

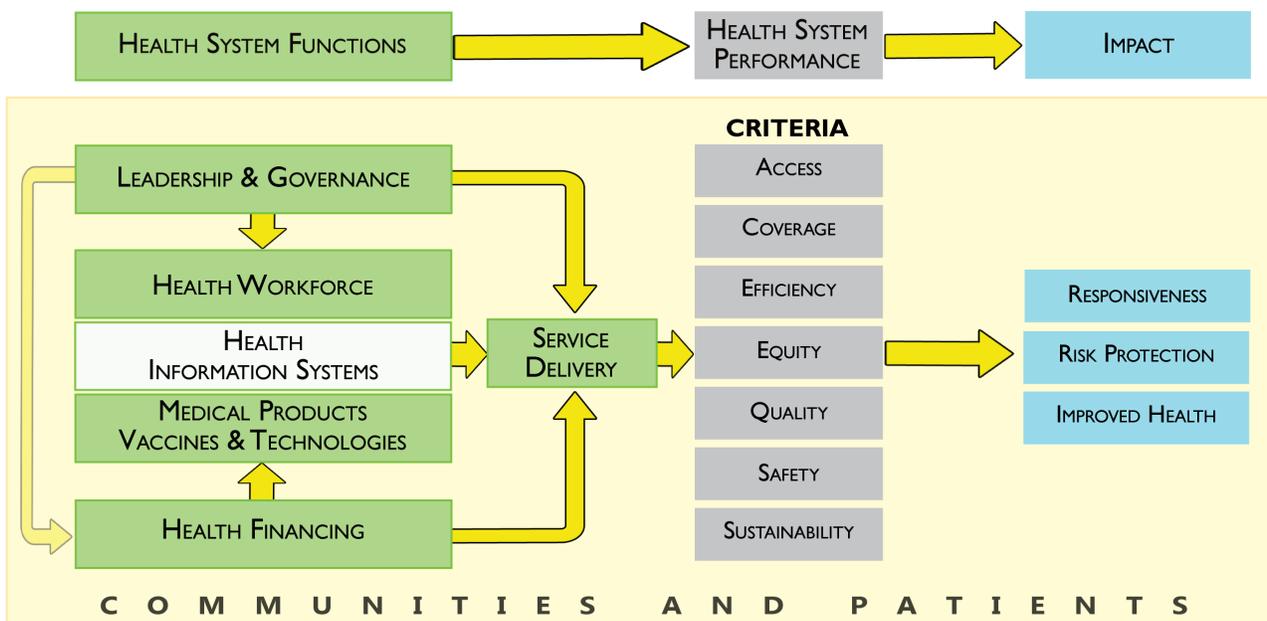
MODULE 7

HEALTH INFORMATION SYSTEMS



This module describes the components of a functioning health information system and provides indicators to assess the adequacy of information collection, reporting, analysis, and use in a country's health system.

FIGURE 3.7.1 IMPACT OF BUILDING BLOCK INTERACTIONS



INTRODUCTION

The objective of the HIS assessment is to provide a better understanding of a country's capacity to “integrate data collection, processing, reporting, and use of the information necessary for improving health service effectiveness and efficiency through better management at all levels of health services” (Lippeveld, Sauerborn, and Bodart 2000). This definition should be broadly interpreted to include information not only about the government-supported public health system, but also data from the country's private for-profit and not-for-profit health providers. HIS performance should be measured in terms of the quality and comprehensiveness (e.g., all actors delivering health services and products) of data produced and by the evidence of regular use of data by all health system stakeholders, to improve the performance of the entire – public and private alike – health system.

This module looks at how the HSA approaches the HIS building block.

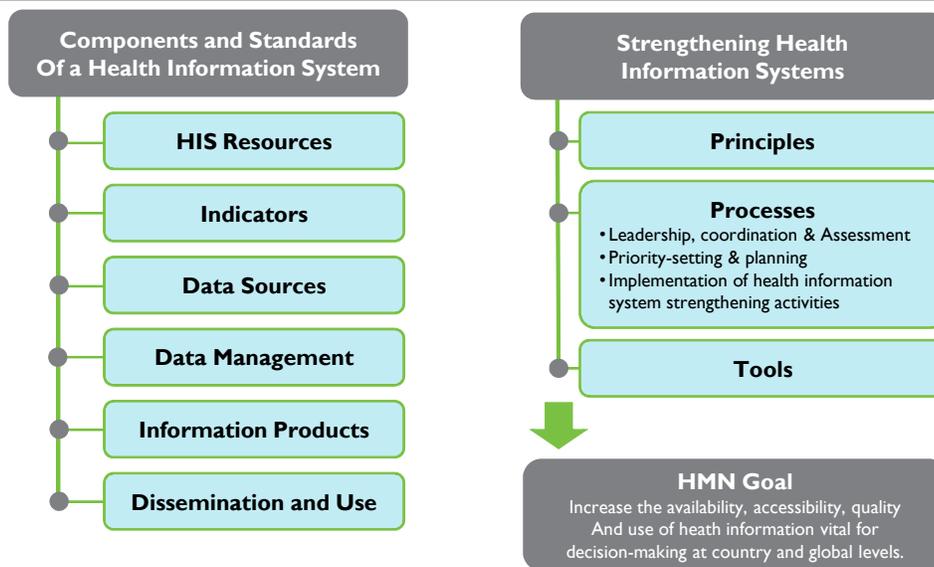
- Subsection 7.1 defines an HIS and its key components.
- Subsection 7.2 provides guidelines on preparing a profile of the HIS of the country.
- Subsection 7.3 presents six topical areas around which the HIS assessment should be structured and includes detailed descriptions of the indicators to assess the performance of the HIS.
- Subsection 7.4 provides suggestions on how the assessment results can be developed into possible solutions to address HIS-related issues in the context of the HSA.
- Subsection 7.5 contains a checklist of topics that the team leader or other writers can use to make sure they have included all recommended content in the chapter.

7.1 WHAT IS A HEALTH INFORMATION SYSTEM?

For the purposes of this HSA, an HIS can be defined as “a set of components and procedures organized with the objective of generating information which will improve health care management decisions at all levels of the [entire] health system” (Lippeveld, Sauerborn, and Bodart 2000). The goal of an HIS is to allow decisions to be made in a transparent way, based on evidence, and ultimately to improve the population’s health status. Therefore, the objective of the HIS is to produce relevant and quality information to support decision making (HMN 2008).¹

HMN developed a conceptual framework for a national HIS (Figure 3.7.2). The framework describes the six components of an HIS (HIS resources, indicators, data sources, data management, information products, and dissemination and use), and promotes the processes of internally driven assessment, strategic planning, and HIS strengthening. As such, it provides a useful outline for studying HIS and describing their fundamental requirements of HIS.

FIGURE 3.7.2 THE HMN FRAMEWORK FOR HEALTH INFORMATION SYSTEMS



Source: http://www.who.int/healthmetrics/documents/hmn_framework200803.pdf

An HIS typically has both routine and non-routine data sources; routine sources include regularly reported health facility data, while non-routine sources include data from censuses, DHS, and civil registration systems (for birth and death records). Routine HIS data are reported at least every six months, while reporting of non-routine data is generally less frequent.

Most countries have a national HIS and a variety of HIS subsystems at different levels of government. The HSA should assess each of these, as well as examine how the MOH system collects information on private (commercial and NGO/FBO) sector facilities and provide a wide range of information to all (including non-MOH) stakeholders in health.

¹ HMN was launched in 2005 and has led the way in harmonizing approaches to strengthening country HIS while promoting country ownership of the HIS strengthening process. HMN assessments have been conducted in over 80 countries. Country reports and the 2008 HMN Framework document can be downloaded at: http://www.who.int/healthmetrics/documents/hmn_framework200803.pdf.

