following topics: Infrastructure and health services, HR, financing and expenditure for health services, equipment supplies and commodities.

6.4.6.1 Infrastructure and Health Services

The HIS assessment has revealed that the records related to infrastructure and health services are *present but not adequate*. The database/roster of public health facilities with a coding system that permits integrated data management is not adequate. GPS coordinates for public health facilities exists but is not adequate. This needs updating as new facilities have been established and old ones closes temporarily or permanently. Human resources and equipment for maintaining and updating the data base and maps are *not adequate* at all due to limited capacity at national, county and district levels. With regards to dissemination, maps are *present but not adequate*. While maps may be available in some counties and districts, they are not up to date. Integration and use of infrastructure and health services data is not adequate at all. In fact managers at both national, county, district levels rarely link information about the location of health facilities and health services to the distribution of the population.

Moreover the more detailed ICTIAT revealed that the ICT infrastructure is not adequate at all from the national servers hosting the different HIS application and services up to the county level where the number of hardware need to perform the daily work is also present but not adequate. Another issue is the limited interoperability between all HIS sub-systems. Despite some ongoing efforts to link the human resources system (iHRIS) with the HMIS based on DHIS2 and the MOH finance management system (iFMIS) used together with Norming PSA by finance section of MOH to manage health workers payroll, a lot need to be achieved yet. Part of the scope of work of the MEASURE Evaluation team is to provide an HIS Enterprise Architecture document to set up and global framework for interoprability between the various HIS sub-systems.

6.4.6.2 Human Resources

The current human resources records are *not adequate at all*. The national human resources (HR) database that tracks the number of health professionals exist but does not provide statistics disaggregated by professional category. The MOH has engaged the services of Collaborative Support of Health (CSH), UNDP, and Clinton Health Access Initiative (CHAI) to assist in the strengthening of the iHRIS data base at national and district levels and link it to CHIS and eLMIS. Recently a study was undertaken with funding from UNDP to examine how iHRIS and FMIS,

the management information system used by the Ministry of Finance and the Civil Service Agency, could be linked with each other. IntraHealth under USAID and UNDP is working to strengthening the iHRIS application. This will likely allow the national human resources (iHRIS) database to track the number of health professionals by major professional category working in the public sector. There is no national database that tracks the annual numbers graduating from all health-training institutions (e.g. nursing; private institutions).

6.4.6.3 Financing and Expenditure for Health Services

Financial records are available on public government expenditure on health and its components (e.g., by ministry of health, other ministries, social security, counties, and extra budgetary entities) and but not on private expenditure on health and its components (e.g., household out-of-pocket expenditure, private health insurance, NGOs, firms and corporations). Adequate numbers, but in need of external technical support, or inadequate numbers of skilled staff are regularly deployed to work on the National Health Account (NHA) whether or not they are employed by the ministry of health. According to Liberia 2015 Health System Assessment Report, three National Health Accounts (NHA) exercises have been carried out in FY07/08, FY09/10, and FY11/12. Recently, MOH rolled-out Performance-Based Financing (PBF) at primary care level in 10 pilot counties using resources raised form Pool Fund and FARA program Performance-Based Fund uses incentives to achieve desired health outcomes by rewarding facilities and providers contingent upon achieving targets. Efforts are being made to link the PBF to DHIS2 so that financial expenditures can be monitored routinely since estimates from last NHA are 3 years old. In addition, the last three NHA conducted have not provided information on health expenditure by major diseases, health program areas, counties and/or target populations (according to major policy concerns). Ministry of Finance is planning to have an integrated Financial Management System (iFMIS).

6.4.6.4 Equipment, Supplies and Commodities

The reporting system on equipment, supplies and commodities is *adequate*. Each facility is required to report at least annually on the inventory and status of equipment and physical infrastructure (e.g., construction, maintenance, water supply, electricity and sewage system) in the public sector. Each facility is required to report at least quarterly on its level of supplies and commodities (e.g., drugs, vaccines and contraceptives) in the public sector. However there is incomplete reporting on equipment and physical infrastructure due to capacity limitations to manage physical infrastructure and logistics. The assessment revealed that the reporting systems for different supplies and commodities are not fully integrated in the public sector. All supplies and commodities are separately reported. Furthermore, managers at national and county levels rarely attempt to reconcile data on the consumption of commodities with data on cases of disease reported in the public sector. MOH through the support of USAID-Collaborative Support of Health (CSH) and DELIVER project is about to conduct an assessment on LMIS. The current Excel-based Supply Chain Management System supported by Deliver has reported very minimum stock outs of commodities. MOH and Deliver are currently discussing how to strengthen Community Based Supply Chain with the Technical Working Group.

6.5 Data Management

The data management score is the lowest as compared to other components of Health Information System. There is a data management system that exists but is not adequate enough as shown in the table below.

Table 6: Score for the Data Management Component

Categories	Score out of 100	Result
Data management	33% (8.9 / 27)	Present but not adequate

Different "Unique Identifier codes" are used in different databases and a complete relational table is not adequately available to merge them. In addition, there are no written procedures for data collection, storage, cleaning and quality control including analysis and report writing throughout the country and county levels.

There is no written set of procedures for data management including presentation, visualization and dissemination for target audiences, and these are implemented throughout the country. A metadata dictionary does not exists which provides comprehensive definitions about the data. Definitions include information in the following areas: (1) data elements for the indicators, (2) specification of collection methods used, (3) periodicity, (4) geographical designations (urban/rural), (5) analysis techniques used and (6) possible biases. There is no system in place to capture unstructured/ semi-structured data and information (documents, emails, videos, audios). And only 25% of staff at national level is competent in routine data management (queries, merging, data cleaning, and aggregation). The same percentage is also true at the county level.

The HIS unit at national level is running an integrated data warehouse (DHIS2) containing data from all population-based and institution-based data sources (including all key health programs) and has a user-friendly reporting utility accessible to various user audiences. The integrated data warehouse is largely used for storage, and reporting. The human resources information system based in iHRIS, an open source software like DHIS2, has started implementation. It has approximately 12091 records to date, but an important effort is needed to keep the data base updated as the human resource data may change several time in given year. The disease surveillance Information System (IDSR) is mainly paper based, the Laboratory information system and Logistic management information system are MS Excel based. This is almost the case for all other sub-systems of the Liberian HIS, that are currently working in silos. Therefore, it is more than critical to allow "communication" between the HIS sub-systems by agreeing on authoritative databases to act as facility registry, data dictionary, routine data registry, health workers registry, interoperability layer etc. This will reduce redundancy and duplication of data and efforts, and enable the development of a holistic HIS architecture.

Some efforts were done to promote interoperability and data use across DHIS2 and iHRIS system during the DHIS2 and iHRIS academy organized by the RBHS project in 2014 in Monrovia, and UNDP Liberia just completed a study on requirements for iHRIS and IFMIS integration in the Liberia. But despite those past and current efforts there is still a real need for a global interoperability framework to allow communication and integration of data collected and managed by the different HIS sub-systems to foster a comprehensive HIS in Liberia. At the time of the writing of this report, the MEASURE Evaluation team in Liberia is working closely with the Ministry of Health on the development of a HIS Enterprise Architecture to define and orchestrate the overall interoperability strategy.

6.6 Information Products

The Information Products category, which reflects the quality of the data produced, received a moderate score among all assessed products. The overall average score is (57%) with most scores falling between "present but not adequate" and "adequate". Routine data on these indicators are collected from the Demographic and Health Survey (most recently in 2013) by the Institute of Statistics and Geo-Information Services, the National AIDS Control Program and the Ministry of Health (and Social Welfare). Additionally, a variety of sources of data provided from the individual counties are aggregated, stored, analyzed and presented at the national level by the Ministry of Health.

The evaluation is based on the assessment of the following basic indicators: (1)Health status indicators (Under 5 mortality, Maternal mortality, Morbidity, HIV prevalence); (2) Health system indicators (Measles vaccination coverage by 12 months of age, Deliveries attended by skilled health professionals, TB treatment success rate under DOTS, GGHE per capita, Private expenditure on health per capita, Density of health workforce by 1,000 population); and (3) Risk-factor indicators (Smoking prevalence 15 years and older). Each indicator was evaluated against the following criteria: data collection methods, timeliness, periodicity, consistency, representatives, disaggregation, and adjustment methods, where appropriate.

In general the quality of Health Information System (HIS) data in Liberia was found to be "adequate," scoring 57%. The health status and the health system indicators were found to be at the same level, adequate, however the Risk Factor indicator is "present but not adequate" at 40%, likely due, at least in part, to the infrequency with which the data on smoking prevalence is collected.

6.6.1 Health Status Indicators

Health status indicators in Liberia are mainly collected through surveys such as the LDHS, Malaria Indicator Survey and Disease Surveillance System. The Liberia Institute of Statistics and Geo-Information Services (LISGIS) in collaboration with the MOH coordinates the collection of DHS data, while the MOH in collaboration with counties provide disease surveillance data. The assessed mortality indicators are the under five mortality (all

causes), and maternal mortality. Others include morbidity indicators like HIV prevalence. Ideally, the most reliable data collection source to provide empirical evidence on mortality indicators would have been the vital registration; however, it has very low coverage in the country. The findings imply that indicators for health status are adequately produced to provide evidence base for the health sector needs. The only weakness according to the evaluation is on periodicity of sources of data as this was found to be inadequate or too spaced.

