WORKING PAPER

Guide to a Team Approach to Building Capacity for Health Information Management

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ABBREVIATIONS

ANC	antenatal care
DHO	district health office
DQA	data quality assessment
DST	district support team
EDP	external development partner
FP	family planning
GIS	geographic information system(s)
HIS	health information system(s)
HIT	health information system improvement team
HR	human resource(s)
ICD	International Classification of Diseases
IS	information system(s)
IT	information technology
MOH	Ministry of Health
MTP	Monitoring, Training, and Planning [method]
MSH	Management Sciences for Health
OPD	outpatient department
PAI	Performance Assessment and Improvement [initiative]
PRISM	Performance of Routine Information Management System
QA	quality assurance
RDQA	routine data quality assurance
SMS	short message service
USAID	United States Agency for International Development
WHO	World Health Organization

DEFINITIONS

Health information system (HIS)

A health information system is composed of subsystems that facilitate the collection, processing, analysis, presentation, and use of health status, service, and resource data from a variety of sources to support policy development and decision making, management of operations, and actions needed to provide effective preventive and curative health services to a defined population.

HIS staff

Personnel whose primary responsibility is to manage and maintain the HIS and its subsystems at defined system levels, and to use or help others to use procedures, tools, data, and information to take appropriate action. Although all healthcare staff are responsible for maintaining and using certain registers, records, and reports, they do so as a function of their service delivery positions and cannot be considered as HIS staff.

HIS capacity: the ability to perform required HIS functions

Systems level: The current state of development and adequacy of the overall HIS and its subsystems as pertaining to data input, analysis, processing, and information product generation, with special reference to the levels of the health system (central, region, district, facility), and to the governance functions and formal mandates that apply to data management at those levels.

Organizational or unit level: The current state of development and adequacy of the HIS, its subsystems, and its documented procedures, including the capacity of staff and unit managers to perform defined HIS functions at each organizational level, in the management of health service delivery resources for optimum performance of service functions and the fulfillment of defined responsibilities.

Individual staff member level: HIS staff, healthcare managers, and service delivery staff have adequate knowledge, skills, and motivation to perform their assigned functions, responsibilities, and tasks, including the management and effective use of the HIS and its data for service delivery and support system management and performance improvement.

HIS performance: the achievement of HIS functions

Systems level: The degree to which the HIS and its subsystems are fulfilling the functions of acquiring and entering the defined data inputs; enabling the analysis of data; processing, presenting, transferring, storing, and retrieving acquired data; and facilitating the generation of routine and ad hoc data and information products.

Organization or unit level: The degree to which a facility, or health office and its network of healthcare facilities, effectively and efficiently manage the HIS and its subsystems to produce the required quality of information for planning at the local, intermediate, and central levels; make management decisions and take corrective actions; and inform policymakers at various levels of plans and actions.

Individual staff member level: The degree to which HIS and service delivery staff fulfill their defined functions related to HIS management and use.

Information cycle

A sequence of activities related to information: data identification, collection, processing, analysis, presentation, interpretation, and use.

Data warehousing

A systematic process for storing and managing a large amount of data of various types, usually from multiple sources, with the capability of generating various types of information using tools included in the system.

Knowledge management

A function that promotes an integrated approach to identifying, capturing, evaluating, retrieving, and sharing all information assets of an enterprise. This may include databases, documents, policies, procedures, and previously uncaptured expertise and experiences of individual workers.[1]

The team approach

Personnel work together to assume and fulfill a unit's HIS responsibilities and build their capacity for carrying out HIS functions, such as data assembly, analysis, service performance assessment, and design and implementation of data and service performance improvement activities. Individual team member responsibilities for ensuring a correctly functioning HIS can and often do overlap. By creating and supporting a team approach with a common objective of a high performing HIS, ownership and reward for achieving results is shared by all in the team, leading to high motivation.

[1] Based on the definition in Koenig, M.E.D. (2012, May 4). What is KM? Knowledge management explained. Retrieved from http://www.kmworld.com/Articles/Editorial/What-Is-.../What-is-KM-Knowledge-Management-Explained-82405.aspx.

INTRODUCTION

There is a widespread problem of staff shortages for health information systems (HIS) at subnational levels in developing countries. No dedicated HIS staff work at these peripheral levels, and few hospital staff and district and regional office personnel are assigned responsibility for collecting, processing, and reporting functions. Health system managers at these levels have always depended on healthcare providers to carry out HIS functions. However, most of them are inadequately trained in information systems (IS). Naturally, healthcare personnel give higher priority to their primary function of managing and providing health services. Therefore, the quality of data captured at service delivery points can deteriorate, and unreliability increases as poor data are aggregated. Policy decisions made based on data of poor quality cannot produce intended health outcomes.

Although health ministries are aware of these shortcomings, they lack the financial and technical resources to create enough positions for specific HIS development and operations. A feasible approach to addressing gaps in HIS functions is to build the HIS capacity of existing staff and mobilize them to take on HIS responsibilities, either solely or as a component of other services. This guide is designed to help health managers and administrators at subnational levels identify staff with potential; build their capacity in the production, management, and use of information for effective action planning and other decision making; and mobilize them to take on HIS responsibilities.

The guide begins with a discussion of the purpose of an HIS, the desired attributes of a fully functional HIS, and how this compares with the HIS of a typical developing country. It then describes how a facility or a health office can effectively manage and use an HIS. Tools and references with illustrative examples are provided in the appendixes.

The *team approach* is a method for mobilizing staff to work together to assume the full HIS responsibilities of a unit and build the unit's capacity while carrying out the HIS functions. The guide recommends that health managers and administrators implement the team approach to close HIS performance gaps created by human resource (HR) and financial constraints, and presents procedures for doing so and for monitoring progress.

This guide builds on HIS-related materials published by the MEASURE Evaluation project (e.g., the Performance of Routine Information System Management [PRISM] and routine data quality assurance [RDQA] tools), other literature, and 30 years of experience working in HIS brought to bear by the consultant for this activity. It has benefited immensely from the experience, knowledge, and feedback of staff at MEASURE Evaluation, which is funded by the United States Agency for International Development (USAID). It also draws on the consultant's interactions with policymakers, healthcare providers, and information system specialists in the Ministry of Health (MOH) of Nepal and with personnel at external development partner (EDP) agencies working in Nepal.

BACKGROUND

Purpose of a Health Information System

The purpose of an HIS is to support the proper delivery of health services to patients. Managers and healthcare providers at all levels need specific information to analyze a health situation, set relevant objectives, and prepare or modify action plans, which they can monitor locally using predefined indicators. This means that an HIS should support activities and processes that generate information, and have managers and staff who know how to use the system. Realizing this, the World Health Organization (WHO) has identified **information and research**[2] as one of the six building blocks of a health system. Health ministries throughout the world maintain HIS, which are composed of subsystems, as they strive to ensure that essential information is available and accessible to all users as needed, on time, and in usable formats.

The success of an HIS is demonstrated not by the number and type of reports produced, but rather by the use of information, when health managers, planners, and service providers act to bring about changes, leading to the improved health status of a population. If information is not used, the purpose of an HIS is defeated, and it becomes merely a cost-incurring entity rather than a value-adding asset.

HIS Capacity in Developing Countries

The success of an HIS depends on balanced capacity in three interrelated areas[3]:

- Technical—system design, procedures, and tools
- Organizational—human and other resources, roles, responsibilities, reporting structures, information culture, leadership, and management
- Behavioral—staff knowledge, skills, attitudes, values, and motivation.

Health ministries in developing countries provide services through established static facilities and community outreach mechanisms, using both public and private providers. Trained staff provide essential health services. In many developing countries, health systems also mobilize large numbers of volunteers to conduct outreach in communities.[4]

In most countries, the HIS and its subsystems have a nationwide network of information nodes, from the periphery to the central level.[5] Healthcare and IS specialists work to keep this network operational. In designing and maintaining the HIS, health ministries also receive support from EDPs. Healthcare staff collect hundreds of data elements using standard formats. The amount and nature of data that are recorded,

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[2] World Health Organization (WHO). (2010). *Monitoring the building blocks of health systems: A handbook of indicators and their measurement strategies.* Geneva, Switzerland: WHO. Retrieved from http://www.who.int/healthinfo/systems/monitoring/en/.

[3] MEASURE Evaluation. (2011*). Performance of routine information management system (PRISM) tools* (ms-11-46d.pdf). Chapel Hill, NC: MEASURE Evaluation, University of North Carolina. Retrieved from https://www.measureevaluation.org/resources/tools/health-information-systems/prism.

