

*Toolkit on monitoring health systems strengthening*

# **HEALTH INFORMATION SYSTEMS**



**World Health  
Organization**

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## Table of contents

<b>1. Introduction .....</b>	<b>2</b>
<b>2. Expectations of a country health information system .....</b>	<b>3</b>
<b>3. Sources of information about the country health information system .....</b>	<b>4</b>
<b>4. Criteria for assessing country health information system performance .....</b>	<b>4</b>
<b>5. Methods for assessing country health information system performance .....</b>	<b>7</b>
<b>6. Core indicators for country health information system performance .....</b>	<b>8</b>
Health surveys .....	8
Birth and death registration .....	8
Census .....	8
Health facility reporting.....	9
Health system resource tracking.....	9
Capacity for analysis, synthesis and validation of health data.....	9
<b>7. Summary measure of health information system performance .....</b>	<b>9</b>
Annex: selected tools .....	14

# 1. Introduction

Sound and reliable information is the foundation of decision-making across all health system building blocks, and is essential for health system policy development and implementation, governance and regulation, health research, human resources development, health education and training, service delivery and financing.

*The health information system provides the underpinnings for decision-making and has four key functions: data generation, compilation, analysis and synthesis, and communication and use. The health information system collects data from the health sector and other relevant sectors, analyses the data and ensures their overall quality, relevance and timeliness, and converts data into information for health-related decision-making.<sup>1</sup>*

The health information system is sometimes equated with monitoring and evaluation but this is too reductionist a perspective. In addition to being essential for monitoring and evaluation, the information system also serves broader ends, providing an alert and early warning capability, supporting patient and health facility management, enabling planning, supporting and stimulating research, permitting health situation and trends analysis, supporting global reporting, and underpinning communication of health challenges to diverse users. Information is of little value if it is not available in formats that meet the needs of multiple users – policy-makers, planners, managers, health care providers, communities, individuals. Therefore, dissemination and communication are essential attributes of the health information system.

Health planners and decision-makers need different kinds of information including:

- health determinants (socio-economic, environmental behavioural, genetic factors) and the contextual environments within which the health system operates;
- inputs to the health system and related processes including policy and organization, health infrastructure, facilities and equipment, costs, human and financial resources, health information systems;
- the performance or outputs of the health system such as availability, accessibility, quality and use of health information and services, responsiveness of the system to user needs, and financial risk protection ;
- health outcomes (mortality, morbidity, disease outbreaks, health status, disability, wellbeing); and
- health inequities, in terms of determinants, coverage of use of services, and health outcomes, and including key stratifiers such as sex, socio-economic status, ethnic group, geographic location etc.

A good health information system brings together all relevant partners to ensure that users of health information have access to reliable, authoritative, useable, understandable, comparative data.

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<sup>1</sup> Health Metrics Network Framework and Standards for Country Health Information Systems, World Health Organization, January 2008

## 2. Expectations of a country health information system

Health information systems serve multiple users and a wide array of purposes that can be summarized as the generation of information to enable decision-makers at all levels of the health system to identify problems and needs, make evidence-based decisions on health policy and allocate scarce resources optimally.<sup>2</sup> Data from different sources are used for multiple purposes at different levels of the health care system.

- **Individual** level data about the patient's profile, health care needs, and treatment serve as the basis for clinical decision-making. Health care records provide the basis for sound individual clinical care. Problems can arise when health workers are overburdened by excessive data and reporting demands from multiple and poorly coordinated subsystems.
- **Health facility** level data, both from aggregated facility-level records and from administrative sources such as drug procurement records, enable health care managers to determine resource needs, guide purchasing decisions for drugs, equipment and supplies, and develop community outreach. Data from health facilities can provide immediate and ongoing information relevant to public health decision-making but only if certain conditions are met. The data must be of high quality, relate to all facilities (public and private), and be representative of the services available to the population as a whole.
- **Population** level data are essential for public health decision-making and generate information not only about those who use the services but also, crucially, about those who do not use them. Household surveys have become a primary source of data in developing countries where facility-based statistics are of limited quality. But household surveys are needed everywhere because they are the only good source of information on individual beliefs, behaviours and practices that are critical determinants of health care use and of health status.
- **Public health surveillance** brings together information from both facilities and communities with a focus mainly on defining problems and providing a timely basis for action. This is especially so when responses need to be urgent, as in the case of epidemic diseases. The need for timeliness of reporting and response, and the requirement for effective linkages to those in authority with the responsibility for disease control, impose additional requirements on health information systems.

