

SECTION 3: GUIDANCE ON ASSESSMENT OF THE HEALTH SYSTEM AND ITS CORE FUNCTIONS

MODULE 5: HEALTH INFORMATION SYSTEMS

5.1 Introduction

The objective of the assessment of the Health Information Systems (HIS) core function 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 the country's private for-profit and not-for-profit health providers. National HIS performance should be measured in terms of the quality and

The modules in this section describe the indicators that can be used to assess each of the health system core health system functions.

comprehensiveness of data produced (e.g., all actors delivering health services and products), and by the evidence of routine dissemination and regular use of data by all health system stakeholders to improve the performance of the entire national health system.

This module looks at how the HSA approaches the HIS Core Health System Function.

- Subsection 5.1 defines the HIS and its key components.
- Subsection 5.2 provides guidelines on preparing an HIS profile for the country.
- Subsection 5.3 presents three topics used to structure the HIS assessment and includes detailed descriptions of assessment indicators.
- Subsection 5.4 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 5.5 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.

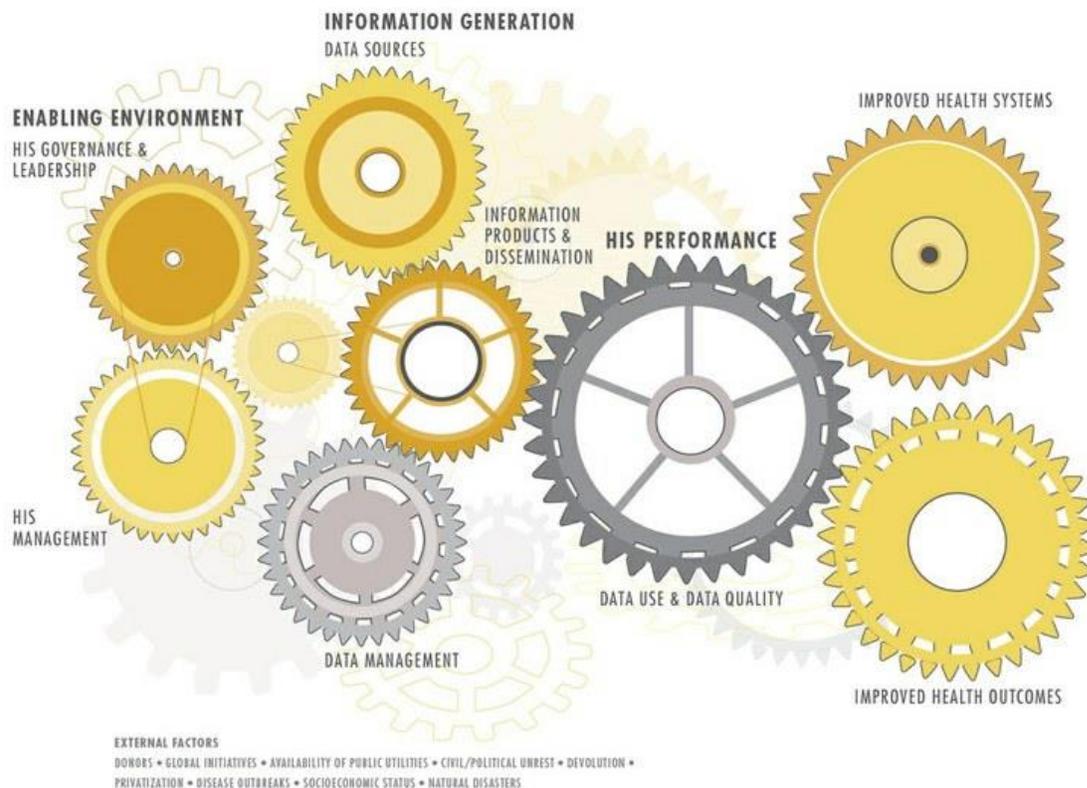
5.2 What Is a Health Information System?

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 health system decision making (HMN 2008).¹ USAID / MEASURE Evaluation developed a model for a national HIS Strengthening (Figure 3.5.1). The model developed using the WHO Health Metrics Network (HMN) framework as a foundation.

The HIS Strengthening Model describes three major components of a well-functioning health information system that contribute to turning the wheels of the health system to have better health

outcomes. These three components are: (1) An enabling environment for HIS constituted by HIS governance & leadership and HIS management; (2) information generation, that includes HIS data sources, data management, information products and dissemination; and (3) HIS performance measured in terms of the ability of the HIS to generate quality data and which are used for decision making to improve health systems functioning. As such, this model provides a useful outline for studying HIS and describing the fundamental requirements of strengthening HIS.

Figure 3.5.1 HIS Strengthening Model



Source: <http://www.cpc.unc.edu/measure/his-strengthening-resource-center/his-strengthening-model>.