[4] For example, Nepal mobilizes more than 50,000 female community health volunteers.

[5] For example, in Nepal there are nearly 4,000 primary healthcare facilities, hundreds of hospitals, 75 districts, five regional offices, and one central HIS office in the nationwide information network.

assembled, and used, along with the calculation of indictors, are determined by a country's HIS system design.[6]

The HIS reporting scheme generally follows the administrative structure of a country. In a typical HIS setting, primary healthcare facilities and hospitals report to district offices, which report to regional offices, which report to the central office. However, with the implementation of web-based computerized HIS systems, this reporting hierarchy is becoming less important because districts and some facilities can directly upload reports to a central HIS server.

Appendix A presents the HIS capacity and performance status of a typical developing country and compares it with a fully functional HIS in the three capacity areas: technical, organizational, and behavioral. Analysis of this matrix shows that the HIS in developing countries are comparatively sound in their technical aspects. It is with the two other determinants, Organizational and Behavioral, that many countries face challenges.

HIS Human Resource Status in Developing Countries

Shortages in HIS staff occur at all levels; they are especially evident at subnational levels.[7] The peripheral level generally has no full-time, trained HIS staff. Healthcare providers collect data in their respective medical areas. Managers usually assign one of them to be responsible for coordinating, preparing, and transmitting reports. These staff are trained to use recording formats and prepare reports, but they frequently lack the capacity to analyze, interpret, and use information to improve health services.

Even where HIS staff are available, their numbers are insufficient. For example, a district health office (DHO) usually has only one specialized HIS position, even if it is responsible for hundreds of healthcare facilities. For a variety of reasons, these positions often remain vacant. Healthcare providers and HIS staff do not adequately coordinate their tasks, most often because of the common misunderstanding that the HIS staff alone are responsible for all HIS activities. Managers find it difficult to change this mindset.

Frequent and unplanned employee transfers severely disrupt the HIS, such as when trained HIS staff are transferred to other ministries and replaced by untrained ones from other ministries. Such practices affect the retention of HIS expertise.

Managers generally find it easier to address technical HIS challenges than to solve problems related to inadequate HR, capacity building, and changing behaviors and mindsets. The simplest solution is to hire more people, train them, and try not to transfer them on an ad hoc basis. However, ministries simply cannot afford to hire more HIS staff for all their peripheral health facilities.[8] In addition, because governments' administrative and HR practices do not change quickly, we can expect frequent staff transfers to continue.

[6] In Nepal, the HIS has approximately 50 forms for collecting and reporting data that calculate 265 indicators.

[7] Subnational level means all offices, hospitals, primary healthcare facilities, and communities below the national level.

[8] In Nepal, the MOH/HR department estimates a financial burden of nearly $500 million over the staff's entire tenure if it were to hire staff for each of the 4,000 plus health facilities.

HIS Management and Operations Responsibilities

Healthcare facilities and health offices at various levels of a health system usually have either implicitly or explicitly defined HIS responsibilities. As is evident in the matrix in Appendix A, which shows the desired attributes and typical performance status of an HIS in the technical, organizational, and behavioral capacity areas, most developing countries need to improve their HIS capacity. This requires that health facilities and offices at all levels clearly define and understand their individual staff and unit HIS responsibilities, and attempt to fulfill them.

Appendix B describes the broad HIS management and operational responsibilities for various levels of the health system. Managers should focus primarily on the responsibilities that are most applicable at their level.

Capacity Required of HIS Human Resources

Adequate numbers of competent personnel are essential to fulfilling HIS responsibilities. Staff at all levels need certain skills, a positive attitude, and a tendency to be proactive.

As health systems and HIS become increasingly complex, HR needs for operating and maintaining them are growing. More computers are now used in HIS operations than ever before. Mobile phones with clearer voice, text, and rapid data transfer capability have become more affordable. They are increasingly used in HIS for recording and communicating reports (especially for surveillance systems), the management of commodities, and for community-level service delivery. This trend is expected to accelerate in the near future. Therefore, improved organizational and systems management and leadership skills will be needed for better planning and management.

Staff engaged in HIS activities require capacity in four areas:

1. Leadership and management
2. Data recording, processing, analysis, and presentation
3. Interpretation and use
4. Use of information technology (IT) and mobile technology

Managers at each level of the health system need to ensure that their health facilities and offices have adequate capacity to fulfill HIS responsibilities. Appendix C provides a self-assessment tool that may be used to evaluate HIS capacity and identify areas needing improvement. (Application of this tool is further discussed below.)

Strengths and Opportunities

Although HIS in all countries need constant improvement, they are more or less functional. Although it is not the best indicator of HIS performance, the reporting rate is quite high in some countries.[9] This demonstrates

[9] For example, Nepal's Health Facility Survey 2015 shows the national reporting rate to be higher than 94 percent. Source: Ministry of Health, Nepal; New ERA, Nepal; Nepal Health Sector Support Program (NHSSP); and ICF. (2017). Nepal Health Facility Survey 2015. Kathmandu, Nepal: Ministry of Health, Nepal. Retrieved from https://dhsprogram.com/pubs/pdf/SPA24/SPA24.pdf

some degree of functionality and provides opportunities to generate new ideas and implement interventions built on a strength.

The following are some positive aspects that managers may consider when devising strategies to improve HIS performance, even under HR constraints.

- Other facility staff can supplement or assist HIS staff for selected tasks.
- The chances of finding one or more data-oriented employees at a health office or facility are very high.[10]
- The service workload at peripheral facilities is usually lower than more centralized facilities, allowing healthcare staff to take on more HIS responsibilities.
- Health facilities usually have several service providers and community workers attached to them who have a deep understanding of the community and its health information needs.
- EDPs are concerned about the lack of health data and the failure of staff/managers to use data, and are eager to help improve the situation.
- Almost all health offices and service delivery facilities, including many at the peripheral level, are connected to the Internet, and are increasingly using computers and mobile technology. Service delivery staff are generally attracted to the opportunity to work with new technology and see it as a means to further their careers.[11]
- Peripheral-level facilities often have direct access to analyzed information from the central HIS server. They can also access their facility's performance indicators and compare themselves with other facilities.
- Ministries are trying to improve the use of information at all levels. Health ministries are increasingly implementing information-intensive programs, such as performance-based financing and health insurance schemes, which continually use service data, thereby creating an information culture.

The Challenge

HIS performance at subnational levels in developing countries is usually poor. While several factors are responsible for this situation, managers find that HR and governance issues are the most difficult to resolve. There are usually very few full-time HIS staff at the regional and district levels, and there are no HIS staff at the peripheral level. Therefore, managers have always depended on healthcare providers, who usually lack the required HIS capacity, to take on HIS responsibilities. An inability to hire additional staff just for HIS functions, and the common practice of frequent staff transfers, complicate the issue. It is challenging for managers at subnational levels to close HIS performance gaps when working under these constraints.

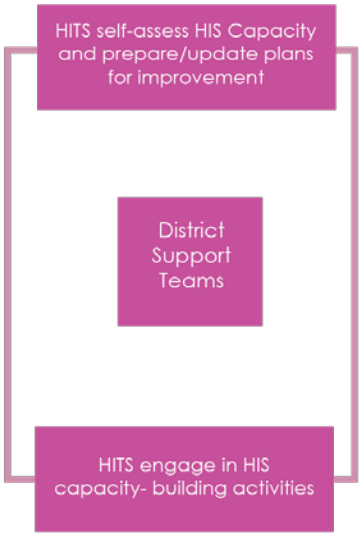
[10] During consultant field visits in Nepal, many data-oriented staff with outstanding interest and capacity were found.

[11] In Nepal, healthcare staff who were primarily working in HIS said that IT had been the main motivation for them to take on HIS responsibilities.

THE TEAM APPROACH AS A SOLUTION TO HEALTH INFORMATION SYSTEM PERFORMANCE GAPS

Some managers successfully address HIS performance gaps despite shortages of human and other resources. This is demonstrated by the fact that some health facilities perform remarkably better than others operating under similar conditions, suggesting that a workable solution can be built on existing strengths in the system, instead of waiting for an opportunity to hire more people.

Figure 1. Team hierarchy 1



A team approach aims to enable managers at subnational levels to improve HIS performance with existing personnel. They can achieve this by identifying and mobilizing appropriate staff to work as a team; enhancing the team's performance through the application of effective capacity-building techniques; and engaging the team to take on expanded responsibilities for HIS management and information use for the benefit of the health system and its services.