Recognition of the importance of health information systems capable of generating reliable data is growing. In many countries, health sector reform and decentralization have brought about shifts in functions between the central and peripheral levels and generated new information needs with changing requirements for data collection, processing, analysis and dissemination. Health sector reforms also magnify the need for standardization and quality of information.

Performance and results based monitoring, stimulated by unprecedented increases in development assistance and global health initiatives such as the GAVI Alliance, the Global Fund to fight AIDS, Tuberculosis and Malaria (GFATM), the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and the Roll Back Malaria (RBM) partnership, have increased pressure on governments and organizations to improve their performance and demonstrate tangible results to their stakeholders. In this environment, a premium has been placed on the existence of adequate, quality

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<sup>2</sup> Health Metrics Network *Framework and Standards for Country Health Information Systems*, Geneva, World Health Organization, 2008  
<http://www.healthmetricsnetwork.org>

health information. Health information systems are called upon to enable tracking along the continuum of inputs to the health system, processes and outputs, as well as outcomes and impact.

Few developing countries have sufficiently strong and effective health information systems to meet all these diverse information needs. New technologies can contribute to improving data generation, compilation and exchange but will require the existence of clear data quality standards to be of optimal value.

### **3. Sources of information about the country health information system**

Information about the functioning of the health information system can be obtained from the different sectors and agencies that have responsibilities for the generation, synthesis, analysis and use of data at country, regional and global levels. At country level, Ministries of Health record the timeliness and quality of data reported through health services and disease surveillance systems. National Statistics Offices maintain information about the availability and quality of data generated through major data collection undertaking such as the decennial census, large scale household surveys, and the civil registration system. As custodians of national official statistics, they often have explicit requirements for the way data are collected, compiled and shared, and adhere to the Fundamental Principles of Official Statistics.<sup>3</sup> International agencies working in health also maintain information about the availability and quality of data on international health goals, including but not limited to the Millennium Development Goals.

### **4. Criteria for assessing country health information system performance**

Criteria for assessing performance of health information systems and the quality of data they generate have rarely been defined, let alone implemented. By contrast, in sectors other than health, and particularly for macroeconomic and financial statistics, considerable work has been done to define standards, guidelines and best practices (BOX).

A commonly used standards framework is provided by the UN Fundamental Principles of Official Statistics. Data quality assurance approaches generally distinguish assessment criteria for data outputs from those that relate to the quality of institutional frameworks that are prerequisites for the generation of reliable data. Some of the quality frameworks are intended to be used to assess national level data whereas others relate to the quality of data issued by international agencies such as the World Bank or the IMF.

The Health Metrics Network (HMN) Framework identifies the key components and standards of a country health information system.<sup>4</sup> The Framework describes health information system components in terms of resources, indicators, data sources, data management, information products,

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<sup>3</sup> United Nations. *Fundamental principles of official statistics*. New York, United Nations Statistics Division, 1994. Principles include impartiality, scientific soundness, professional ethics, transparency, consistency and efficiency, coordination and collaboration.

<sup>4</sup> Health Metrics Network *Framework and Standards for Country Health Information Systems*, Geneva, World Health Organization, 2008  
<http://www.healthmetricsnetwork.org>

and dissemination and use. The Framework lays out standards to be attained for each component and describes data-management, transformation of data into useable information, dissemination and use.

Country information system performance can be assessed either through independent (often external) expert evaluation or using a self-administered tool (see matrix). Independent, assessment is generally based on existing sources such as databases of international agencies so as to minimize the reporting burden on countries. The disadvantage is that countries may not agree with the assessment and therefore may not use the results for developing an improvement strategy. The major advantage of self assessment approaches are the degree of country ownership generated that enables the assessment to serve as the basis for the development of a plan for improvement. However, self assessment approaches are generally time consuming and complex to implement and are less likely to generate results that can be compared over time or between countries, and are likely to be biased

	Self assessment	Independent assessment
Statistical system	General Data Dissemination Strategy	World Bank Statistical Capacity-Building Score
Health information system	HMN self assessment tool	HIS performance index (HISPIX)
		Specific indicators - reporting rates, data and statistics availability

### Self-assessment approaches

The General Data Dissemination Strategy (GDDS)<sup>5</sup> is designed to:

- assist countries in assessing and documenting their statistical practices and procedures and compiling metadata; and,
- enable countries develop and implement plans for improvement in the different areas of statistics covered by the GDDS.