7.2 DEVELOPING A PROFILE OF THE HEALTH INFORMATION SYSTEM

This section provides guidance on developing a profile of the assessment country's HIS, a starting point for the indicator-based assessment². The intent of the assessment is not to review, interpret, or analyze the values of health statistics or data produced by the system but rather to assess the **ability** of the system to produce valid, reliable, timely and reasonably accurate information for use by planners and decision makers. Before addressing the specific indicators in Subsection 7.3, you will need to map the HIS by first listing, then developing a schematic or flowchart for each HIS component or subsystem, by level of government, which will help you visualize the structure.

The PRISM (Performance of Routine Information System Management) Toolkit contains several well-tested and frequently updated tools that can help guide you through the process of mapping routine health information systems (RHIS). The toolkit can be downloaded at: <http://www.cpc.unc.edu/measure/publications/pdf/ms-09-34.pdf>. It includes a chart for mapping various types of HIS to the information that each HIS supplies. It also includes guidance for creating an information flowchart that specifies which types of data are reported by each level of care in a RHIS. (Both tools are shown in Annex 3.7.A) When mapping the information flow, be sure to examine how data are collected and shared with private health stakeholders.

Creating a flowchart will help show, by reporting level and by stakeholder group, who reports to whom, at what frequency, and the type of data reported. It does not reflect the completeness, accuracy, or timeliness of data that moves through the system. Considering the context for the functioning of this flow is also important: Is it established by law? Are procedures standardized? Are international classifications being used for classifying diseases? Are control mechanisms in place to ensure the quality of data?

A number of HIS components may operate within a given health sector, and each may have a different and separate flow of data and reporting mechanism. Externally funded programs (e.g., HIV/AIDS, TB, malaria) often have distinctly defined indicators reported through a separate mechanism. Understanding all of these components and diverse elements, their operation, and their level of integration, consolidation, and cohesion is important for assessing and understanding the performance of the HIS and opportunities for its strengthening. It also is important to consider the private commercial and not-for-profit providers (such as FBOs and NGOs): Does the HIS include them? If not, as is often the case, are there plans to incorporate these sectors into the national HIS?

² Note that these indicators provide a framework for assessing the structure and function of an HIS – they are not data collection instruments. You will need to organize and develop a process for the review of records and documents as well as the interviews of key informants and stakeholders to obtain the information necessary to make judgments with respect to the indicators listed. The organization of data collection will vary from country to country.

In some countries, HIS staff may be seconded from the central statistical office and may not appear on the MOH establishment register.

TIP

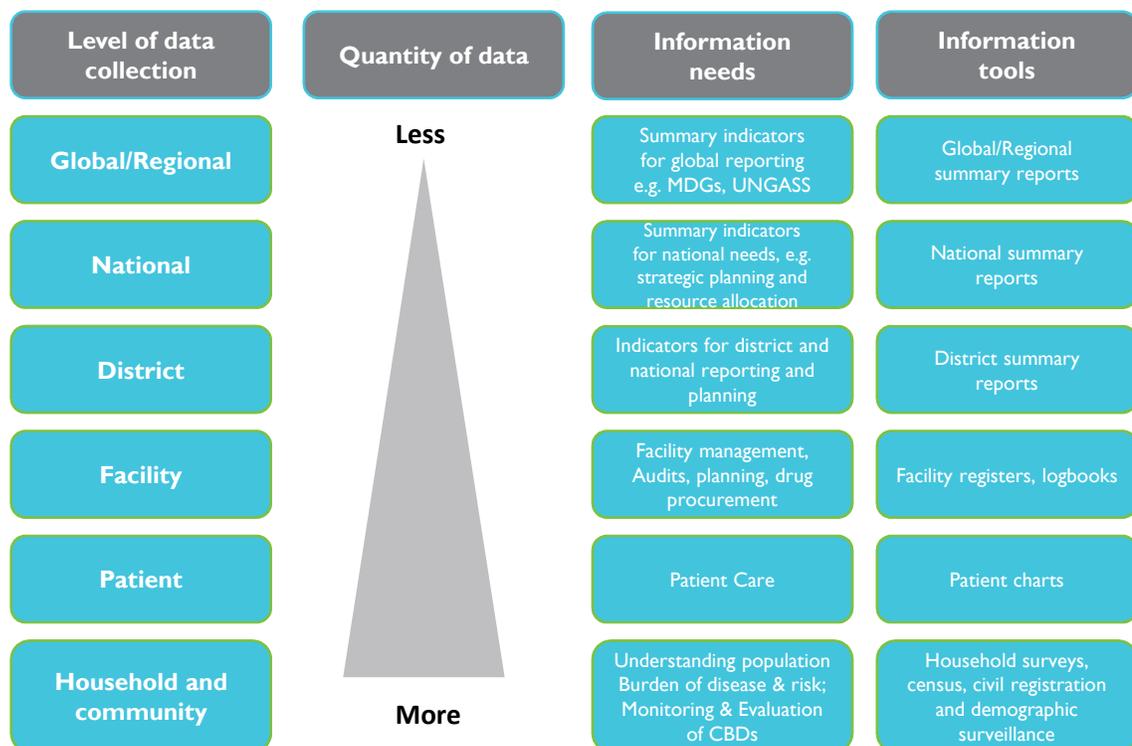
CONDUCTING THE ASSESSMENT

- Select only indicators that apply to the specific country situation.
- Conduct a thorough desk review of all available secondary data sources before arriving in country.
- In stakeholder interviews, focus on filling information gaps and clarifying issues.
- Coordinate stakeholder interviews with team members so all six modules are covered and avoid interviewing the same stakeholder twice.
- Look at all health actors – public, for-profit and not-for-profit – involved in delivering health services.
- Tailor assessment questions to reflect the level of decentralization so the questions are relevant to the interviewee.
- Schedule team discussions in country to discuss cross-cutting issues and interactions.
- Finalize an outline for the assessment report early on so sections can be written in country.

Because the structure and functional format of an HIS reflects the organizational structure of the entire health system, doing an assessment first requires a clear understanding of the overall system organization, of how the different sectors – public, private, and FBO/ NGO – interact and relate to each other, and of the division of responsibilities among the different levels within the MOH (see Country and Health System Overview Module) which, in many countries, are national or ministry level, regional or provincial level, district level, and health center or facility level (Figure 3.7.3). The national or ministry level may include health parastatals (e.g., national reference laboratories and teaching hospitals). You must also understand the role of the private sector and its participation in the HIS, and the role of other ministries or national offices (e.g., interior or justice ministries often track births and deaths, and the census is often the purview of the office of statistics).

Because HIS-related international donor support may affect how the country's HIS is organized and functions, you must investigate donor assistance: Does it strengthen the nationwide HIS, or only individual components in individual regions? In some countries, donors may be the main source of funds and resources for the HIS. For more information on this area, see Subsection 7.3, Topic A of this Module, and for donor mapping, the Country and Health System Overview. Donor implementation plans, monitoring and evaluation plans, and activity reports also are informative.

FIGURE 3.7.3 HIS NEEDS BY LEVEL OF DATA COLLECTION



Source: http://www.who.int/healthmetrics/documents/hmn_framework200803.pdf

DECENTRALIZATION AND HEALTH INFORMATION MANAGEMENT

In a decentralized health system (see Modules 3.1, the Country and Health System Overview, and 3.2, Leadership and Governance, for definitions of decentralized health systems), some government functions and responsibilities are devolved to lower levels of government (provincial, regional, or district). In such a context, you will need to determine whether the level of decentralization of the health system is consistent with that of the HIS and whether the HIS is structured to satisfy the information needs of each level. If not, the utility of the HIS as a management tool is likely to be severely limited. For example, data that flow to the central level and are analyzed there may actually have more relevance to the regional or district level where important resource allocation decisions are made.