6.6.2 Health System Indicators

Indicators assessed in this category were "measles coverage by 12 months of age", "deliveries attended by skilled health professionals", "tuberculosis treatment success rate under direct observed treatment strategy (DOTS)", and "general government expenditure on health (GGHE) per capita" (Ministries of Health, other ministries and social security, county and local governments, extra budgetary entities), "private expenditure on health per capita" (households' out-of-pocket, private health insurance, NGOs, firms and corporations) and "density of health workforce" (total and by professional category) by 1,000 population. Health systems indicators are mainly collected routinely by the MOH through the HMIS. These indicators provide information on performance of the health system including human resources, drug supplies, and disease burden which includes incidence and case fatality rates. In general, all the health systems indicators had adequately met data quality assessment criteria. An overall, quality of the health system indicators was found to be adequate (57 percent). However, resulting estimates are not replicable because availability of detailed information on sources and statistical methodologies, and recording of any departures from international guidelines, for all adjustments carried out and their resulting estimates are not published.

6.6.3 Risk Factor Indicators

This area assessed the indicator on smoking prevalence (15 years and older). The overall performance was poor (40 percent). It was noted that this indicator was not very clear, either rarely done or is done on an ad hoc basis. It is not collected at all in Liberia. It follows that the HIS may not have adequate information regarding this risk factor for health to provide to the Liberian population.

Table 7: Scores for the Data Quality Component Categories

	Data- collection method	Timeliness	Periodicity	Consistency	Representative ness	Disaggreg ation	Estimation method	Overall
A. Under-5 mortality (all causes)	48%	65%	68%	56%	50%	72%	57%	60%
B. Maternal mortality	39%	68%	59%	58%	50%	82%	71%	61%
C. HIV prevalence	75%	56%	24%	63%	78%	77%		62%
D. Measles vaccination coverage	71%	55%	47%	63%	59%	75%		61%

by 12 months of age								
E. Deliveries attended by skilled health professionals	65%	60%	49%	65%	72%	66%		63%
F. Tuberculosis (TB) treatment success rate under DOTS	77%	60%	73%	71%	61%	68%		68%
G. General government health expenditure (GGHE) per capita (ministry of health, other ministries and social security, county and local governments, extra budgetary entities)	48%	62%	67%	59%	29%	52%	58%	54%
H. Private expenditure on health per capita (households' out-of- pocket, private health insurance, NGOs, firms and corporations)	56%	57%	64%	66%	63%	51%	42%	57%
I. Density of health workforce (total and by professional category) by 1,000 population	39%	31%	37%	63%		43%		42%
J. Smoking prevalence (15 years and older)	44%	37%	27%	40%	47%	45%		40%

6.7 Dissemination and Use

The Liberia HIS dissemination and use of information is adequate (50%) based on HMN standards. All categories within this component except for analysis and use of information are available or implemented at adequate level.

6.7.1 Analysis and Use of Information

Implementation of data analysis and use of information is "present but not adequate". Demand from managers is ad-hoc, usually as a result of external pressure and such demand does not follow a proper channel. Regular meetings held with stakeholders to share information, review relevant activities and impact are mainly organized at central and county levels.

But recent progress was documented in the results of the PRISM assessments, organized by the MOH with support of the USAID funded RBHS project in 2012 and 2014 to measure the performance of their HMIS. Use of information in 2014 was estimated at 58%, a substantial increase compared to the 38% of 2012. The study listed examples of HMIS informed decisions made by health facilities such as: increasing EPI outreach services; organizing meetings with TTMs to encourage pregnant women to go to the health facility for ANC and delivery; and conducting more community education sessions on STIs and healthy behaviors. The county level showed even better use of HMIS data than the facility level when making decisions. Some of the decisions taken by the CHTs based on HMIS data included: organizing orientation on HMIS recording and reporting forms for data producers and users; strengthening supportive supervision to low performing health facilities; revising health facilities to share their best practices.

IT has been used in Liberia to bring together and present in an integrated manner all the information needed to manage and plan the health system. Ideally this includes health services data; human resource, financial, and commodity data; and disease incidence and demographic data. All these data were presented in dashboards as exemplified during the Ebola crisis.

6.7.2 Information use for Policy

Information use for policy making is adequately carried out within Liberia HMIS. However, integrated HIS summary reports including information on a minimum set of core indicators (including those used to measure progress towards achieving the MDGs and those used by Global Health Partnerships), are mainly distributed annually to the Ministry of Health with distribution to partners based on request.

6.7.3 Information use for planning and priority setting

HIS information use for planning and decision-making is done adequately. However, there are still gaps. Health information (population health status, health system, risk factors) is demonstrably used in the planning and in the resource allocation processes, but mainly only at national levels of the health system.

6.7.4 Information use for resource allocation

The Liberia HIS provides available information to support resources allocation. However, only some of the targets set and budget proposals are backed up by HIS information. Moreover, HIS information used to advocate for equity and increased resources allocation to disadvantaged groups and communities are done only on an ad hoc bases.

6.7.5 Information use for implementation and action

Similarly, information use for implementation and action is adequate but still requires improvement. Managers at health administrative offices (particularly at national and county offices) use health information for health service delivery management, continuous monitoring and periodic evaluation. However, information use at facility and community levels is weak.

Table 8: Scores for the Categories of Dissemination and Use Component

	Categories	Score out of 100	Result
A	Analysis and use of information	44% (5.3 / 12)	Present but not adequate
В	Information use for policy and advocacy	57% (1.7 / 3)	Adequate
С	Information use for planning and priority setting	55% (1.7 / 3)	Adequate
D	Information use for resource allocation	50% (3.0 / 6)	Adequate
E	Information use for implementation and action	54% (4.8 / 9)	Adequate
	TOTAL	50% (16.5 / 33)	Adequate

7 CONCLUSION

Generally, the performance of the HIS in Liberia is inadequate. With an unsatisfactory resource environment for HIS (policy and planning, financing as well as institutions and human resource), there is limited capacity among program managers to analyze data and use information for program improvement and resource allocation. Although there is reasonable performance in terms of capacity of the data platform, some of the data sources (including vital registration, health and disease records, health services records, human records and financial records) require special attention. The assessment has revealed reasonable performance in terms of capacity to generate information products (with exception of generation of information products related to risk factors for health) along with quality of those products in terms of .the data collection methods, timeliness of the products, consistency, representativeness, disaggregation and estimation methods (with an exception of periodicity). This is also an area with potential for further improvement.

Ranking of categories can facilitate priority setting process, which is important in a view that strengthening activities should be incremental, step-by-step process. The Table 7.0 below shows that the lowest scores were given to *data management* and *HIS Infrastructure* categories demonstrating the weakest parts of the system were also agreed on by the participants. Population-based surveys were classified as "highly adequate." However, this important source of information is underestimated and is not used for facility-based data validation.

Table 9: The Rankings of Scores by various HIS Components

HIS Component	Category	Score	Result
Data Management	Data Management	33%	Present but not adequate
Resources	HIS Infrastructure	38%	Present but not adequate
Data Quality	Risk Factors	40%	Present but not adequate
Data Source	Health & Disease Records	40%	Present but not adequate
Resources	HIS Institutions, human resources & finan	41%	Present but not adequate
Data Source	Resource Records	44%	Present but not adequate
Dissemination and Use	Analysis & use of information	44%	Present but not adequate
Resources	Policy, Planning & Coordination	44%	Present but not adequate
Data Source	Vital Statistics	46%	Present but not adequate
Dissemination and Use	Information use for resource allocation	50%	Adequate
Dissemination and Use	Information use for implementation	54%	Adequate
Indicators	Indicators	54%	Adequate
Dissemination and Use	Information use for Planning	55%	Adequate
Data Quality	Health System Indicators	57%	Adequate
Dissemination and Use	Information Use for Policy	57%	Adequate
Data Quality	Health Status Indicators	60%	Adequate
Data Source	Health Service Records	60%	Adequate
Data Source	Census	61%	Adequate
Data Source	Population-Based Surveys	75%	Highly Adequate

8 RECOMMENDATIONS

Based on the findings of the HIS assessment, the following recommendations, arranged by component, are proposed. The core team believes that implementing these recommendations will address current problems identified during the assessment and strengthen the HIS as a whole. They will need to be discussed further in the HIS planning workshop scheduled at the end of September 2015.

8.1 Policy and Coordination

- Review and strengthen existing legislation providing the framework for health information to cover all
 HIS components such the data sources including vital registration; notifiable diseases; private sector
 data including social insurance; confidentiality; and fundamental principles of official statistics.
- Establish a mechanism for enforcing existing and newly created legislation

8.1.1 Partnership and Governance

- Establish and maintain a list and/or map of key HIS stakeholders and service providers in the same geographic and/or technical areas in which they operate
- Establish clear mechanisms (e.g. feedback reports, newsletters, memos, bulletins) to communicate about HIS related activities and decisions in a timely manner with relevant stakeholders involvement
- Put in place a mechanism that links with other organizations (government, national, international, community, technical, academic) for sharing knowledge, experiences, technical expertise and best practices
- Support and strengthen the HMER TWG to ensure that continuous coordination among HIS stakeholders

8.1.2 HIS Institutions, Human Resources and Financing

- Increase the capacity of HIS and service delivery staff in managing and performing HIS responsibilities and functions, both at national, county and facility levels
- Organize regular mentoring and in-service training to health and HIS staff at national, county and facility level in designing, managing and supporting databases and software
- Establish a HIS budget-line item in the National Health Budget
- Strengthen the resource information systems including financial, human resources, supplies and commodities tracking systems

8.2 Indicators

• Continue to work with vertical programs to ensure web-based access to their indicators, so as to avoid the setting up of parallel indicator and reporting system.

