Measurement and Accountability for Health in Bangladesh

A Status Report

June 2016

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MCHIP Maternal and Child Health Integrated Program
SIAPS Systems for Improved Access to Pharmaceuticals and Services
MEASURE Evaluation

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ABBREVIATIONS

AHI	assistant health inspector
APR	Annual Program Review
BBS	Bangladesh Bureau of Statistics
CC	Community Clinic
COIA	United Nations Commission on Information and Accountability for Women's and Children's Health
CRVS	civil registration and vital statistics
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
DHIS 2	District Health Information System, Version 2
EPI	Expanded Program on Immunization
FPI	family planning inspector
FWA	family welfare assistant
GDP	gross domestic product
GNI	gross national income
GOB	Government of Bangladesh
HA	health assistant
HDC	Health Data Collaborative
HIS	health information system
HNP	health, nutrition, and population
HPNSDP	Health, Population and Nutrition Sector Development Program
HRIS	Human Resource Information System
HRM	human resource management
icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
ICT	information and communication technology
LD	line director
LGI	local government institution
LMIS	logistics management information system
MA4Health	Measurement and Accountability for Results in Health
MDG	Millennium Development Goals
M&E	monitoring and evaluation
MESAP	Monitoring and Evaluation Strategy and Action Plan
MIS	management information system(s)
MOHFW	Ministry of Health and Family Welfare

NCD	noncommunicable disease
NIPORT	National Institute for Population Research and Training
NGO	nongovernmental organization
OP	operational plan
PMMU	Program Management and Monitoring Unit
RFW	results framework
RHIS	routine health information system
RHW	rural health worker
SCMP	Supply Chain Management Portal
SDG	Sustainable Development Goals
SHR	shared health record
SWAp	sector-wide approach
UHC	universal health coverage
UIMS	Upazila Inventory Management System
USAID	United States Agency for International Development
WHO	World Health Organization
WIMS	Warehouse Inventory Management System

EXECUTIVE SUMMARY

The United States Agency for International Development (USAID), the World Bank, and the World Health Organization (WHO) convened a global summit—Measurement and Accountability for Results in Health (MA4Health)—at the World Bank's headquarters, in Washington, DC, in June 2015. There, more than 600 participants from 60 countries, representing development partners, country governments, and civil society organizations, endorsed the Health Measurement and Accountability Roadmap and 5-Point Call to Action. The Call to Action identified a set of priority actions and targets to strengthen data and accountability systems. Two countries had been invited to be co-sponsors of the summit: Bangladesh, because of its readiness to measure progress in health during the post-2015 period, and South Africa, for the high quality of its cause-of-death data, which aid understanding of the national and subnational health situation.

At the summit, Bangladesh agreed to host a follow-on regional conference, and this was held in Dhaka in April 2016. This conference had the following objectives:

- Facilitate the regional and country response to data needs
- Engage with development partners to improve health data systems
- Share and strengthen country-led monitoring and evaluation (M&E) plans

This paper outlines the progress that Bangladesh's Ministry of Health and Family Welfare (MOHFW) has made toward the country's measurement and accountability objectives. We review the health, nutrition, and population (HNP) data system (routine and ad hoc) and identify the financial requirements for strengthening health information system (HIS) and M&E functions for the next five years.

This assessment is well-timed. Bangladesh's third HNP sector program will close at the end of 2016, and planning for the follow-on program is under way. Having demonstrated considerable success in achieving the Millennium Development Goals (MDGs), the MOHFW now turns its attention to the health targets of the Sustainable Development Goals (SDGs). The roadmap and call to action endorsed at the MA4Health summit, subsequent steering committee meetings of the Health Data Collaborative (HDC; an informal partnership of international agencies, donors, and governments, including Bangladesh), and HDC's operational plan are springboards for the MOHFW to align with these global initiatives to meet SDG data needs.

The MOHFW's improvement of the country's HIS—including the routine health information system (RHIS) and electronic health (e-health) applications—is being recognized at home and abroad. Against this backdrop, in 2015 the MOHFW approved the Monitoring and Evaluation Strategy and Action Plan (MESAP) for the Bangladesh HNP sector, which establishes a coordinated, interoperable information system for all agencies and departments under the ministry's auspices and moves toward a fully digitized HIS for better use of data and evidence in planning and decision making. The MESAP also advocates increasing the budget for strengthening ongoing M&E activities and ensuring those activities' sustainability.

We developed a scorecard to showcase our assessments of the quality of M&E arrangements in the health sector (presented later in this paper). It shows that the country's M&E policy, method for program monitoring, and data use are reasonably strong. However, coordinated efforts are needed to harmonize and strengthen monitoring, M&E capacity, and participation by stakeholders. We end our assessment with a number of recommendations to accomplish these improvements. Some key recommendations are:

- Secure agreement on increasing the budget for those M&E activities that specifically address the sustainability of ongoing digitization and computerization initiatives, as outlined in the action plan in the

MESAP.

- Develop national health data standards and an interoperability framework to integrate the approach to HIS by all agencies under the MOHFW, and develop an overarching Internet technology leadership and governance framework to drive the National eHealth Strategy.
- Strengthen the HIS and mainstream, integrate, and scale up improvements in the RHIS and other projects that now are in the pilot stage.
- Develop a multiyear, comprehensive capacity building plan for facilitating and promoting the development of M&E knowledge, skills, and competence in routine data collection, analysis, feedback, and use.
- Assess and put in place the human resources required to accomplish the planned activities for strengthening M&E systems in the health sector.
- Enhance demand for data, by establishing partnerships among agencies within the MOHFW and between the MOHFW and other ministries, research organizations, development partners, nongovernmental organizations (NGOs), and professional bodies, which will facilitate data analysis and support for evidence-informed decision making.

INTRODUCTION

A strong and effective health information system (HIS) is the backbone of any health system that supports both program implementation and policy formulation. Globally, demand has been growing over the past decade for stronger commitments and attention by development partners to the production of more and better data to increase transparency in the health, nutrition, and population (HNP) sector. In response, USAID, the World Bank, and WHO convened the MA4Health Summit in 2015. It was timed as the MDGs era was ending and the SDGs era was beginning. As a co-sponsor of the summit, Bangladesh endorsed the conference documents—the Health Measurement and Accountability Roadmap and 5-Point Call to Action—and agreed to host a follow-up conference the next April for countries in the Asian region. The regional conference had the following purposes:

Facilitate the regional and country response to data needs, including strengthening country capacity to monitor and review progress, enhancing existing and establishing new regional approaches, building consensus on monitoring health strategies and the SDGs, and enhancing technical collaboration.

- **Engage development partners to improve health data systems,** by improving efficiency and alignment of their investments, establishing new ways for countries to work with development partners, and sharing knowledge and tools within the region.
- Share and strengthen country-led M&E plans, including learning from the experience of countries in the region, highlighting innovative approaches to fill technical and financial gaps, strengthening accountability mechanisms, and measuring progress toward the health-related SDGs.

Objective of This Report

To support the regional conference's third purpose—learning from the experience of countries in the region—we developed this report on the status of Bangladesh's progress toward improving measurement and accountability in the health sector. This document also outlines the investment needed to develop an HIS capable of meeting the broad M&E goals of the country's HNP Sector Program. We begin by describing the country context and health service delivery system. Then we assess Bangladesh's response to the MA4Health road map and call to action in terms of the MOHFW's next health sector-wide approach (SWAp), scheduled to begin in 2017. We briefly describe the potential of the HIS and end with a set of key recommendations.

Method

To make this assessment, we conducted a desk review of relevant literature and consulted government and development partner stakeholders in Bangladesh's HNP sector. (The results are woven into the discussion that follows; the documents for the desk review are listed in the References section.) We then disseminated a draft of this paper to participants in a seminar on the upcoming Inter-Country Conference on Measurement and Accountability for Health, which was held in Dhaka the week before the regional MA4Health conference. We incorporated the feedback we received at the seminar and presented another draft of this paper at the regional conference.

The study does not address the M&E requirement of Bangladesh's government as a whole, nor does it discuss coordination mechanisms required to achieve a cross-sectoral, nationwide, effective information system. Such a system might be desirable to meet the data requirements of the SDGs.

COUNTRY AND SECTORAL CONTEXT

The Government of Bangladesh's Vision 2021 defines several economic and social outcomes for the country to attain middle-income country status by 2021. This vision would be achieved by implementing the Perspective Plan for 2010–2021 and successive five-year plans covering 2011–2020. Bangladesh is committed to attaining universal health coverage (UHC) by 2032, ensuring access to quality services to all citizens of the country. The targets of the 7th Five Year Plan (2016–2020) and the fourth health sector program (2017–2021) are fully aligned with global commitments such as the SDGs and the Global Partnership on Family Planning 2020 (FP2020).

Bangladesh has been undergoing steady social and economic changes, especially since 1990. Over the past two decades, the country has registered a significant rise in gross domestic product (GDP) and gross national income (GNI). As of 2015–2016, per capita GDP was estimated at US $1,384 and the per capita GNI was estimated at $1,466 (Bangladesh Bureau of Statistics [BBS], 2016), moving the country up to the lower-middle income group (World Bank, 2015). The GDP growth rate has been above 6 percent for the past few years, on par with some of the best-performing economies in the world, and reached 7 percent in 2015–2016. However, despite these successes, nearly one-fourth (24.8%) of the population still lives below the poverty line (Government of Bangladesh [GOB], 2015). In the social sector, Bangladesh has made remarkable progress in many areas during the past decade: literacy and life expectancy at birth have increased; child immunization coverage has increased to a high level, resulting in steady declines in infant and child mortality; and the maternal mortality ratio has declined sharply. In terms of health services, the number of visits by pregnant women for antenatal care by medically trained providers nearly doubled, from 33 percent in 1999–2000 to 64 percent in 2014; deliveries by medically trained birth attendants increased from 12 percent to 42 percent during the same period. This increase in skilled delivery is predominantly due to a rise in the number of deliveries at health facilities, which increased from 8 percent to 37 percent from 1999–2014. Bangladesh also demonstrated substantial progress in implementing an effective family planning program. The total fertility rate declined, from 6.3 births per woman in 1975 to 3.4 in 1994, and further to 2.3 as of 2014.