An HIS typically has both health institution-based (i.e., health facility and community) data sources and population-based data sources. The institution-based data sources can be further divided into:

- Individual Record Systems (paper-based or electronic medical records of patients);
- Service Record Systems (health management information systems, community-based information systems; disease surveillance and lab information systems);
- Administrative Record Systems (human resource information, financial information, logistics management information).

Facility-based surveys, including Service Availability and Readiness Assessment (SARA) and quality of care assessments, also fall under facility-based information sources.

Population-based data sources are censuses, civil registration and vital statistics systems (CRVS), and population-based surveys, including surveys and studies done on a specific segment of the population, such as HIV-infected individuals or other key population groups.

It should be noted that with the increasing use of Information and Communications Technology (ICT) in the health sector, warehousing and triangulation of data from various sources is possible. For example, Geographic Information Systems (GIS) and electronic dashboards often integrate into a single platform data from various sources, such as Demographic and Health Surveys (DHS), logistics management information systems (LMIS), service record systems, and disease surveillance systems. These platforms allow for triangulation and analysis, and thus a broader and more nuanced understanding of the health situation in a given area or within a specific population. Therefore, a comprehensive HSA of the country's HIS should consider all three components of HIS relating to both health institution- and population-based information systems in public and private (NGO/FBO and commercial) sectors.

In the context of monitoring Universal Health Coverage (UHC), the focus is on monitoring effective service coverage as well as financial protection coverage.^{1,2} Ideally, the sources of data are nationally representative, population-based surveys that enable the measurement of those in need of intervention (in addition to counting those who receive it), and allow for disaggregation of coverage by different subpopulations for equity analysis. However, health facility based data may be used in conjunction with additional analytic steps to estimate denominators or conduct equity analyses, such as by estimating the population served in a given catchment area.³

5.3 Developing a Profile of the Health Information System

This section provides guidance on developing a profile of a country's HIS, which is the natural starting point for an indicator-based assessment.² The intent of the assessment is not to review, interpret, or analyze the values of health statistics or other data produced by the system, but rather to assess the readiness and ability of the system to produce valid, reliable, timely and reasonably accurate information for use by planners and decision makers.

The analysis and interpretation of these indicators should serve as the basis for further strengthening of a country's HIS; with that purpose, each indicator in Subsection 5.3 is supplemented by a descriptive analysis of that indicator to help clarify the actual situation reflected by the assessment indicator.

However, before addressing the specific indicators in Subsection 5.3, you will need to map or develop a profile of the existing national routine HIS by first listing, then developing, a schema or flowchart for each HIS component or subsystem. If you do this for all government levels and private organizations, you can visualize and better understand the country's entire health information system structure on a single page. When mapping the data flow, be sure to examine how data are collected from, and shared with, private health stakeholders. In addition, include how the data are collected and transmitted to map how data are being managed as well as the points at which ICT is playing a role.

¹ Monitoring progress towards universal health coverage at country and global levels Framework, measures and targets May 2014

(http://apps.who.int/iris/bitstream/10665/112824/1/WHO_HIS_HIA_14.1_eng.pdf?ua=1)

² Effective Coverage: A Metric for Monitoring Universal Health Coverage: Marie Ng, Nancy Fullman, Joseph L. Dieleman, Abraham D. Flaxman, Christopher J. L. Murray, Stephen S. Lim; Institute for Health Metrics and Evaluation (IHME), University of Washington, Seattle, Washington, United States of America
(<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001730>)

³ Meeting Report: Monitoring Universal Health Coverage Rockefeller Centre, Bellagio, 16–19 November 2015
(http://www.who.int/healthinfo/universal_health_coverage/UHC_Meeting_Nov2015_Report.pdf?ua=1)

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 RHIS and the data that each system supplies. It also includes guidance for creating a data flowchart that specifies which types of data are reported by each level of care in a RHIS. (the chart and guidance are provided in Annex 3.7.A.)

Use this tool for mapping a generic data flow of routine information systems as well as periodic data collected across the country or specifically for mapping data sources for monitoring UHC indicators of effective service coverage and financial protection coverage.

Creating a flowchart by reporting level and by stakeholder group will help show who reports to whom, at what frequency, and what types of data are reported. This will help in the assessment of these data sources in the context of their overall governance, and their performance in terms of data management, quality and use. The subsequent assessment of these data sources will try to answer such questions as: Is it established by law? Are procedures standardized? Are international classifications used for classifying specific diseases? Are adequate control mechanisms in place to ensure data quality?

A number of HIS components operate within a country's health sector and enable the management of various service and support systems. Each may have a separate flow of data and thus distinct reporting mechanisms. Externally funded programs (e.g., HIV/AIDS, TB, malaria) often have unique indicators that are reported through a separate mechanism or system. Understanding the diverse components; their operation; and their levels of integration, consolidation, and cohesion is important for contextualizing the performance of the HIS and identifying opportunities for its strengthening. It also is critical to consider the private commercial and not-for-profit providers (such as FBOs and NGOs), such as the degree to which their health data is incorporated into national systems and thus national planning cycles. If they are not included, as is often the case, are there policies and concrete plans to incorporate these sectors into the national HIS?