What Is the Team Approach?

The team approach is a mechanism for bringing HIS and healthcare staff together to work on HIS-related tasks. The teams that are formed have specific functions to support improvements in HIS capacity and the achievement of HIS performance objectives at their levels.

Figure 1 shows the team structure. In the center of the figure—at a hospital or primary healthcare facility—is the *HIS improvement team* (HIT). The HIT consists of managers or HIS staff (if available), healthcare staff, and community workers. The HIT leads the implementation of activities to improve HIS capacity and achieve the facility or unit's HIS objectives.

At the district level is the *district support team* (DST). The DST consists of a district manager, HIS and selected healthcare staff, and supervisors. The DST has two responsibilities: 1) to provide technical support to all HITs in the district; and 2) to improve the capacity of the DHO to achieve the district's HIS objectives.

Figure 2. Team approach activity cycle 1

Concerned staff at the central or regional level, working either individually or as a team, provide support to all DSTs in the region to achieve regional and national HIS objectives.The HIT implements activities to improve the unit's HIS capacity and performance. Figure 2 illustrates that HITs undertake two sets of distinct, but interrelated activities, with support from DSTs, and in a continuous sequence. An overview of this activity cycle follows. Detailed guidelines on the self-assessment and resulting capacity-building activities are provided in the next section.

Why Use a Team Approach?

Assigning HIS responsibilities to a team reduces a facility's vulnerability to staff shortages, inadequate capacity, or frequent employee transfers, and lessens overdependence on specific people by making HIS management more system- and organization-oriented. In addition, the team approach:

- Promotes team spirit; allows all team members to contribute, learn, and lead; replaces the common practice of working in isolation; and reinforces the belief that a team can produce more than the sum of individual staff.
- Enables staff to go beyond simple data collection and reporting to assess the local situation, and recognize and act on emerging service improvement priorities.
- Empowers staff to demand more data for local use and to drop whatever is not relevant.
- Improves knowledge management by increasing the possibility of retaining learning in the team.
- Facilitates the use of appropriate IT because team members learn from each other.
- Helps with planning data capture, management, and use.
- Builds leadership and management capacity of staff members, helping them to better communicate and collaborate in their teams, ask for evidence, and be more proactive in taking action.
- Helps all staff recognize and internalize their strengths and challenges.
- Improves the quality of work by creating positive peer competition.

Self-Assessment of HIS Capacity, Performance of the Team, and Planning for Improvement

The launch the HIS improvement process, a self-assessment helps an HIT obtain a general understanding of the requirements for a functional national HIS and recognize the areas that need improvement at their level. The team explores the roles and responsibilities needed for a functional HIS and for a stronger national HIS.

Using appropriate reference materials, procedures, standards, and tools, HITs assess their performance in fulfilling their HIS responsibilities; identify performance gaps; and prepare an HIS performance improvement plan to close those gaps.

Engaging in HIS Performance Improvement Activities

Using their HIS performance improvement plan as a blueprint, the HITs meet regularly. The objective is for team members to jointly engage in selected HIS activities, and to seize opportunities to learn from each other. The HITs can also use other approaches to learn about HIS operations and management, such as sharing information, coaching, teaching, organizing exchange visits, attending meetings, and taking short courses.

The improvement process is a self-driven approach, whereby the HITs meet regularly to implement initiatives at their level, with on-call technical support from the DST, as shown in Figure 2. The HITs are permanent, but their membership may change. It should be easy to add new team members; however, all team members should not change at the same time, for the sake of retaining the team's knowledge.

Self-assessment, planning, and building capacity to improve HIS performance repeat in a cycle as the teams learn to mobilize available resources and to incrementally improve the production, management, and use of information to improve the quality of health services and programs, and their responsiveness to local needs

and demands. The team approach described here differs from traditional training methods, in which participants gather outside the workplace to attend conventional lectures. Instead, the team approach features learning-by-doing meetings held locally—ideally at the team members' place of work. This continuous performance improvement approach to capacity building through interactions or meetings designed and paced by the learners themselves is more likely to have a sustainable effect.

The approach draws from the experiences of Management Sciences for Health (MSH) applying the Monitoring, Training, and Planning (MTP) method[12] and the Performance Assessment and Improvement (PAI)[13] initiative in many countries.

Where and How to Implement the Team Approach

HITs are the frontline implementers at the health office or facility level. In those regions or districts that have been selected for the implementation of the team approach, managers at all levels have specific responsibilities for supporting the process. The central level reviews, adapts, approves, initiates, and monitors the approach at the national level. Similarly, regional and district offices communicate, inspire, and motivate facilities and health offices to implement the team approach, and provide necessary technical or other support. DSTs work directly with the HITs in the district to plan and schedule technical support.

When and How Often the Team Meets

It is up to each HIT to decide when and how often to meet. Scheduling a meeting at the time that monthly reports are prepared may be the most effective because the HIT will have data for the current month and an opportunity to analyze them together. The team could also meet when a district or program supervisor visits the facility or health office. All planned activities may not be able to be addressed during one meeting because it is often difficult for team members to take much time away from their other duties. DSTs can meet when there is a need to discuss the support requested by the HITs.

[12]Rational Pharmaceutical Management Plus Program. (2009). *A guide for implementing the monitoring-training-planning (MTP) approach to build skills for pharmaceutical management.* Arlington, VA, USA: Management Sciences for Health. Retrieved from https://www.msh.org/sites/msh.org/files/mtp-tool-for-pharma-mgmt.pdf.

[13] Sapirie, S. (2015). The experience of district team problem-solving (DTPS) and team service performance assessment and improvement (PAI). Medford, MA, USA: Management Sciences for Health.

GUIDELINES FOR IMPLEMENTING THE TEAM APPROACH

Purpose, Scope, and Intended Users

The primary purpose of this guide, and the team approach that it espouses, is to identify service delivery staff who would like to assume more responsibility for managing, using, and improving the HIS, and to build their individual and their unit's skills to carry out defined HIS functions. In this way, managers can improve HIS performance even though they may lack full-time HIS staff.

This guide describes the specific steps under two categories: *support* and *implementation.*

Support Activities

Responsibility for initiating and sustaining the support activities lies with supervisory-level management at various levels of the health system. The central HIS office is ultimately responsible for ensuring the uniformity of the approach, providing resources, and monitoring HIS performance improvement across the country. The regions and districts are responsible for creating a mechanism to support and monitor those offices and facilities under their supervision that intend to implement HIS improvement initiatives using the team approach. The recommended support steps follow.

Step S-1: Review, Adapt, and Approve Implementation

Review

Appendix A (HIS Capacity and Performance Status in Developing Countries) presents the desired technical, organizational, and behavioral attributes of a functional HIS. Using this information, central-level HIS management should confer with regional and selected district managers to understand the overall HIS capacity in the country, particularly the staffing situation at subnational levels. This appendix also compares the typical HIS capacity and performance status in developing countries with the desired status.

For example, as shown in Appendix A, one of the desired attributes of a functional HIS is: "HIS planning is participatory and involves several levels of the health system," whereas the actual situation in a typical developing country is described as: "HIS planning is mostly top-down. Subnational levels are often not involved in the development of procedures." This comparison helps health managers understand the gap, if any, and the importance of participatory planning, and to introduce desired practices, if they are not already in place.

Similarly, central-level HIS management should review Appendix B (Broad HIS Responsibilities), which lists the general HIS responsibilities of health offices and facilities across all levels of the health system. The matrix shows at which level(s) a responsibility is most applicable. For example, the responsibility to "Define essential (core) set of data elements and indicators" is usually applicable at the central level only, whereas "Present information in easy to understand visually appealing formats (e.g., tables, graphs, and maps)" is applicable at all levels. It should be noted that responsibility requirements may vary from country to country.

Central-level management should then review Appendix C (HIS Capacity Self-Assessment Tool), which facilitates a unit's self-assessment through discussion of predefined questions during HIT meetings. Participating HITs can also use this matrix to generate ideas to plan improvements, as necessary.

Adapt

This guide assumes that most developing countries have similar HIS attributes, structures, functions, and challenges. The main initiators of the HIS improvement process can adapt all or selected tools, procedures, and references to suit whatever local differences may exist.

One adaptation might be to tailor Appendix B (Broad HIS Responsibilities) to the country's central, regional, and district offices; hospitals; and primary healthcare facilities by selecting their responsibilities from the general list, translating them into the national language, and printing them separately for each level.