8.3 Data Sources

- Support the implementation of post-enumeration survey of 2018 census
- Institutionalize within MOH and counties the use of population projections for the estimation of coverage and planning of health services
- Strengthen the registration of vital events, for example, by making it one of the core administrative functions of village volunteers.
- Improve coverage and use of VR including causes of death at health facilities and community level
- Increase the proportion of outbreaks investigated with laboratory results
- Improve on the first detection rate of epidemic at district level or facility level
- Introduce and train clinicians/doctors on ICD-10 coding and verbal autopsy.

8.4 Data management

- Support the development and implementation of SOPs for data sharing, security, storage, confidentiality, management, analysis, dissemination and use
- Develop and disseminate metadata dictionary which provides comprehensive definitions about the data. Definitions include information in the following areas: (1) Potential use of information for decision making, (2) specification of collection methods used, (3) periodicity, (4) geographical designations (urban/rural), (5) analysis techniques used and (6) possible biases
- Standardize unique identifiers codes that are required to link and merge data across various databases

8.5 Information Products

- Expand estimates of general government (health?) expenditures includes Ministry of Health and other components: other ministries and social security, regional and local governments, extra budgetary entities and not by county or district level
- Institutionalize the use of other data sources like the upcoming 2018 census to validate density of health workforce

8.6 Data Use

- Ensure that all 15 CHOs as well as all health facilities give evidence of data use for planning, resource allocation; performance improvement; and patient/client management
- Create a consistent and timely data demand from senior managers and policy makers

Organize data review meetings at all levels: community, facility, county, national

8.7 ICT Recommendations

8.7.1 Central MOH Level

- Advocate with eGovernment project for rapid implementation of Liberia Internet exchange point.
- Advocate for less expensive internet fees at national level
- Advocate for better internet quality and reliability
- Equip the MOH with 20 tablets with GPS functionalities to allow mobile survey data collection
- Renew all computers aged more than 3 years
- Increase the number of network printers for more efficiency
- Develop SOPs and policy documents to guide the use of ICT at MOH and at decentralized level
- Advocate for a more clear budget line to cover Internet expenses at central and decentralized levels
- Advocate for more transparency regarding financial data
- Elaborate and implement data backup and disaster recovery plan at nation and decentralized levels
- Advocate for more use of Linux based client side system to reduce the cost of antivirus programs
- Implement a centrally managed antivirus server system
- Upgrade the MOH server room at international security standards
- Hire additional ICT personnel: computer programmers, database and Linux system administrators
- Use more Unix based servers to reduce security risks

8.7.2 County level

- Advocate for charge free locally hosted data. All data hosted in Liberia and at MOH Liberia should be freely accessible since it does not require international Internet traffic.
- Install a wired LAN at the county level to ensure smooth Internet sharing among the users
- Share government corporate Internet connectivity when possible (close to the county office location)
- Increase the number of computers available at county level
- Renew all computers aged more than 3 years
- Provide all the counties with at least one tablet and/or smartphone equipped with GPS functionality
- Advocate for more use of Linux based client side systems to reduce the cost of antivirus
- Advocate for more qualified human resources, especially data managers and ICT staffs to perform computer trouble shooting and network maintenance.

8.7.3 Facility level

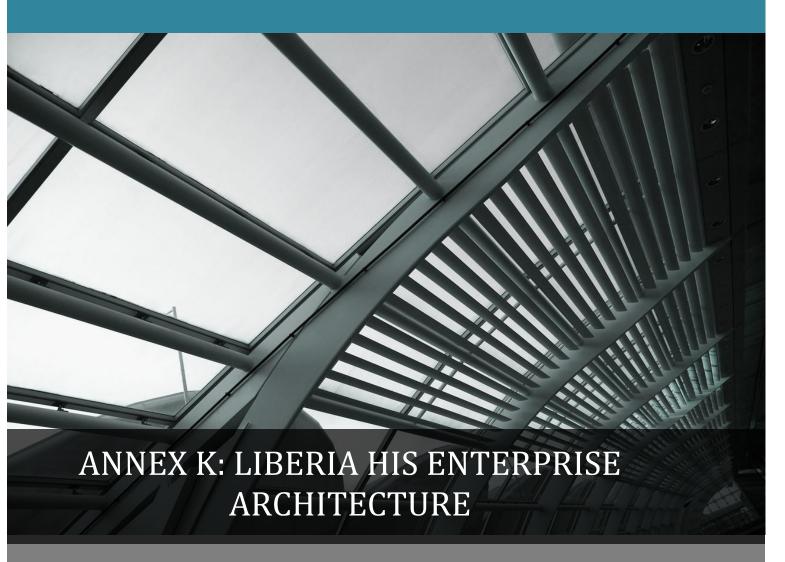
- Advocate for more GSM/3G/WIMAX network coverage to GOL and Liberia network operators
- Advocate computers and/or tablets provision at facility level
- Advocate for more electricity availability by the national electricity comapny

9 WAY FORWARD

The MOH considers the health information system as an important element of the health system. As such the ministry has already launched a process to formulate policy and guidelines for HIS as part of the strengthening mechanism of its Health Information System. The findings from this assessment are therefore timely and are a first step towards the development of a 2016-2021 HIS Strategic Plan.

The following tasks have been scheduled to build upon findings of the assessment:

- (i) A HIS Strategic Plan for 2011-2016 shall be developed and disseminated to stakeholders for their inputs. This plan will prioritize HIS objectives and interventions and through consensus building lead to better donor and IP coordination
- (ii) A 2015/2017 HIS costed operational plan shall be prepared in which each proposed intervention will be costed out and the source of financing identified
- (iii) A HIS capacity building plan shall be developed and implemented particularly to frontline workers to ensure effectiveness at the level of operations. Most of the gaps identified in this assessment are within the reach of the Ministry of Health and other Ministries responsible for Health Information System. It is therefore important that efforts are made to strengthen the capacity to develop and maintain a user friendly and implementable Health Information System at all levels of health delivery system in the country.



Romain T

MINISTRY OF HEALTH OF LIBERIA

Liberia HIS Enterprise Architecture

REPORT VERSION CONTROL

Version No	Date	Revision description	Authors
#1		Initial release	 MOH Liberia: Beatrice Lah MEASURE Evaluation TA in Liberia: Romain-Rolland TOHOURI Theo Lippeveld

Plan

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I. Introduction

In the post Ebola context, building a resilient and strengthened health information system (HIS) becomes an emergency. But how to strengthen it, when we know that National health organizations in developing countries are very complex organization managing a complex health information system (HIS) with goals, actors, processes, subsystems and various outputs. Understanding the internal relations and rationale driving the running of HIS is valuable to identify actions and roadmap toward a more efficient and functioning health system. With regards to this, learning from others disciplines such as Enterprise Architecture (EA), developed over the last 20 years to guide planning, development and management of complex system in all sectors can help in achieving such a task.

The present document is building upon EA to first describe the current Liberia MOH Health Information System, make a diagnosis the problems hampering efficiency of the functioning of the overall HIS and finally proposed a new architecture promoting better alignment between the organization business logic, the data architecture, the application architecture and the technical architecture.

II. Definition of HIS enterprise architecture

Enterprise architecture (EA) is a comprehensive description of all of the key elements and relationships that makes up an organization. In our case EA is used to describe the methods for describing HIS in terms of a well-defined set of health system functions see figure 1 showing how they fit together and how communication between groups of functions can be achieved. It is used to define alignment of an organization's mission, goal and objectives with Information Systems and guide developers in setting up computerized data management applications.

Figure 1: Enterprise Architecture Domains

Business Architecture

• Business Model, process and activities use

Data Architecture

• Data that must be collected, organized, safeguard and distributed

Applications Architecture

• Software **Application**, Interface applications, users interfaces

Technical Architecture

• **Technology** such as servers, computer, network, etc.

III. Methodology

The methodology used in this document is based on the work conducted by Sally Stansfield et all[1], stating that EA is the missing link to guide national development and implementation of HIS. It fills the need for a more detailed technical elaboration of the HMN Framework to support focused investments and the mobilization of a wider pool of leaders and advocates of health information. As such this document can be seen as a more detailed technical HIS improvement plan building on the HMN framework strategic planning process just completed by MOH Liberia in September, 2015.

We will follow the EA outline described in table 1 below, proposed in their work[1] to describe Liberia MOH EA As-Is and then proposed an EA design As-To-Be. This design will be based on a visual analysis of the HIS Enterprise Architecture following the Archimate meta model[2] allowing a visual approach to business model and IT alignment and then zoom in a more detailed Application Architecture and Technical Architecture design.