Gradual improvement of basic health and nutrition services also contributed to a substantial reduction in under-five mortality: from 94 deaths per 1,000 live births in 1999–2000 to 46 per 1,000 in 2014. With this, Bangladesh achieved MDG 4 before the 2015 deadline (National Institute of Population Research and Training [NIPORT], et al., 2016). The government's leadership and continued support from development partners contributed to an accelerated improvement in key HNP outcomes in Bangladesh over the past decade (Ahsan, et al., 2015). Bangladesh's success in achieving MDG targets has received global acclaim: the United Nations MDG Award, in 2010, for child mortality reduction; the South-South Award, in 2011 and 2013, for innovative use of information and communication technology (ICT) to accelerate improvements in the health of women and children and to reduce poverty; and the Food and Agriculture Organization's Diploma Award, in 2013, for achieving the MDG 1 target well ahead of the deadline.

Health Service Delivery in Bangladesh

Within the Government of Bangladesh, the MOHFW is responsible for health and population policies. It implements health service programs through the Directorate General of Health Services (DGHS) and the Directorate General of Family Planning (DGFP). The DGHS has elaborate healthcare delivery structures based on administrative units: upazilas; and above those, districts; and above those, divisions. It manages primary, secondary, and tertiary care facilities at all three levels and employs community-based rural health workers (RHWs) to provide in-home care to rural populations. In addition to these sources of healthcare, there are

Union Health and Family Welfare Centres, which DGFP manages. And there are Community Clinics (CCs)—some 13,300 of them, each serving one or more villages within a ward: the lowest administrative unit of the government. Both DGHS and DGFP are responsible for reproductive, maternal, and child healthcare. DGHS provides those services in facilities at every level and through the RHWs it deploys, as well. DGFP is particularly responsible for family planning services. Each directorate has its own system for data collection and analysis, and this has resulted in conflicting information. The MOHFW is now focusing its attention on integrating and harmonizing the systems.

The MOHFW has been pursuing SWAp since 1998, beginning with the Health and Population Sector Program (1998–2003), and following up with the Health, Nutrition and Population Sector Program (2003–2011). Currently, the MOHFW is implementing its third SWAp: the Health Population and Nutrition Sector Development Program (HPNSDP). It was originally scheduled to be in effect from July 2011 to June 2016. An extension beyond June 2016 has been agreed to by the MOHFW and the development partners, and now the program is likely to extend to December 2016. The priorities of the current SWAp are to stimulate demand for HPN services and improve access to the services and use of them in order to reduce morbidity and mortality; slow the rate of population growth; and improve nutritional status, especially of women and children. This program is managed through 32 operational plans (OPs), which are headed by line directors (LDs). LDs are responsible for proper implementation of activities included in the OPs. The SWAp has a results framework and all OPs have indicators for measuring performance. Key data requirements and management processes are analyzed in a later section of this report. In the current SWAp, the Program Management and Monitoring Unit (PMMU) was created to strengthen the program's M&E, and it was functioning well according to the midterm review (MOHFW 2014a).

Role of M&E in Bangladesh's Next SWAp and Post-2015 Development Agenda

A background paper prepared for the strategic investment plan for the fourth HNP sector program cited key issues in the health sector's M&E and identified a set of outputs that the new program needs to achieve (MOHFW, 2015). The background paper narrated the MOHFW's strategic vision and key interventions required to build an efficient and sustainable evidence base for decision making. It identified priority interventions to strengthen data collection, analysis, and dissemination processes based on lessons learned from the previous SWAps. It also looked at developing systems to help the MOHFW establish partnerships with relevant institutions to facilitate data use and evidence-informed programming. Finally, it looked at promoting efficient use of research to inform and guide HNP service delivery and pro-poor policies.

Bangladesh fared well in meeting the data needs of the MDGs. Most of the HNP-related MDGs were reflected in the results framework of HPNSDP, and periodic surveys (e.g., Bangladesh Demographic Health Survey and Multiple Indicator Cluster Survey) reported on these indicators at regular intervals. Reporting tools were improved and the ministry invested in improving or automating the systems. Overall, the ministry has shown its capacity to respond to the requirements of the United Nations Commission on Information and Accountability for Women's and Children's Health (COIA) and other international commitments.

The SDG targets are comprehensive, and reporting by countries requires a high level of preparedness. The SDG declaration emphasized data availability to assess progress and elaborated different mechanisms for monitoring and follow-up actions, cutting across all SDGs. A unique challenge for monitoring the SDGs is its inherent design, where progress in one area is dependent on progress in many others. Monitoring arrangements under the SDGs will require a more integrated and comprehensive approach covering multiple sectors to track health goals—for example, UHC—effectively (United Nations, 2013).

Urban Health and Private Sector Issues

By law, urban health is the responsibility of urban local government institutions (LGIs): city corporations and *pourashavas* (municipalities). All secondary and tertiary healthcare facilities under DGHS and DGFP are located in urban settings and provide services to the urban as well as rural population. However, the MOHFW has no infrastructure to serve the urban population's needs for primary healthcare. The ministry's elaborate structures and manpower devoted to primary and public health issues exist only to serve rural areas. The MOHFW's ability to provide primary healthcare to urban populations is constrained by the following factors:

1. Administrative and financial capacities of LGIs vary to a great extent. Generally, all LGIs lack an adequate health workforce for effective health service delivery. While some major city corporations own a few general hospitals, they have trouble running them properly.

2. As autonomous organizations, the LGIs are supposed to generate their own resources. In practice, however, LGIs depend on government grants to meet budget deficits and to undertake even routine development projects. Healthcare finance tends not to be among their top priorities.

3. Health service delivery by LGIs is dependent on projects funded by development partners, including multilateral institutions (loans; grants; technical assistance). In many areas, development partner-financed projects fill crucial gaps in the service delivery system, so the risk of unsustainability is ever-present. NGOs or nonprofits are providing health services on a contractual basis.

4. The MOHFW has struggled in the past to devise a coordination mechanism for urban health, and in the absence of such a mechanism, urban data reporting has been poor (with recent, slight improvements).

5. Many private-sector clinics and hospitals of varying size and capacities provide healthcare in urban areas, creating an environment driven by an excess of commercialization.

Because of the lack of capacity and coordination, collection of data from urban settlements is problematic. Development partners have shown interest in supporting HMIS implementation in the city corporations of Sylhet, Rajshahi, and Narayanganj, with the active participation of relevant health departments and NGOs and public and private facilities. Facilities operated by the private sector, including NGOs, are not generating MIS data as a rule, and doing so would require rigorous effort, including the creation of a legal framework. While apps used in rural areas show that ICT systems are able to track individuals, the situation would be different in urban areas, because of structural factors. Given the challenges of health data collection in urban areas, different strategies and activities will have to be developed, if SDG requirements are to be met.

Meeting SDG targets will require increased capacity to collect and analyze data. To achieve this, investments for HIS need to be increased and the monitoring processes of different sectors need to be coordinated, strengthening country measurement and accountability systems. These efforts should be based on robust country-led plans that increase the efficiency of domestic and external investments in HIS. The expectation is that countries will respond to the global data revolution, be able to track the delivery of health services to citizens, listen to the voices of underserved populations, and empower more-focused responses to health issues (Fryatt, 2015).

M&E Strategy and Action Plan

The first MESAP for the health sector in Bangladesh was finalized in 2015. It remains effective in the next SWAp (MOHFW, 2014b). The MESAP was developed after a comprehensive assessment of the health system's capacity at all levels. MOHFW and other stakeholders were consulted and their involvement and ownership in planning and implementation of HPNSDP were instrumental in developing the M&E Strategy. The M&E Strategy allows the MOHFW and its implementing agencies and development partners to assess accurately the extent to which the program's goals and objectives have been achieved. The strategy also elaborates specific steps and tools that are needed for informed decision making. There is guidance for developing plans for data collection, analysis, and use, and to ensure good data quality. The strategy can be used to carry out oversight activities and program evaluation.

The MESAP provides an evidence base for resource allocation decisions. An M&E system not only provides essential data for monitoring the services delivered but also helps in guiding the planning, coordination, and implementation processes of a program. It identifies areas for development, and thus improves the system as a whole. The need to invest in well-functioning national health sector M&E systems is widely acknowledged (Holvoet & Inberg, 2014). The MESAP noted that a costed M&E work plan that describes the priority M&E activities for the year with defined responsibilities for implementation, costs for each activity, identified funding sources, and a clear timeline for delivery of outputs is critical. Although a costed national M&E plan for the HPNSDP was not available at that time, the MESAP also provided a figure by considering estimated budgets of different OPs[1] involving M&E activities. Table 1 shows the areas the OPs covered. These plans were found to be primarily responsible for the performance monitoring of HPNSDP. They accounted for around 4 percent of HPNSDP's development budget that the program implementation plan (PIP) had estimated for 2011–2016. In fact, these six operational plans accounted for 4.3% of HPNSDP's total expenditure during the program's first three years (July 2011–June 2014).

Table 1: Estimated budget for M&E activities under the Health, Population and Nutrition Sector Development Program (HNSDP)

Operational Plan Name	Original Estimate in PIP (% of total budget)	Estimate in Revised PIP (% of total budget)
Planning, Monitoring and Research (PMR): DGHS	5,300.00 (0.24%)	4,588.00 (0.23%)
Health Information Systems and E-Health (HIS & e-Health): DGHS	60,887.37 (2.75%)	44,000.00 (2.25%)

1 Some other operational plans also invest in generating routine data for monitoring implementation progress (e.g., Communicable Disease Control; Community Based Healthcare; Maternal, Neonatal, Child and Adolescent Health; Tuberculosis/Leprosy Control; and the National Aids Program.