Most HIS components and subsystems are managed at the central level of government. If you are told or observe that all or some HIS subsystems (e.g., data collection) are the responsibility of lower levels, you will need to look for information at the lower levels. A decentralized HIS system could result in the following:

- The presence of different definitions and methods used for data collection at different levels
- Different data sets being collected at different locations
- Inequity in the amount of data collected or in the level of resources (funding, staff, equipment) of the HIS subsystems between regions, provinces, or districts
- In some highly decentralized countries, some regions may report to the central level while other regions do not, which may skew the balance of national data sets
- If standards for data collection are set nationally in a highly decentralized context, the issue of relevance to the decentralized level can become an issue

Unregulated decentralization – where data standards vary by region – is not desirable. Even when HIS responsibility and management is shifted to districts and regions, HIS structure and functions in all regions must conform to national standards and guidelines on data collection, reporting, and analysis, and the lower levels must be held accountable for the application and implementation of the national standards.

TIP

USE HIS MANAGEMENT AS AN INDICATOR

How the HIS is managed can be a useful proxy to measure the decentralization process and to identify regional inequities and differences with regard to health indicators, budget allocations, and staff distribution or allocation.

7.3 ASSESSMENT INDICATORS

This section focuses on HIS indicators – it shows the topical areas into which the indicators are grouped, lists data sources to inform the indicators, discusses how to deal with indicators that overlap with other building block modules, defines the indicators, and, in the “Interpretation” and “Issues to Explore” subsections, shows how to work with them. Finally, the section identifies key indicators to which the HSA technical team member can limit their work, if time precludes their measuring all indicators.

TOPICAL AREAS

The indicators for this module are grouped into three topical areas (see Table 3.7.1), based on the HMN Framework:

- A. Inputs: more particularly, the HIS resources
- B. Processes: how indicators are selected, what the data sources are for those indicators, and how the data are managed and analyzed
- C. Outputs: including the quality of the information products, and the dissemination and use of information

TABLE 3.7.1: INDICATOR MAP—HEALTH INFORMATION SYSTEM

Topical Area	Indicator Numbers
A. Inputs	1–8
B. Processes	9–21
C. Outputs	22–24

DATA SOURCES

There are many sources to help the technical team member assess and analyze the health information system. They are organized in three categories:

- I. **Standard indicators:** Data are drawn mainly from existing and publicly available international databases.
 - Data on information products available in the Health Systems Database at <http://healthsystems2020.healthsystemsdatabase.org/>.
 - The World Bank also has a database on development indicators at <http://data.worldbank.org/data-catalog/world-development-indicators>
 - Other surveys contain a wealth of information; with additional analysis, they can provide more nuanced analysis of access, equity, efficiency, and quality of health services in a specific country.

- Demographic Health Surveys (DHS)
- AIDS Indicator Survey (AIS)
- Household health expenditure survey
- National Health Accounts (NHA)
- Living Standards Measurement Survey (LSMS)

- 2. Secondary sources:** Indicators should be gathered to the extent possible through desk review of reports, forms, and other documents (i.e., determine whether an HMN assessment has been done recently).
- Health Metrics Network. 2007. Framework and Standards for Country Health Information Systems. Second edition. Geneva: World Health Organization.
 - MOH policies, decrees, public health laws (i.e., notifiable conditions)
 - MOH budget, regional and district budgets (review guidelines for what is to be included in these budgets)
 - National HIS strategic plan
 - National HIS operational plan/budget (if available)
 - Human Resources Information Systems
 - U.N. census files
 - Vital events records (as available) or alternatively, Sample Vital Registration with Verbal Autopsy (SAVVY), produced by MEASURE Evaluation, may be available
 - National data management software platforms
 - Donor reporting guidelines and/or monitoring and evaluation plans
 - Central-level technical guidelines, specific program guidelines, and directives
 - Supervision checklists; MOH district-level procedures and directives
 - Reports, graphs, or maps that display the information provided through the HIS
- 3. Stakeholder interviews:** The indicator data should be supplemented with additional information obtained in the stakeholder interview process. Ideas for probing questions to be asked during the assessment may be found within the discussion of the topical areas and indicators and under “Issues to Explore.” Annex 3.7.B presents a Summary of HIS issues to discuss in Stakeholder Interviews.
- MOH planning unit or health information unit
 - Central statistics office (may be within the MOF)
 - Vital records office

TIP**PRIORITIZING INDICATORS**

If you are able to complete only part of this module because of limited time or resources, do the following:

- First, assess indicators 1–4, because data for them are readily available from the Health Systems Database (<http://healthsystems2020.healthsystemsdatabase.org>).
- Second, assess indicators 25, 26, 29, and 34.
- Third, if possible, assess all remaining indicators to get a more comprehensive picture of health system financing in the country.

- Key private sector health care providers: private physicians and/or medical groups, laboratories, pharmacies, hospitals, and home care providers.
- Central-level MOH budget authorities
- Central-level program heads (especially the head of the planning or statistics unit); regional and district program heads
- Human resources officers; medical officers; health management team members.
- HMIS director or director of eHealth [as appropriate]; other agencies involved in HIS strengthening such as the ministries of telecommunication and local government
- Donor representatives; even where there is no significant donor involvement in HIS, interviews with international advisers may be highly informative. The public health program directors can also be interviewed (e.g., the head of the malaria or HIV/AIDS programs).
- Staff working in the statistical department of MOH and MOH staff who analyze the data³

DETAILED INDICATOR DESCRIPTIONS

This section provides an overview of each topical area and then a table that gives a definition and interpretation of each indicator.

TOPICAL AREA A: INPUTS

Overview

Inputs include those HIS resources that must be in place for the HIS to function properly such as:

- **Coordination and leadership:** mechanisms to effectively lead and coordinate the HIS and use the data generated by the system. The HMN Framework recommends the creation of a national HIS coordination committee and a national HIS strategy. The strategy should outline goals for streamlining and improving existing reporting mechanisms, roles and responsibilities of all stakeholders (public and private), funding for HIS strengthening including maintenance of the current HIS system, and improving integration of data at national and subnational levels. Moreover, private sector stakeholders should be members of the HIS coordination committee and actively involved in the creation of the national HIS strategy.
- **Information policies:** existing legislative and regulatory framework for public and private providers, use of standards, guidelines for transmission, management and storage of information, rules and guidelines for data confidentiality and security

³ In some countries, HIS staff may be seconded from the central statistical office and may not appear on the MOH establishment register

- **Financial resources:** government investment in the processes for the production of health information (e.g., collection of data, collation, analysis, dissemination, and use)
- **Human resources:** adequately trained personnel at different levels of government
- **HIS infrastructure:** for paper-based information systems as well as the required information and communication technology (hardware and software) for electronic systems