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<sup>5</sup> The International Monetary Fund (1997) The General Data Dissemination System: Guide For Participants And Users IMF Washington

## BOX

The Organization for Economic Cooperation and Development (OECD) has developed statistical standards, guidelines, and best practices on development indicators.<sup>6</sup> Explanatory metadata are collected and published to accompany all data and thus enable users to assess data quality, i.e., fitness for use. Based on these metadata, comparability across countries – an important aspect of data quality – can be assessed.

Some national statistics offices have commissioned external reviews of performance to identify strengths and weaknesses and make recommendations for improvement.<sup>7</sup> The United Nations Fundamental Principles of Official Statistics is often used as a general framework to assess the performance of national statistics offices.<sup>8</sup> The quality of information is central to its usefulness. Information must be reliable, up-to-date, independent and trustworthy. At the same time, it is important to avoid duplication of efforts and to minimize the burden of data collection on front line staff so that data are generated minimal impact on the delivery of care.

Although there is wide agreement in the literature on what the components of data quality should be, there is no universal consensus on how to group them. Some authors have proposed headings covering accuracy, relevance, coherence and consistency, continuity, timeliness, accessibility, and revisability.<sup>9</sup> Others include coherence (especially comparability), availability, and clarity.<sup>10</sup> Clearly, conflicts can arise between different facets such as those between consistency and timeliness and trade-offs must be made. The extent to which statistics meet user's needs and expectations for statistical information is widely recognized as of paramount importance. In order to allow users to assess the quality of the statistics they utilize, producers of statistics provide neutral, descriptive information about all aspects of statistics that affect users' views on how well the statistics might meet their needs and expectations.

The International Monetary Fund (IMF) has developed the General Data Dissemination Strategy (GDDS) in order to help countries improve data quality. The GDDS provides a framework for evaluating needs for data improvement and setting priorities and provides guidance in the dissemination to the public of comprehensive, timely, accessible, and reliable economic, financial, and socio-demographic statistics.<sup>11</sup>

Arising out of the GDDS, the IMF Data Quality Assessment Framework (DQAF) identifies quality-related features of governance of statistical systems, statistical processes, and statistical products. It is rooted in the UN Fundamental Principles of Official Statistics and describes five dimensions of quality – assurances of integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. The DQAF, which is used for comprehensive assessments of countries' data quality, covers institutional environments, statistical processes, and characteristics of the statistical products.

<sup>12</sup>

The Food and Agriculture Organization (FAO) has developed a "Data Quality Stamp" that applies to statistical data that meet quality criteria including: availability of appropriate metadata for all data series; use of international classifications; provision of update schedule to ensure timeliness; the data

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<sup>6</sup> <http://www.oecd.org/dataoecd/26/38/21687665.pdf>

<sup>7</sup> Ivan P. Fellegi and Jacob Ryten, *A Peer Review of the Swiss Statistical System* (2000),

<sup>8</sup> W. de Vries, *How Are We Doing? Performance Indicators for National Statistical Systems*, (1998)

<sup>9</sup> Tim Holt *Quality Work and Conflicting Quality Objectives*, (1998)

<sup>10</sup> E. Elvers and B. Rosén, *Quality Concept for Official Statistics* (1997) *Encyclopedia of Statistical Sciences*

<sup>11</sup> <http://dsbb.imf.org/Applications/web/getpage/?pagename=gddswhatgdds>

<sup>12</sup> <http://dsbb.imf.org/Applications/web/dqrs/dqrsdqaf/>

series provides global coverage information; the data series in the databases are integrated within a statistical framework; the data series is up to date.<sup>13</sup>

## 5. Methods for assessing country health information system performance

The principal goal of the GDDS is to improve data quality, which relates both to the data themselves but also to the statistical system overall. The strategy involves providing short-term technical assistance to countries to engage in a systematic review of existing statistics as compared to international standards, essentially an externally facilitated self assessment. The process engages both data producers and data users and seeks to bring about more effective communication both among national statistical agencies and with the user community. Based on the result of the assessment, countries develop a comprehensive improvement plan for the statistical system. The GDDS has been used to as the basis for the preparation of National Strategies for the Development of Statistics.