Table 1: HIS Enterprise Architecture outline [1]

HIS Enterprise Architecture					
Architecture	Deliverables	Representative Questions Addressed			
Domain					
1. Organizational	 Business domains 	Who are key decision makers, what are their roles			
Architecture	 Business functions 	and behaviors insofar as decision-making is			
	 Business processes 	concerned?			
	 Governance, Policy, 	What are the essential questions that users must be			

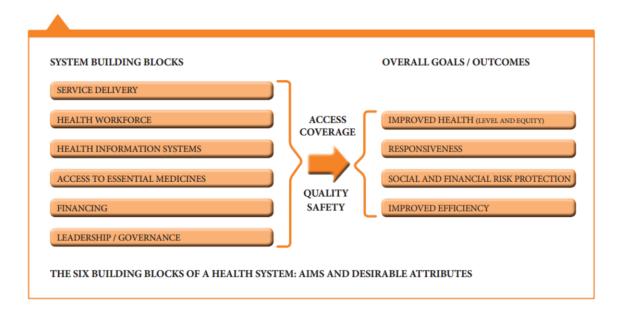
	Resources	 able to answer for strategic and day-to-day decision-making? What core business processes, i.e. health services delivery, laboratory, pharmacy, are necessary to support decision-making? What policies and laws are necessary to support the initial development and implementation of a
		 national HIS? What resources are necessary to establish the minimum capacity for a sustainable HIS? Who will be responsible for the maintenance of the integrity of the national HIS?
2. Data Architecture	 Data model Metadata dictionary Classification standards and systems 	 What are the essential core and common data necessary to support information and evidence for decision makers? What data sources contain these data and what can be linked for use from existing operational systems? For example the national census, vital registration or surveillance systems? What is the link between essential minimum data sets and global program M&E?
3. Applications Architecture	 Software applications Interfaces between applications User interfaces 	 What are the initial key applications a minimal national HIS must be able to deliver? Examples include standard data collection instruments, data communication services, data analysis and modeling, report generator, GIS. What applications are best included within a single platform design versus those applications that are best maintained as separate operational systems? How will applications that have a requirement to be linked be able to do so? How should the user interface work?
4. Technical Architecture	 Hardware platforms Local and wide area networks Operating system Interoperability 	 What are the requirements for information to be captured, data entered, tagged, communicated, managed and disseminated? What is the minimum information and communication technology capacity needed across the country to support access to the applications and dissemination of information? How will new classes of electronic devices, communication networks and related ICT be leveraged over the next 5 to 7 years?

IV. Liberia MOH Enterprise Architecture As-Is

1. HIS Business Model

In general the HIS Business model can be summarized by the six health systems building blocks (see figure 2) also called Health System (HSS) Core Functions leading to the HIS overall goal that is to improve the health of the population, to be responsive, to manage social and financial risk protection and improve efficiency. This applies to Liberia Ministry of health as well with an emphasis on the responsiveness overall goal.

Figure 2: HIS Business model – source: WHO's monitoring the building blocks of health systems document



2. Liberia MOH Organizational Architecture

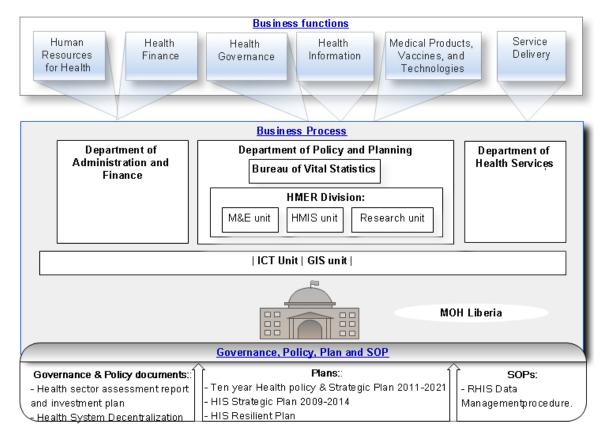
The current Liberia MOH organizational architecture is based on a set of governance, policy and SOPs documents defining the mission, the processes and the standard operations to guide the day to day functioning of the HIS.

To ensure smooth operations the MOH sections dealing with the HIS are divided as follow:

- The Department of Administration and Finance, managing the health workers and health finances.
- The Department of Policy and Planning: This department is the one hosting the Bureau of Vital Statistics comprising the Heath Monitoring and Evaluation and Research (HMER) division composed of three units:
 - HMIS unit in charge of the Routine Health Information System (RHIS)
 - o The Monitoring and Evaluation Unit
 - o The Research Unit

- The department of Health Services
- And Finally two cross cutting units:
 - o The ICT Unit
 - o The GIS Unit

Figure 3: Liberia MOH As-Is Organizational Architecture

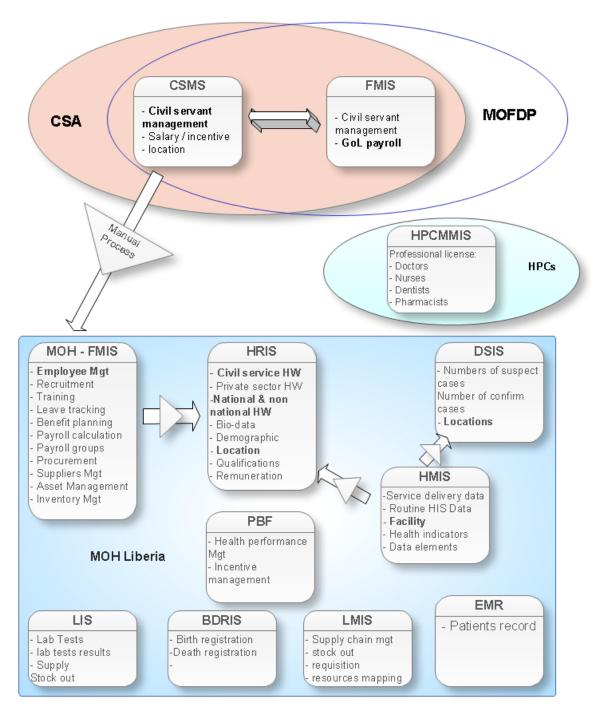


These MOH Departments, Division and Units are in charge of managing the six key HIS functions i.e. Human resources for health, Health finance, Health governance, Health Information, Service delivery, Health Workforce, Financing, Health Information System, Services delivery and Medical Products, vaccines and technologies.

3. Data Architecture

The MOH Liberia HIS produced a certain amount of data mostly collected and produced in silos with little to no integration (see figure 4).

Figure 4: MOH Liberia As-Is data architecture



The health workers and financial data are manually updated from external databases creating a very challenging process to keep them up-to-date. In the other end health management information data, the logistic data, the laboratory generated data and others HIS subsystems data are collected independently close to no communication or exchange. This makes the aggregation/integration of the data produced by these various sub-systems a very complex and tedious task.

4. Application Architecture

The Liberia MOH HIS Architecture reveals that the siloed and difficult to integrate data produced originates from very fragmented application architecture operating in parallel with close to no data exchange. The MOH Department and unit often needs to manually extract the data from one application and load it to another to update their records.

The data storage varies from paper based to MS Excel spreadsheet, MS Access databases and various Database Resource Management Systems (DBRMS) like Microsoft SQL, Mysql and PostgreSQL servers (see figure 5).

To date part of the data collected is coming from entities external to the MOH. This is the case for the human resource and financial data that are manually reconciled from the Civil Servant Agency (CSA) database called CSMS and the Integrated Financial Management Information System (iFMIS) of the Ministry of Finance and Development Planning (MOFDP). The two systems provides list of active Civil Servant under government payroll, salaries and others information needed for the MOH financial information system based on Norming PSA, a web based application implementing a Human Resource module which provides a set of complete human resource management functionality, including employee management, recruitment, training, leave tracking, benefit planning and payroll calculations.

The Human resource unit also has its own system based on the Integrated Human Resource Information System (iHRIS) managing the health work force. The iHRIS is not integrated with Norming PSA and therefore has to manually reconcile through a set of complex procedures to import and update its human resources records. The finance management unit is also using the Sage 300 software to manage procurements, assets and budgeting.

The Health Management Information System (HMIS) managed by the DHIS2 software is collecting, hosting and processing the RHIS data on a monthly basis. The Meta data hosted by the DHIS2, mainly the list of facilities, are used by iHRIS and the DSIS to respectively locate the health workers and the cases reported. A very important amount of health data is also generated by other HIS subsystems like the logistic management information system (LMIS), the Laboratory information system (LIS), the Performance Based Financing (PBF) system and sporadically by some test implementations of Electronic Medical Records (EMR).

The main lesson learned from the data architecture as-is, is the heavy redundancy of the health information collected in parallel with different periodicity and understanding.

Application Architecture Laptop Î Internet Î SAGE 300 ERP Norming PSA BDRIS **iHRIS** DHIS2 Π 11 Receiving SQL Server SÖL Server MOH CHO County Facility / Community

Figure 5: Liberia MOH As is Application Architecture

5. Technical Architecture

The current MOH Liberia Technical architecture is fragmented with various Internet providers and means of connection as well as inadequate bandwidth availability. The different applications and databases are hosted in a heterogeneous environment i.e. at the MOH server room, at local Internet provider data center or internationally hosted cloud infrastructure.

The MOH central office is equipped with a Local Area Network (LAN) but at the decentralized level only 64% of the counties are equipped with a LAN[3]. Except the

RapidPro system linking DHIS2 to iHRIS to send SMS communication to health workers no infrastructure is available to promote interoperability.

OpenHIE mHero nteroperability DHIS2 mSync RapidPro IL iHRIS Cloud Infrastructure Fio EMR Technical Architecture OpenMR r Rapi**∢Pro In Country Infrastructure** LIBTELCO Data Center MOH Server Room iHRIS Linux Hardware ooo **(Arc** Server Birth & Death 0000 NT Servers Registration sage 0000

Figure 6: Liberia MOH As-Is Technical Architecture

V. MOH Liberia To-Be

1. MOH Liberia To-Be Architecture analysis

Base on the current HIS architecture we proposed a visual model showing how including innovation can help better align the Liberia MOH Business Model to the data, application and technical Architectural model to increase responsiveness of the health system. To achieve that goal a key value to reach is providing a holistic view of the health data produced by all subsystems. But only an innovative approach bringing interoperability in to play can help move forward.