INPUTS

Indicator	Definition and Interpretation
<p>1. Availability of financial and/or physical resources to support HIS-related items within MOH/central budget</p>	<p>The level of support the government provides to the HIS functioning is a contributing determinant to its quality and sustainability</p> <p>Assess this indicator by determining which specific HIS-related items, among the items listed below, are funded by the government and which are not. Assess this indicator separately for the central and local levels. Make notes about amounts (absolute numbers and proportionate to the total budget) for subsequent discussion. If the breakdown suggested below is not available, collect any budget information about personnel involved in HIS activities and allocation of resources.</p> <ul style="list-style-type: none"> • Data processing and reporting equipment and software (e.g., computers, printers, telephones) • Meetings of interagency committees • Record books, forms, stationery, instruments for data collection, storage, and reporting • Maintenance of a functioning communications infrastructure • HIS-related training • Operational costs related to data collection/transmission (e.g., fuel, per diem, phone bills) • Population-based surveys (e.g., health surveys, census) • Facility-based records • Administrative records <p>Module link: Health Financing Module, Indicators 9 and 13 (MOH budget process and allocations by line items). Also link to budget utilization rates. Sometimes funding is available but not used.</p>
<p>2. Availability at each level of a sufficient number of qualified personnel and infrastructure to compile and analyze information</p>	<p>Sufficient and adequately trained MOH human resources for HIS essential for the operation of the HIS at facility, district, regional (if applicable), and national level in the public health system</p> <p>Assess this indicator by preparing a staffing profile of the HIS unit at the MOH central level – it is important to know whether the MOH has trained statisticians, epidemiologists, and information technology personnel to support the HIS unit. It is also important to know whether data officers are deployed at district level and whether data managers are working in health facilities.</p> <p>How many staff are working on HIS at central, district, and facility level? What are their professional profiles? Are they project, government, temporary, or donor staff? How does staffing for the routine HIS differ (if at all from vertical programs)?</p> <p>The source of funding (donor/government) is an important dimension to consider from a sustainability/integration of HIS perspective. Additionally, it is important to know if any, and which, capacity-building activities for HIS staff were carried out in the last year</p> <p>Module link: Governance Module, Indicator 10 (Technical capacity for data analysis)</p>
<p>3. Evidence of ongoing training activities related to HIS data collection and analysis</p>	<p>Training is essential to maintain analytical skills of personnel. Look for the type(s) of training provided: training to record and analyze data, training in the use of information and the type(s) of staff by type of training</p> <p>Training contributes to efficiency and quality by maintaining or augmenting personnel's skill set. Investigate for the presence of training curricula. Review training curricula, and make notes if you have concerns. Look at the frequency and duration of trainings; ask trainees how useful it has been. Also assess the degree to which private providers are trained in HIS data collection and analysis.</p> <p>Keep in mind that HIS training activities are often funded by external donors.</p>

INPUTS CONT...

Indicator	Definition and Interpretation
<p>4. National HIS strategic plan consistent with resources available, developed in broad consultation with key stakeholders, and widely accepted</p>	<p>The starting point for strengthening the HIS is a widely accepted strategic plan that provides direction and coherence to HIS strengthening efforts.</p> <p>According to the HMN Guidance for HIS Strategic Planning Process (2009), a strategic plan for HIS should include the following:</p> <ul style="list-style-type: none"> • HIS vision • Description of current and planned HIS strengthening efforts • HIS objectives and interventions • Timeframe for phasing in the interventions • Plan for activity implementation • Costing of the strategy • System/plan for monitoring and evaluation of the strategy and the overall performance of the HIS <p>Some countries do not have HIS strategic plans. If that is the case, other documents may provide direction to HIS, such as national health plans, MOH strategic plans, and/or a national information systems/plan. Also assess the degree to which the private sector is incorporated into these strategic plans.</p>
<p>5. Functioning interagency body with the mandate and capacity to guide the implementation of the national strategy</p>	<p>It is important to determine if such a body exists, and if it is effective.</p> <p>Because of the interagency nature of HIS, an interagency body should be formed to oversee the implementation of the HIS national strategy. This body is likely to include representatives from the MOH, telecommunications, local government, and the central statistics bureau. To encourage greater private sector reporting, it is critical to also have representatives from the private health community. The interagency body must also have the official mandate to function effectively including capacity in a wide range of areas:</p> <ul style="list-style-type: none"> • Strategic leadership to align partners and their activities with the strategy • Coordination of stakeholders including establishing mechanisms for coordination and regular communication • Project management that includes planning, monitoring, and holding people accountable for results. • Gaining commitment and support from decision makers • Establishing demand for health information
<p>6. Presence of international donors providing specific assistance to support strengthening the entire HIS or its individual and/or vertical components in more than one region</p>	<p>State whether donors are present, and, if so, provide a qualitative description of how donor funding is assisting or preventing the HIS efficiency and effectiveness</p> <p>Major HIS-related donor support may affect how the country HIS is shaped and functions. For some countries, it may be the main source of funds and resources for the HIS. If donors provide assistance for the HIS, include assessment of the scope, type, level, and impact of such assistance in your analysis. Note which items are supported directly from donor sources because this support has a direct link to questions of both ownership (of the system or subsystem as well as results) and sustainability. Issues to consider are:</p> <ul style="list-style-type: none"> • Are the donors who fund vertical programs promoting the creation of parallel systems to address their health information needs? • How can vertical HIS systems be linked with the rest of the HIS? For example, are the same codes for identifying health facilities used consistently nationwide? You may find projects that address HIS issues on a limited basis (e.g., for that specific program or a geographic region) but have little impact on the broader system. Inefficiencies arise when resources are not shared (e.g., computers bought by a program can be used only by that program) across the health system. <p>Module link: Country and Health System Overview Module, section on donor mapping, and, Governance module</p>

INPUTS CONT...

Indicator	Definition and Interpretation
<p>7. Existence of policies, laws, and regulations mandating public and private health facilities/ providers to report indicators determined by the national HIS</p>	<p>State which such documents exist. Provide a qualitative description of those that are in place and the extent to which they are enforced.</p> <p>A regulatory framework for the generation and use of health information enables the mechanisms to ensure data availability of public and private providers. If a general law is not available, review decrees that are pertinent to individual subsectors. For example, assess whether or not the legal framework is consistent with the United Nations' Fundamental Principles of Official Statistics (United Nations 2006). Issues to consider are:</p> <ul style="list-style-type: none"> • Is any person or office responsible for regulating or interacting with the private sector? Does regulation go beyond licensing? • Has any attempt been made to plan health service delivery in collaboration with the private sector? Are clear mechanisms in place for collating health information at the national level? • Does the country have specific requirements in terms of periodicity and timeliness of reports? • Is there a minimum set of core health indicators that both public and private providers should report? <p>If possible, assess the degree to which the laws are enforced because the presence of a regulatory framework does not guarantee compliance.</p>
<p>8. Presence of mechanisms to review the utility of current HIS indicators for planning, management, and evaluation process, and existence of process by which to adapt and modify accordingly</p>	<p>State whether these exist and if so, provide a qualitative description of mechanisms and processes.</p> <p>An HIS must provide relevant and important information to stakeholders. HIS design should provide for a dynamic process subject to periodic review and adaptation to the changing health environment in the country. Needed mechanisms include the existence of an active national HIS steering committee, a national HIS policy, and periodic HIS review meetings.</p> <p>Interviews with stakeholders will indicate whether and with what frequency HIS outputs are reviewed. Most health systems do not regularly reflect on the utility of HIS methods or outputs. If data collection tools and report contents have been unchanged for many years, it is likely that their output is unresponsive to need and of limited use to stakeholders – they simply are a burden to health workers who must collect and report data. Conversely, some HIS are constantly revised and as a result suffer from a lack of clarity and definition and therefore are not fully functional, often error-ridden, and incomplete.</p>