The **HMN health information system assessment** brings together country users and producers of health data to assess the strengths and weaknesses of the national health information system. Like the GDDS, it involves a facilitated assessment that is intended to guide countries' efforts to strengthen their health information systems by enabling a baseline analysis and the identification of areas for improvement in which donor support might be sought. The HMN assessment tool framework follows a cascading structure that flows from five main dimensions of data quality; integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. For each of these interrelated dimensions, the framework identifies pointers, or observable features, that can be used in assessing quality. In addition to these five dimensions of quality, the tool describes a set of prerequisites for the assessment of data quality. The coverage of these dimensions recognizes that data quality encompasses characteristics related to the institution or system behind the production of the data as well as characteristics of the individual data product. By engaging all stakeholders it helps develop a shared vision of a more coherent, integrated, efficient and useful system.

The assessment had been completed by more than 20 countries by the end of 2007.<sup>14</sup> Overall, the self assessment approach appears to have worked well in generating a broad understanding of the HMN concept of health information system, cutting across both disease-based and source-based information silos. The tool resulted in enhanced collaboration among various stakeholders in health information, particularly between health and statistics constituencies. However, the degree of stakeholder involvement required means that the approach is complex and time consuming to administer. There are issues of objectivity of the respondents and possible conflict of interest that arise when a self assessment approach is used and the approach is not well suited to enabling comparisons between countries and over time.

### Independent assessment approaches

The **World Bank Statistical Capacity Indicator** is calculated on the basis of a desk review by external technical experts. This summary measure provides an overview of the statistical capacity of developing countries and is based on a diagnostic framework developed with a view to assessing the capacity of statistical systems using metadata information generally available for most countries. The

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<sup>13</sup> FAO Mainstreaming sectoral statistical systems in Africa

<sup>14</sup> HMN Board paper July 2007



framework has three dimensions: statistical practice (the ability to adhere to internationally recommended standards and methods); data collection (frequency of censuses/surveys and completeness of vital registration); and indicator availability (availability and frequency of key socioeconomic indicators). Countries are scored against specific criteria, using information available from the World Bank, IMF, UN, UNESCO, and WHO. A composite score for each dimension and an overall score combining all three dimensions is derived for each country on a scale of 0–100. A score of 100 indicates that the country meets all the criteria and suggests good statistical standing. The assessment is carried out annually (check).

## 6. Core indicators for country health information system performance

Indicators of country health information system performance can be grouped into two broad types, namely:

- Indicators related to data generation using core sources and methods (health surveys, civil registration, census, facility reporting, health system resource tracking);
- Indicators related to country capacities for synthesis, analysis and validation of data.

Indicators of data generation reflect country capacity to collect relevant data at appropriate intervals and using the most appropriate data sources. Benchmarks include periodicity, timeliness, and contents of data collection efforts and availability of data on key indicators. Indicators of country capacity measure key dimensions of the institutional frameworks needed to ensure data quality including independence, transparency and access. Benchmarks include the availability of independent coordination mechanisms, and the availability of micro data and meta data. Table 1 summarizes the indicator definitions and measurement methods.

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### Health surveys

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1. Country has a 10 year costed survey plan that covers all priority health topics and takes into account other relevant data source
2. Two or more data points available for child mortality in the past 5 years<sup>15</sup>
3. Two or more population-based data points for maternal mortality in the last 10 years
4. Two or more data points for coverage of key health interventions in the last 5 years
5. One or more data point on smoking and adult nutritional status in the last 5 years

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### Birth and death registration

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6. Percentage of births registered
7. Percentage of deaths registered
8. ICD10 used in district hospitals and causes of death reported to national level

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### Census

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9. Census completed within past 10 years
10. Population projections for districts and smaller administrative areas available in print and electronically, well documented