Approve

If during this review process, the central level of HIS management recognizes that gaps exist in HIS capacity and performance, wants to address them, and is convinced of the effectiveness of the team approach in the local context, it should approve implementation of the improvement initiative and inform all regions and districts. It is important that the central level ensure that no other initiatives with similar objectives are underway to avoid duplication of effort. It should also identify those regions and districts that are most interested in and capable of providing the support that is needed for effective implementation at the unit level.

Step S-2: Formulate an Implementation Strategy

Countries should formulate the implementation strategy at the central level according to what appears to fit the local situation best. However, there may be advantages to granting the district and facility levels considerable flexibility and control over the process. The following are approaches that central-level HIS management should consider:

1. Let the HITs design and lead implementation themselves, under close supervision and with the support of respective DSTs, and possibly with assistance from EDPs and projects working at that level.
2. Plan for nationwide implementation to be managed by regional and district offices in a phased manner.
3. Select regions and districts where the need is greatest, and let them decide whether to ask all or some of the facilities to participate.

The central level should then announce the strategy through its regional and district offices.

Step S-3: Establish District Support Teams and Build Their Capacity

Depending on the national implementation strategy, the concerned districts should do the following:

Establish DSTs

If the national strategy is that all districts in a given region will implement the team approach, for example, and your district is in this region, you need to establish a DST. The DST will have an HIS staff member as the team leader and selected healthcare staff. The former will primarily provide support in assessing and building IS skills, and the latter will support the interpretation of results and the use of data for service delivery planning. It is recommended that DST members be limited to five. (If more staff are interested, the opportunity can be offered on a rotating basis.)

Build the DSTs' Capacity

The primary objective of the DST is to provide technical support to all service delivery facilities implementing HIS improvements in the district. Note that the DST is also the HIT for the district office. It is therefore essential that the DST develops its expertise in implementing the team approach before it starts to support the HITs. All DST members should study this guide.

In addition to providing technical support to the HITs, the DST should inspire, motivate, and encourage them to implement the team approach to identify gaps in HIS capacity and to plan activities to address those gaps, ideally without additional HR and with limited support from higher levels. The rationale is that the solutions most frequently proposed to identified problems usually start with a specific need and end with a request for additional resources. This is problematic for two reasons: 1) it makes change dependent on resources, which may or may not be available; and 2) it tends to disempower rather than empower teams to take charge of their problems and find local, sustainable ways of address them. The DST should be ready to provide support by sending one of its members to participate in HIT meetings, especially in the beginning of the improvement process. DSTs need to create a communication process and scheduling mechanism to ensure that participating HITs receive proper, timely support.

The DSTs should also prepare standard briefing/teaching materials (e.g., PowerPoint presentations, posters, handouts) for use at the HIT meetings.

Step S-4 Establish the HITs

To implement the national HIS improvement strategy at the local level, primary care facilities and hospitals should do the following:

Each primary care facility should establish an HIT, consisting of the facility manager, one representative from each health service area (e.g., family planning/maternal and child health [FP/MCH], tuberculosis, leprosy, laboratory, pharmacy, in-patient department, outpatient department [OPD]), and a community worker.

In hospitals, the team should consist of HIS staff members and representatives from selected health service areas.

Use the following criteria to select team members:

- Level of interest, availability, and commitment to work on the HIS
- Skill with manual and/or computer- or mobile-based tools
- Ability to work on a team and interest in doing so
- Belief in the benefits of sharing information

- Interest and capacity to learn new data use and supporting technology
- Possible inclination to pursue a career in HIS

Teams should be gender-balanced and limited in size to four or five members because managing larger teams is more difficult.

Should more than one qualified person from the same health service area be interested in joining the team, rotating participation may be a good strategy for sustainability because it will build staff capacity over time.

An HIS or service delivery staff member with HIS responsibilities should lead the team, at least initially. If no HIS personnel are available, as is the case at primary care facilities, the facility manager or a senior service delivery staff member should lead the HIT, and determined by team consensus. Rotating leadership is an effective way to ensure continuity of teamwork in the event of an unexpected personnel transfer, which is common. It is very important to consider gender diversity when selecting the team leader.

Step S-5: Train HITs and Develop an Implementation Support Schedule

Orient HITs

The DST should assemble all or most of the facility-level HITs for a one-day workshop at which the participating teams achieve the following through discussion and hands-on exercises:

- Understand the purpose of the HIS and its subsystems, and how it can improve the provision of effective health services. (The background information provided in this guide may be used as a resource material.)
- Understand the structure and functioning of the HIS from the central to the community level. (Use the background information provided in this guide.)
- Understand the attributes of a functional HIS and the known gaps in the HIS in the country, if any. (Use the results of the review of Appendix A described in Step S-1.)
- Understand the HIS responsibilities applicable to each level. (Use the results of the review of Appendix B.)
- Develop skills and practice the assessment of HIS capacity and the HIS performance of the units, identify gaps, and devise possible solutions. (Use the results of the application of the self-assessment tool given in Appendix C.)

It may be necessary to conduct more than one workshop if there are more than 30 participants. DST facilitators should use teaching materials prepared in advance (e.g., PowerPoints, practice exercises, handouts). If necessary, the DST can invite HIS and/or health experts from the region and/or the central level to participate in the orientation workshop.

Develop an Implementation Schedule

The DST and participating HITs should agree on dates for an implementation schedule. One copy of this plan should remain with the DST. The plan should help the DST assign staff to support and monitor the schedule's implementation. HITs will require at least one DST member to be present at their first few monthly meetings.

Step S-6: Monitoring and Support from District and Regional Offices

DSTs should closely monitor the initiation and completion of planned interventions to strengthen the functioning of the HIS and improvements in the quality of the units' reports; express appreciation for positive changes and other successful actions; and offer support. DSTs or regional staff can monitor the work and progress of the HITs through periodic meetings, supervision visits, and attendance at HIT meetings. DSTs should encourage HITs to present their accomplishments at review meetings. Such meeting are an effective strategy for exchanging ideas and lessons learned with other participating units.

Step S-7: Central Office Review and Sharing of Successful Approaches

National HIS management should ask regional/district offices to identify offices/facilities that have improved their HIS capacity and to recognize them with letters of appreciation. If there is credible evidence of success, it should encourage the team approach to gradually expand nationwide. Central HIS management should disseminate success stories through the MOH website, newsletters, and presentations at review meetings and other such occasions. This can be a positive, nonmonetary incentive for teams to be asked to change their way of doing things.

Implementation Activities

Regardless of the implementation strategy adopted by a country, units should lead the initiative from their own level. The activities recommended here are applicable to any subnational-level unit that plans to implement the team approach to HIS improvement. The director of the unit is responsible for all activities.

Step I-1: Conduct an Introductory HIT Meeting

The objectives of this meeting are to formalize the team; agree on the principles of teamwork; and develop a common understanding of how the team approach will help build individual and unit HIS capacity and contribute to the functioning of the national HIS.

The HIT should consider the following general principles for working in teams, and for planning and conducting successful meetings:

- Circulate the agenda and relevant reference materials, if any, well ahead of the meeting. For example, attach a copy of this guide with the agenda for the introductory meeting and ask team members to read it beforehand.
- Start and end meetings on time.
- Disregard rank and treat all participants as peers.
- Give each HIT member a chance to state his or her views.
- Make decisions by consensus. If that is not possible, let the team leader make the final decision.
- Do not take silence as agreement or consensus. Probe for HIT members' views.
- Respect the ideas of all participants, regardless of gender, ethnicity, or religious background.
- Focus on *what* is right, not *who* is right, to avoid circular discussions.
- Take critical views as input for improvement.
- Give credit for contributions.

- Promote the notion that no views are wrong, only different.
- Record the proceedings and decisions, preferably using a standard format.

The team leader facilitates the following agenda, with technical support from the DST member(s). It is expected that all team members will have read this guide before the introductory meeting. Allow two hours for this first meeting.

1. Formally announce the team and how it was formed (Step S-4), and ask everyone to commit to participating in a positive manner.
2. Explain the purpose of the HIS improvement initiative and how it can enhance the HIS capacity of the unit and of the national HIS.
3. Present the principles for working in teams and conducting meetings (described above), and agree on them.
4. Ask team members to share their learning from reading this guide.
5. Prepare a calendar for monthly meetings (Step I-2) for one year. Meeting dates will differ for various levels, and some meetings may be held jointly among a group of facilities, hosted by the DST. For primary health facilities and district hospitals, the meetings should occur on the day that monthly reports are prepared. At the district office, the meetings should occur one week after all reports have been uploaded to the HIS server or the hard copies of monthly reports have been received. This will give the DST time to analyze the data and share the results at the meeting.