Operational Plan Name	Original Estimate in PIP (% of total budget)	Estimate in Revised PIP (% of total budget)
Planning, Monitoring and Evaluation (PME): DGFP	1,000.00 (0.05%)	1,141.30 (0.06%)
Management Information Systems (MIS): DGFP	5,800.00 (0.26%)	5,100.00 (0.26%)
Training, Research and Development (TRD): DGFP	11,127.00 (0.50%)	10,985.98 (0.56%)
Sector-Wide Program Management and Monitoring (SWPMM): MOHFW	7,200.00 (0.32%)	9,595.10 (0.49%)
Total	91,314.37 (4.12%)	75,410.38 (3.85%)

Source: MOHFW 2011; MOHFW 2014c. All currency is Bangladesh Taka (100,000)

M&E Scorecard for the Bangladesh Health Sector

Following up on the recently launched MA4Health initiative, Bangladesh aims to develop a five-year roadmap to strengthen the HIS and improve accountability in the health sector. As a part of this activity, we applied a diagnostic instrument (Holvoet & Inberg, 2014; Holvoet & Renard, 2007) to assess the quality of existing M&E arrangements in the health sector. The diagnostic tool assesses the quality of M&E systems according to six dimensions: (1) policy; (2) method; (3) organization; (4) capacity; (5) participation by stakeholders; and (6) outputs.

Topics	Question	Current Status (HPNSDP)	Score
I. Policy			
The evaluation plan	Is there a comprehensive evaluation plan indicating what to evaluate, why, how?	The M&E Strategy and Action Plan was approved by MOHFW in May 2015 and is awaiting implementation.	Moderate
M vs. E	Is the difference and the relationship between M&E clearly spelled out?	Routine monitoring activities are carried out under SWAp. Separate, independent evaluations of the SWAp are conducted by the Implementation Monitoring and Evaluation Division and World Bank at program completion.	Strong
Autonomy and impartiality (accountability)	Is the need for autonomy and impartiality explicitly mentioned? Does the M&E plan allow tough issues to be analyzed? Is there an independent budget?	Planning Wing, with support from the MIS, monitors program performance. An independent team reviews program performance every year. Based on the review, a joint GOB/development partner action plan is developed to address selected priority issues.	Moderate
Feedback	Is there an explicit and consistent approach to reporting, dissemination, and integration?	Results of the annual program review are disseminated and feed into program planning. However, dissemination and feedback mechanisms of routine monitoring data (except that of the Expanded Program on Immunization [EPI]) remain weak.	Weak
Alignment with planning and budgeting	Are M&E results integrated in planning and budgeting?	HPNSDP incorporated OP-level indicators to better align results in program planning and implementation. There is a disconnection between results and budgeting. Moreover, the routine review by the MOHFW focuses on financial performance only.	Weak
II. Method			
Selection of indicators	Is it clear what to monitor and evaluate? Is there a list of indicators?	HPNSDP has a well-developed results framework (RFW) consisting of goal- and intermediate outcome-level indicators to monitor SWAp progress.	Strong
Selection criteria	Are the criteria for the selection of indicators clear? And who selects?	The RFW was developed during the HPNSDP design through a detailed consultative process. A technical working group comprising GOB and development partner representatives drafted the RFW.	Strong

Topics	Question	Current Status (HPNSDP)	Score
Priority setting	Is the need acknowledged to set priorities and limit the number of indicators to be monitored?	Yes, the number of outcome-level indicators in the RFW was reduced from 62 in the second SWAp to 33 in the current SWAp (HPNSDP), to better reflect the program's priorities and facilitate program monitoring.	Strong
Causality chain	Are the levels of indicators (input-output-outcome-impact) explicitly linked?	Yes, a logical framework was employed to identify the RFW- and OP-level indicators. The OP-level indicators were revised in 2013 to refine the causality chain.	Strong
Methods used	Is it clear how to monitor and evaluate? Are methods clearly identified and mutually integrated?	Yes, the roles of implementers (MOHFW) for monitoring and the roles of other actors (Implementation Monitoring and Evaluation Division; World Bank) in evaluation are clear.	Strong
Data collection	Are sources of data collection clearly identified? Are indicators linked to sources of data collection?	Indicators rely both on routine MIS and sample surveys for data. OP-level indicators are explicitly linked to routine MIS sources and administrative records.	Strong
III. Organization			
Coordination and oversight	Is there an appropriate institutional structure for coordination, support, central oversight, and feedback? With different stakeholders?	The PMMU was established under the Planning Wing of MOHFW for coordination, support, and feedback on program performance. PMMU liaises both with the MOHFW and development partners. It established a biannual monitoring mechanism in the form of the Six-Monthly Progress Report and the Annual Program Implementation Report. However, coordination between the LDs is weak.	Moderate
Statistical office	Are surveys, censuses, etc. streamlined into M&E needs? Is the role of the statistical office in M&E clear?	Health sector monitoring heavily relies on specialized surveys that NIPORT conducts with development partner support. These surveys are designed with inputs from the national statistical office (i.e., the BBS).	Moderate
Line agencies	Do line agencies have M&E units, and are they properly relayed to the central unit?	DGHS and DGFP have individual MIS units (program-based MIS also exist) that still need interoperability in some areas.	Weak
Decentralized levels	Are M&E units at decentralized levels and are these properly relayed to the central unit?	No. The MIS units at the central level collate service statistics from facilities of different tiers. The full array of data is relayed from facility to central level with access at lower to intermediate level, as well. The culture of accessing real-time information and data analysis has been progressing for local-level planning and management since 2010, when DHIS 2 was installed and it became possible to gather real-time data.	Weak

Topics	Question	Current Status (HPNSDP)	Score
Links with projects	Is there any effort to connect to/coordinate with donor M&E mechanisms for projects?	The DHIS 2 platform collects data from a number of parallel projects (e.g., the Urban Primary Health Care Services Delivery Project). No data linkage or triangulation takes place. Reporting from development partners on parallel projects in the health sector is irregular.	Weak
IV. Capacity			
Problem acknowledged	Are current weaknesses in the system identified?	Yes. Part of the M&E Strategy is an Action Plan to address the identified systemic gaps and weaknesses. The Action Plan has not yet been implemented.	Moderate
Capacity building plan	Are there multi-year plans for building capacity?	In the M&E Strategy is a proposal for a capacity building plan, which needs to be detailed and implemented.	Weak
V. Participation of actors outside the MOHFW			
Policymakers	Is the role of policymakers properly recognized in monitoring and oversight procedures?	The Planning Wing submits its Annual Program Implementation Report to ECNEC[2] for review every year. Linkages with parliamentary committees on health are not regular.	Moderate
Civil society	Is the role of civil society recognized? Are there clear procedures for participation by civil society?	Civil society participation is limited to stakeholder consultation before the annual program reviews.	Weak
Development partners	Is the role of development partners recognized? Are there clear procedures for participation by donors?	Yes, participation by development partners in program planning is ensured through Task Groups, established for 9 thematic areas	Strong
VI. Quality			
Effective use of M&E in the Annual Programme Review (APR)	Is there a presentation of relevant M&E results? Are results compared to targets? Is there an analysis of discrepancies?	PMMU disseminates the results of the Six-Monthly Progress Report and the Annual Program Implementation Report to MOHFW and development partners and these results feed into the APR.	Strong
Internal use of the APR	Is the APR also used for internal purposes? Does it influence policy and advocacy?	Yes. Based on the APR findings, policy consultations take place every year to influence planning and policymaking.	Strong

2 The Executive Committee of the National Economic Council, chaired by the Honorable Prime Minister

MA4HEALTH SUMMIT AND ITS FOLLOW-UP

The underlying reason for organizing the MA4Health Summit was to create capacities among the countries to meet SDG data needs. It is recognized that in response to the increasing demand for reliable and timely data in the health sector, countries are seeking to leverage investments, technologies, and partnerships to advance their information systems. Accountability, including performance measurement and resource tracking, compels participation by citizens and government, empowering both to take responsibility for developing a strong, effective, and sustainable system. Well-functioning data platforms that serve as the basis for accurate reporting, transparent reviews, and informed decision making at all levels can enable countries to drive their own health priorities and improve the well-being of their populations. The two key documents endorsed at the MA4Health Summit spell out actions over the next 15 years to achieve these ends: the Roadmap for Health Measurement and Accountability and the 5-Point Call to Action (World Bank, USAID, & WHO, 2015).

Roadmap and 5-Point Call to Action

The roadmap describes how low- and middle-income countries can harness the information they need to plan, manage, and account for the results of their health policies, to respond to inequities in health, and to measure progress in achieving subnational and national global health goals. It also shows how international efforts can best support these actions. The roadmap is based on a shared vision. It recognizes that countries are at different stages, requiring investments to be prioritized. Across the low- and middle-income countries, the roadmap found insufficient investment to meet data needs and inefficient investment in data collection and analysis, lack of country capacity to produce good-quality data, and limited access to and usability of data. In designing new approaches, the roadmap elaborates some strategic actions: developing data generation and reporting capacity, promoting evidence-based decision making, and aligning stakeholders to strengthen country HIS. The roadmap envisions an investment plan for HIS with several phases and joint health sector reviews every year. Reporting is a major deliverable, and milestones have been set accordingly. Thus SDG progress reports will also be produced every year, beginning with a baseline report in 2017. By the end of the first phase, in 2017, 25 countries (including Bangladesh) will have completed individual HIS investment plans, with nationally set timetables and country-specific accountability mechanisms. In the second phase (2018–2025), accountability reports will be produced every three years. Over this period, two countdown reports will also be produced and disseminated, outlining progress on measurement and accountability in health. By the end of this phase, 81 countries will have completed an HIS investment plan. Over the course of the third phase (2026–2030), two more countdown reports will be produced—the final one to be published in 2030.