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<sup>15</sup> Indicators 1.2 and 1.3 only relevant to countries without complete civil registration systems (>90% coverage of births and death)

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### **Health facility reporting**

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11. Number of institutional deliveries available, by district, and published within 12 months of preceding year
  12. HIV prevalence for relevant surveillance populations published within 12 months of preceding year
  13. Country web site for health statistics with latest report and data available to the general public
  14. Reporting of notifiable diseases makes use of modern communication technology and reporting of statistics from district to national levels is web-based
  15. Percentage of districts that submit timely, complete, accurate reports to national level
  16. Data quality assessments carried out and published within last 3 years
  17. International Health Regulations implemented according to international standards
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### **Health system resource tracking**

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18. At least one national health accounts completed in last 5 years
  19. National database with public and private sector health facilities, and geocoding, available and updated within last 3 years
  20. National database with health workers by district and main cadres updated within last 2 years
  21. Annual data on availability of tracer medicines and commodities in public and private health facilities
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### **Capacity for analysis, synthesis and validation of health data**

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22. There is a designated and functioning institutional mechanisms charged with analysis of health statistics, synthesis of data from different sources and validation of data from population and facility sources
23. There is a national set of indicators with targets and annual reporting to inform annual health sector reviews and other planning cycles
24. There is a national microdata archive for health surveys and census that is operational
25. Survey data are used to assess and adjust routine reports from health facility on vaccinations with the results published within 12 months of the preceding year
26. A burden of disease study has been conducted within the last 5 years by national stakeholders
27. A study of health systems performance has been carried out within the last 5 years by national stakeholders
28. There is national commitment to transparency in data dissemination and acknowledgement of uncertainty
29. The official annual health statistics report has been published within 12 months of the preceding (calendar or fiscal) year

## **7. Summary measure of health information system performance**

We are proposing a **health information system performance index** (HISPIX), a summary measure based on the above mentioned standardized indicators for assessing data quality and the overall performance of the health information system. The score is calculated from information available in the public domain using standard indicators in order to enhance objectivity and comparability over time and across countries.

For the majority of the indicators, a simple binary scoring system (yes/no) is use, with no weighting. For the few indicators that are measured in terms of percentages, the score is calculated as described in the table. The advantage of this approach is that it permits countries and development partners to identify key areas for improvement as part of a health information system strengthening plan.

## **Data sources**

The crucial difference between the HISPIX approach and the HMN self-assessment is that the indicators can be assessed on the basis of information largely available in the public domain. Information on data sources and data availability can be compiled from WHO databases and those of other international agencies. Information on inputs and resources is available from country health statistics reports and from the self-assessments conducted though HMN. For countries that have not conducted such assessments, it may be necessary to gather the information working through WHO and other agency country offices and through direct contacts with country health information units and statistics offices.

Because of the relative ease of data collection, and because several of the indicators are amenable to relatively rapid change, we suggest that the analysis be conducted every three years in order to gauge trends over time.

However, efforts should continue to link the independent assessment approach to self-assessment strategies such as the HMN tool. This would help ensure ongoing country engagement and sustainability. Clear descriptions of data quality criteria and user-friendly checklists could be valuable tools in this regard.