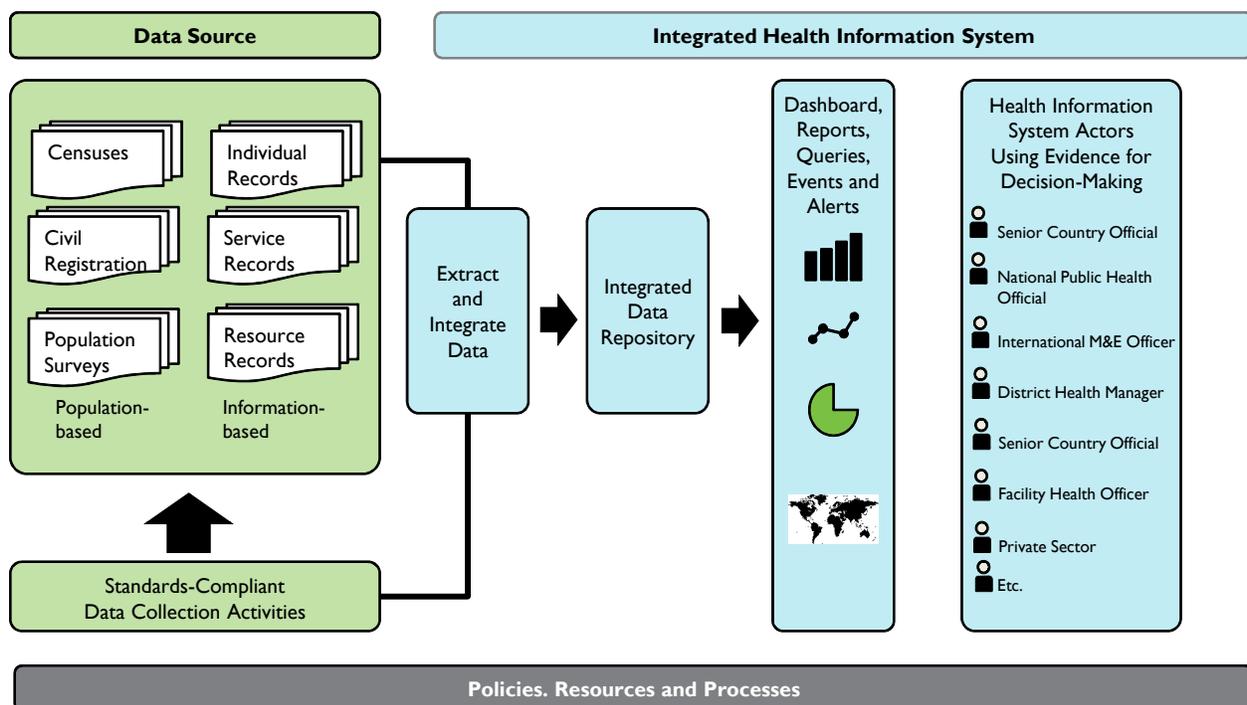
TIP**CHECK OUT
MEASURE
EVALUATION**

MEASURE Evaluation developed tools for data quality assessment that are also widely utilized and excellent for this context. <http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/data-quality-assurance-tools>

TOPICAL AREA B: PROCESSES**Overview**

HIS generally evolve in a non-linear way, in response to different pressures – administrative, economic, legal, or donor – that the health system encounters. This can result in multiple, fragmented, and overburdened HIS. Parallel subsystems frequently arise from a lack of coordination among local stakeholders and donor-driven vertical systems. As a result, it is typically difficult to use the output of HIS for decision-making.

An *integrated, well-functioning HIS* should be able to produce data for a series of indicators that relate (1) to the determinants of health, including socioeconomic, environmental, behavioral, and genetic determinants or risk factors; (2) to the health system, including the inputs that all stakeholder groups, in the public, private, and NGO/FBO sectors, use in the provision of health care; and (3) to the health status of the population. Figure 3.7.4 presents the data sources and the processes by which to collect, analyze, and apply the data to health sector policy and planning.

FIGURE 3.7.4 SCHEMATIC OF AN INTEGRATED HIS

Source: http://www.who.int/healthmetrics/documents/hmn_framework200803.pdf

Obtaining the data required for evidence-based decision making requires querying different data sources. A very important function of the HIS is precisely matching of a data item or indicator with the most cost-effective tool for generating it. In many cases, however, one data item can be obtained from two different sources. Understanding the strengths and weaknesses of each data source and knowing why the information is needed for contributes to making the right choice as to which data source to use. The list of indicators should be defined in a consensus-building process by the users of information at different levels in the health system, including stakeholders outside of the MOH who also rely on data to help them plan the delivery of their health services and products.

According to the HMN Framework, data management includes three aspects of HIS: data storage, data quality, and data processing and compilation (HMN 2008).

1. **Data storage** involves the organization of patient and other records in such a way that they can be accessed at a patient's next visit, while maintaining patient confidentiality.
2. **Data quality** can be difficult to assess, but is best achieved by collecting a minimum number of data and defining each piece of information to be collected clearly.
3. **Data processing** and compilation relies on successful data storage and collection of high-quality data. It includes cleaning and aggregating data sets from various sources as well as extracting trends and relevant information for data use.

These processes are frequently a mixture of paper-based manual processes and computer-based electronic processes. In evaluating data management, it is important to observe the way that these processes interact and whether high-quality information is produced as a result. At some point in the development of a national HIS, an electronic repository would be created to bring together the multiple data source across a given country, be they paper based or electronic

TIP

TWO CATEGORIES OF DATA SOURCES

Population-based data sources:

- **Censuses:** Information regarding standards for censuses can be found on the UN World Population and Housing Census Programme Website at: <http://unstats.un.org/unsd/demographic/sources/cwp2010/docs.htm>
- **Civil registration:** Records of vital events including marriages, divorces, births, and deaths.
- **Population-based surveys on health:** Two of the most commonly used surveys are the DHS and the Multiple Indicator Cluster Surveys (MICS).

Institutional data sources:

- **Individual records** include those kept by patients and facilities, such as routine patient records, visit logs, and vaccination records.
- **Service records** extend beyond health facilities to records kept by other local authorities such as police and insurance companies.
- **Resource records** describe health system inputs such as human resources for health, facilities, infrastructure, and fiscal resources.

PROCESSES

Indicator	Definition and Interpretation
9. Availability of minimum core indicators at national and subnational level	<p>Qualitative description of available data and how it links to the overall HIS system.</p> <p>Availability of indicators, and information on how they were defined, is indicative of the functioning of a country's HIS. The types of indicators tracked (reliability, etc.) are also indicative of HIS performance and organization. Data should be comprehensive and cover all categories of health indicators: determinants, inputs, outputs, outcomes, and health status.</p>
10. Availability and accessibility of data sources	<p>Yes or no, with qualitative description of data sources and its availability.</p> <p>Were the population and institutional records described above available? (Such as censuses, civil registrations, and population surveys, individual records, service records, and resource records). Are these accessible by the public? Were the MOH records or health information department aware of the types of data sources available?</p>
11. Timeliness of updates to the national database of facilities	<p>Measures the timeliness for updating the national database of health facilities.</p> <p>In assessing this indicator, note the timeliness of its updating (when was it last modified and at what intervals) and any indications of quality or completeness of the data used in its calculation. The HMN standard for when the national database of facilities was last updated is: highly adequate if less than two years; adequate if 2–3 years; present but not adequate if more than three years; not adequate at all if there is no national database or if no data are available. The existence of a national database of facilities also indicates that facilities have been assigned a unique facility identifier, making data reporting more reliable.</p>
12. Percentage of districts represented in reported information	<p>Number of districts in HIS reports divided by the total number of districts. Incomplete data do not permit adequate decision making. The absence of this indicator is indicative of an HIS weakness.</p> <p>You may find that reports do not indicate the percentage of districts represented. This omission calls into question the information reported. It may also signify a system that lacks quality control mechanisms to review and improve data and report quality. Keep in mind that even if 100 percent of the expected reports are received but they are only 5 percent complete, the data are “incomplete.”</p> <p>Compare the number of reports received at the national level from districts to the number of expected reports for the last six months (separately for each of the HIS subsystems). If the percentage is below 95 percent, then the data quality is compromised. Is a quality review mechanism in place to improve the reporting of districts or units?</p> <p>Also it is important to note the existence of any regularly published HIS reports or data summaries (complete or incomplete) that are widely disseminated and in the hands of users and decision makers. The existence of a mechanism to disseminate information is an important element that can be built upon when strengthening HIS activities.</p> <p>Module link: Governance Module, Indicators 15–19 (information/assessment capacity)</p>
13. Percentage of private health facility data included in reported data	<p>MOH reports should indicate whether private facilities or services are included. In many cases, information on this indicator will be “unspecified” or “unknown.”</p> <p>Inclusion of private facilities and health personnel in the HIS is important given high utilization of the private sector for essential services in many developing countries.</p>

PROCESSES CONT...