The 5-Point Call to Action identified a set of priority actions and targets to strengthen country data and accountability systems for the post-2015 sustainable development agenda. These are:

- *Increase the level and efficiency of investments by governments and development partners to strengthen the country HIS in line with international standards and commitments;*
- *Strengthen country institutional capacity to collect, compile, share, disaggregate, analyze, disseminate, and use data at all levels of the health system;*
- *Ensure that countries have well-functioning sources for generating population health data, including civil registration and vital statistics systems, censuses, and health surveys tailored to country needs, in line with international standards;*
- *Maximize effective use of the data revolution, based on open data standards, to improve health facility and community information systems including disease and risk surveillance and financial and health*

workforce accounts, empowering decision makers at all levels with real-time access to information;

- *Promote country and global governance with citizens' and communities' participation for accountability through monitoring and regular, inclusive transparent reviews of progress and performance at the facility, subnational, national, regional, and global levels, linked to the health-related SDGs.*

Health Data Collaborative

To support the measurement and accountability agenda, institutional arrangements are being put in place. USAID, the World Bank, and WHO have engaged country experts and partners to develop a shared approach to measurement and accountability for the post-2015 sustainable development agenda. The HDC is to lead the process. This collaborative, launched in March 2016, is an informal partnership of WHO and other development agencies, countries, donors, and academics whose objective is to strengthen country capacity for health data (WHO, 2016). The HDC will pursue a three-phase timeline,[3] in parallel with the three phases of the MA4Health roadmap.

In the first phase (2016–2017), HDC seeks endorsement and consensus by at least five countries. (Bangladesh aims to be in this group.) These countries will engage in the collaborative, and by the end of 2017 will have completed assessments and investment plans for their health data systems and for strengthened monitoring of the health-related SDGs. A package of tools and guidance to support strengthening of country health data systems, with enhanced coordination of global health data initiatives, will also be launched.

The second phase (2018–2024) aims to ensure investments in plans for country health data systems. By 2024, 60 low- and middle-income countries and supporting donors will be using common investment plans to strengthen health data systems. Major donors will lead efforts to transition from program-specific investments in information and reporting to countries reporting national priorities and health-related SDGs using national health data systems.

In the final phase (2025–2030), sustainable measurement and accountability will be ensured when countries transition from international development assistance and have sufficient support for strengthening and sustaining robust health data systems.

3 http://www.healthdatacollaborative.org/

RESPONDING TO THE CALL TO ACTION

To successfully deliver on MA4Health's roadmap and call to action, concerted and aligned national and international efforts are required. In the following section, we consider how Bangladesh should respond to each of the five points in the call to action.

1. Increasing the Level and Efficiency of Investments

The first point in the call to action highlights the need to increase the level and efficiency of investments by governments and development partners to strengthen country HIS in line with international standards and commitments. This point aims to increase the level and efficiency of investment in health information and statistical systems by 2030 and to ensure that development partner investments in health information are fully aligned with a given country's platform for information and accountability by 2020.

The MESAP recommends developing multiyear, comprehensive plans for the future. Significant investments have been made in hardware and ICT infrastructure within facilities and in equipment for health workers at the grassroots level. It is essential to ensure that these investments are fruitful. Appropriate programs or software are needed to assure good use of the equipment, especially by RHWs. DGHS and DGFP need to ensure that current levels of investments to computerize their routine data systems will be sustained and that the systems operate efficiently. The development of HIS in Bangladesh has been noteworthy, but due to a lack of coordination within different line functions or programs, fragmentation has occurred. Bringing synergy and ensuring compatibility through an interoperability framework and health data standards are important tasks. The MOHFW has mapped the scope and performance of existing HIS tools to explore opportunities to integrate or link the tools and improve efficiency (Steen et al., 2015). The ministry's report on this exercise made technical, tactical, and policy recommendations, and provided guidance on using a unique electronic platform to establish interoperability among all the existing HIS databases under the DGHS.

Investment in M&E has been historically low in the sector program. Different operational plans involving M&E activities have accounted for around 3.6 percent of the HPNSDP development budget estimated for 2011–2016. This is at the low end of the recommended range for a program's budget allocation for M&E: 3 percent–10 percent (MOHFW 2015; MOHFW 2014b). The MESAP suggests a higher allocation, and the MOHFW should consider an increase for M&E activities in the next SWAp.

2. Strengthening Institutional Capacity To Collect, Compile, Disseminate, And Use Data

The second call to action item recommends strengthening country institutional capacity to collect, compile, share, disaggregate, analyze, disseminate, and use data at all levels of the health system. By 2020, it aims for country institutions to have annual transparent reviews of health progress and system performance, based on high-quality data and analyses. Also by 2020, it recommends that the flow of health information includes regular feedback and local use of data to improve services and programs in countries by 2020. By 2025, it aims for countries to be using comprehensive, disaggregated, high-quality data to review progress against their national plans and against the health-related SDGs. Our analysis of the Global Reference List of 100 Core Health Indicators for country, regional, and global reporting of the post-2015 health-related SDGs (WHO, 2015) has found that only 15 indicators can be monitored in Bangladesh using HIS. Table 3 tabulates these core indicators by data sources available in Bangladesh.

Table 3. Global Reference List of 100 Core Indicators, by sources in Bangladesh

Indicator type	Data Source							
	Household surveys (BDHS/ UESD/ MICS/ BMMS)	Facility surveys (BHFS)	Other/irregular surveys	Vital registration system (SVRS)	Health accounts/ expenditure review (NHA/ PER)	Sero-surveillance	Not available	Routine MIS
Health status indicators	7		1	8		4	4	3
Risk factors indicators	13		5			1	2	
Service coverage indicators	9					1	6	11
Health systems indicators	3	3	5		7		5	1
Total	30	3	11	8	7	6	17	15

BDHS: Bangladesh Demographic and Health Survey; UESD: Utilization of Essential Service Delivery Survey; MICS: Multiple Indicator Cluster Survey; BMMS: Bangladesh Maternal Mortality Survey; BHFS: Bangladesh Health Facility Survey; SVRS: Sample Vital Registration System; NHA: National Health Accounts; PER: Public Expenditure Review

Increasing the organizational capacity of the MOHFW or organizations under its auspices poses significant challenges. It has been noted that skills to carry out M&E functions are limited. Sectoral monitoring of HPNSDP is being managed through extra-organizational bodies such as the PMMU. There are also workforce shortages to fill key data management and system engineering posts in MIS units at different levels, and training of MIS and data collection staff involved with data entry, management, and reporting is insufficient. There is also a need to increase coordination and harmonization among the MIS functions of different departments under the MOHFW. Generally, demand for MIS data from line functions is not great; the LDs responsible for programmatic results do not rely much on the MIS or use such data.

Annual reviews have been a major activity in the health SWAp. Midterm reviews of the program have been conducted. Such reviews are done by independent third parties and add objectivity and neutrality to the process. A broad range of stakeholders is consulted through this review process.

The MOHFW has generally met global reporting requirements, relying on ongoing country processes of data generation, compilation, analysis and synthesis, communication, and use. Disease- and program-specific reporting systems for programs supported by the Global Alliance for Vaccines and Immunizations, the Global Fund, the Global Health Initiative of the U.S. government, and other development partners are well-structured. Using data from periodic surveys, Bangladesh provides updates on COIA's 11 core indicators that track the country's progress in increasing coverage of interventions needed to ensure the health of pregnant women and children under five across the continuum of care. MIS/DGHS is also providing periodic updates on coverage indicators using HIS. The HNP sector in Bangladesh is organized to meet performance-based requirements for funds release: that is, where ongoing disbursements are linked to the achievement of clear and measurable programmatic results. Technical assistance for the MOHFW to improve its M&E systems for reporting and decision making is ongoing from a number of sources.

DGHS has successfully established computer-based systems to collect and analyze data. DGFP uses a mixture of paper-based and electronic systems that generate acceptable MIS data. Overall, computerized systems are showing potential: systems have been developed to monitor program performance, track finance and procurement, support disease reporting and surveillance, and also to improve some human resource management (HRM) functions. However, the technical capacity of the organizations within the MOHFW varies, and the ministry needs to set priorities to address the gaps. Some examples are covered later in this report.

3. Generating Population Health Data Including Civil Registration and Vital Statistics, Censuses, and Health Surveys

MA4Health's third call to action item aims to ensure that countries have well-functioning systems for generating population health data, including civil registration and vital statistics (CRVS) systems, censuses, and health surveys that are tailored to country needs and in line with international standards. It specifically recommends that countries have in place a regular, comprehensive program of health surveys by 2025 and that they conduct a 2020 census, in line with agreed international standards. It further recommends that by 2030 all births will be registered by the CRVS system as soon as possible; that 80 percent of deaths will be reported, registered, medically certified, and disaggregated by age and sex; that causes of death will be reported by all hospitals using the International Classification of Diseases and Injuries (ICD); and that verbal autopsy will be used to ascertain causes of death in communities.

Bangladesh, with support from development partners, has been producing surveys at regular intervals. Household-level, population-based sample surveys are routinely carried out by NIPORT and other government agencies and NGOs, including the development partners. Major nationally representative sample surveys are the National Health Accounts; Bangladesh Demographic and Health Survey; Utilization of Essential Service Delivery Survey; Bangladesh Maternal Mortality Survey; Bangladesh Health Facility Survey; Multiple Indicator Cluster Survey; EPI Disease Surveillance and Coverage Evaluation Survey (CES); Tuberculosis Prevalence Survey; Food Security and Nutritional Surveillance Project, by BRAC University; Routine Surveillance (Disease Profile), by the Institute of Epidemiology, Disease Control and Research (IEDCR); and the Bangladesh HIV Sero-Surveillance. Table 4 below presents a survey matrix of the health-sector surveys completed and planned for the period 2000–2021. Surveys often collect qualitative data for in-depth understanding of care-seeking behavior.