**Table 1**  
**Summary of core indicators and data collection methods**

	<b>Indicator</b>	<b>Definition</b>	<b>Data collection method</b>
1.	Country has a 10 year costed survey plan that covers all priority health topics and takes into account other relevant data source	Survey plan comprises modular contents with periodicity for specific indicators calibrated to achieve maximum sensitivity and efficiency. Includes data collection related to health-related behaviours and bio-clinical measurements.	Country reports
2.	Two or more data points available for child mortality in the past 5 years <sup>16</sup>		Country reports; DHS, MICS
3.	Two or more population-based data points for maternal mortality in the last 10 years		Country reports; DHS, MICS
4.	Two or more data points for coverage of key health interventions in the last 5 years	Comprising coverage of key maternal and child health care interventions, risk behaviours, care seeking	Country reports; DHS, MICS
5.	One or more data point on smoking and adult nutritional status in the last 5 years	Nutritional status clinically measured	Country reports; DHS, MICS
6.	Percentage of births registered	<i>Numerator:</i> Number of births registered, as reported by civil or sample registration systems, hospitals and community based reporting systems. <i>Denominator:</i> Total births for the same time period and geographic region. Where information on total births is not available because of incomplete civil registration, total births can be estimated by extrapolating from the census or on the basis of information about natality rates derived from population surveys.	Civil registration or sample registration systems. <50% score 0 50–89% score 1 ≥90% score 2
7.	Percentage of deaths registered	<i>Numerator:</i> Number of deaths registered as reported by civil or sample registration systems, hospitals and community based reporting systems. <i>Denominator:</i> Total deaths for the same time period and geographic region. Where information on total deaths is not available because of incomplete civil registration, total deaths can be estimated by extrapolating from the census or on the basis of information about mortality rates derived from population surveys.	Civil or sample registration systems. <50% score 0 50–89% score 1 ≥90% score 2
8.	ICD10 used in district hospitals and causes of death reported to national level	<i>Numerator:</i> Number of district hospitals using ICD–10 <sup>17</sup> to certify cause of death <i>Denominator:</i> Total district hospitals	Routine HMIS reports <50% score 0 50–89% score 1 ≥90% score 2
9.	Census completed within past 10 years		Bureau of the Census, National Statistics Office and Ministry of

<sup>16</sup> Indicators 2 and 3 only relevant to countries without complete civil registration systems (>90% coverage of births and death)

<sup>17</sup> World Health Organization. *International Statistical Classification of Diseases and Related Health Problems (ICD)*. 10<sup>th</sup> Revision, Second Edition. Geneva, World Health Organization, 2005. <http://www.who.int/classifications/icd/en/>

	Indicator	Definition	Data collection method
10.	Population projections for districts and smaller administrative areas available in print and electronically, well documented		Health.
11.	Number of institutional deliveries available, by district, and published within 12 months of preceding year	Includes deliveries in public, private and NGO facilities	Country HMIS reports
12.	HIV prevalence for relevant surveillance populations published within 12 months of preceding year		National Aids Committee reports
13.	Country web site for health statistics with latest report and data available to the general public		Country HIS reports
14.	Reporting of notifiable diseases makes use of modern communication technology and reporting of statistics from district to national levels is web-based		Country HMIS reports
15.	Percentage of districts that submit timely, complete, accurate reports to national level	<i>Numerator:</i> Number of health districts with timely and complete reporting of key data series. <i>Denominator:</i> Total districts. Countries should define core data series that should be reported by all facilities and reported to districts and compare reports against this list.	An accurate listing of public and private service delivery points should be available in all countries. (see 19)
16.	Data quality assessments carried out and published within last 3 years	Assessment should cover routine all administrative data sources (eg civil registration, facility reports)	Country HMIS reports
17.	International Health Regulations implemented according to international standards	Compliant with IHR monitoring and evaluation framework	Country health sector reports
18.	At least one national health accounts completed in last 5 years		NHA report
19.	National database with public and private sector health facilities, and geocoding, available and updated within last 3 years	Database should separately distinguish public, private and non-profit facilities; should also include key infrastructure, human resources, medicines, equipment and supplies, and service availability	Health facility assessments (see also 21)
20.	National database with health workers by district and main cadres updated within last 2 years	Database comprises data from multiple sources, including census, labour force surveys, professional registers, training institutions, facility assessments	National health sector review
21.	Annual data on availability of tracer medicines and commodities in public and private health facilities	Aligned to national essential medicines list	Essential medicines reviews; health facility assessments
22.	There is a designated and functioning institutional mechanism charged with analysis of health statistics, synthesis of data from different sources and validation of data from population and facility sources	Ideally, the body should be quasi autonomous or independent and should adhere to Fundamental Principles of Official Statistics	National health sector reports