Step I-2: Conduct Monthly Meetings to Implement the Team Approach

Conduct HIT meetings every month on an agreed date. These meetings provide opportunities to explore and identify talent in the team and to follow up on its activities. For example, one staff member may be good with computers and plotting graphs, while others are good at data validation, or at using spreadsheets to calculate descriptive statistics (mean, mode, etc.). It is helpful to document the expertise of each team member. The team leader can mobilize these diverse resources to train other members while the team works on planned improvement activities. If one or more required types of expertise are missing from the team, the team leader can ask for help from the DST. Because DST support may not always be available at the time of the monthly meeting, the team leader should consider using the telephone, email, or Skype to access support. For example, the team can plot a line graph, analyze the trend of an indicator, and email it to the DST for feedback.

Plan each meeting for no more than two hours. Please note that it may take several meetings to build HIS capacity in just one area. Because team members may change over time, it is highly likely that some activities will have to be continued or repeated. All meetings should be seen as learning opportunities. The team leader should ensure that new team members catch up quickly by organizing special coaching sessions.

The team leader should also ensure that at least one member of the DST is present for several of the initial monthly meetings, not as the convener but as a supporter. The DST member can help the team leader conduct the meeting and provide technical support, if required. The team leader facilitates the two primary activities of the HIT described below.

Self-Assess HIS Capacity/Performance and Prepare/Update a Plan for Improvement

As described in Figure 2, the HIT develops an HIS performance improvement plan and updates the plan periodically according to progress made toward expected results. (Skip this activity at the first meeting because there will not yet be an improvement plan.)

If you have no plan, or your previously planned improvement objectives have been achieved, use the HIS Capacity Self-Assessment Tool (Appendix C) to select one or two capacity areas and assess the team's HIS capacity in them. Record your findings. Discuss the answers to the questions in the left-hand column and what can be done to close the identified gaps, if any. Also discuss what resources the team has and whether any support is required from the DST or elsewhere. An example from a HIS self-assessment follows.

At the monthly HIT meeting of a health facility held on August 25, 2016, the team selected the capacity area *Prepare basic graphs (line, pie, etc.) and/or make/update community map to reflect service coverage* from the HIS Capacity Self-Assessment Tool; assessed the current situation; and recorded its findings. The facility wanted to regularly prepare graphs for indicators to monitor trends, but it lacked the skills to do so. Following some deliberations, the team learned that one of its members knew how to prepare graphs using Excel. This team member volunteered to teach others. Similarly, the team decided to prepare community maps and plot immunization coverage. For this, it needed support from the DST (Figure 3).

Figure 3. Sample HIS capacity self-assessment

HIS Capacity Self-Assessment Tool	
Name of the Health Facility: *XYZ Primary Health Facility* **Date of Assessment: August 25, 2016**	
Capacity Area	**Findings of the Assessment**
Data recording, processing, analysis, and presentation	
Prepare basic graphs (line, pie, etc.) and/or make/update community map to reflect service coverage • Do we prepare graphs using the data collected by the facility manually or using computers? • Do we prepare and use community maps to monitor service coverage?	• Never prepared any graphs, either manually or with computers • Not all team members can prepare graphs • One member can use Excel to prepare graphs • The facility has a computer • Do not have a map defining the catchment area • Need assistance with calculating immunization coverage

Based on the HIS capacity self-assessment, an action plan was prepared to address identified gaps (Figure 4).

Figure 4. Sample HIS performance improvement plan

HIS Performance Improvement Plan XYZ Primary Health Facility					
SN	**Expected results**	**Activity**	**Expected completion date**	**Responsible / Resource**	**Current Status**
1	All HIT members will be able to use Excel to prepare types of graphs	HIT team member conducts training in Excel on Fridays from 2-4 PM	Dec 2016	Responsible: team leader Resource: team member who knows Excel	Completed
2	Map of facility's catchment area will be prepared, and immunization coverage will be plotted by village wards on a quarterly basis	a. Manually prepare a map of the village, demarcated by wards b. Calculate immunization coverage for each of the wards and plot on the map c. Update the map every quarter	Feb 2017	Responsible: team leader Resource: team leader for preparing the map Seek DST support on calculating ward-wide immunization coverage	In progress

The performance improvement plan is a dynamic document; it should be updated as results are achieved and when areas of improvement are added.

Engage in HIS Capacity-Building Activities

The objective of these activities is to build the HIT's HIS capacity while developing useful procedures and products and, thereby, simultaneously improving HIS performance. Some capacity-building activities are done at the HIT meeting itself, while others are conducted outside the monthly meeting. For example, in the sample improvement plan above, Excel training takes place every Friday.

- The team approach employs a "learning-by-doing" strategy, requiring all team members to collaborate on a certain task. For example, HIT members can work together to prepare monthly reports, and analyze, present, and interpret the data. One team member can validate the data while others consolidate them. Another member can update the trend graph. The team leader can then open discussion on how the facility performed during the month, whether anything needs immediate attention, and whether the facility needs to shift priorities or address performance gaps. For example,

if the facility diagnosed an unexpected number of malaria cases during the month, what actions should it take to prevent the spread of the vector and find and treat new cases? The team members should use available tools to process, present, and analyze information, and to make recommendations for an effective response by the health facility. This exercise builds the team's capacity to use information in planning how to better serve its catchment population. Some actions can be taken locally, while others may require assistance from the district. For example, you might want the district to send more rapid diagnostic tests for malaria diagnosis and more antimalarial medicine to treat new malaria cases. Appendix D provides a template for recording the minutes of the monthly HIT meeting. This document can serve as the basis for requesting more resources, recommending a shift in priorities or an adjustment in service delivery strategies, and requesting technical support from the DST. The team leader should ensure the proper documentation and filing of the meeting minutes.

- The team can conduct many other activities to improve HIS capacity on its own or with the DST's help. It can choose one or more of the activities listed below, as appropriate. As capacity is developed over time, the HIT can take an incremental learning approach and set the pace accordingly.
    - **Share knowledge and/or skills related to HIS:** Team members can volunteer to share something they recently learned that is relevant to other team members, such as:
        - Learning from a recently attended course. For example, a team member who attended a course on the logistic management information system could make a short presentation on how it can help the facility reduce stockouts of essential medicines or how to calculate the average monthly consumption of medicines.
        - New tools and techniques. For example, the team leader could ask team members to study tools, such as PRISM, RDQA,[14] the 5 Whys technique,[15] etc., and then present on them.
    - **Conduct training:** Mobilize competent HIT/DST team members to facilitate and teach specific tools and methods. For example, a skilled team member could organize training on a specific topic (e.g., Excel, using mobile phones to send/receive short message service [SMS], using the 5 Whys technique to identify the root causes of a problem). The team could organize training during monthly meetings or at other times. The training could occur over a period of several weeks or months. Please note that training is only effective if it is interactive, and includes practical exercises and hands-on practice sessions.
    - **Invite guest speakers:** Invite people with HIS expertise from a nearby health facility, district, or other organizations to share their experiences.
    - **Use HIS training opportunities to learn:** When a training is organized by HIS management at the district, regional, or central level, or by third parties, make sure that at least one team member attends. The team can be proactive in asking to participate in a training if it is not invited. Also, when appropriate, seek help from EDPs or other stakeholders at the local level in matters related to IS.

[14] MEASURE Evaluation. n.d. Tools. Retrieved from https://www.measureevaluation.org/resources/tools.

[15] Galer, J., Vriesendorp, S., & Ellis, A. (2005). *Managers who lead*. Cambridge, MA: Management Sciences for Health. Retrieved from https://www.msh.org/sites/msh.org/files/mwl-2008-edition.pdf.

- **Participate in monthly meetings of other offices/facilities:** Encourage one or more members of the team to attend monthly meetings of other facilities that are implementing the team approach. Share your knowledge and/or skills with other offices/facilities, if requested.
- **Take online courses**[16] related to HIS, as a team or individually.
- **Use supervision visits as learning opportunities** by asking for feedback and discussing HIS areas about which you are unclear.
- **Participate in reviews and other meetings** and use them as an opportunity to present your facility's status, with evidence.

Step I-3: Continue to Conduct Monthly Meetings

Continue monthly meetings as described in Step I-2, and obtain feedback from the district or regional level as described in Step S-6. Continue to update your improvement plan and to document and share your results.