The BBS manages a sample vital registration system. The BBS conducts surveys to estimate the determinants of annual population change and provide national and regional data on births and deaths, including the causes of death and life expectancy. The surveys are conducted throughout the year and results are disseminated every two to three years.

BBS also conducts the decennial National Census; this is the primary source of data on the size and geographic distribution of the population.

The CRVS system is weak, and the Government of Bangladesh is keen to improve it. The Birth and Death Registration Act 1873, intended to facilitate birth and death registration by the local government institutions, was never rigorously enforced. In 2004, it was repealed and a new act was adopted. The new law established a computerized database, and it requires a birth certificate as proof of age to obtain services such as school enrollment. Even so, the country falls far short of the MA4Health target of registering births within 45 days. The MOHFW's immunization program creates additional impetus for parents to collect a birth registration document for their newborn, but the ministry is not responsible for the CRVS system, which instead is managed by a number of other ministries as well as a Cabinet committee. The HIS is uniquely positioned to assist in timely registration of births and deaths.

Table 4. Survey matrix for Bangladesh HNP sector, 2000–2021

Study/survey name	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Bangladesh Demographic and Health Survey	X				X			X				X			X			O			O	
Multiple Indicator Cluster Survey							X			X			X				O			O		
Utilization of Essential Service Delivery Survey							X		X		X						O		O	O		O
Bangladesh Maternal Mortality and Maternal Healthcare Survey		X									X						O					
Bangladesh Household Income and Expenditure Survey	X					X					X						O					O
Bangladesh Global Adult Tobacco Survey										X							O			O		
Bangladesh Non-communicable Disease (NCD) Risk Factors Survey											X						O		O		O	
Bangladesh Urban Health Survey							X							X						O		
Bangladesh Health Facility Survey	X									X		X			X		O		O		O	
National HIV Serological Surveillance/ Integrated Biological and Behavioral Surveillance	X	X	X		X	X	X	X				X					O		O		O	
Bangladesh National Health Accounts		X						X					X					O			O	
Public Expenditure Review for the HNP Sector		X	X		X			X	X	X					X		O	O	O	O	O	O

X — Completed
O — Planned

4. Maximizing Effective Use of the Data Revolution Based on Open Data Standards

The fourth item in the call to action emphasizes maximizing effective use of the data revolution, based on open standards, to improve health facility and community information systems, including disease and risk surveillance and financial and health workforce accounts, empowering decision makers at all levels with real-time access to information. By 2020, it aims for countries to comply with the national core functions for surveillance and

response of the International Health Regulations and to have effective, real-time disease surveillance systems in place with the capacity to analyze and link data using interoperable, interconnected electronic reporting systems. By 2025, this item says countries should have in place electronic systems with data quality assurance mechanisms for real-time reporting of health statistics from at least 80 percent of facilities and communities. By 2030, it says countries should have regular maternal and perinatal death surveillance and response mechanisms at the national, subnational, and facility levels. Also by 2030, it aims for at least 90 percent of countries to be reporting data according to international standards from the system of health accounts and to have complete, up-to-date health workforce accounts.

A high-level panel appointed by United Nations Secretary-General Ban Ki-moon to advise on the post-2015 global development agenda suggested ushering in a data revolution that would draw from existing and new sources of data to fully integrate statistics in decision making; promote open access to and use of data; and ensure increased support for statistical systems (United Nations, 2013). IEDCR, a unit of DGHS, is responsible for IHR core functions. IEDCR uses a web-based disease surveillance system, which is not integrated with major systems managed by the DGHS MIS. Interoperability could be an issue. However, an interoperability framework being drafted by DGHS requires endorsement by the MOHFW. Improving the reporting of health statistics by facilities will require greater emphasis on automating data collection. Facility automation is complex. Solutions comparable to DHIS 2 (District Health Information System, Version 2; developed by Oslo University) are not yet available.

Management of the quality and reliability of survey data is already in place. HPNSDP's performance monitoring plan has a section on data quality issues including dates of quality assessment and known data limitations. The plan also provides data quality assessment tools (MOHFW, 2014d). MESAP recommends periodic data quality audits of recorded data by supervisors; regular training of staff, and provision of routine feedback to staff at all levels on completeness, reliability, and validity of data; and dissemination of results to different levels of government (national; divisional). MESAP also recommends carrying out these audits at points of data collection, collation, and analysis by the technical staff of MIS and developing standardized data quality audit tools. There are mechanisms for survey data. For administrative records, data quality checklists would be implemented.

Bangladesh has produced four rounds of National Health Accounts since 1997. The most recent covers the period 1996/97–2011/12 and it is based on the 2011 edition of the Organisation for Economic Co-operation and Development's System of Health Accounts framework—the international standard. The results are publicly available.

5. Enhancing Accountability

The fifth point in the call to action recommends promoting country and global governance with participation by citizens and communities. It stipulates accountability through monitoring and regular, inclusive, transparent reviews of progress and performance at the facility, subnational, national, regional, and global levels, linked to the health-related SDGs. These aims are immediate. By 2016, a global coordination and accountability mechanism is supposed to be functioning, producing regular reports, and holding reviews to assess the progress of the health measurement roadmap and action plan. By 2017, countries should have established mechanisms to make health data available to users through electronic dissemination and easy access to a central data repository. And by 2020, civil society organizations in countries are to be actively and meaningfully participating in country reviews of progress and performance at all levels.

At the country level, there is an imperative to make health data public to ensure transparency of health data and increased accountability. DGFP has made its logistics data available for public use (https://scmpbd.org/index.

php/lmis-dashboard) and incorporated scheduled short message services—SMS—features in the HIS platform to push data to users, producers, and their supervisors. This system generates SMS alerts, sent in the name of the "MOHFW," which are received by users who might not be using the DGFP dashboard or who might be more attuned to a reactive model of addressing supply chain management failures rather than proactively preventing them. The alerts are sent in the following instances: (1) action reminder: time to report; (2) successful upload of report; and (3) alerts to potential stock imbalance or stockout of FP commodities. This push notification system has been facilitating the transition of local managers from data producers to participants in a data-use culture, thus improving decentralized decision making and enhancing accountability. This level of performance visibility also has profound motivating effects in terms of recognition of excellence and transparency.

Data on coverage and outcomes, health systems, and health financing should be accessible by all stakeholders. Regular assessment of progress and performance reviews, with transparent, inclusive, and independent mechanisms are also essential. Bangladesh's civil society organizations are already vibrant and active. However, lack of access to data may hinder their ability to act. Health data often are not available to those who can use the information to improve the health system's performance. The next sector program can address these issues in a meaningful way. Currently, several practices exist to make data available and to promote accountability in the health sector. Under the COIA initiative, Bangladesh periodically provides updates on the 11 core indicators the commission has identified to track progress in increasing the coverage of interventions needed to ensure the health of pregnant women and children under five across the continuum of care. Data from surveys such as Bangladesh Demographic and Health Survey and Bangladesh Maternal Mortality Survey are used to target priority areas for expansion of essential service coverage. Also, Community Groups and Community Support Groups established under the CCs serve as an accountability mechanism for the delivery of primary healthcare services in rural areas.

INVESTING IN TECHNOLOGY AND HUMAN RESOURCES

Under the HPNSDP, digital transformation has been sought by increasing the use of ICT-based software programs and tools. Many tools, including paperless ones, have enriched the work of the MOHFW. Appendix A lists tools the ministry uses, by department, and we will update this periodically. Modern ICT solutions employ different platforms (for example, Windows and Android) and media (tablet, desktop, and mobile phone), facilitating the convergence of data in a cloud-based database. Most applications need connection to the Internet through a server. Online transactions are a necessary routine and rely on web-based solutions. The route from front-end to back-end is complex, and people with varied skills are required to navigate it. While private-sector organizations have recourse to services from vendors or other third parties, public-sector organizations often lack such flexibility. Moreover, public-sector organizations are not well-prepared to manage a rapidly changing environment that requires new skills to manage evolving technologies. Technical assistance can fill this vacuum.

Investments have been made in creating an ICT infrastructure in the MIS of the DGHS. The DGFP has followed suit with its MIS. Large investments have also been made in hardware.[4] There are data centers in DGHS and DGFP. Tablets are available to all RHWs (known as health assistants) working at the community level for the DGHS. Gradually, the facilities are being equipped with servers, workstations, printers, and other electronic equipment. About 13,000 CCs at the village level are equipped with laptops. Internet connections are available to all with large data quotas through the commercial mobile operators. Connectivity and a continuous power supply are persistent problems; software development has to take these uncertainties into account. Moreover, the ICT equipment (tablets and desktops) will need to be replaced over the next three to five years. Indeed, inventories will need to be reorganized from now on in three- to five-year cycles, and this will require predictable budget provisions. There is also a need for a robust asset management system—now absent—to tackle hardware-related problems and prevent loss or misuse.

HIS are essential suppliers of data for M&E activities, particularly with regard to coverage and use, and therefore, the improvement of sector M&E systems will logically require HIS strengthening (Holvoet & Inberg, 2014). Although many ICT solutions have been introduced across the agencies under and within the MOHFW, their implementation is at different stages of maturity. We describe two solutions—DHIS 2 and RHIS—as examples of the potential of digital transformation for the MOHFW.