Because the structure and functional format of an HIS reflects the organizational structure of an 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 with 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 central level, regional or provincial level, district level, and health center or facility level. The national or ministry level may include health parastatals (e.g., national reference laboratories and teaching hospitals). It is also important to 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

TIP BOX

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

the census is often the purview of the office of statistics). In many countries, universities and other higher-level education institutes play an important role in conducting national health surveys.

Because HIS-related international donor support may affect how the country's HIS is organized and functions, you must investigate donor assistance: Does it target the HIS comprehensively, or only individual components or geographical areas? In some countries, external development partners contribute the majority of funds and resources for an HIS. For more information on this area, see Subsection 5.3, Topic A of this Module, and for external development partner mapping, in Section 3, Module 1, Country and Health System Overview. Development partner implementation plans, monitoring and evaluation plans, and activity reports also are informative, if accessible.

Decentralization and Health Information Management

In a decentralized health system (see Section 3: Modules 3.1, Country and Health System Overview, and 3.7, Leadership and Governance, for definitions of decentralized health systems), some government functions and responsibilities are devolved to lower levels of government (e.g., 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 currently structured to satisfy the information needs of each level. If not, the utility of the HIS as a planning and management tool is likely to be limited. For example, data may flow directly to the central level for analysis and yet have more relevance to a subnational level from where it was collected and 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., HMIS, LMIS, HRIS, FMIS) are the responsibility of subnational levels, you will need to look for information at those levels.

TIP BOX

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.

A well-functioning decentralized HIS could result in the following:

- Greater ownership of the HIS by subnational offices that have institutionalized mechanisms to ensure HIS data quality and information use; and,
- Better engagement of the private sector in contributing to the HIS.

You might also encounter:

- Distinct data definitions and data collection methods at different levels;
- Duplicative data or datasets being collected at different locations;
- Variations in the routine 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, regions, provinces, or districts may report to the central level while others do not, thus compromising the completeness and reliability of national data sets
- If standards and indicators for data collection are defined nationally in a highly decentralized context, the issue of relevance to the decentralized level can become an issue. Yet even when HIS responsibility and management are shifted to subnational levels, HIS structures and functions in all regions must conform to national standards and follow guidelines on data

collection, reporting, and analysis. The subnational levels must be held accountable for the application and implementation of the national standards.

Mapping HIS roles and responsibilities at different levels of the health system according to the HIS Strengthening Model can help in understanding the current status of decentralization of HIS functions and inform follow-on recommendations.

5.4 Assessment Indicators

This section focuses on HIS assessment indicators that will help diagnose the relative strengths and weaknesses of a country's HIS and inform recommendations for strengthening interventions. It provides the topics into which the HIS assessment indicators are grouped, lists data sources to inform those indicators, discusses how to deal with indicators that overlap with other core health system function modules, clearly defines the indicators, and shows how to work with them.

The section also identifies key HIS assessment indicators for the HSA technical team member to focus on, if lack of available time precludes measuring all indicators.

Topics

The indicators for this module are grouped into three topics, based on the HIS Strengthening Model.:

- A. HIS Governance and Management
- B. Data Management
- C. HIS Data Quality and Information Use

This topical arrangement also links to the HMN Framework where HIS components and standards are organized as inputs, processes and outputs. The World Health Organization (WHO) in collaboration with USAID/MEASURE Evaluation, University of Oslo and other international reference organizations have developed a resource kit for health facility and community based information systems. The kit contains Standards for Information Systems—Tool for Assessment and Planning (SISTAP), which presents detailed indicators for assessing a country's HIS.

The indicators selected for this HIS component of the HSAA document are mostly taken from that assessment tool in combination with those used in PRISM Assessment and Data Quality Review/Audit tools to frame a simplified, best practice approach to broadly assess a country's HIS data sources. Also referenced is the USAID/MEASURE Evaluation's RHIS Data Management Standards Guidance document,⁴ which proposes standards on data management for RHIS across four themes: (1) User's data and decision support needs; (2) Data collection, processing, analysis and dissemination of information; (3) Data integration and interoperability; and, (4) Governance of RHIS data management. The development of the SISTAP benefited from this guidance document. As such, an understanding of HIS data management standards will help in articulating the assessment questions for HSA.

⁴ <http://www.cpc.unc.edu/measure/resources/publications/ms-15-99>.

Table 3.5.1 Indicator Map–Health Information System

Topic	Indicator Numbers
A. HIS Governance and HIS Management	1–8
B. Data Management, Information Product and Dissemination	9–21
C. HIS Data Quality and Information Use	22–24

Assessment Methodology

As explained earlier, the purpose of an assessment of the HIS is to understand the capacity of the country’s health information system to produce reliable information for decision-makers. As such, the assessment does not review, interpret, or analyze the health statistics or data produced by the population- or institution-based information systems rather it looks at how the system functions.