The interoperability implementation should start at the organizational level by the development of various policy and SOP documents promoting the use of:

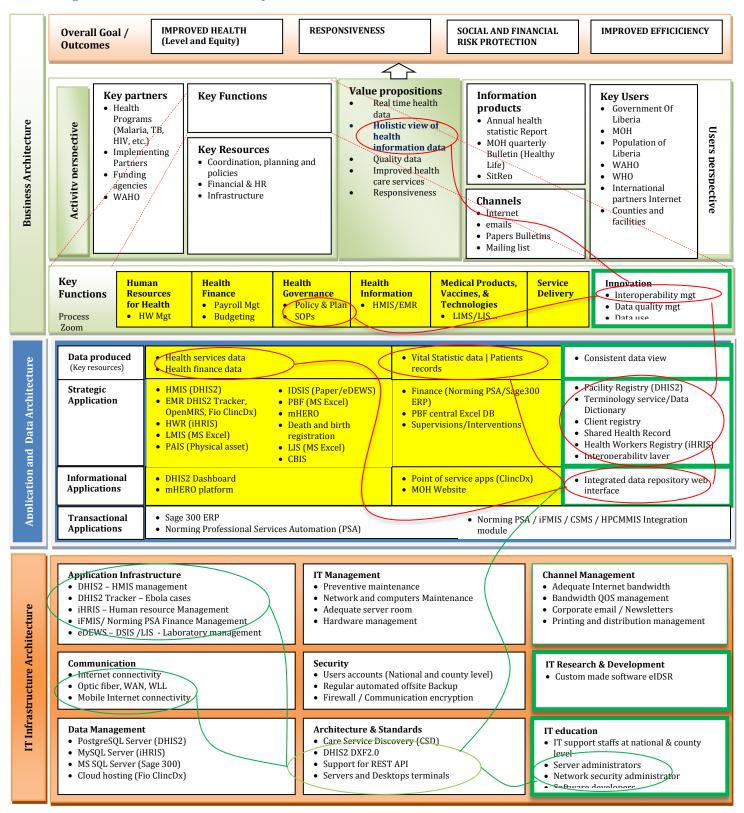
- open source software to guaranty sustainability,
- maintenance, security and disaster recovery plan to ensure health data safety
- the use of identified agreed upon standards and API on newly implemented applications
- Policy document on open data and health data sharing

The next intervention to carry on is the integration of all health data produced in a data warehouse with user friendly web interface accessible by HIS users and partners based on credentials provided by the MOH. But manually feeding this data warehouse is a tedious task so automating the integration of the various data sources is the way forward and the requirements are the establishment of various authoritative databases aimed at ensuring that the data to be integrated are consistent with regards to the location, the description of the phenomenon and when the event happened. Setting up a data dictionary also called terminology service, a facility registry, a health worker registry, client registry and a shared health record are among the authoritative databases to be set up. But this has to be done progressively as the needs rose.

At the infrastructural architecture level, mutualizing the IT resources will bring more sustainability and reliability of the service provided. Our analysis shows that providing the databases as services to the client applications will help provide a better database management and security and help the implementers focus on the their system design. Implementing an Interoperability Layer (IL) to serve as mediator between the different applications (legacy systems and new ones) implemented in the Liberia HIS ecosystem as proposed by the openHIE community. This IL will ensure data validation across the different authoritative databases before storing it for later use in the data warehouse.

The last but not least point to consider is the professionalization of the ICT infrastructure management by hiring competent and experimented IT professionals to manage the database system, the network security and the servers administration.

Figure 7: Liberia MOH EA To-Be analysis



2. Zoom on the organizational architecture To-Be

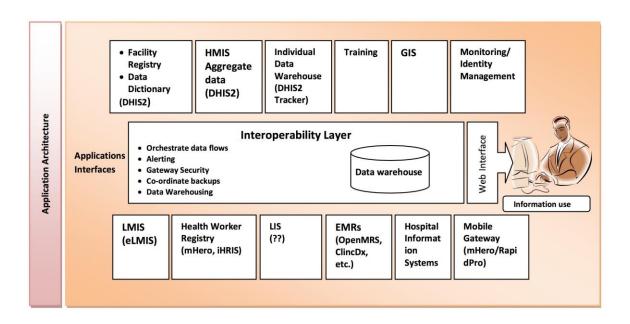
At the organizational architecture level the main improvement will be the development and implementation of a set of policy and SOPs documents to guide the various processes to conducted in order to achieve the overall responsiveness goal. A few of them are:

- Elaborate SOPs and policy documents to guide the use of ICT at MOH and at decentralized level
- Elaborate and implement ICT resources management
- Elaborate SOPs on MOH ICT resource maintenance and replacement
- Elaborate and implement data backup and disaster recovery plan at national and decentralized levels
- Elaborate a software implementation in HIS ecosystem policy document
- Elaborate an Interoperability charter/agreement to be signed by all health stakeholders

3. Zoom on the application architecture To-Be

The innovation here is the IL and the data warehouse allowing an holistic user friendly view of health data.

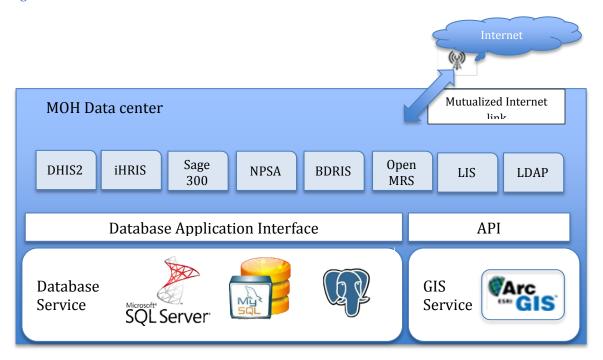
Figure 8: Application Architecture To-Be



4. Zoom on the Infrastructure Architecture To-Be

At Infrastructure level, mutualizing the resources is the way forward. Instead of managing separate instances of the same database system managed by people with different skills level we propose here to offer the databases as service to the different applications that need a storage system. The same applies to others cross cutting services like the GIS that can also be offered as a service to all application through an Application Programming Interface (API). The resource sharing can also be applied to the Internet connectivity. A broad band Internet connection can be linked to the MOH data center and shared with all the existing application and services.

Figure 9: Infrastructure Architecture To-Be

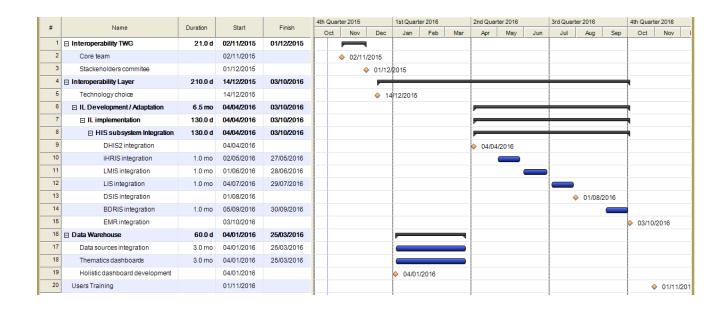


VI. Roadmap toward interoperability

We hereby propose some key steps (figure 10 and annex 1) to follow to implement this new HIS architecture model.

- 1. Creation of an Interoperability technical working group composed of a core team and a stakeholders committee
- 2. The development or implementation of the Interoperability Layer
- 3. The data warehouse development
- 4. The holistic data view dashboards system development
- 5. End users training

Figure 10: Interoperability road map gantt chart



VII. Conclusion

This document comes as a complement to HIS Strategic Plan 2015-2021 document elaborated by MOH Liberia with technical assistance from MEASURE Evaluation. It can be used as more specific guideline document to improve the ICT component of the Liberian HIS.

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Annex L: HIS ICT Infrastructure Assessment in Liberia







ACRONYMS

CHO County Health Officer

CHT County Health Team

DHIS2 District Health Information Software version 2

EOC Emergency Operation Center

GDL Global Development Lab

HIS Health information system

HIV Human immunodeficiency virus

HMER HMIS, M&E, and Research

HMIS Health management information system

ICT Information and Communication Technologies

ICTIAT ICT Infrastructure Assessment Tool

ITU Information Technology Unit

iHRIS Integrated Human Resource Information System

LAN Local Area Network

LMIS Logistics Management Information System

M&E Monitoring and evaluation

mHero Mobile Health Worker Electronic Response and Outreach

MOHSW Ministry of Health and Social Welfare

NGO Non-governmental organization

OIC Officer In Charge

SMS Short Message Service

TOT Training of trainers

USAID United States Agency for International Development

WAN Wide Area Network

WLL Wireless Local Loop

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All photographs appearing in this report are credited to Dr TOHOURI Romain-Rolland.