Indicator	Definition and Interpretation
<p>14. Availability of clear standards and guidelines for: 1) data collection, 2) reporting procedures methods, and 3) data analysis to be performed</p>	<p>Yes or no, with qualitative description of quality and use of guidelines.</p> <p>To measure this indicator, list available documents and topics covered by them. Review the documents carefully, and make notes if they are not complete or if you have other concerns.</p> <p>In many instances, staff will indicate that such procedures, standards, and guidelines exist but will be unable to produce copies or evidence of them. Clear instructions contribute to increased data quality.</p> <p>In addition, there should be clear instructions for data analysis. Many HIS have predefined analyses that have been programmed into the system. The origin and utility of these analyses may not be known or reviewed. Most analyses are done as a routine and are a function of what was done in the past.</p>
<p>15. Number of reports a typical health facility submits monthly, quarterly, or annually</p>	<p>Description of the ease and/or difficulty in complying.</p> <p>Health workers in the public sector may be overburdened with data collection and reporting requirements, which can negatively affect the HIS quality. The greater the number of required reports, the higher the HIS burden on a typical health worker. In this case, poor-quality data should be expected. Make notes about the specific types of reports required, including duplication of information. Other issues to consider: Does the staff feel that the number of reports and other HIS requirements are a burden? Does the staff see or appreciate the importance of HIS activities, including data collection, reporting, or analysis, that they are asked to do? Is any feedback provided to the data producers? Lack of feedback can have a detrimental effect on data and report quality. Some probing and persistence may be needed to fully catalog all of the forms and reports required at this level.</p>
<p>16. Presence of procedures to verify the quality of reported data (accuracy, completeness, timeliness)</p>	<p>Description of procedures for tracking the quality of data, data verification, and subsequent processes to correct data to ensure quality.</p> <p>Data quality is an important consideration when interpreting or using system information and results. It can be verified using tools such as data accuracy checklists prior to report acceptance and internal data quality audit visits. According to the IMF's "Data Quality Assessment Framework" (IMF 2006), six criteria are used to assess the quality of health data:</p> <ul style="list-style-type: none"> • Timeliness: the gap between when data are collected and when they become available to a higher level or are published • Periodicity: the frequency with which an indicator is measured • Consistency and transparency of revisions: internal consistency of data within a database and consistency between datasets and over time; extent to which revisions follow a regular, well-established, and transparent schedule and process • Representation: the extent to which data adequately represent the population and relevant subpopulations • Disaggregation: the availability of statistics stratified by sex, age, socioeconomic status, major geographic or administrative region, and ethnicity, as appropriate • Confidentiality, data security, and data access: the extent to which practices are in accordance with guidelines and standards for storage, backup, transport of information, and retrieval <p>Although actually applying these criteria to assess data quality is beyond the scope of this assessment – the focus of the HSA is to verify if such checklists are used – you should try to get some insights into how the HIS or subsystem being studied responds to the criteria. Review HIS reporting documents carefully; make notes if they are not complete or if you have other concerns. If these criteria exist, what is the government response to poor quality? Many systems assign the task of monitoring the quality of data to the supervisory level. In many cases, however, such supervision is not carried out for a variety of reasons. Although most systems have general checklists to be used during supervision, the checklists often do not include steps to improve the quality of data or reports. Data entry staff, or those who aggregate the data reporting forms, often make corrections and carry out data quality functions.</p>

PROCESSES CONT...

Indicator	Definition and Interpretation
17. Availability of a national summary report (i.e. annual health statistics report) that contains HIS information, analysis, and interpretation (most recent year)	Information availability is a key to its widespread use. Such reports offer an opportunity to bring together results of different HIS subsystems and integrate their analysis and interpretation. Issues to consider: Is a current-year report that includes HIS data, analysis, and interpretation available? Why is a summary report not produced? What are the constraints to integration of HIS results? What are the uses of such a report for planning, management, budgeting, and other functions? Is it possible to determine who uses this report?
18. Data derived from different health programs/ subsectors are grouped together for reporting purposes (or even integrated in a single document), and documents widely available	<p>Integrated HIS are cheaper to maintain, and they allow and encourage analysts and decision makers to explore links between indicators in various subsectors (e.g., number of measles cases and immunization rates). Flowcharting the various HIS subsystems will demonstrate where data are integrated and grouped (if at all). Too many parallel subsystems are indicative of a fragmented HIS that cannot provide the type of analysis necessary for good planning, management, or evaluation of health policies or programs. Interpretation of the level of integration is basically a judgment call on the part of the assessment team member.</p> <p>You will also need to also identify at which level the data are grouped (facility or district). Are key pieces of information not grouped (but possibly available)? Who is responsible for grouping or integrating data from various sources?</p> <p>Module link: Leadership and Governance Module, Indicators 9 (data flows) and 11 (data presentation to policymakers)</p>
19. Availability of appropriate and accurate denominators (such as population by age group, by facility catchment area, by sex, number of pregnant women) for analysis	<p>Accurate denominators are critical for data analysis. Analyze each subsystem, and answer yes or no. Make notes if you have concerns if the information is partially available.</p> <p>The collection of these statistics allows the technical team member to judge whether a given country's HIS has collected and reported commonly agreed-upon indicators of health status to international sources and how current these data are. The presence/absence of these indicators at the national level is a strong indication of the system's function and capacity; lack of current data also implies serious weaknesses in the HIS. The source of these weaknesses, however, cannot be derived from a review of the indicators alone. These should be investigated during the in-country stakeholder interviews.</p> <p>Denominators for the district level and above are based on census data with assumptions about population growth built into the calculations. At lower levels, denominators and effective catchment areas can be difficult to derive and substantiate. WHO EPI documents can be a source of commonly used denominators at the facility level, based on numbers of estimated or reported births, see http://www.who.int/immunization_delivery/en/</p>
20. Availability of timely data analysis, as defined by stakeholders and users	<p>This indicator must be assessed at the central, regional, and district levels (across both public and private provider groups) by reviewing documents; make notes if they are incomplete or if you have areas of concern.</p> <p>Questions to ask include: Who defines what analysis to perform? Do staff understand the analysis and its interpretation and implications (or do they carry out analysis as routine required activity)? When assessing the timeliness of any analysis, remember that the frequency of analysis depends on the program and on its specific needs and guidelines.</p> <p>Module link: Leadership and Governance Module, Indicators 7 and 8 (responsiveness to stakeholders)</p>

TOPICAL AREA C: OUTPUTS

Overview

Two outputs that are indicative of a well-functioning HIS are: (1) production of relevant and quality data and (2) regular use of information for decision making, planning, budgeting, or fundraising activities at all levels. These outputs are linked not only to a series of technical determinants such as data architecture and HIS resources, but also to organizational and environmental determinants that relate to the information culture within the country context, the structure of the HIS, and the roles and responsibilities of the different actors as well as behavioral determinants such as the knowledge and skills, attitudes, values, and motivation of those involved in the production, collection, collation, analysis, and dissemination of information (Aqil, Lippeveld, and Hozumi, 2009).