To carry out the assessment of the country’s HIS as part of the overall HSA Approach, relevant evidence is collected to study the existing HIS governance and management mechanisms, HIS data management practices, and the evidence of the ability of the HIS to generate and use quality data.

Data collection for the purpose of the assessment is organized in three categories:

- A. Document review
- B. Key stakeholders interviews
- C. Site visits for physical verification of the various component or products of the system

There are a number of standardized and widely used tools for HIS assessment that can be used to feed into the HAS.⁵

A. Document review

Documents that can help in planning and conducting the assessment can be accessed through both global and national sources.

1. **Global sources:** Data drawn mainly from existing and publicly available international databases.

The World Development Indicators database on the World Bank website (at <<http://data.worldbank.org/data-catalog/world-development-indicators>> provides indicator results on the completeness of birth and death registrations by country to help assess the functionality and

HIS ASSESSMENT TOOLS

- PRISM Assessment Tools
- Data Quality Audit tool
- Routine Data Quality Assessment Tool
- Standards for Health Facility and Community Information System-Tool for Assessment and Planning (SISTAP)

These tools can be access at:

www.cpc.unc.edu/measure/resources/tools.

⁵ PRISM tools are used for a comprehensive qualitative assessment of the country’s routine health information system; SISTAP can be applied in a range of ways depending on the needs of the HIS at the time it is used. The primary applications of the tool are as:

1. Facilitator Guided Workshop—representative s from different levels of the health system, and different program areas, come together in a workshop setting to discuss and come to consensus on the extent to which the HIS adheres to the identified standards.
2. Sample of health facilities and subnational HIS units—assessment teams descend to health facilities and HIS management units at subnational level to interview key staff and complete standard templates to determine adherence to the standards.

robustness of its CRVS. This type of national coverage indicator is also available from (i) the United Nations Demographic Yearbook, (ii) United Nations Statistics, and (iii) UNICEF.

Other international standard health system surveys contain a wealth of information that, with additional analysis, can provide a more nuanced view of access, equity, efficiency and quality of health services in a specific country. The availability of such survey data is itself an indicator of access to useful and globally standardized HIS databases for the specific country.

Such publicly available data products include:

- Demographic Health Surveys (DHS)
- AIDS Indicator Surveys (AIS)
- Household health expenditure surveys
- National Health Accounts (NHA)
- Living Standards Measurement Surveys (LSMS)
- Multiple Indicator Cluster Surveys (MICS)

2. **National sources:** Data should be gathered to the extent possible through desk review of all relevant reports and policy documents whenever available, including:

- Health Metrics Network Assessment Reports;
- 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 eHealth strategy document;
- National HIS operational plan/budget (if available);
- Human Resources Information Systems reports;
- Country census files;
- Vital events records (as available) or alternatively, Sample Vital Registration with Verbal Autopsy (SAVVY) Reports; National data management software platform guidelines;
- 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.

B. Stakeholder interviews

Document review is 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 topics and assessment indicators and under "Issues to Explore."

Annex 3.7.B also presents a Summary of HIS issues to discuss in stakeholder interviews.

Key HIS stakeholders to interview include:

- The Ministry of Health (MOH) planning unit or health information unit;
- Central statistics office (may be within the Ministry of Finance);
- Vital Records Office;

- 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; Director of eHealth; other government agencies involved in HIS strengthening such as the ministries of telecommunications 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 data⁶;

C. Physical verification of the various components and products of HIS sub-systems

For example:

- Electronic systems for data collection, aggregation, communication and visualization
- Availability of ICT equipment, guidelines, reports etc. at health offices
- HIS-related training curricula
- HIS-related protocols and manuals

5.5 Detailed Indicator Descriptions

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

Topic A: HIS Governance and Management

Overview

Robust HIS governance framework is necessary in the management of the complex mechanisms, processes, relationships and institutions crucial for the functioning of the HIS in a country. Key elements that form the foundation of HIS governance and management include:

- **Partnership and coalition building:** Formal ways to operationalize broad-based (public and private) stakeholder coordination in HIS is to develop a participatory national HIS strategy to streamline and improve existing data collection, aggregation, and reporting mechanisms particularly in the context of capturing data to monitor UHC indicators, institutionalizing data quality assurance mechanisms and information use procedures, roles and responsibilities of all stakeholders (public and private), funding for HIS strengthening including maintenance of the current HIS operating systems, achieving interoperability of ICT based health data systems, and improving integration of data at national and subnational levels. There can also be a separate eHealth (and mHealth) strategy outlining the use of ICT for HIS.
- **Health information legislation, policy and standards:** existing legislative and regulatory framework for public and private providers; use of standards, guidelines for transmission,

⁶ In some countries, HIS staff may be seconded from the central statistical office and may not appear on the MOH establishment register.

management and storage of information; rules and guidelines for data confidentiality and security; standards and guidelines for the use of ICT for HIS, interoperability and access.