EXECUTIVE SUMMARY

1. Summary of results

The ICT assessment report shows that less than 10% of the counties know their GPS coordinates while this is far better at facility level with more than 35%. Internet is nowadays the main channel for data transmission and communication and its availability in developing countries is directly correlated to the mobile network coverage. The assessment reveals that only one-third of the counties have access to more than two mobile network operator while the Internet connection bandwidth is inadequate for more than 55% of all assessed institutions at county level. Less than 70% of assessed facilities have GSM network coverage. The working stations are needed to process and enter the data into the HIS sub-systems but their number are highly inadequate according to 100% of the health institutions assessed. They reported that the number of available computers was insufficient to perform their work and in fact 33% of the computers are aged more than 3 years, furthermore 38% of the computers in use at county level are personal computers. Another major finding is the quasi inexistence of ICT policies documents in place to guide the use of Internet at work, the network security, computer maintenance, data backup and disaster recovery, etc. at central MOH level as well as at county level. This lack of ICT policy has a direct impact on the security of the data collected and stored locally: only 29% of computers at central MOH HQ are equipped with updated antiviruses and only 6% of the computers at county level have updated antiviruses and most of them are free antiviruses; 62% of the counties already reported loss of hardware; 38% of counties perform backup on external hard drives and finally the MOH Central HQ server room scores only 20% compliance with international standards with only 6% of the servers benefiting from the a backup system.

In term of human resources there is great need of skilled staff at county level where only 8% of them have more than one data manager and none of the counties have IT staff. At central level also there is an important need for computer programmers, database administrator, network security and Linux systems administrators.

And finally most of this ICT infrastructure can difficultly work if there is no electricity available to power the various devices needed to properly operate the system. The assessment revealed that only 58% of the facilities have access to 18 hours of electricity per day across the county and most of it powered by generator (50%), solar panel (31%) and combination of generators and solar panels (13%). The national electricity company is only providing electricity to 6% of the facilities. At county level and central level the power is mainly produced by generators.

	Central level	County Level		Facility Level	
Components	Values	Values	# resp.	Values	# resp.
County location					
% of offices for which GPS coordinates are known		7%	1	38%	16

% of offices with apparent network accessibility		70%	10		
Network					
% of offices with mobile network coverage	100%	93%	14	69%	16
% of offices with at least 1 Network operator		92%	12		
% of offices with more than 2 network operators		33%	12		
% of offices with SMS coverage	100%	93%	14	75%	12
% of offices with Voice data coverage	100%	100%	14		
% of offices with GPRS/3G/UMTS/WIMAX Data coverage	100%	55%	11	63%	16
% of offices with working Internet connection	100%	90%	10		
Average Internet connection Download speed (Mb)	4.00	2.61	2		
Average Internet connection Upload speed (Mb)	4.00	2.47	3		
% of offices with adequate Internet bandwidth availability	30%	44%	9	38%	16
% of offices with a LAN infrastructure		64%	11		
% of offices with a corporate WAN within 3 km		21%	14		
% of offices connection via satellite network provider (VSAT)		33%	12		
Hardware					
Total number of offices with at least one working computer		100%	12		
% of offices with inadequate number of computer	100%	100%	13	100%	15
Proportion of personal computers		38%	12		
% of functional government computers	89%	73%	12	0%	15
Total number of functional government computers	260	113	12	0	15
Number of computers connected to Internet				0	12
% of offices with more than 2 modems (usb/3G modems)		54%	13		
% of offices owning at least one Smartphone	0%	18%	11	7%	15

% of offices with at least one health worker owning a smartphone		73%	11	53%	15
% Health workers owning a Smartphone		37%	13		
% of offices owning others type of cell phone		45%	11		
% of offices owning a basic phone (ex: Nokia 3310)				57%	14
% of offices owning at least one GPS device (GPS or phone with GPS)	0%	0%	11	47%	15
% of functional scanners		71%	12		
% of offices with at least one functional scanners		92%	12		
% of functional printers	100%	79%	13		
% of offices at least two functional printers		77%	13		
Total numbers of Tablets own by MOH	4				
% of network printers	4%				
Total number of servers own by MOH	16				
Proportion of functional servers	88%				
Proportion of servers in use	44%				
Governance					
% of offices with a budget line to cover Internet expenses	0%	8%	13		
% of offices with Policy in place for professional use of Internet	0%	23%	13		
% of offices with Policy in place for network securit	y 0 %	8%	13		
% of offices with Policy in place for computer maintenance	0%	8%	13		
% of offices with Policy in case of lost of a hardware	0%	15%	13		
% of offices with an inventory of hardware own by the offices	100%	69%	13		
% of offices with a policy document to guide data backup/Disaster recovery	0%	15%	13		
Is an ICT policy available within the MOH	0%				

Is there a policy in place for managing computer resources (e.g. hardware, software, network etc.)	0%				
Finance					
% of offices with available budget for Internet subscription		67%	12	19%	16
% of Internet subscription fees supported by donors only	x	57%	7		
% Internet subscription fees supported by offices only	x	29%	7		
% Internet subscriptions fees supported by both donors and office		14%	7		
Amount paid monthly for hardware maintenance at county level		\$100	6		
Amount paid monthly for network maintenance at county level		\$0	5		
Security					
% of offices with secure building hosting computers		85%	13	31%	13
% of computer with updated antivirus	29%	6%	12	0%	11
% of offices already reported lost of hardware		62%	13		
% of offices with backups kept in different physical location		15%	13		
% of offices with data backup on external hard drive		38%	13	8%	12
% of offices with cloud based backup system		8%	13		
Number of equipped server rooms	1				
Security of the server room	100%				
Are the server rooms respecting the standards and norms?	20%				
Efficiency of the backup system	33%				
% of servers benefiting from backup system	6%				
% of servers with cloud based backup	0%				
Maintenance					

% of offices with HR available to perform maintenance	100%	15%	13		
% of government computers aged more than 3 years	35%	31%	10		
Users					
% of health worker with an email classifying themselves as confortable using a computer		17%	13		
% of offices with at least one data manager		85%	13		
% of offices with more than one data managers		8%			
Number of MOH local network users	150				
Estimated Number of the infrastructure users outside the MOH	308				
Total number of staff at the IT unit	8				
Proportion of specialist in network maintenance IT unit	25%				
Proportion of Specialist in computer maintenance IT unit	50%				
Proportion of computer programmers at the IT unit	0%				
Proportion of network security administrators at the IT unit	13%				
Proportion of database administrators at the IT unit	0%				
Proportion of LINUX system administrators at the IT unit	0%				
Proportion of Windows system administrators at the IT unit	38%				
Software					
% of servers running Linux OS	29%				
% of servers running MS Windows OS	57%				
Service availability					
% of offices having access to MoH Servers (DHIS2)		100%	12	8%	13

% of offices having moderate/intermittent access to MoH Servers (DHIS2/iHRIS/mHero)		60%	10		
% of offices having difficult/no access to MoH mHERO platform (DHIS2/iHRIS/mHero)		42%	12		
% of facility with electricity availability	100%	100%		58%	26
Average hours of power availability during working days	17	13	15	18	14
Average hours of power availability during weekend	24	2	15		
% of offices powered by Generators	100%	93%	15	50%	16
% of offices powered by Solar Panels	0%	0%	15	31%	16
% of offices powerded by Natioanl Electricity Company	0%	7%	15	6%	16
% of offices powered by combination of Generators and solar panel	0%	0%	15	13%	16

BACKGROUND

USAID's Global Development Lab requested MEASURE Evaluation assistance to embedded experts to provide dedicated technical and organizational support to the Liberian Ministry of Health's (MOH) Health Monitoring, Evaluation and Research (HMER) unit, within the Planning and Research Department, as well as, where needed, with other stakeholders in the Government of Liberia (GOL) such as the Ministry of Finance and the Civil Service Agency. The two embedded advisors were in charge of assisting the MOH to develop a vision for the development and integration of sustainable digital platforms to "build back better" a national HIS that will enable the MOH to better manage routine health service provision and integrate disease outbreak surveillance and response.

The primary objective of this requested assistance was to strengthen the institutional capacity of the Liberia's MOH in the area of health informatics. The main specific objectives of this technical assistance are to:

- develop and initiate the implementation of the new health information system (HIS) strategy 2015-2020
 and a costed operational plan for country-led HIS development and institutional capacity strengthening
 in Liberia
- 2. accelerate the process of integrating the various HIS systems and their sub-systems
- 3. enhance the MOH's capacity to use data for decision-making

To address the objective #2 of the mission, an ICT infrastructure assessment tool was developed to assess HIS infrastructure of MOH Liberia at all levels of health system: National, County, Facility and partners level. The aim of this assessment is to understand the current state of the HIS Infrastructure to guide the strategic planning process and elaborate an HIS architecture that will help bring together the various stakeholder interventions toward a strengthened health information System.

Study Objectives

1. General objective

The global objective of this study is to assess the state of the underlying information and communication infrastructure in support of the Liberia health information system.

2. Specific objectives

The specifics objectives are:

- 1. Evaluate the state of ICT network across the health system in Liberia
- 2. Evaluate the state of the hardware needed to support the HIS process
- 3. Evaluate the existence of governance framework to guide proper use of the ICT infrastructure
- 4. Evaluate the financial requirement to a sustainable ICT Infrastructure

- 5. Evaluate the security of the ICT infrastructure and supported HIS process
- 6. Evaluate the adequacy between the human resources, users and the ICT infrastructure capacity
- 7. Evaluate the adequacy between the ICT infrastructure and HIS services running on top of it
- 8. Formulate recommendations for the HIS ICT infrastructure improvement

Evaluation Framework

This assessment was based on the ICT Infrastructure Assessment Tool (ICTIAT) developed by MEASURE Evaluation team in Liberia with the funding of USAID Global Development Lab.

The assessment intends to reveal the state of the ICT infrastructure supporting the health information system and to highlight the adequacy of the ICT resources available compared to the HIS applications and user's needs.

The ICTIAT assesses the following aspects of the infrastructure (see table 1 below) and provides a set of automated analysis to be used for reporting purpose.