DHIS 2

DHIS 2 has been in use by the DGHS since 2010. DHIS 2 is a tool for the collection, validation, analysis, and presentation of aggregate statistical data, tailored to integrated health information management activities. It allows the users to design the contents of a specific information system. DHIS 2 is a modular, web-based software package that requires no knowledge of programming. It is available free as open source software. The DGHS has used it extensively and worked to increase functions within the core software, thus contributing to DHIS 2's development (Birdsall, 2014). With technical support from the German development agency GIZ from the beginning, and further assistance from the United Nations Children's Fund (UNICEF) and, more recently, from the International Centre for Diarrhoeal Disease Research, Bangladesh (icddr,b), DHIS 2 has been rolled out nationwide. Currently within DHIS 2, the DGHS has 32 aggregated data sets collecting facility service statistics and three data sets collecting individual demographic and treatment information. Most health programs within the DGHS are included in the system. The coverage is also huge: data entry is performed by

4 Appropriate programs or software need to be made available for appropriate and full use of the equipment. This has been lacking in the MOHFP's systems, with the exception of the RHIS, which seems to have filled that gap.

the union-level facilities and the CCs. All primary, secondary, and tertiary care facilities furnish data at regular intervals. DHIS 2 has also been extended to capture individual patient records from CCs, as prescribed by COIA. DGHS has successfully developed a health management information system (HMIS) package for all urban facilities including those of city corporations and NGOs. DGFP has piloted DHIS 2 in two districts and intends to scale it up in other districts. Please see Appendix B for details.

The MOHFW's HIS won the United Nations Digital Health for Digital Development Award in 2011. Each year, the Federal Ministry of Economic Cooperation and Development (BMZ) of the Government of Germany recognizes one project as the best practice among all projects in about 160 countries that GIZ supports. In 2014, it chose Bangladesh's RHIS, describing the system's improvement, from nothing, as almost a miracle. Also that year, the World Bank's Bangladesh office commissioned an international study to see whether the investment in HIS by the MIS-DGHS is returning value for the money spent. The report, published in 2015, concluded that the MIS is indeed a good investment and recommended sustaining the system's momentum.

COIA

COIA, established to register and track pregnant women and children under-five electronically, is a United Nations initiative to improve maternal and child health and attain MDGs 4 and 5 in countries lagging behind the targets. The Bangladesh COIA secretariat, established in 2014 with support from WHO, is operating COIA activities countrywide. The COIA program prompted Bangladesh's other development partners to step up their maternal, newborn, and child health activities. UNICEF further expanded the COIA model of individual patient data collection to local-level planning, in order to facilitate overall improvement of health at the district and upazila level. Indeed, the unique feature of the COIA model is the tracking of individuals: community health workers and CCs use DHIS 2 to register every pregnant woman and every child younger than five living in their catchment areas. A routine weekly meeting is held in the CC, at which the government community health workers (community healthcare providers, health assistants, and family welfare assistants), NGO healthcare workers, and members of the CC management committee and Community Support Group review the local maternal and child health data. If required, they clean and update those data, make an intervention plan for the next week, and implement the plan. Through this cycle, Bangladesh continues to track, follow up, and improve maternal and child health.

Because WHO's support was a seed grant for the COIA secretariat, sustaining the growing momentum of the COIA program in Bangladesh was a concern. The Joint Development Partners' Technical Assistance Fund, which provides technical assistance for HPNSDP, has rescued the COIA program for the life of HPNSDP, but this ends in 2016. Given the high morbidity and mortality burden of noncommunicable diseases in Bangladesh, the fund also proposed that community-based NCD interventions be part of the COIA program as a requirement for funding support. Therefore, NCD interventions have been included in the extended COIA programs.

Shared Health Records

Shared health records (SHRs)—the platform for citizens' lifetime electronic health records— was developed with technical assistance from the United Kingdom Department for International Development. It is ready for use. First, the software will be piloted in a few hospitals and community settings, and then it will be scaled up nationally. The SHR platform was developed to pave the way for the electronic health records that will be needed for UHC in Bangladesh. However, its potential is now being viewed from other perspectives, as well. For example, the SHR can also be adapted to capture data on the global reference list of 100 core health indicators

(WHO, 2015). This minimal but comprehensive list allows collection of health data to measure progress toward the SDGs' health targets, including UHC. Another perspective is the global drive to help countries establish universal CRVS systems. The Government of Bangladesh is also pushing the CRVS agenda forward. Because the SHR system's purpose is to register and track every citizen for health encounters, routine check-ups, and surveillance, it is best-suited to measure progress toward UHC and the other health-related SDGs. The system could also be linked to CRVS, especially for notification of births and deaths to the National Birth and Death Registration Authority and for capturing data on cause of death. The days to come will show the extent to which the SHR platform realizes this ambitious vision.

Online Health Bulletins

Online local health bulletins, which health organizations began publishing annually in fiscal year 2011–2012, have been well-received. [5]As of 2014–2015, 630 organizations were publishing these bulletins, which synthesize and report clinical and facility (human resources and infrastructure) data. This information is presented at meetings of health managers, MIS focal points, and statistical staff of the organizations publishing the bulletins, along with technical experts from the MIS (DGHS), development partners, and major NGOs. Open discussion, critical analysis, and feedback follow each presentation.

Human Resource Information System

The Human Resource Information System (HRIS)—developed by and for the MIS of the DGHS—digitizes the performance reviews of doctors and makes them available online. The electronic arm of the system could eventually be expanded and improved to capture human resource data not just for the DGHS but also across the health sector. For now, though, most of the ministry's human resource information management is conducted using a manual, paper-based HRIS. The OP for HRM calls for collaboration with the MIS-DGHS to gradually automate the ministry's system so that it can handle all MOHFW human resource management processes, not just those of the DGHS. If this plan is carried out, the DGHS's HRIS will be able to fulfill the dream for which it was built. Good software alone is not enough for effective human resource information management, however. The most important factor is compliance with data quality standards of timely and accurate reporting. Recognizing the need to monitor data quality and provide feedback to agencies falling short of these standards, the MOHFW has delegated these tasks ministry-wide to the DGHS.

Online Procurement Portal

An online procurement portal, developed with technical assistance from Management Sciences for Health and supported by USAID, has been in operation since 2013. All procurement processes under HPNSDP are handled through this portal, significantly reducing the time required to complete a procurement.

RHIS Initiatives

RHIS Initiatives is a program whose ultimate goal is an elaborate HIS for rural areas. It began in January 2015 as a pilot in the districts of Tangail and Habiganj, conducted by four implementing partners of USAID: MEASURE Evaluation, icddr,b, the MaMoni Health Systems Strengthening Project, and Systems for Improved Access to Pharmaceutical Systems. The initiatives work through the government health system—DGHS and

5 All bulletins are available on the DGHS website: http://app.dghs.gov.bd/localhealthBulletin2015/publish/.

DGFP—to replace paper-based data collection with software applications in tablets, laptops, or desktops. They are automating the work of RHWs and of the family welfare visitors and subassistant community medical officers who provide services on behalf of the union health facilities. Details of all service encounters are captured electronically and saved in a database, which also serves as a population registration system (PRS), similar to the census. The RHIS data will be the basis for relevant online reporting to DHIS 2 by DGFP and DGHS.[6]

One advantage of the PRS is its speed. A household with four to five members can be registered in 10–12 minutes, and RHWs have collected data on as many as 60 people a day. As of March 2016, 1.4 million people had been registered. Each person receives a health identification number that is entered in the PRS, which is considered the foundation of the RHIS. The population and service data that the PRS captures can be of immense use to decision makers as they plan what services to offer and where. Bangladesh's CRVS system could benefit from the birth and death registration modules of the PRS.

When the system's service delivery modules were developed, the RHIS was integrated with the DGFP's Upazilla Inventory Management System (UIMS). As a result, distribution of reproductive health commodities is recorded at the source and inventory can be updated in real time. Management modules for the database are being developed to support the work of supervisors, with data visualization tools for the monitoring of routine performance.

National scale-up is envisioned after all of the RHIS modules are successfully piloted. Based on program experience, it has been estimated that the GOB will be able to provide the equipment at no cost, but training to use the equipment is likely to require US $5 million.

6 See Appendixes A and C.

INVESTMENT REQUIREMENT FOR M&E IN THE FOURTH SWAP

The background document for the MOHFW's fourth SWAp identifies eight key result areas, which are likely to be part of the next sector program's implementation and operational plan. These are quoted below:

Move towards fully digitizing the entire routine HIS in Bangladesh by 2021 to build a robust evidence-base for decision making;

Sector program M&E processes are strengthened by ensuring timely availability of routine, surveillance, civil registration and vital statistics (CRVS) and survey data, which are comprehensive and of good quality;

Data demand, updating, and utilization are facilitated in MOHFW and its agencies and departments by establishing partnerships with relevant institutions;

Coordination and harmonization of MIS of the Directorates and programs are improved by building towards functional linkages between the information systems (including non-governmental and private sectors);

Monitoring and supervision systems within MOHFW and the Directorates are made functional for routine program monitoring and performance appraisal, thus promote accountability and ensure quality of services;

Multi-year, comprehensive training and program implementation plans are in place for capacity building of program managers and field staff for effective implementation;

Budgetary allocation for M&E activities are increased for strengthening organizational structure of MIS Units to sustain digitization and computerization (particularly on maintenance of procured hardware and system engineering);

A research culture in place within the MOHFW by effectively identifying priority research issues and building up capacity for ensure evidence-based decision making;

MESAP provides an evidence base for resource allocation decisions, and noted that investment for M&E activities under the next sector program should increase. According to a preliminary costing analysis, around US$ 215 million will be required for M&E activities under the fourth HNP sector program. This will increase the total allocation for M&E activities to around 7 percent of the total SWAp allocation for 2017–2021, from 4 percent in the third sector program (HPNSDP 2011–2016).

KEY RECOMMENDATIONS AND CONCLUSION

Having seen considerable success in tackling the MDGs, the MOHFW now needs to look forward to achieving the SDG health targets. Based on our literature review and the M&E scorecard, the previous section elaborated the critical issues for Bangladesh's response to the MA4Health 5-Point Call to Action. Here we summarize our key findings and recommendations.