- **Financial resources:** government investment in the processes for the production of health information (e.g., collection of data, collation, analysis, dissemination, and use, data quality assurance, HIS management, capacity building);
- **Human resources:** adequately trained HIS personnel at all 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 at health institutions (including community-based service sites) and health system management units;
- **HIS capacity building:** training institutes, training curricula, trainers, pre-service and in-service training arrangements, maintaining HIS training standards and certification;

Table 3.5.2 Governance and Management

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 subnational 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>Explore whether external development partners are present, and, if so, provide a qualitative description of how donor funding is assisting or preventing the HIS efficiency and effectiveness. For some countries, it may be the main source of funds and resources for the HIS. If external development partners 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 external development partners 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

Indicator	Definition and Interpretation
	<p>not shared (e.g., computers bought by a program can be used only by that program) across the health system.</p> <p>Module link: Section 2, Module 1: Country and Health System Overview, section on development partner mapping, and, Module 7: Leadership and Governance 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>Data source: MOH Budget; MOH or the donors may also compile a document to show all the financial or other resources mobilized by the donors in support of HIS.</p>
<p>2. Availability at each level of a sufficient number of qualified and competent HIS personnel</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 first reviewing MOH documents that lay down the HIS staffing positions and respective HIS knowledge, skills and competencies disaggregated by level (national, subnational, health facility, community). In accordance with that staffing layout, prepare a staffing profile of the HIS unit at the MOH central level and subnational levels, including clear delineation of lines of supervision. It is important to know whether the MOH has visualized the need for trained statisticians, epidemiologists, and information technology personnel to support the HIS unit and has actually put them in place. 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>Similarly, it is important to know the profile of ICT staff deployed for supporting HIS activities at national and subnational levels—fully dedicated to provide ICT services for the HIS. Also, assess the skills of the HIS and health staff in using ICT applications used for HIS in the country.</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>Data Source: Stakeholders Interview; review MOH/HIS/M&E Unit organogram; PRISM Assessment (particularly the Management Assessment section). The management assessment section of the PRISM assessment can provide insight on the availability of staff, HIS tools and equipment at district and health facility levels. You may plan to conduct such assessment, or review recently conducted assessment reports, if available.</p>

Indicator	Definition and Interpretation
<p>3. Evidence of HIS workforce development mechanisms</p>	<p>Training is essential to maintain and/or augment HIS core competencies of the personnel.</p> <p>Look for the existence of a systematic and formalized workforce development strategy— e.g., does the country has a HIS workforce development plan for the required positions and functions; 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>Investigate for the presence of induction or on-the-job 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. Ask for training institutions which provide HIS related trainings, pre-service and in-service, to health staff, HIS managers, and ICT experts. Explore if there is a training database maintained for HIS trainings, including training on ICT.</p> <p>Keep in mind that HIS training activities are often funded by external donors. Examine if such donor funded HIS trainings are done regularly through training institutions or organized on ad hoc by various project funded by those donors.</p> <p>Data source: Review of documents; Stakeholders interviews; PRISM Assessment</p>
<p>4. Existence of a National HIS strategic/comprehensive 5-year plan, costed, with clear roles and responsibilities, developed through a participatory process with engagement of key stakeholders (public, private, civil society, development partners, researchers), and widely accepted</p>	<p>The starting point for strengthening the HIS is a fully endorsed national strategic plan that provides direction and coherence to HIS strengthening efforts. This can be a comprehensive 5-year costed plan that covers various aspects of the national HIS, including population and institution based data sources, use of ICT for HIS, capacity building mechanisms, promotion of data use and data quality.</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 • 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 was involved in the development of the plan and to which the private sector is incorporated into the plans. Explore the awareness and acceptance of the HIS strategic/comprehensive plan among the stakeholders.</p> <p>Data Source: Document review; stakeholders interview</p>

Indicator	Definition and Interpretation
<p>5. Clearly defined and functioning HIS management structures are in place: These include a regulatory authority, interagency coordinating body with the mandate and capacity to guide the implementation of the national HIS strategy, management bodies for ICT infrastructure and support, financial and human resources, and an oversight body</p>	<p>It is important to determine if such bodies exist, and are effective.</p> <p>A regulatory body is an essential component of good governance. This body sets the HIS policies and standards and regulates the adherence to these regulations. These regulations can include aspects of data confidentiality and security, access to data, public and private sector reporting requirements, use of ICT, and reporting notifiable diseases. Examine the regulations set by this body and the mechanisms for ensuring adherence to them.</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. External donors, if active in HIS strengthening, are worth consideration as permanent or temporal group members. 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>Data Source: Document review; stakeholders interview</p>
<p>6. Existence of policies, laws, and regulations mandating public and private health facilities/providers to report indicators determined by the national HIS</p>	<p>List existing documents. 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 private and public 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 beyond the presence of a regulatory framework (which does not guarantee compliance).</p> <p>Data Source: Document review; stakeholders interview</p>