Table 1: Areas assessed by level of the health system

National	County	Facility	MoH Partners
Internet Access	Office Location	Facility Location	Already implemented software
Available bandwidth	Network	Network	Planned software implementation
Hardware	Hardware	Hardware	
Governance	Governance	Governance	
Security	Security	Finance	
Maintenance	Maintenance	Security	
Human Resources	Users	Maintenance	
Software services	Connectivity	Users	
		Connectivity	

Survey Methodology

The assessment process was conducted entirely by the MOH HMER and ICT unit assisted by the embedded MEASURE Evaluation TAs using an innovative approach to meet the following constraints:

- 1. Time constraint: The embedded TA mission were limited to only 3 months
- 2. No budget available to send enumerators in the field for data collection
- 3. One week time frame to conduct the ICT Infrastructure assessment because of the preliminary results needed to be presented at the HIS assessment workshop organized in prelude to Liberia MOH HIS strategic planning process.
- 4. Need to use existing already implemented solutions

To meet the above requirements the tools questions were sent to respondents using three different means depending on their location in the health information system hierarchy:

- 1. At Central MOH head office, the respondents (ICT unit and MOH partners) received the questionnaires on the native MS Excel format of the tool
- 2. At county level, the data managers and M&E officers responded to the survey using the Liberia MOH DHIS2 online platform.
- 3. At facility level the OICs received and replied to the light weight questions version of the tool via SMS messages sent and received through the mHero platform

The respondents took the questionnaires as a self-assessment though we had a chance to review the answers provided by 11 counties with their representatives (data managers and or M&E officers). We were also able to review the answers provided by the MOH ICT unit to enforce the validity of the data collected.

Some of the preliminary results were presented during the Liberia MOH HIS assessment workshop and taken into consideration during the SWOT analysis.

1. Type of study

A self-assessment cross-section survey was carried out applying quantitative as well as qualitative methods to collect data from key informants at all level of Liberia health system hierarchy.

2. Sampling

This survey tried an holistic approach by assessing all key respondent across the country.

As a result the survey was sent to the ICT unit at central Liberia MOH head quarter and all the 15 counties although only 14 of them responded.

At the facility level the questions were sent via SMS to all OICs in the country with a phone number recorded into the human resource database (iHRIS).

3. Data collection

The tools were disseminated through different means:

- 1. MS Excel the native format of the tool was used to assess the MOH central office IT unit
- 2. The MOH partners version of the tool was sent to all the partners and stakeholders to assess the software application their supporting or planning to support the implementation in Liberia HIS
- 3. The county questionnaire was designed in Liberia DHIS2 and the assessment taken online by the different counties (14 out of 15)
- 4. An SMS friendly version of the tool (20 questions) was used to assess the facilities. An SMS message was sent to all facilities OICs registered in the mHERO platform and the answers collected in excel format.

Table 2: Overview of SMS messages sent to the facilities using the mHero platform

Questionnaire	SMS Sent	Complete Answers	Aborted answers	No Reply
ICT survey	91	17	23	51
Electricity survey	68	16	17	35

Results: Current Status of HIS ICT infrastructure

1. Location

Most of the county health offices (70%) are located in an area with an unobstructed view allowing them to be reached wirelessly by a wireless local loop. At county (7%) as well as facility (31) level only few of the offices knows their GPS coordinates.

2. Network

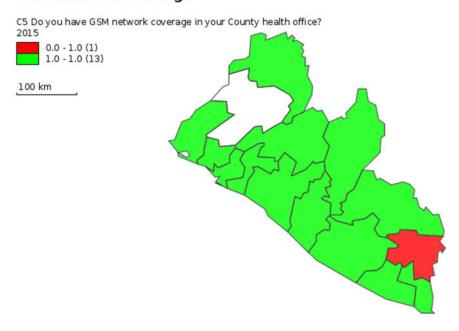
One of key components of the ICT infrastructure is the network availability and quality since it is a sine qua non condition for communication between the different entities. The assessment results shows that the mobile coverage is obviously maximum (100%) at the Liberia MOH central headquarters located in the capital town, but drops to 93% at the county level and 58% at the facility level. More in detail the survey shows that 92% of the counties have access to at least one network operator, but 33% of them have access to more than two (2) network operators.



GSM Network operator availability

Regarding the specific network services, the counties reported 93% of network SMS service coverage, while the facilities reported 73% coverage. The network voice service is fully available at all counties. The mobile Internet service is less present at decentralized level: 55% coverage at county level, and 58% coverage at facility level.

GSM Network Coverage



Despite the average mobile network Internet coverage, 90% of the 10 counties that responded to the question reported having a working Internet connection with an average speed of 2 Mb while at central level the whole MOH reported 4Mb internet connection speed. But we need to take into consideration that 33% of the counties reported being connected to Internet using a VSAT dish.

Only 64% of counties offices benefits from having a LAN to connect their different computers to Internet.

3. Hardware

This section reports on the hardware at the national and county which is the backbone of a functional Health Information System. The MOH Central IT Office and County Offices were asked to report on their computers, smartphones, scanners, modems, GPS device, printers, servers, and tablets. In addition they were asked to report on their functionality.

Except for the number of county offices with at least one working computer or scanner and percent of county offices with at least one health worker owning a smartphone, the availability and functionality of other hardware were reported to be either inadequate or not functional at all. For example, all county offices in Liberia have inadequate number of computers and none has at least one GPS device. While the percentage of county offices owning at least one Smartphone is extremely low (18%), the percent of county offices with at least one health worker owning a smartphone is extremely high (73%). Otherwise, among the county health workers only 37% own a smartphone.

At the national level, the number of office computers is inadequate but virtually all staffs have personal computers (89%). All central level printers are functional but only 4% are network printers. While the proportion of functional servers at the national is very high, only 44% are being used.

4. Governance

The governance section of the study tries to assess the regulatory measures in place to ensure proper business process and quality of work.

Except for the existence of office hardware inventory that is present at MOH central level and at 69% of the counties, almost all the governance documents and SOP assessed are inexistent at both central and county levels. There is no budget line, policy for professional use of Internet, neither policy for network and computer security, SOPs for backup or disaster recovery nor general ICT policies at MOH central level. Same picture at county level where less than 25% of the counties reported partial existence of one or more document.

5. Finance

The finance section is a very sensible one and information is hard to get at all level of the health system hierarchy. This assertion is materialized by the number of respondents at the county level that drops from 14 to 5 for the question regarding the monthly amount paid for the network maintenance and up to 7 for the question related to percentage of Internet subscription fees supported by donors. Despite these obstacles, 67% of the counties reported availability of a budget for Internet subscription against 25% of the facilities.

Donors are the main payee of the Internet subscription fees (57%) for the 7 counties that responded to the question, while 29% of them reported the office being paying for Internet.

The remaining 14% reported sharing the costs between donors and the office.

6. Security

The security score is globally not good at all central, county and facility levels. The physical security of the building hosting the computers is not good for 15% of the counties and for 64% of the facilities. In fact 62% of the counties reported at least once a loss of hardware. The security of the data produced at both county and facility level is not good as well. The main proxy to monitor security is the availability of updated antivirus programs. Only 29% of computers are reported to have an updated antivirus program, while respectively 6% and 0% of computers are reported to be up-to-date from the antivirus point of view at the county and facility level. An important point to keep in mind is that the major part of the up-to-date antiviruses are freeware and therefore are not optimum to safe guard the data collected and stored in the computers.

An even worse and critical finding is the very low level of counties performing regular backup of their data on an external hard drive (38% at county level and 9% at facility level) and only 15% of the backup copies done at the county level are stored in a different location, meaning that 23% of the 38% of routinely performed backup at the county level is still at risk.

The central level is not making exception to this rule since there isn't any file sharing server to allow MOH users to manually or automatically backup their data. Converting it into figures mean that most of the data stored in the 260 functional computers in used at MOH central head quarter are at risk!

The MOH also has a physically secured server room, but unfortunately that server room is only meeting 20% of the main security standards requested for a data center. 25% of the servers are running MS Windows operating system and therefore need strong antivirus systems and firewalls to secure the hosted data as well being protected against unwanted used by cyber pirates, various hackers and spammers. Only 13% of the servers run by the Liberia MOH are running under Linux operating system that are more secure, less expensive in term of software license and also easier to protect against external attacks. In addition, the server's backup system in place is only meeting 33% of the ICTIAT efficiency criteria. Lastly, only 6% of the servers are benefiting from backup system in place (94% of the servers are not backed up).

7. Maintenance

Maintaining the network and the hardware are keys to a sustainable and long lasting ICT infrastructure, therefore the tool assessed the availability of human resources to perform network infrastructure and computer (LAN cable, routers, switch, etc.) maintenance (100% at MOH level but only 15% at county level.

The study revealed that 35% of the computers at Central level and 31% at County level are aged more that 3 years and should be renewed very soon.

8. Human resources and Users

Having a good knowledge of the users of an ICT infrastructure is very important to meet their needs and design the services that they are supposed to be using. The ICTIAT is focusing on the human resources at central level dedicated to support and improvement of ICT infrastructure and services and focuses on end users at county and facility level.