Recommendations

- Implement the action plan outlined in the MESAP. Build consensus on a five-year operational plan for improving measurement and accountability systems in Bangladesh's health sector (drafted at the MA4Health Regional Conference) and secure agreement on increasing the budget for those M&E activities that specifically address the sustainability of ongoing digitization and computerization initiatives, such as system maintenance, hardware replacement, and capacity building.
- Establish strict health data standards for all heath facilities (public, private, and NGO sector) to ensure cross-departmental (among different government agencies under the MOHFW) and cross-sectoral coordination (among different ministries), so that data are compatible.
- Conduct an assessment of the current HIS to identify areas that need overhauling.
- Move toward fully digitalizing the entire HIS.
- Create an asset management system to audit and manage the proliferation of equipment and perishable assets.
- Strengthen the HIS and such eHealth programs as DHIS 2, HRIS, SHRs, local health bulletins, telemedicine, and call centers. Mainstream, integrate, and scale up improvements in the RHIS, and other projects that now are in the pilot stage.
- Develop a multiyear, comprehensive capacity building plan for facilitating and promoting the development of M&E knowledge, skills, and competence in routine data collection, analysis, feedback, and use.
- Equip local-level managers with essential skills so they can provide leadership in conducting household-level and population-based sample surveys at regular intervals, in addition to the formal surveys done by professional groups.
- Assess and put in place the human resources required to accomplish the planned activities for strengthening M&E systems in the health sector. Organizational reform and reassessment of job descriptions are required, especially to address the need for new skills and changes in the work environment.
- Establish a supportive legal environment to maintain confidentiality of personal data and privacy concerns of the citizens.
- Enhance demand for data, by establishing partnerships among agencies within the MOHFW and between the MOHFW and other ministries, research organizations, development partners, nongovernmental organizations (NGOs), and professional bodies, which will facilitate data analysis and support for evidence-informed decision making.
- Improve coordination of the MOHFW's HIS with the Office of the Registrar General of Birth and Death (or some such entity that may be established later in the Local Government Division) to strengthen CRVS.
- Increase coordination and harmonization of MIS functions among the agencies and departments of the MOHFW.

- Improve and ensure the effective use of the Integrated HRIS by all agencies and departments of the MOHFW. HRIS needs to harmonize the MIS of DGHS and DGFP. Because programs such as the RHIS rely on central data to create user profiles, assigning responsibilities and tracking performance are difficult when a system cannot be updated in real time.
- Develop an overarching Internet technology leadership and governance framework to drive the National eHealth Strategy.
- Explore opportunities to establish a stand-alone national health information policy unit to oversee HIS governance and policy. Also establish an oversight committee to develop standards, policies, guidelines, and protocols for data and interoperability in such domains as privacy, security, access control, sharing, shared services, and best practices.
- Facilitate an open government data initiative to ensure transparency and accountability and to mobilize community engagement in data use.
- Enhance efforts to promote facility automation and gathering of data from government agencies, NGOs, and the private sector, with particular attention to urban areas, and ensure that the MOHFW has an effective stewardship role in this work.

Conclusions

Most countries made tremendous progress in monitoring health during the MDG era, but significant gaps and inefficiencies remain (Handley, et al., 2015). The role of monitoring in the post-2015 development agenda has become even more crucial. For a resource-constrained setting such as Bangladesh, development of a multiyear operational plan and a country roadmap is critical. Bangladesh took a big step in this direction by drafting a five-year operating plan during the MA4Health Conference. Now it must reach consensus on this plan, and design an action plan (or roadmap) to carry it out, with both in place when the next SWAp takes effect next year. A sustainable improvement of the country's HIS capacity requires better coordination and collaboration between Bangladesh and its development partners. This will improve data quality, availability, and use. Better data, in turn, will support better healthcare decisions by policymakers. Ultimately, the health of the people of Bangladesh will be better, too.

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APPENDIX A. MAPPING OF SOFTWARE SOLUTIONS USED IN MOHFW

Sl.	ICT Tools	Year initiated	Type	MOHFW	DGHS	DGFP	DGDA	HED	DNS	NIPORT	BMDC	NC	SMF	PCB	BHB	BU&AB	Developer	Current State	Sustainability
1.	Annual Development Program (ADP) Monitoring System	2012	Web-based	X	X	X	X	X	X	X							Vendor	Functional	Integrated
2.	HRM database/ PMS/PMIS[7]		Web-based	X	X	X			X								Vendor	Functional	Integrated
3.	Supply Chain Management Portal (SCMP)/ procurement tracker	2011	Web-based	X	X	X	X	X	X	X							Project	Functional	Integrated
4.	Facilities registry		Web-based		X			X									Vendor	Functional	Integrated
5.	DGFP eLMIS	2011	Web-based		X	X											Project	Functional	Integrated
6.	DGHS eLMIS	2015			X												Project	Pilot stage	Not Known
7.	Geolocation registry		Web-based		X												Vendor	Functional	Integrated
8.	Deputation management system		Web-based	X	X												Vendor	Not used	Not Known
9.	Leave management system	2012	Web-based	X	X												Vendor	Not used	Not Known
10.	Disciplinary cases		Desktop	X													MOHFW	Functional	Integrated
11.	DHIS 2 (DGHS)	2011	Web-based		X	X											Project	Functional	Planned

7 The Personnel Management System (PMS) and Personnel Management Information System (PMIS) were developed to handle the human resource functions of DGHS and DGFP.

Sl.	ICT Tools	Year initiated	Type	MOHFW	DGHS	DGFP	DGDA	HED	DNS	NIPORT	BMDC	NC	SMF	PCB	BHB	BU&AB	Developer	Current State	Sustainability
12.	Share health record	2016	Web-based		X												Project	Piloting	Planned
13.	Asset management system	2015	Web-based														Project	Functional	Planned
14.	PharmaDex	2015	Web-based														Project	Testing	Not Known
15.	OpenMRS		Web														Project	Piloting	Not Known
16.	Bulk SMS-based system		Mobile														DGHS	Functional	Integrated
17.	Website			X	X	X	X	X	X	X	X	X	X	X	X	X	Vendor	Functional	Not Known
18.	Content management			X	X	X	X	X	X	X	X	X	X	X	X	X	In-house	Functional	Integrated
19.	Telemedicine		Web		X												DGHS	Pilot	Integrated
20.	RHIS	2015	Android		X	X											Project	Piloting	Planned
21.	CC reporting tool		Web-based		X												Project	Functional	Not Known
22.	OpenSRP		Android			X											Project	Research	Not Known
23.	COIA		Web-based		X												Project	Pilot	Not Known
24.	Social media		Web-based														In-house	Informal	NA
25.	Mobile-based complaint registration		Mobile + Web		X												Project	Functional	Not Known
26.	Fingerprint reader for attendance		Web-based	X	X												Project	Pilot	Not Known
27.	mCare (maternal care)					X											Project	Research	Not Known
28.	mTikka (vaccination)				X												Project	Research	Not Known
29.	DGDA web portal	2014	Web-based				X										Project	Functional	
30.	DGFP service statistics		Web-based			X											Project	Functional	Integrated

Sl.	ICT Tools	Year initiated	Type	MOHFW	DGHS	DGFP	DGDA	HED	DNS	NIPORT	BMDC	NC	SMF	PCB	BHB	BU&AB	Developer	Current State	Sustainability
31.	e-TB Manager (individual TB patient tracker)	2010	Web-based		X												Project	Functional	
32.	TB eLMIS	2016	Web-based		X												Project	Piloting	
33.	Bangladesh Country Coordinating Mechanism website	2015	Web-based	X													Project	Functional	
34.	Information Communication Technology for Reproductive Health Project		Desktop			X											Research	Pilot	
35.	Other, such as IEDCR surveillance				X												DGHS	Functional	Integrated

Explanation of Columns:

Developer: "Vendor" means development was outsourced to vendor by the concerned organizations. "Project" means the activity was carried out under a development partner-funded project. "In-house" means the system was developed by the organization's own staff. It could be part of a research project. These categories may have implications for sustainability.

Current State: "Functional" means the solution has reached a stage of maturity and used under leadership of government agencies, "Pilot" or "Piloting" means the activity is done by external entities with or without engagement or commitment of the government, "Research" means done on a limited scale and plans for scale-up may be absent or ownership of government is not manifested.

Sustainability: This means whether or not the knowledge/project has been transferred to the government. "Integrated" means staff or consultant housed in the organization is maintaining the system. "Planned" means active engagement is planned for successful transfer of the system. "Not known" means data was not available at the time this report was written.