Indicator	Definition and Interpretation
7. Presence of mechanisms to review and agree on a core and standardized set of HIS indicators.	<p>For a harmonized and standardized HIS, it is essential that countries have a minimum set of indicators that is agreed upon through a consultative process and is in line with global standards. Examine if the country has published such a list of core HIS indicators, and whether it was agreed upon through consultations with the stakeholders.</p> <p>State whether a formalized mechanism to review and agree on national core list of HIS indicators exists and if so, provide a qualitative description of mechanisms and processes. 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. Compare the indicators to global standards as well as those in use in neighboring countries. 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> <p>Data Source: Document review; stakeholders interview</p>

Topic B: Data Management

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 difficult to use the output of HIS for decision-making.

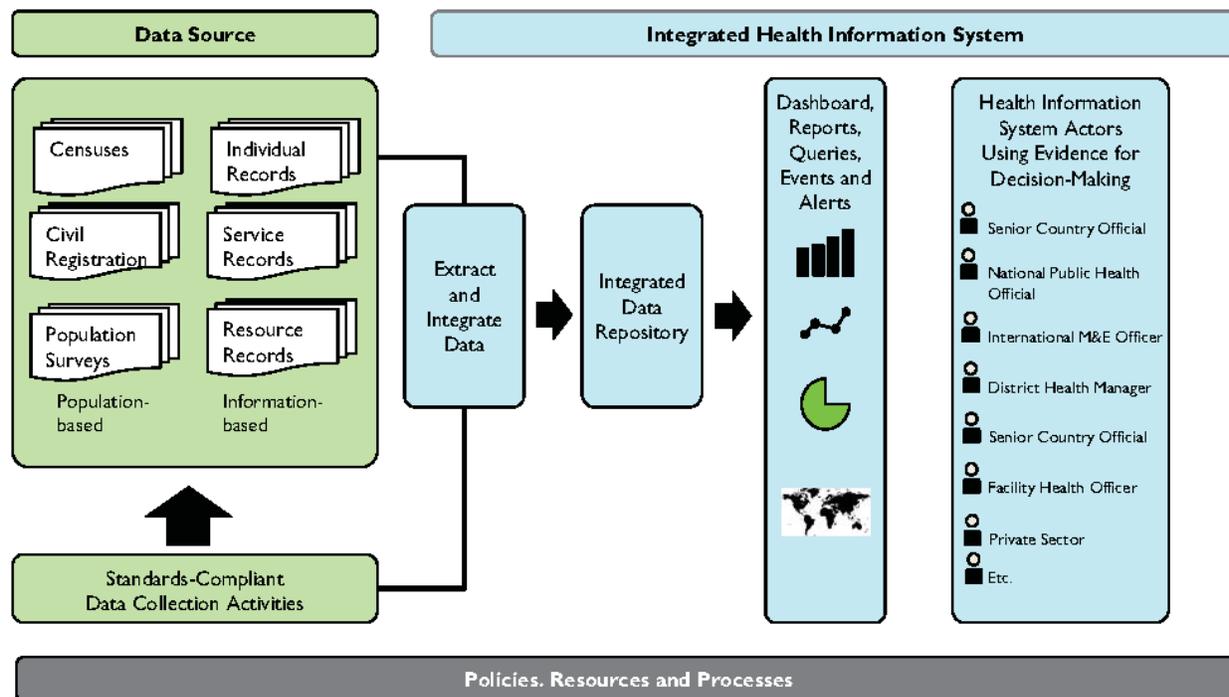
An integrated, well-functioning HIS should be able to produce data for a number of specific service and support sub-systems and altogether generates a series of indicators that relate (1) to the determinants of health, including socioeconomic, environmental, behavioral, and genetic determinants or risk 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 3.5.2 presents the data sources and the processes by which to collect, analyze, and apply the data to health sector policy and planning.

TIP BOX

CHECK OUT MEASURE EVALUATION

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

Figure 3.5.2 Schematic of an Integrated HIS



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

HIS data management encompasses a wide range of functions essential for maintaining a system capable of producing quality data and institutionalized use of the information generated by that system. The foundation stone of an efficient and effective HIS is the set of indicators that meet the needs of information needs for managing the health services and the support systems with the overall health system. These indicators form the basis of designing the data collection tools and methods, which in turn influence how the data are managed. Data management, therefore, involves making available a core set of HIS indicators that meet the data needs at various levels of the health system and the mechanisms for operationalization of data management functions,⁷ which are:

- Setting and implementation of data standards
- Data collection
- Data reporting
- Data quality assurance
- Use of ICT for data processing
- Data analysis, information packaging and dissemination

⁷ Taken from the WHO/MEASURE Evaluation/University of Oslo—Draft Proposed Harmonized Data Management Standards; Jan 27, 2015; and USAID/MEASURE Evaluation HIS Strengthening Model. Most of the HIS assessment indicators included in this HSAA document refer to the indicators listed in these documents.