	<b>Indicator</b>	<b>Definition</b>	<b>Data collection method</b>
23.	There is a national set of indicators with targets and annual reporting to inform annual health sector reviews and other planning cycles	Indicators cover key issues including health determinants, health system inputs, processes and outputs, use of health care services, mortality, morbidity, health system responsiveness etc	National health sector reports
24.	There is a national microdata archive for health surveys and census that is operational		
25.	Survey data are used to assess and adjust routine reports from health facility on vaccinations with the results published within 12 months of the preceding year	Validation by an independent reviewer would be needed to ascertain the extent of analysis and validation.	Information available from health statistics reports.
26.	A burden of disease study has been conducted within the last 5 years by national stakeholders		
27.	A study of health systems performance has been carried out within the last 5 years by national stakeholders		
28.	There is national commitment to transparency in data dissemination and acknowledgement of uncertainty.	Published health data include meta data descriptors, margins of uncertainty, methodologies	Review of annual health statistics report
29.	The official annual health statistics report has been published within 12 months of the preceding (calendar or fiscal) year		Review of annual health statistics report

## Annex: selected tools

The following provides references and links to key sources of standards, guidelines and quality criteria for different components of the health information system. Not all the references are assessment tools in and of themselves, but they do offer guidance on quality criteria for aspects of the health information system. The main focus is on ensuring data quality.

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### General health information systems assessment

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Health Metrics Network (2008) *Assessing the National Health Information System An Assessment Tool VERSION 4.00*, World Health Organization, Geneva

Offers a tool for conducting a systematic assessment of the existing national health information systems – both to establish a baseline and to monitor progress. The assessment is aligned with the standards for health information systems described in the HMN Framework. The assessment covers the many subsystems of a national health information system, including public and private sources of health-related data. It addresses the resources available to the system (inputs), its methods of work and products (processes and outputs) and results in terms of data availability, quality and use (outcomes). All major stakeholders should participate in assessing the national health information system and planning for its strengthening. Stakeholders include the producers, users and financiers of health information and other social statistics at various national and subnational levels. These include officials in government ministries and agencies; donors and development partners such as multilateral and bilateral agencies; NGOs; academic institutions; professional associations; other users of health-related information such as parliamentarians; civil society (including health-related advocacy groups); and the media.

The tool is also available as an electronic spreadsheet in order to facilitate scoring of the indicators.  
<http://www.who.int/healthmetrics/tools/hisassessment/en/index.html>  
accessed July 15 2008

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### Health surveys

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United Nations Statistics Division (2005) *Household Sample Surveys in Developing and Transition Countries* Series: F, No.96 Sales number: E.05.XVII.6

This document describes standards for household surveys but is not an assessment tool. The publication presents the “state of the art” on important aspects of conducting household surveys in developing and transition countries, including sample design, survey implementation, non-sampling errors, survey costs, and analysis of survey data. The main objective of the handbook is to assist national survey statisticians to design household surveys in an efficient and reliable manner, and to allow users to make greater use of survey generated data.

<http://unstats.un.org/unsd/hhsurveys/>  
accessed 15 July 2008

Demographic and Health Surveys MEASURE DHS, Macro International Inc., 11785 Beltsville Drive, Suite 300, Calverton, MD 20705 USA

The USAID-supported Demographic and Health Surveys, implemented by Macro, are based on specified standards and quality criteria. On behalf of the U.S. Agency for International Development

(USAID), Macro has been conducting Demographic and Health Surveys (DHS) work around the world for more than two decades. These nationally representative household surveys include large sample sizes (usually between 5000 and 30 000 households) and generally are conducted every 5 years to allow for comparisons over time. DHS staff members have advanced training in economics, sociology, behavioral psychology, statistics, management, and social marketing.

<http://www.orcmacro.com/programareas/Health/research.aspx>

accessed 15 July 2008

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## Civil registration

United Nations Statistics Division (1998) Principles and Recommendations for a Vital Statistics System Revision 2 Series: M, No.19/Rev.2 Sales number: 01.XVII.10

The Principles and Recommendations for a Vital Statistics System, Rev. 2 is a guide for national governments in establishing and maintaining reliable civil registration systems for legal documentation on events throughout the lifetime of individuals from birth, changes in marital status, and to death. It provides technical guidance on standards, concepts, definitions, and classifications for civil registration and vital statistics to further increase international comparability of data. Companion to this book are series of Handbooks on Civil Registration and Vital Statistics Systems issued by the United Nations over the last several years.