At MOH ICT unit, there are 8 staff, of which network maintenance specialists (25%), computer maintenance specialists (50%), network security administrators (13%) and MS Windows system administrators (38%). They lack computer programmers, database administrators and Linux system administrators. This reveals the weakness of the ICT infrastructure at the central level since the ICT unit has no skills to monitor and maintain the two (2) Linux servers (DHIS2 and iHRIS servers) and therefore have to rely on external, out of country support to ensure proper functioning and upgrades. Knowing that the Liberia MOH HIS software ecosystem is very rich and in perpetual growth with high frequency of new databases introduction by donors and partners, it is absolutely critical for the MOH Liberia to hire a database administrator to monitor and manage the different databases and information produced with the collected data. Computers programmers are also needed to help tailoring and customizing local solutions to better fit Liberia's needs.

At county and facility level the tool is mostly focusing on the end users. The tool makes use of a proxy indicator to assess the computer and Internet use literacy of the end users, showing that 17% of health works own an email account and 13% classify themselves as comfortable with the use of computer.

Almost all the counties (85%) have one data manager but only 8% of them have two (2) data managers making the system fragile since the is no replacement option available to most of the counties.

Table 3: Data managers and M&E skills level in Basic computer trouble shooting

Basic computer trouble shooting skill level	Data Manager		M&E		
	Value	# of resp.	Value	# of resp.	
Very Good	1	5	0	7	
Good	4	- 5	1	7	
Fair	0	5	4	7	

Poor	0	5	1	7
Very poor	0	5	1	7

Table 4: Data managers and M&E skills level in MS Excel

MS Excel Skill level	Da	ata Mai	nager	M&E		
	Value	#	of resp.	Value	# of resp.	
Very Good		0	5	0	7	
Good		5	5	7	7	
Fair		0	5	0	7	
Poor		0	5	0	7	
Very poor		0	5	0	7	

Table 5: Data managers and M&E skills level DHIS2

DHIS2 Skill level	Dat	Data Manager			E
	Value	#	# of resp.	Value	# of resp.
Very Good		1	5	0	7
Good		4	5	6	7
Fair		0	5	1	7
Poor		0	5	0	7
Very poor		0	5	0	7

9. Service availability

On the service availability section we explored from the end users point of view the availability of the services hosted by the MOH servers. 100% of the counties are able to access the DHIS2 server but only few facilities reported being able to access the application. This is understandable and has no impact since the DHIS2 data entry is done at county level and not at the facility level. The iHRIS application is less accessible according to 58% counties that are unable to access it.

An additional challenge revealed is the power supply availability that was unfortunately only answered at central level and shows that only 17 hours of electricity are provided per days during working days powered by a generator and 24 hours provided during the weekend powered by solar panels. The rest of the time the power availability is relying on the highly unstable national electricity.

Conclusion

The assessment used innovative ways to assess the entire Liberia's HIS ICT infrastructure in a very short period of time (1 week) but it wasn't without many challenges. Specifically talking about the facility component of the assessment, which was sent using the mHero platform, we noticed how highly unreliable the SMS technologies are here in Liberia to conveying messages. But still a good number of data were collected, using this channel that is far cheaper and more realistic than sending enumerators to those facilities that responded. Most of the SMS messages sent did not reach the OICs and an important number of respondents were unable to complete questionnaire because service unavailability.

Recommendations

- 1. Central MOH Level
- 1. Advocate with eGovernment project for rapid implementation of Liberia Internet exchange point.
- 2. Advocate for less expensive internet fees at national level
- 3. Advocate for better internet quality and reliability
- 4. Equip the MOH with 20 tablets with GPS functionalities to allow mobile survey data collection
- 5. Renew all computers aged more than 3 years
- 6. Increase the number of network printers for more efficiency
- 7. Develop SOPs and policy documents to guide the use of ICT at MOH and at decentralized level
- 8. Advocate for a more clear budget line to cover Internet expenses at central and decentralized levels
- 9. Advocate for more transparency regarding financial data

- 10. Elaborate and implement data backup and disaster recovery plan at nation and decentralized levels
- 11. Advocate for more use of Linux based client side system to reduce the cost of antivirus programs
- 12. Implement a centrally managed antivirus server system
- 13. Upgrade the MOH server room at international security standards
- 14. Hire additional ICT personnel: computer programmers, database and Linux system administrators
- 15. Use more Unix based servers to reduce security risks
- 16. County level
- 1. Advocate for charge free locally hosted data. All data hosted in Liberia and at MOH Liberia should be freely accessible since it does not require international Internet traffic.
- 2. Install a wired LAN at the county level to ensure smooth Internet sharing among the users
- 3. Share government corporate Internet connectivity when possible (close to the county office location)
- 4. Increase the number of computers available at county level
- 5. Renew all computers aged more than 3 years
- 6. Provide all the counties with at least one tablet and/or smartphone equipped with GPS functionality
- 7. Advocate for more use of Linux based client side systems to reduce the cost of antivirus
- 8. Advocate for more qualified human resources especially data managers and ICT staff to perform computer trouble shooting and network maintenance.
- 9. Facility level
- 1. Advocate for more GSM/3G/WIMAX network coverage to GOL and Liberia network operators
- 2. Advocate computers and/or tablets provision at facility level

Annex M: Terms of Reference for Coordination Mechanisms

Note: Each standing group for subsystem development has terms of reference not included here. Please refer to HMER for these documents.

Terms of Reference for the HMER Technical Working Group (HMERTWG)

I. Background and purpose

The MOH HIS and ICT Strategy 2016-2021 and National M&E Strategy mandate the establishment of a National Health Information System and ICT Technical Working Group (HMERTWG). The role and functions of the Technical Working Group are to provide technical recommendations, and the development and implementation of the national health information system, ICT infrastructure, health research, and monitoring and evaluation of health programs and population interventions.

II. Objectives

- 1 Coordinate HMER subgroups (ie. HIS subsystems, monitoring and evaluation, research, etc.) and liaise with internal and external stakeholders
 - 1.1 Provide a forum for reporting ongoing activities and operational plans by subgroups
 - 1.2 Review and validate subgroup technical recommendations and provide forum for decision-making and seeking further clarification from technical advisors
 - 1.3 Validate recommendations on software platforms, procurement, and proposed capacity building trainings in line with the overall strategy and HIS interoperability
 - 1.4 Develop SOPs, trainers guide and other tools related to HMIS, M&E and Research
- 2 Monitor implementation of strategic plans, activities and pilots
 - 2.1 Develop and update national health indicators
 - 2.2 Identify gaps and overlaps in the implementation of HIS, M&E, and research programs, and report to the HMERCC
 - 2.3 Review and validate tools for monitoring and public health research

III. Reporting

All HIS, ICT, M&E, and health research related groups will report to the HMERTWG. The HMERTWG reports to the HMERCC.

IV. Membership

The HMERTWG will be attended by:

- Ministry of Health (i.e., HMER, ICT, program specific data managers, and other Ministry of Health partners as applicable
 - Subsystem focal points and key technical partner

- Partners
- External technical partners, including:
 - o NGOs; JHU, CSH/PACS, eHealth Africa
 - o CDC
 - o USAID
 - o UN technical partners including; WHO, UNICEF, UNFPA, UNOPS
 - o all others implementing areas of the HIS, M&E, or Research Strategies

The HMERTWG should be chaired by the HMER Coordinator.

V. Frequency of Meetings

The HMERTWG will meet routinely on a monthly basis.

Revised Terms of Reference for the HMER Coordination Committee (HMERCC)

I. Background and purpose

The HIS National Strategy 2016-2021 and the National Monitoring and Evaluation Plan mandates the establishment of a National Health Monitoring, Evaluation and Research Coordination Committee (HMERCC). The role and functions of the HMERCC is to provide policy direction and leadership for the development and implementation of Health Management Information System, Monitoring and Evaluation framework and Research Policy. The HMERCC meets once in every quarter to discuss plans, key activities, implementation and challenges related to Health Information System (HIS), Monitoring and Evaluation (M&E), research, and vital registration. The committee will support and ensure better coordination in support of one information System for the health sector.

II. Objectives and Responsibilities

- 1 Provide guidance and leadership for the development and implementation of Health Information System Strategy, Monitoring and Evaluation Plan and Research Policy
 - 1.1 Assess, validate, and endorse technical recommendations from the HMER TWG
 - 1.2 Assess, validate, and elevate policy recommendations to the HSCC
 - 1.3 Monitor and evaluate implementation of HIS, M&E, and Research programs to ensure transparency, coordination, and accountability
 - 1.4 Provide oversight for the development of SOP, trainers guide and other related tools to HIS, M&E and Research
 - 1.5 Validate core list of national health indicators
 - 1.6 Ensure health research follows national IRB policies and guidelines
- 2 Coordinate and mobilize resources and interventions between stakeholders supporting HIS, M&E, and Research
 - 2.1 Ensure alignment and effectiveness of resources and interventions to appropriate strategies and policies
 - 2.2 Coordinate monitoring, evaluation and review mechanisms and processes in relation to the implementation of the National Health Policy and Plans
 - 2.3 Advocate for evidenced-based decision-making and resource allocation
 - 2.4 Provide technical input to inter-sectorial and international efforts in improving health information system and reporting health related information such as SDGs.

III. Reporting

The HMERCC reports to the Health Sector Coordination Committee (HSCC).

IV. Membership

The HMERCC will be attended by:

- Ministry of Health
- Donors; including CDC, USAID, World Bank, Global Fund and others
- Relevant UN Agencies, including WHO, UNICEF

• Representatives from key NGOs

The HMERCC should be chaired by Assistant Minister for Statistics, and co-chaired by the coordinator for HMER.

V. Frequency of Meetings

The HMERCC will meet routinely on a quarterly basis.