Table 3.5.3 Data Management, Information Products and Dissemination

Indicator	Definition and Interpretation
<p>8. Availability of minimum core indicators at national and subnational level, including the community level</p>	<p>Qualitative description of available data systems and how they 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. Data should be available disaggregated by key stratifiers (e.g. age, sex, administrative area). The core standardized indicators should be appropriate with regard to their management and programmatic decisions, and the disease and program specific data are aligned with the core set of indicators.</p> <p>In the context of monitoring Universal Health Coverage (UHC), country's HIS should have the ability to generate and use data on effective service coverage and financial protection coverage⁸. Within the national list of core indicators, look for the presence of indicators that monitor the UHC, particularly the effective service coverage. Such indicators include measurements of individual and population needs for particular services, use of those services, and actual health benefits from those services.</p> <p>Data source: Document review; stakeholders interview</p>
<p>9. Birth registration and Death registration coverages⁹</p>	<p>Birth and death registration coverages indicate the robustness of the country's CRVS system.</p> <p>Data Source: Estimates of coverage are available from two sources: (i) the United Nations Demographic Yearbook, and (ii) United Nations Statistics and UNICEF. They are also available on http://data.worldbank.org/data-catalog/world-development-indicators</p>
<p>10. There is an overall framework/ strategy for the implementation of ICT for HIS</p>	<p>With most of the low and middle income countries increasingly embracing ICT for HIS, these countries need a well-formulated strategy and roadmap for implementing ICT for HIS. Such a strategy should be developed in consultation with and involvement of the stakeholders, and efforts should be in place to implement the strategy. Look for evidence for a harmonized introduction of ICT, which can include evidence of availability of equipment and training for ICT, availability of national standards for design and development of ICT approaches, availability of meta-data (e.g. data dictionaries), availability of adequate ICT maintenance support, introduction of ICT for patient-level and aggregate level data in a harmonized and standardized manner.</p> <p>Data source: Document review; stakeholders interviews; physical assessment of ICT</p>

⁸ Effective Coverage: A Metric for Monitoring Universal Health Coverage: Marie Ng, Nancy Fullman, Joseph L. Dieleman, Abraham D. Flaxman, Christopher J. L. Murray, Stephen S. Lim; Institute for Health Metrics and Evaluation (IHME), University of Washington, Seattle, Washington, United States of America (<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1001730>)

⁹ World Health Organization: Global Reference List of 100 Core Health Indicators 2015.

Indicator	Definition and Interpretation
11. 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).</p> <p>Are these accessible by the public? Were the MOH records or health information department aware of the types of data sources available?</p>
12. Availability of a Master Facility List (MFL) with unique identifiers and including the private sector and parastatal health facilities	<p>A master facility list (MFL) is not only necessary for efficient management of health infrastructure, but an electronic MFL with unique identifiers for the health facilities serves as the cornerstone for the integration and interoperability of health facility based datasets generated by different implementers.</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> <p>Data source: Document review and physical assessment of the MFL</p>
13. 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, 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> <p>You can use PRISM Assessment reports, if available to get data for this indicator.</p>
14. Percentage of private health facility data included in reported data	<p>MOH reports should indicate whether private for profit, NGO, and FBO 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 non-government facilities for essential services in many developing countries.</p>

Indicator	Definition and Interpretation
<p>15. 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>16. Data burden on health staff (measures as the 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.</p> <p>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?</p> <p>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>17. Presence of institutionalized regular 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 International Monetary Fund's (IMF's) "Data Quality Assessment Framework" (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

Indicator	Definition and Interpretation
	<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.</p> <p>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> <p>Data Source: Document review; stakeholders interview; spot checks</p> <p>Look for documents that lay down a data quality assurance plan at national level and for the availability of the data quality assurance guidelines at subnational and facility levels. Examine records of data quality checks carried out by national and subnational supervisors or teams. Review the frequency of the data quality checks conducted by national and subnational supervisors/managers; and any written feedback provided to the concerned staff/units/departments.</p>
<p>18. Availability of a national summary report (i.e. annual health statistics report) that contains HIS information, analysis, and interpretation (most recent year)</p>	<p>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? Are these reports available online? Are previous annual national summary reports accessible online?</p>
<p>19. 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>	<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>Are data from different sources available online? Does electronic information system integrate data from different sources? Does the electronic system generate reports drawing data from different databases? Do the electronic systems allow for data triangulation and visualization as integrated charts/graphs or tables?</p> <p>Module link Leadership and Governance Module, Indicators 9 (data flows) and II (data presentation to policymakers)</p>