[16] Global Health eLearning Center. n.d. Retrieved from https://www.globalhealthlearning.org/courses.

CONCLUSION

The health ministries in developing countries have a common problem—enhancing and maintaining HIS in HR-constrained settings. Managers are usually aware of the shortcomings, but continue to operate suboptimal systems rather than to identify existing strengths and build on them. Adding new personnel is often not possible. The best solution is to: 1) draw on the interest and expertise of existing service delivery staff who already have some experience and expertise in data management; and 2) have them work in organized teams to increase their HIS capacity while solving HIS-related problems.

This learning-by-doing strategy builds HIS capacity and improves performance. It identifies what to learn, how to learn, and whether learning has increased, and involves exploring opportunities and resources rather than waiting for higher levels to send help. The HITs, which are learning and problem-solving teams, are proactive in seeking technical support from staff at higher levels and from other sources (e.g., EDPs).

The successful operation of an HIS and its subsystems depends on the effective use of information at all levels of the health system. Experience shows that expanding the use of information tends to improve its quality. In fact, unless it is used, one cannot ascertain the quality of one's data. For that matter, why should anyone be concerned about the quality of data that are *not* used? This guide therefore has as its central theme the *use of information* to plan for service improvement actions. It provides staff an opportunity to expand their HIS management capacity and improve the quality of their data.

APPENDIX A. HIS CAPACITY AND PERFORMANCE STATUS IN DEVELOPING COUNTRIES

The information presented here is useful for all staff, in general, and for HIS staff in particular, in their efforts to improve the functioning of the HIS. Staff can use this resource to get a broad sense of the gaps in their country's HIS and what might be done to close the gaps. It is important to note that this table does not contain all the desired attributes of a fully functional HIS. DSTs and HITs should use HIS assessment tools, such as PRISM (https://www.measureevaluation.org/our-work/routine-health-information-systems/performance-of-routine-information-system-management-prism?searchterm=prism) and RDQA (https://www.measureevaluation.org/our-work/routine-health-information-systems/rdqa-landing-page?searchterm=rdqa), developed by MEASURE Evaluation, to conduct a more detailed assessment of HIS functioning at a specific level.

Desired Attributes	Typical Status in Developing Countries
Technical Determinant (system design, procedures, and tools)	
• Current versions of well-defined national health data elements and indicators are documented and available.	• Normally available, but may not have been reviewed and updated recently.
• Current versions of data collection, processing, and reporting procedures and formats are available, preferably in digital format.	• Available mainly in paper-based formats, and may not have been reviewed and updated recently.
• The mechanism for change management is efficient. For example, if a data collection format changes, all facilities across the country get the new format and instructions before its first use.	• Change is usually unplanned and implemented inefficiently. Facilities sometimes use various versions of forms and procedures.
• A mechanism exists, either as part of a report or as a separate note, for reporting results of data analysis, interpretation, and use on a regular basis.	• Only data are reported; no mechanism exists for reporting the results of their analysis, interpretation, and use. Facilities sometimes make presentations using data during review meetings, but usually without discussing use.
• Standard tools and documented procedures promote the analysis and use of information at every level, but the recording level is the most important.	• Some tools and procedures are available to facilitate data analysis and use.[17]
• Instruction manuals exist for the use of forms, and for preparing and transmitting routine and other reports (e.g., surveillance).	• Some instruction manuals are normally available, but they are often out of date, and frequently stress reporting over using information to take local action.
• Each level has a comprehensive training manual for the operation and use of various elements and subsystems of the HIS.	• User manuals are normally available as training reference materials, but comprehensive training manuals are rare.

[17] For example, Nepal has a worksheet for "Data aggregation and monthly monitoring" for use at the facility level and "Guidelines for Data Analysis and Use for District Programs."

Desired Attributes	Typical Status in Developing Countries
• A combination of training and other capacity-building activities, covering all phases of the information cycle, are used to build the HIS capacity of staff.	• Basic HIS training is sometimes provided to all staff members. Training focuses mainly on how to fill out forms and prepare reports, and usually does not include analysis, presentation, interpretation, and use of information, especially at the peripheral level. • Capacity-building activities, such as peer learning, self-assessment, and coaching are rare.
• Data quality standards exist, and local staff members are empowered to assess quality at all stages of the information cycle using standardized quality assurance (QA) tools.	• Data quality standards and assessment processes are rarely available at the peripheral level. QA training is usually reserved for supervisory staff; local staff members normally lack QA skills.
• Appropriate and functional computer hardware/ software networked to the facility level are available.	• HIS software is normally available to support computer use. It is either developed in-house or uses open-source platforms, such as DHIS 2.[18] Computers are usually available at the district level and above only because of the lack of skills and electricity at lower levels. MOHs are increasingly placing computers in peripheral-level service delivery facilities.
• Modern mobile communications technology is used well in support of critical nationwide health system communications.	• Availability is limited, but increasing, and usually in an unplanned manner. • Mobile solutions are usually implemented by specific projects or only in certain facilities and are rarely scaled up nationally.
• Mechanisms for data and information warehousing and knowledge management are in place.	• Such mechanisms are rarely fully developed and functional. Initiatives are often focused more on the promise of the technology than on addressing actual pre-identified needs and uses.
Organizational Determinant (human and other resources, roles, responsibilities, reporting structures, information culture, leadership, management)	
• There is a documented policy on confidentiality, privacy, and security of personal health data.	• Usually, no policy is available, except at some hospitals.
• Adequately trained personnel are available at all levels to fulfill HIS responsibilities.	• There are no dedicated/trained HIS staff at peripheral levels. Healthcare staff, who may be inadequately trained, collect and process data in their respective health service areas. Managers normally assign[19] one of them to be responsible for coordinating, preparing, and transmitting reports. • Dedicated/trained HIS staff are available at district/regional offices and in hospitals, but their numbers are generally insufficient.[20] Healthcare personnel take responsibility for data collection and processing in their respective areas. • HIS staff are generally available, although not always adequate at the central level.
• All HIS staff members have written HIS roles and responsibilities.	• Written roles and responsibilities are rarely provided to HIS staff members.
• Written feedback is regularly provided to reporting offices/facilities.	• Generally, the higher levels of the system do not provide regular written feedback on reports.

[18] In Nepal, the MOH is using custom-built software, but is close to the final stage of shifting to the DHIS 2 platform.

[19] In Nepal, the MOH has instructed all health facilities that do not have IS staff to formally designate a healthcare staff member to take the lead on HIS.

[20] For example, in Nepal, the district, which manages hundreds of facilities, has only one IS staff member. Similarly, even busy hospitals and regional offices have only one dedicated IS employee.

Desired Attributes	Typical Status in Developing Countries
• Regular supportive supervision is conducted and feedback is provided.	• Because the budget determines the frequency of supervisory visits, their regularity cannot be assured. • Usually both verbal and written (checklists) feedback is provided during visits, when they occur.[21]
• Review meetings are conducted regularly.	• Review meetings (e.g., quarterly/annual) are planned, but budgetary constraints sometimes prevent them from occurring.
• Effective coordination exists between HIS and service delivery staff. HIS and healthcare staff work in teams to complement and supplement each other's expertise.	• Effective coordination is generally lacking between HIS and healthcare staff. Service delivery staff believe that any HIS staff who are available have sole responsibility for HIS, and that they themselves have only to submit the data collected from their respective service delivery areas. Meanwhile, HIS staff think that their job is done once they have prepared and transmitted reports.
• The MOH formulates, promulgates, and enforces HR policies and procedures to ensure the uninterrupted availability of HR support for the HIS at all levels.	• Ministries frequently transfer staff in an ad hoc manner, severely disrupting services. The problem is further compounded when trained HIS staff are transferred between ministries.[22]
• Proactive managers at all levels use data for planning and managing services and for taking action, thereby promoting an information culture.	• Managers, especially at peripheral levels, concentrate on routine service tasks that frequently do not involve the use of data. Decisions are often made based on feelings or best guesses, even when they would be well served by using available data.
• HIS planning is participatory and involves several levels of the health system.	• HIS planning is mostly top-down. Subnational levels are often not involved in the development of procedures.
• Adequate physical resources (e.g., recording registers, report formats, tally sheets, calculators, computers) needed for HIS operations and maintenance are available.	• Few facilities have adequate resources, and sometimes their resources go unused. For example, some facilities that have computers lack the skills to use them.
• Managers at all levels conduct routine meetings to review managerial or administrative matters related to HIS.	• Meetings are conducted, but HIS issues rarely get appropriate attention at subnational levels.
Behavioral Determinant (knowledge, skills, attitudes, values, and motivation of staff)	
• Staff at all levels understand that the success of the HIS is truly measured by the degree to which information is used to provide and manage health services.	• HIS success is generally measured by reporting rates, the availability of tools and personnel, and the number of staff trained. The degree to which data and analyzed information are used for planning and managing local action is seldom used as an indicator of performance.
• The HIS and its subsystems are perceived as being intended to help local managers and service providers to better plan and provide services.	• Staff feel that they have fulfilled their HIS responsibilities once they transmit reports.