OUTPUTS

Indicator	Definition and Interpretation
21. Timeliness of reporting specified indicators	<p>Note how recent the data are and any indications of data quality or completeness used in the calculation. Indicate whether the data value is at least within the last five years.</p> <p>The three standard health outcome indicators described below should be examined in terms of the timeliness of their reporting.</p> <p>Maternal mortality ratio reported by national authorities, in years <i>Note:</i> Estimates derived by regression or similar modeling methods should NOT be considered. Measures the timeliness for reporting the annual number of deaths of women from pregnancy-related causes per 100,000 live births, a basic indicator of maternal health services. In most of the least-developed countries, routine HIS reporting systems do not or cannot produce maternal mortality ratio estimates because many births and deaths are not in health facilities and not reported. Such estimates can be reliably derived only from separate surveys. <i>The timeliness standards set by the HMN assessment tool for this indicator are: highly adequate if 0-2 years; adequate if 3-5 years; present but not adequate if 6-9 years; not adequate at all if 10 years or more (HMN 2008).</i></p> <p>Under age five mortality rate (all causes), in years The timeliness for reporting the probability that a newborn baby will die before reaching age five, if subject to current age-specific mortality rates; expressed as a rate per 1,000 live births. Module link: Core Module, indicator 10 (mortality rate, under 5 [per 1,000]) <i>The timeliness standards set by the HMN assessment tool for this indicator are: highly adequate if 0-2 years; adequate if 3-5 years; present but not adequate if 6-9 years; not adequate at all if 10 years or more (HMN 2008).</i></p> <p>HIV prevalence among pregnant women aged 15–24, in years A basic indicator of HIV/AIDS prevalence, measured by the percentage of blood samples taken from pregnant women aged 15–24 who test positive for HIV during anonymous sentinel surveillance at selected prenatal clinics. The timeliness standards set by the HMN assessment tool for this indicator are: highly adequate if 0–2 years; adequate if 2 years; present but not adequate if 3–4 years; not adequate at all if 5 years or more (HMN 2008).</p> <p>Measles vaccination coverage by 12 months of age (months since data were collected) Indicates the most recent vaccination coverage rate available. <i>The timeliness standards set by the HMN assessment tool for this indicator are: highly adequate if 0-11 months; adequate if 12-17 months; present but not adequate if 18-29 months; not adequate at all if 30 months or more (HMN 2008).</i> All these indicators are available via the health system database at: http://healthsystems2020.healthsystemsdatabase.org/</p>

OUTPUTS CONT...

Indicator	Definition and Interpretation
22. Completeness of reporting, percent)	<p>Percentage of disease surveillance reports received at the national level from districts compared to the number of reports expected. Indicate whether such data are available, and note the most recent compilations (by year or month).</p> <p>This is an indirect measure of the performance of the disease surveillance system. For example, a value of 70 percent would indicate that 70 percent of districts send surveillance data and reports to the central level. If this percentage is 10 percent, then only 10 percent of districts reported to the central level on disease statistics, which could be a sign of a weak HIS. It should be noted, however, that if the country has a passive reporting system, reports are submitted only when cases are identified and not necessarily routinely.</p> <p>The HMN assessment tool does not provide a standard for reporting of percentage of surveillance reports received at the national level from districts compared to number of reports expected. Instead, the standard for “percentage of districts submitting weekly or monthly surveillance reports on time to the next higher level” was used: highly adequate if 90 percent or more; adequate if 75 percent–89 percent; present but not adequate if 25–74 percent; not adequate at all if less than 25 percent. This indicator is used by the HMN to assess the dimension of Capacity and Practices (defined as: Does capacity in country exist to collect the data, and analyze and manage the results? Are standards applied for data collection? Is documentation available, accessible and of high quality?) of the Health and Disease records (including disease surveillance systems) (HMN 2008b).</p> <p>Also note if there are data on a specific item (e.g., cholera reported). The surveillance reports should be submitted on a regular, standardized basis from each location. If a facility does not report on a given (week, month), then it reduces the completeness of reporting.</p>
23. Use of data for planning, budgeting, or fundraising activities in the past year	<p>This measures the government’s demonstrated use of HIS data (e.g., a change in budget levels, funding allocation/ budgeting proposals utilizing HIS data for advocacy).</p> <p>These data will be used to inform decision making in areas such as resource allocation, the issuing of health insurance cards, health promotion, and disease-prevention planning.</p> <p>Examine the presence of stakeholder cooperation mechanisms. For example, are meetings held to analyze disease patterns, trends, outbreaks, financial issues affecting health facilities, and/or performance of the health care delivery system? What is the promptness and adequacy of response measures?</p> <p>Mechanisms linking data/information to actual resource allocation (budgets and expenditure)</p> <ul style="list-style-type: none"> • Indicator-driven, short-term (1 year) and medium-term (3–5 years) planning • Organizational routines where managers are held accountable for performance through the use of results-based indicators at all levels of the health system • A program addressing behavioral constraints to data use, for example through applying incentives for data use, such as awards for best service delivery performance, best/most-improved district, or best HIS products/use • A supportive organizational environment that places a premium on the availability and use of well-packaged and well-communicated information and evidence for decision making. <p><i>Module link:</i> Leadership and Governance Module, Indicator 19 (Policy changes based on performance review)</p>
24. Data or results of analyses are fed back to data providers to inform them of program performance	<p>Feedback (written or oral) indicating if management uses information at various levels.</p> <p>Search for evidence of feedback in documents or communications</p> <ul style="list-style-type: none"> • What is the promptness and adequacy of response measures to a noted lack (or problem) of performance? • Are the data reported up through the system utilized in any sort of supportive supervision mechanism between health system levels? • Does any sort of benchmarking of facilities or districts take place based on the reported data? <p><i>Module link:</i> Leadership and Governance, Indicator 17 (use evidence to improve service delivery)</p>

KEY INDICATORS TABLE

Table 3.7.2 identifies eight indicators from the HIS indicator list that are particularly useful to: (1) monitor and track HIS performance over time; and (2) guide a team with severe time constraints to focus on the most important measures of health information systems. Depending on the scope and time and resources available for your particular assessment, you may modify this table and create your own list of key indicators.

TABLE 3.7.2: KEY INDICATORS

No.	Indicator
2	Availability at each level of a sufficient number of qualified personnel and infrastructure to operate, compile and analyze health information.
4	National HIS strategic plan consistent with resources available developed in broad consultation with key stakeholders, and widely accepted
7	Existence of policies, laws, and regulations mandating public and private health facilities/providers to report indicators determined by the national HIS
9	Availability of minimum core indicators at national and subnational level
13	Percentage of private health facility data included in reported data
17	Availability of a national summary report (i.e., annual health statistics report) that contains HIS information, analysis, and interpretation (most recent year)
23	Use of data for planning, budgeting, or fundraising activities in the past year
24	Data or results of analyses are fed back to data providers to inform them of program performance

7.4 SUMMARIZING FINDINGS AND DEVELOPING RECOMMENDATIONS

Section 2, Module 4, describes the process that the HSA team will use to synthesize and integrate findings and prioritize recommendations across modules. To prepare for this team effort, each team member must analyze the data collected for his or her module(s) to distill findings and propose potential interventions. Each module assessor should be able to present findings and conclusions for his or her module(s), first to other members of the team and eventually in the assessment report (see Annex 2.1.C for a suggested outline for the report). This process is interactive; findings and conclusions from other modules will contribute to sharpening and prioritizing overall findings and recommendations. Below are some generic methods for summarizing findings and developing potential interventions for this module.