APPENDIX B. DISTRICT HEALTH INFORMATION SYSTEM, VERSION 2 (DHIS 2)

DGHS has been using DHIS 2 since 2011. DHIS 2 is a tool for collection, validation, analysis, and presentation of aggregate statistical data, tailored to integrated health information management activities. DHIS 2 is a modular web-based software package—a generic tool that allows the user with no programming knowledge to design the contents of a specific information system. It is open source software, available at no charge. DHIS 2 software is used in more than 46 countries in Africa, Asia, and Latin America. A rapidly increasing number of countries and organizations are starting new deployments. The main features of DHIS 2 implementation in Bangladesh are the following:

- DHIS 2 is used to collect and store aggregated data on a monthly basis from a wide range of points in the national health system and to generate reports. Internet connection is provided. It is a comprehensive HIS solution for the reporting and analysis needs of health information users at any level.
- DHIS 2 was customized for decentralized data entry in Bangladesh in 2011. The first data sets were for monthly emergency obstetrical care, monthly hospital bed statements, and monthly integrated management of childhood illness.
- Now DGHS has 32 aggregated data sets and three individual data sets. Most health programs participate: 4,501 union-level facilities and 12,784 CCs.
- An urban HMIS package has also been developed for all urban facilities including city corporations and NGOs. DGHS provides a dedicated server for the urban HMIS.
- Facilities use customized forms to enter data in the system directly. Statisticians use the software for data entry from upazilas; district-level officials also report through this system. All community clinics are transferring data through DHIS 2.
- Hospitals and upazilas enter data directly in DHIS 2 through the Internet using desktop computers. The community healthcare providers use laptops to enter monthly service statistics directly in DHIS 2. In case of connectivity problems, the community provider can send data to health facility staff, who will then enter the data directly in DHIS 2.
- The reports are accessible through the DGHS website. Program managers can view data on web pages and export them in other formats (pdf, for example) for further analysis or print them for distribution to other users.
- The data are stored in a PostgreSQL database. This database can scale up to quite a large size, but if more space is needed, another database system can be employed.
- DHIS 2's patient tracker allows monitoring of individual patients—in particular, those whose conditions require close surveillance. Bangladesh recognized a need to closely monitor pregnant women and children under five to fulfill its COIA initiative commitments. Since 2013, approximately 300,000 pregnant women and 1,200,000 children under five have been registered. Some countries use DHIS 2 to monitor the care of HIV and AIDS clients, but Bangladesh has no plans to extend the registration beyond the original two groups.
- Aggregated data from the patient tracker is transferred to DHIS 2 at the end of the month. Data from the patient tracker are stored in a separate database from the other DHIS 2 data.

APPENDIX C. ROUTINE HEALTH INFORMATION SYSTEM INITIATIVES

Routine Health Information System (RHIS) Initiatives began as a pilot in January 2015 in the Tangail and Habiganj districts of Bangladesh. Their ultimate goal is to create an elaborate health information system starting from rural areas. RHIS Initiatives work through the parts of the government health system managed by DGHS and DGFP. These organizations maintain facilities at different levels of administrative units and deploy RHWs to provide community health services, mostly home-based care.

RHIS Initiatives aim to automate the work of RHWs using different platform and media. The pilot replaces paper-based systems with mHealth applications on tablets (handheld computing devices) for data entry during home visits, or—in union-level facilities, where client data are entered by family welfare visitors and subassistant community medical officers—on laptop and desktop computers. With the databases thus created, it is possible to track all individuals receiving services. The data can be accessed by providers as well their supervisors and used and analyzed for decision-making purposes.

The RHIS under construction has three layers of applications:

- Population registration system (PRS) for registering population. This system imitates the census. It was modeled on geographic reconnaissance that DGHS carried out yearly until 2010. CRVS could benefit from integration with PRS.
- Service modules. These modules capture the routine work of health workers, such as services provided by the family welfare assistants (FWAs) under the DGFP and health assistants (HAs) under the DGHS. FWAs service statistics are documented by structured registers. The HAs also follow structured methods for providing and documenting the expanded program of immunization, maternal care, and other disease-related surveillance. As these modules evolve, they will automate all business processes of the union-level facilities.
- Management modules. These modules, now under construction, will have data visualization tools to help supervisors monitor routine performance. Officials at upazila, district, division, and headquarters levels, including the MOHFW, will be able to use and analyze data through the tools developed under these modules to plan coverage and make decisions about provision of services.

Computerization of upazila-level facilities and district hospital or tertiary hospitals is also within the scope of RHIS. DGHS plans to develop software for that purpose on platforms such as OpenMRS, with whatever enhancements are necessary.

Bangladesh Non-communicable Disease (NCD) Risk Factors Survey

RHIS Initiatives started in January 2015. It aimed to establish the baseline by registering population in the PRS using Android (mobile) technology. Mobile devices and Internet are now available countrywide, though problems of consistent power supply and connectivity remain. Therefore, ability to work offline is embedded in the design of RHIS apps.

FWAs and HAs are using tablets to register populations so that they can identify need for services such as reproductive health, maternal and child health, and immunization and provide these services later. Each FWA and HA is responsible for a specific catchment area in a ward or union (the lowest unit of local government). Geographic and administrative data appropriate to the health workers' responsibilities are uploaded in their

tablets. The FWAs and HAs visit households to collect data relating to the household members; they have access only to data belonging to the households to which they are assigned. PRS is considered the foundation of RHIS because all service delivery modules function by retrieving filtered data from the PRS database. Background metadata (such as global positioning system data) are also captured.

PRS was introduced in Madhabpur upazila of Habiganj in March 2015 and in Basail upazila of Tangail in April 2015. The app's interface is in Bangla. The data are synchronized daily with a central database. Health workers receive 3G Internet connections and a short training before deployment. They also have access to and support from field staff of MaMoni HSS at Habiganj and icddr,b at Tangail. The RHWs became proficient with the tablets quickly, and can register a household with four to five members in 10–12 minutes. They are collecting data at a rate of 50–60 people a day. Each person registered receives a health identification number. Registration of Basail and Madhabpur has been completed, and PRS has been deployed in 10 more upazilas of the 12 in Tangail. By the end of March 2016, about 1.4 million people had been registered. The following table provides a picture of household and member registration through the RHIS Initiatives as of that date:

Upazila	Start Date	# of RHWs	Work-days	HH (Census 2011)	HH (Regd)	HH (%)	Member (Census 2011)	Member (Regd)	Pop (%)
Ongoing									
Mirzapur	1 Nov 15	111	5975	93880	77440	82.49	407781	318817	78.18
Bhuapur	1 Dec 15	61	2670	46412	37303	80.37	189913	157256	82.80
Ghatail	14 Dec 15	125	4222	104035	44297	42.58	417939	174409	41.73
Gopalpur	14 Dec 15	70	1873	63976	18829	29.43	252331	75536	29.94
Dhanbari	14 Dec 15	41	1325	45948	17672	38.46	176068	69246	39.33
Madhupur	31 Jan 16	63	1871	75903	26980	35.55	296729	99578	33.56
Delduar	22 Feb 16	61	1329	48227	13649	28.30	207278	55927	26.98
Nagarpur	8 Mar 16	86	623	66523	4654	7.00	288092	18815	6.53
Sakhipur	16 Mar 16	74	436	71009	3711	5.23	277685	13109	4.72
Kalihati	30 Mar 16	38	76	98702	388	0.39	410293	893	0.22
Completed									
Basail	In 2015	55	3139	38565	41598	107.86	159870	164189	102.70
District	Total			753180	286521	38.04	3083979	1147775	37.22
Madhabpur	In 2015	50	4754	62300	68442	109.86	319016	342200	107.27

Source: RHIS database

The PRS database provides key links to other service modules. After successful deployment of PRS, the electronic FWA register was introduced in Basail in February 2016. Data received so far shows FWAs are catching up in terms of coverage, but their work has been hampered by DGFP's requirement that they keep

paper records, as well, increasing their workload. For HAs (working under the DGHS), EPI registers have been developed and were introduced in April 2016 in Basail.

Effective use of ICT will change the business processes of the RHWs. The MIS administrators both in DGHS and DGFP strongly support RHIS Initiatives. The district- and upazila-level officials of the government supervised the pilot's implementation and provided assistance as difficulties arose. After successful piloting, scale-up of RHIS all over the country will begin and could be completed in three to five years.

APPENDIX D. MOHFW SUPPLY CHAIN MANAGEMENT PORTAL

The MOHFW Supply Chain Management Portal (SCMP) (https://scmpbd.org/) is a web-based portal accessible by the Ministry, procuring entities, line directors, drug administrators, hospital staff, and stakeholders. This comprehensive system tracks procurement; maintains specifications in a comprehensive product catalogue; facilitates procurement planning of goods and services, package development, and tracking; and maintains linkages with drug registration to efficiently and effectively monitor the health ministry's procurement management. In addition, the electronic logistics management information systems (eLMIS) for both DGFP and DGHS are part of the SCMP and track the stocks of reproductive, maternal, newborn, and child health commodities up to service delivery points and CC levels. This platform has been made interoperable so that DHIS 2 and RHIS can exchange logistics data, and it is serving as the national central logistics data repository. The SCMP visualizes the logistics data through an interactive "business-intelligence," drilled-down dashboard to facilitate data-driven decision making.

DGFP's eLMIS consists of two systems: the UIMS and the WIMS.

- The Upazila Inventory Management System (UIMS) is a software program for maintaining inventory at upazila (subdistrict) family planning stores. It enables upazila family planning store staff to maintain stocks of commodities, monitor field reporting, generate the supply plan, and automate the issuance of vouchers and monthly Logistics Management Information System (LMIS) reporting. UIMS is running on a stand-alone desktop computer, and synchronizes data with LMIS when prompted to by a user with an active Internet connection.
- The Warehouse Inventory Management System (WIMS) is a software program designed to maintain inventory at family planning warehouses at the district level. It enables warehouse staff to maintain stocks of commodities and monthly LMIS reporting. Like UIMS, WIMS is running on a stand-alone desktop computer, and synchronizes data with LMIS when prompted to by a user whenever an Internet connection is established.

The platform has another module: the Asset Management System, which tracks the status of costly and lifesaving medical equipment and other office and information technology equipment at different levels of health facilities under DGHS. The MOHFW is creating linkages among the product catalogue, table of equipment, and master health facility list to reflect the readiness of health facilities to provide the essential service delivery package and to map referral facilities throughout the system. It is envisioned that the system will also link to the MOHFW human resources database to assess facilities' readiness to provide basic health services.

To facilitate the smooth transition of the SCMP from the implementing partner (Management Sciences for Health and USAID's Systems for Improved Access to Pharmaceuticals and Services program) to the MOHFW, a sustainability plan has been developed. The plan stresses the urgent need for transformation of the structure, processes, and people within the MOHFW and its key entities (DGFP, DGHS, and also the Directorate General of Drug Administration) so the ministry can manage and maintain the system effectively. The MOHFW has responded promptly to accelerate the implementation of this plan.

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