Indicator	Definition and Interpretation
<p>20. 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>	<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. Also, where feasible, look for the source of data for the denominators at national, subnational and health center levels.</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>
<p>21. Availability of the results of timely data analysis, as defined by stakeholders and users</p>	<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. Did the HIS staff receive training on data analysis?</p> <p>Look for availability of HIS products, like reports, bulletins, other documents that contain analysis and interpretation of HIS data. Look for access of the health managers/HIS staff and other stakeholder to electronic dashboards, Decision Support Systems that can generate graphs, charts and tables for analysis if levels, trends and differentials. Explore if the analysis uses appropriate data for calculating indicators.</p> <p>Module link: Leadership and Governance Module, Indicators 7 and 8 (responsiveness to stakeholders)</p>

Topic C: Data Quality and Information Use

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). The following are

selected key tracer indicators to understand the ability of the country's HIS to produce quality data and promote information use.

Table 3.5.4 Data Quality and Information Use

Indicator	Definition and Interpretation
<p>22. Timeliness of reporting specified indicators</p>	<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</p> <p>Note: Estimates derived by regression or similar modeling methods should NOT be considered.</p> <p>This indicator 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.</p> <p>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.</p> <p>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).</p> <p>Under age five mortality rate (all causes), in years</p> <p>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])</p> <p>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).</p> <p>HIV prevalence among pregnant women aged 15–24, in years</p> <p>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)</p> <p>Indicates the most recent vaccination coverage rate available.</p>

Indicator	Definition and Interpretation
	<p>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).</p>
<p>23. Completeness of disease surveillance reporting, (percent)</p>	<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>
<p>24. Use of data for planning, budgeting, or advocacy activities in the past year</p>	<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>Required 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.

Indicator	Definition and Interpretation
	<p>At subnational levels, look for presence of mechanisms or formal forums where HIS data is presented, discussed and decisions taken are recorded and followed-up. Examine the composition of these forums and see if stakeholders other than government health managers are also included in the membership. Look for evidence of the functionality of these forums.</p> <p>Data source: Document review, stakeholders interviews, physical verification of the evidence.</p> <p><i>Module link:</i> Leadership and Governance Module, Indicator 19 (Policy changes based on performance review)</p>
<p>25. Data or results of analyses are used at every level of the health system to inform them of program/health system's performance</p>	<p>Look for evidence that there are mechanisms/tools/systems in operation that facilitate HIS data analysis at different levels of the health system. Electronic dashboards and decision support systems or paper-based charts help in data analyses and visualization. Explore if health managers and staff are able to access and operate the electronic tools and explain/interpret the data.</p> <p>In addition, feedback (written or oral) indicate 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 3.5.5 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 3.5.5 Key Indicators

No.	Indicator
26	Availability at each level of a sufficient number of qualified and competent HIS and service management personnel to operate, compile and analyze health information.
27	Existence of a National HIS strategic/comprehensive 5-year plan, costed, with clear roles and responsibilities, developed through a participatory process with engagement of key stakeholders (public, private, civil society, development partners, researchers), and widely accepted
28	Existence of policies, laws, and regulations mandating public and private health facilities/providers to report indicators determined by the national HIS
29	Availability of a standard minimum set of core indicators at national and subnational level including the community level
30	Percentage of reported data that comes from private health facilities
31	Availability of a national summary report (i.e., annual health statistics report) that contains HIS information, analysis, and interpretation (most recent year)
32	Use of data for planning, budgeting, or advocacy activities in the past year
33	Data or results of analyses are used at every level of the health system to inform them of program/ health system's performance

5.6 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. The team member should be able to present findings and conclusions for his or her modules, 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 3.5.6) may be the easiest way to summarize and group your findings. 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 3.5.8.

Table 3.5.6 Template: Summary of Findings–Health Information System Module

Indicator or Topic	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 the findings affect the ability of policymakers and health system stakeholders and others 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 3.5.7 is an example of how the Table 3.5.6 might look once completed and adapted to a country environment.

Table 3.5.7 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 3.5.8 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 3.5.8 List of Suggested Indicators Addressing the Key Health HIS System Performance Criterion

Performance Criteria	Suggested Indicator from HIS 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 3.5.9 if the system is deemed deficient in a particular area.

Table 3.5.9 Illustrative Recommendations for Strengthening Health Information Systems

Health Systems Gap	Possible Intervention
HIS Governance and Management	
Data often incomplete Data not analyzed Data not shared on a regular basis	<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.</p> <p>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.</p>
Data not produced regularly and on time to meet planning and policy needs	<p>Timeliness of data collection, transmission, analysis, and reporting might be improved by the following generic activities:</p> <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).

	<ul style="list-style-type: none"> • 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?).
HIS Data Management	
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)
HIS Data Quality and Information Use	
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>

5.7 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