ANALYZING DATA AND SUMMARIZING FINDINGS

Using a table that is organized by the topic areas of the chapter (see Table 3.7.3) may be the easiest way to summarize and group your findings. (This process is part of Module 2.4). Note that additional rows can be added to the table if you need to include other topic areas based on your specific country context. Examples of summarized findings for system impacts on performance criteria are provided in Annex 2.9.A. In anticipation of working with other team members to put findings in the SWOT framework, you can label each finding as either an S, W, O, or T (please refer to Section 2, Module 4, for additional explanation on the SWOT framework). The “Comments” column can be used to highlight links to other modules and possible impact on health system performance in terms of equity, efficiency, access, quality, and sustainability. Additional guidance on which indicators address each of the WHO performance criteria is included in Table 3.7.5

TABLE 3.7.3 TEMPLATE: SUMMARY OF FINDINGS—HEALTH INFORMATION SYSTEM MODULE

Indicator or Topical Area	Findings (Designate as S=strength, W=weakness, O=opportunity, T=threat.)	Source(s) (List specific documents, interviews, and other materials.)	Comments ^a

^a List how HIS findings affect the ability of policymakers and health system stakeholders and workers to measure, analyze, and improve system performance with respect to the five health systems performance criteria (equity, efficiency, access, quality, and sustainability) and list any links to other modules, as well as cross-cutting findings.

Table 3.7.4 is an example of how the Table 3.7.3 might look once completed and adapted to a country environment.

TABLE 3.7.4 KEY FINDINGS IN THE HIS MODULE FROM ST LUCIA

Strengths	Weaknesses
<ul style="list-style-type: none"> Electronic HMIS system has been purchased Strong project management team leading efforts to roll out electronic HMIS Routine reporting taking place across public health facilities, generating data Good technical infrastructure in place across health facilities to support SLUHIS 	<ul style="list-style-type: none"> Limited staff to support needs of a nationally implemented electronic HMIS Absence of unique patient identifier nationally limits capacity of SLUHIS to track patients Poor timeliness of data consolidation and dissemination limits effectiveness of data driven decision policy making Limited funding to complete all projected phases of SLUHIS rollout
Opportunities	Threats
<ul style="list-style-type: none"> Leverage the E-GRIP work plans and team to move the dialogue on a national identifier forward Timely data from health facilities using the SLUHIS increases the ability to drive demand for data Leveraging fledgling telemedicine efforts at Tapion hospital for broader purposes (internal and external to Saint Lucia) 	<ul style="list-style-type: none"> Weak functional specifications process at early stages of SLUHIS acquisition limiting ability to match functions to needs Delayed focus on reporting capacity of the SLUHIS may lead to further delays in consolidating data Unknown data quality may weaken value of SLUHIS rollout (GIGO) Technical support requirements of the SLUHIS will be beyond the manpower capacity of the HMIS unit

Source: Rodriguez et al. (2011)

As discussed in Section 1, Module 1, WHO's health system performance criteria can also be used to examine the strengths and weaknesses of the health system. Table 3.7.5 summarizes the HIS indicators that address some of the five key performance criteria highlighted by WHO: equity, efficiency, access, quality, and sustainability (WHO 2000).

TABLE 3.7.5: LIST OF SUGGESTED INDICATORS ADDRESSING THE KEY HEALTH SYSTEM PERFORMANCE CRITERIA

Performance Criteria	Suggested Indicator from HRH Module
Efficiency	23. Use of data for planning, budgeting, or fundraising activities in the past year (e.g., a change in budget levels in response to a new major health issue, fund allocation/budgeting proposals utilizing HIS data for advocacy)
Quality (including Safety)	16. Presence of procedures to verify the quality of data (accuracy, completeness, timeliness) reported, such as data accuracy checklists prior to report acceptance, internal data quality audit visits
Sustainability	1. Availability of financial and/or physical resources to support HIS-related items within MOH/central budget (or other central sources), regional budgets, and/or district budgets

DEVELOPING RECOMMENDATIONS

After summarizing findings for the chapter, it is time to synthesize findings across modules and develop recommendations for health systems interventions. Section 2, Module 4, suggests an approach for synthesizing findings across modules with your team and for crafting recommendations.

The objective of this module is to develop a comprehensive evaluation of the ability of current HIS systems and subsystems to provide timely and relevant information for use by decision makers at all levels (not necessarily only within the health sector) in order to make recommendations to improve the system. In interpreting the information gathered, reflect on results and group findings (many of which will be subjective) and focus your recommendations on improving data completeness, timeliness, integration, and management of information, and enhancing use of information for decision making. Some generic solutions or recommendations are provided in Table 3.7.6 if the system is deemed deficient in a particular area.

TABLE 3.7.6 ILLUSTRATIVE RECOMMENDATIONS FOR STRENGTHENING HEALTH INFORMATION SYSTEMS

Health Systems Gap	Possible Interventions
Data often incomplete Data not analyzed Data not shared on a regular basis	<p style="text-align: center;">Inputs</p> Implement data quality audit to improve processes. A first step is to evaluate the existing data quality (for timeliness, completeness, accuracy, etc.), then structure a routine process for reviewing and improving data quality by utilizing a data feedback loop. Include in the HIS data on the private sector, to expand reporting coverage. While this is challenging – few countries require the private sector to submit reports and data, and private sector data collection capacity varies – engaging the private sector raises its awareness of its responsibility to report. Also, reaching agreement between public and private sectors on the types of data the private sector should report and designing user-friendly report formats will facilitate and encourage private sector reporting.
Data not produced regularly and on time to meet planning and policy needs	Timeliness of data collection, transmission, analysis, and reporting might be improved by the following generic activities: <ul style="list-style-type: none"> • Build capacity, support, and/or supervise staff to improve compliance with MOH requirements and guidelines. • Improve means of data transmission at all MOH levels to facilitate timely data flow. • Strengthen data handling and analysis (often this improvement implies computerization or upgrading of existing means of electronic analysis). • Revise HIS guidelines to better align the needs of data and information users with existing data collection, communications, and analytic capacities. Include private sector stakeholders in this revision process • Revise HIS guidelines to better reflect the true needs of data users (i.e., are data really required on a monthly basis when they are only used annually as part of program review?).

TABLE 3.7.6 ILLUSTRATIVE RECOMMENDATIONS FOR STRENGTHENING HEALTH INFORMATION SYSTEMS CONT...

Health Systems Gap	Possible Interventions
Processes	
No linkages exist between the results and outputs of the various subsystems	<p>To what extent are the various subsystems integrated or linked? In many instances, some linkages may be subtle, such as whether census data are used to calculate appropriate denominators used in analyzing data collected in other subsystems.</p> <ul style="list-style-type: none"> • Improving the integration of HIS subsystems might be accomplished by ensuring that routine and non-routine data sets are combined to provide a comprehensive understanding of the health system and population health • Improving data handling and analysis (often this improvement implies computerization or upgrading of existing means of electronic analysis) • Harmonizing indicators and consolidating data collection tools to bring subsystems together and minimizing reporting burden on lowest levels in the health system • Increasing demand by information users and stakeholders for integrated analysis (i.e., combining or comparing vaccination program coverage data with vaccine-preventable disease data obtained from the infectious disease surveillance subsystem as a means of measuring program effectiveness and not simply coverage)
Outputs	
Data not consistently used for decision making and planning	<p>Improve information availability in the form of an annual “National Health Data or Statistics Report”</p> <p>Engage in a dialogue between data producers and information users across public and private sectors to clearly define their information needs, resource capacities, and requirements and adaptation of the HIS to fill those defined needs</p> <p>Provide data feedback to all levels and sectors in the health system on relevant domains of performance</p>

7.5 ASSESSMENT REPORT CHECKLIST: HEALTH INFORMATION SYSTEMS CHAPTER

□ Profile of Country Health Information Systems

- A. Overview of HIS
- B. Create HIS description (should include):
 - a. Management
 - b. Distribution
 - c. Selection
 - d. Procurement
 - e. Decentralization

□ Health Information Systems Assessment Indicators

- A. Inputs
- B. Processes
- C. Outputs

□ Summary of Findings and Recommendations

- A. Presentation of findings
- B. Recommendations