[21] In Nepal, supervisors write their feedback in a space provided on the "Data Aggregation and Monthly Monitoring Sheet."

[22] For example, in Nepal, most specialized HIS personnel are not part of the MOH staff. The Ministry of General Administration deputes them from its pool to work in the MOH, and can transfer them to other ministries at any time. This is a loss to the MOH because transferred staff take their experience in health information with them.

Desired Attributes	Typical Status in Developing Countries
	• The HIS is commonly perceived as a mechanism for use of data at higher levels.
• All staff understand the purpose of all data elements and indicators relevant to a given subject and level.	• Few staff and community volunteers understand the purpose of data elements and relevant indicators applicable at their level. They simply collect and report data.
• Staff have knowledge and skills to periodically check data quality at their level.	• Data quality assessment is mostly a top-down process. Supervisors may conduct data quality assessments (DQAs) during supervisory visits. • It is uncommon for local facilities to do their own DQA.
• Staff are competent in HIS tasks that cover the entire information cycle (collection, processing, analysis, presentation, interpretation, and use)	• Most dedicated HIS staff have adequate capacity across the cycle. • Most healthcare staff have capacity only in data collection and processing.
• At each level, staff use information to identify gaps, make plans, and take action.	• Such use of data usually takes place at the central level and is infrequently evident at other levels.[23]

[23] The Nepalese MOH's "Guidelines for Data Analysis and Use for District Programs" (unpublished) recognizes this shortcoming.

APPENDIX B. BROAD HEALTH INFORMATION SYSTEM RESPONSIBILITIES

The matrix below lists the broad HIS responsibilities of health offices or facilities across organizational levels of the health system. Health offices or facilities at these levels fulfill their responsibilities by mobilizing and training both HIS specialists and healthcare managers and staff. This information is a useful reference for DSTs/HITs to ensure that the capacity-building activities they select and implement will prepare team members to take on these responsibilities at their level.

Many HIS functional responsibilities are similar across levels. However, the scope, type of data, depth of analysis, style of presentation, and nature of interpretation vary among the levels, and some responsibilities are specific to a specific level. For example, only the central-level HIS and program managers are responsible for identifying and defining essential sets of data elements and indicators. At lower levels, such as at health facilities, data and indicators are for immediate use in understanding a situation and taking corrective actions. Higher levels use aggregated data to monitor health trends and service performance, to strategize, and to plan.

Use this matrix to identify and focus on only those responsibilities appropriate to a given facility or health office. For example, if you are working at a primary healthcare facility or at a hospital, consider only the rows that are marked "x" under "Facility."

Please note that HIS responsibilities at a specific level in a specific country may differ from what is indicated in this table. Central HIS management should adapt the matrix, as necessary.

HIS Responsibilities at Each Level of the Health System

Area	Broad HIS Responsibilities	Most Applicable Levels			
		Central	Regional	District	Facility
Leadership and Management Support	Develop and disseminate national HIS design, structure, procedures, policies, and guidelines	x			
	Ensure clients' rights and maintain privacy and confidentiality of their personal data				x
	Provide required management and leadership support (e.g., capacity building for staff, resource allocation, motivating staff) to effectively operate the HIS	x	x	x	x
	Ensure effective cooperation and coordination among HIS staff and healthcare staff	x	x	x	x
	Oversee and manage the transfer of data and reports to higher levels and across departments or programs at the level, as appropriate.	x	x	x	x
	Present information in review meetings	x	x	x	x
	Provide supervision and feedback for HIS performance	x	x	x	

Area	Broad HIS Responsibilities	Most Applicable Levels			
		Central	Regional	District	Facility
	Coordinate with government and private sector health providers and other relevant agencies in matters related to health reporting and use of the HIS	x	x	x	x
	Monitor HIS performance through field visits, using routine data, and conducting surveys, where necessary	x	x	x	x
	Create an information culture by using and encouraging others to use information	x	x	x	x
	Deploy modern technology to create efficiency and effectiveness	x	x	x	x
Human Resources	Ensure that adequately trained HR are available to support HIS operations at the level	x	x	x	x
Other Resources	Ensure that adequate materials (e.g., data collection forms, instruction manuals, computing equipment, office space) are available at the level	x	x	x	x
Quality Assurance	Ensure data and process quality at all stages of the information cycle (e.g., data are validated, correctly processed, and analyzed; users interpret the data, make rational management decisions, and report on time)			x	x
Data Collection	Define essential (core) data elements and indicators	x			
	Develop data collection tools and update them, as necessary	x			
	Efficiently manage multiple recording and reporting formats			x	x
	Ensure that all required data are collected			x	x
Data Processing and Reporting	Validate, clean, and consolidate collected data by different groups or criteria			x	x
	Prepare standard HIS reports in the prescribed format, and occasionally on an ad hoc basis			x	x
	Calculate the target population for health programs			x	
Analysis	Assess service data according to coverage, utilization, quality, continuity, costs, risk, and other parameters of relevance to the functioning of public health services			x	x
	Calculate standard HIS indicators, disaggregated by parameters, such as age, gender, ethnicity, geographic area, etc.	x	x	x	x

Area	Broad HIS Responsibilities	Most Applicable Levels			
		Central	Regional	District	Facility
	Set operational targets based on disease burden, program strategy, and available resources	x	x	x	x
Presentation and Promulgation	Present information in easy-to-understand, visually appealing formats (e.g., tables, graphs, and maps)	x	x	x	x
	Prepare periodic HIS and ad hoc newsletters and briefs, as required	x	x	x	
	Prepare periodic health bulletins (e.g., annually for the district and/or region)	x	x	x	
Interpretation	Compare results across facilities, districts, or regions	x	x	x	
	Conduct trend analysis of important indicators	x	x	x	x
	Find the root causes of service gaps and problems, if any			x	x
Use	Provide feedback to reporting units	x	x	`x	
	Take action supported by evidence	x	x	x	x
	Respond to requests and recommendations from lower levels	x	x	x	
	Develop strategies and plans based on credible information	x	x	x	x
	Present indicators and other relevant information at review meetings and on other occasions to inform or for advocacy	x	x	x	x

APPENDIX C. HIS CAPACITY SELF-ASSESSMENT TOOL

This tool is designed as a reference material for guiding discussions at HIT meetings. The list of capacity areas is not exhaustive; teams may select additional areas, as necessary. Consulting other assessment tools, such as MEASURE Evaluation's PRISM (https://www.measureevaluation.org/our-work/routine-health-information-systems/performance-of-routine-information-system-management-prism?searchterm=prism) and RDQA (https://www.measureevaluation.org/our-work/routine-health-information-systems/rdqa-landing-page?searchterm=rdqa), is helpful for conducting a more in-depth evaluation of HIS capacity.

The team leader should ask one question at a time and keep the discussion open until all HIT members feel that they have found the most appropriate answer. Record answers and practical solutions (if required) in the column "Findings of the Assessment." This information can be used to prepare the HIS performance improvement plan.

For example, to open the discussion, the team leader might ask, "Do we know how to maintain privacy and confidentiality of a patient's personal data?" After discussions, the team might record, "We are not clear about what is meant by 'privacy,' but we have some ideas about what 'confidentiality of data' means. We don't keep a patient's records at the facility; we give them to the patient. Maybe in this way we are keeping the data confidential. However, how do we maintain data privacy? We need to ask the supervisor." Based on this assessment, the team might plan to "Request the supervisor to send reference documents on keeping patients' data confidential and maintaining privacy; orient staff on this topic at the next HIT monthly meeting."

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
Leadership and management					
Maintain privacy and confidentiality of personal data • Do we know what is meant by "privacy" and "confidentiality" in relation to providing health services? • Do we know how to maintain privacy and confidentiality of a patient's personal data? • Do we keep the personal data of patients confidential?				x	
Understand the purpose, basic structure, and functions of the national HIS • Do we know the purpose of the HIS? • Do we know the desired attributes of a fully functional HIS? • Do we know the areas in which our national HIS has gaps?	x	x	x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
Promptly inform the appropriate authority of any evidence of infectious disease cases or any possibility of an outbreak in the community or district • Do we immediately report cases of infectious disease or the possibility of an outbreak? • Does anyone have overall responsibility for managing the disease surveillance system and informing higher levels in the event of a disease outbreak or its possibility? • What are the sources of data? • Are any staff designated as backup if the primary responsible person is absent?	x	x	x	x	
Coordination among coworkers, including community workers, and with other agencies; maintaining a helpful attitude and sharing data, as appropriate • Do we share and collaborate with coworkers in matters related to the HIS? • Do we share data with other facilities, government agencies, etc.? Do we have any examples of this? • Do we ask other agencies to share data that would be useful to us?	X	x	x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
Provide supportive supervision, when necessary, with an emphasis on using evidence in decision making • Do we review data collected by facilities? Do we provide feedback? Do we express appreciation for good work and extend support if improvement is required? • Do we know whether staff members understand the purpose of data they collect? • Do we explain the purpose of data to them and how they can help staff do their work better? • Do we ask staff if they need any help from us?	x	x	x	x	
Understand that the HIS requires teamwork, and be aware as a team of the role and responsibilities of the unit for the HIS • Do we understand that the HIS needs a team effort and why? • Do we know the team's HIS responsibilities in our facility or health office?		x	x	x	
Proactively ask for HIS support from higher levels or from other facilities with good IS experience • Do we contact higher levels or seek help from colleagues at other facilities/offices if we run into HIS-related problems or need clarification?			x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
Ensure that updated manuals and forms are available • Are the HIS formats and manuals we use the current ones? • How can we ensure this? • What should we do if they are not the most recent updates?				x	
Data recording, processing, analysis, and presentation					
Understand the purpose and use of collected and recorded data • Do we know which data elements we collect? How many data elements we collect? • Do we know why each of the elements is collected and how they will be useful in improving our planning and services?	x	x	x	x	
Maintain records of all necessary HIS-related resources (e.g., recording registers, reporting forms, calculators, computers, mobile phones) • Do we keep records of all HIS-related resources in a standard format?			x	x	
Efficiently maintain, store, search, and update patient records • Do we keep patients' medical records in the facility? If not, why not? Would it be beneficial to do so? If yes, how best to do it?				x	

Team HIS Capacity and Performance Self-Assessment Tool					
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Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
• If we store the records at our facility, can we retrieve a visiting patient's record quickly? • Do we update the record immediately after the patient receives services?					
Accurately record service data in standard formats with appropriate coding • Do we record all service data in standard formats? • Do we record the ICD code of the diagnosed disease? • Do we use all other required codes when recording data?				x	
Accurately record type and quantity of medicine dispensed • Do we accurately record the quantity of medicines dispensed to all patients?				x	
Use appropriate tools (e.g., tally sheets, calculators, computers) to count and group data • Do we use tally sheets, calculators, or computers to count and summarize the total number of services provided?			x	x	
Prepare regular and ad hoc reports • Do we prepare monthly/quarterly reports on time? • Do we prepare surveillance reports, as necessary?			x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
• Could we prepare additional reports requested by the supervising office on an ad hoc basis?					
Ensure data quality • Do we know how accurate our data are? • Do we know the consequences of relying on inaccurate data?			x	x	
Collect data for surveys (e.g., household-level health surveys) in the community • Do we have experience in conducting surveys using predefined questionnaires?			x	x	
Calculate target populations for health programs • Do we know how to estimate the number of pregnant women in the total population of the catchment area? • Do we know how many married women of reproductive age live in our catchment area? • Do we know how many children younger than five are in the catchment area?			x	x	
Keep track of relevant indicators (e.g., number and coverage of FP users, OPD patients served, women completing four antenatal care [ANC] services) over time • Do we monitor the number of FP users to determine whether they are decreasing or increasing over time?			x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
• Do we know what percentage of pregnant women completed four ANC visits at our facility last year? • Do we know whether the service workload increased or decreased over the past six months?					
Prepare basic graphs (line, pie, etc.) or make/update community maps to reflect service coverage • Do we prepare graphs from the data collected by the facility using computers or manually? • Do we prepare and use community maps to monitor service coverage?			x	x	
Calculate service indicators disaggregated by parameters, such as age, gender, ethnicity, geographical area, etc. Do we calculate different indicators (e.g., percentage of expectant mothers completing four ANC visits; male-to-female ratio among service seekers; percentage of service seekers from rural population)?		x	x	x	
Design and conduct surveys in the area • Do we have the capability to design and conduct health surveys on our own in our catchment area?		x	x		
Prepare quarterly/annual health bulletins • Are we capable of preparing and issuing health bulletins?		x	x		

Team HIS Capacity and Performance Self-Assessment Tool					
Name of the Health Facility/Office: **Date of Assessment:**					
Required Team Capacity Area **(Select only those areas that are applicable at the given level)**	**Mostly Applicable at Levels**				**Findings of the Assessment**
	Central	Region	District	Facility	
• Have we ever prepared them?					
Present health information in reviews and other meetings • Can we prepare and present health service information in review meetings with or without computers? • Do we proactively ask to participate in reviews and other meetings?		x	x	x	
Interpretation and use					
Have positive attitudes about data and assign high value to their quality and use • Do we understand why using data in planning our actions and providing services is important? How do data help? • Do we have any examples of having used data to make decisions?			x	x	
Compare service data with targets, analyze trends in applicable indicators, and identify the root causes of service gaps • Do we compare service data with targets to identify gaps? • If there are gaps, or the trend is not as expected, can we identify the root cause?		x	x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Use follow-up schedules to remind patients of due dates for services • Do community workers prepare and use follow-up schedules to remind patients of their service due dates (e.g., ANC for expectant mothers)?				x	
Identify health facility and community priority data and the need to communicate with higher level authorities • Can we list the data we are collecting that are not useful at this level? • Can we prepare a list of additional data that would be useful at this level? • Using these lists, can we talk about important data needs with our supervisors?				x	
Prepare and analyze reports as a team, plan actions, and communicate recommendations to higher levels • Do we work together to prepare reports? If not, why not? How can we do so more often? • Have we recently analyzed our monthly/quarterly reports as a team? • Have we ever changed our service delivery action plan because of our learning from monthly reports? If yes, when and how? If not, what prevented us? • How can we communicate the understanding we have gained from analyzing information with our supervisors?				x	
Use of IT and mobile technology					
Use computers to record service data and send/receive email • Do we use computers to record data? • Do we use email?		x	x	x	

Team HIS Capacity and Performance Self-Assessment Tool					
Use computers to prepare graphs and PowerPoint presentations • Do we use software, such as Excel, to prepare tables and graphs? • Do we use PowerPoint or similar software to present information?		x	x	x	
Access relevant HIS servers, upload reports, and see reports stored in the server • Can we upload our reports directly to the HIS server using the Internet? • Do we access reports in the HIS server?		x	x	x	
Use statistical software, such as SPSS or Epi Info, to calculate statistics and indicators • Do we use any statistical software to analyze data?		x	x		
Use geographic information system (GIS) software • Do we use any GIS software for mapping our service coverage, identifying focus areas, and deciding what actions to take?		x	x		
Use mobile phones for voice communication, sending/reading SMS • Do we use mobile phones to communicate among staff members and facilities and with service recipients? • Do we use SMS?		x	x	x	
Enter data on preloaded forms in mobile phones • Do we use mobile phones to record data on preloaded forms?		x	x	x	

APPENDIX D. TEMPLATE FOR THE MINUTES OF THE MONTHLY HIT MEETING

HIS Improvement Team Monthly Meeting Minutes
Team members present: **Invitees present**: **Date:**
Review the meeting minutes from the previous month and the HIS performance improvement plan. If planned activities have occurred, remove them from the action plan. If the HIT team could not achieve planned results, modify the plan and write the reasons for underachievement in this space. (Note: Adjust this format and content as necessary to accommodate local requirements.)
Using the interpretation of last month's report, note observations and findings below. 1. Which health services are working as planned? (Cite evidence.) 2. Which health services are not working as expected and need improvement? (Cite evidence.) 3. What activities are planned at the local level to improve service performance? 4. What assistance is required from: *a. The DST* *b. Supervisory offices* 5. Recommendations to the supervisor 6. Changes required in the service delivery work plan based on the discussion in the meeting.