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## Census

United Nations Statistics Division (1998) *Principles and Recommendations for Population and Housing Censuses (2008)*

The main objective of the Principles and Recommendations is to provide international principles and recommendations for use by national statistical offices and census officials in countries throughout the world in planning and organizing their census

<http://unstats.un.org/unsd/demographic/sources/census/census3.htm>

accessed 15 July 2008

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## Health facility reporting

Lafond A, Field R. The Prism: introducing an analytical framework for understanding performance of routine Health Information Systems in developing countries. Presented at a workshop on enhancing the quality and use of health information at the district level. Eastern Cape Province, South Africa, 29 September–4 October 2003.

PRISM: Performance of routine information system management has been developed by MEASURE Evaluation and John Snow, Inc.. It is designed to assess routine, facility-based information and management systems while acknowledging the broader context in which such systems operate. It emphasizes strengthening routine health information system performance through better data quality and improved information use. PRISM broadens the analysis of performance to include three key categories of determinants that affect performance:

- Behavioral determinants – the knowledge, skills, attitudes, values, and motivation of the people who collect and use data;
- Technical determinants – data collection forms, processes, systems, and methods; and



- Organizational determinants – information culture, structure, resources, and roles and responsibilities of key contributors at each level of the health system.

<http://www.cpc.unc.edu/measure/events/improving-routine-health-information-systems-performance-and-use-of-information-for-health-systems-management>  
accessed July 15 2008

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### Health system resource tracking

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World Health Organization (2003) *Guide to producing national health accounts with special applications for low-income and middle-income countries*. WHO, World Bank, USAID Geneva ISBN 92 4 154607 7 (NLM classification: W 74.1)

The Guide walks the reader through the process of acquiring and evaluating data and provides step-by-step examples of how to turn raw numbers into information useful for policy analysis and development.

[http://www.who.int/nha/docs/English\\_PG.pdf](http://www.who.int/nha/docs/English_PG.pdf)  
accessed 15 July 2008

World Health Organization (forthcoming) *Measuring Health Systems strengthening and Trends*

The toolkit describes a set of indicators, measurement approaches and strategies that will permit the establishment of country health system statistical profiles, thus facilitating monitoring of health systems investments and providing guidance to countries and development partners on where the critical gaps in health systems functioning lie.

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### Assessment of data quality in national statistical systems

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W. de Vries, (1998) *How Are We Doing? Performance Indicators for National Statistical Systems*,

The paper proposes a system approach to evaluating the performance of national statistical offices (NSOs) and takes the view that there is a high correlation between the quality of a statistical system and the quality of its products. The United Nations Fundamental Principles of Official Statistics are used as a general framework to assess the performance of NSOs, provides a brief explanation of each principle, and raises several operational questions related to each principle.

<http://dsbb.imf.org/vgn/images/pdfs/nld.pdf>  
accessed 15 July 2008

E. Elvers and B. Rosén (1997) *Quality Concept for Official Statistics* Encyclopedia of Statistical Sciences, Wiley-Interscience Publication, John Wiley & Sons, Inc.

Quality of statistics is defined by referring to how well statistics meet user's needs and expectations for statistical information, once disseminated. The authors suggest that to allow users to assess the quality of the statistics they utilize, producers of official statistics provide neutral, descriptive information about all aspects of statistics that affect users' views on how well the statistics might meet their needs and expectations. They suggest that this information be organized by main quality components, identified as contents, accuracy, timeliness, coherence (especially comparability),

availability, and clarity. The authors provide definitions for the main quality components and their subcomponents.

<http://dsbb.imf.org/vgn/images/pdfs/Encyc.pdf>

accessed July 15 2008

International Monetary Fund (IMF) General Data dissemination System (GDSS) (1995)

The GDSS is designed to encourage countries to improve data quality, provide a framework for evaluating needs for data improvement and setting priorities, and guide countries in the dissemination to the public of comprehensive, timely, accessible, and reliable economic, financial, and socio-demographic statistics.

<http://dsbb.imf.org/Applications/web/getpage/?pagename=gddswhatgdds>

accessed 15 July 2008

International Monetary Fund (IMF) *Data Quality Assessment Framework* (2003)

The IMF Data Quality Assessment Framework (DQAF) identifies quality-related features of governance of statistical systems, statistical processes, and statistical products. It is rooted in the UN Fundamental Principles of Official Statistics and describes five dimensions of quality – assurances of integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. The DQAF, which is used for comprehensive assessments of countries' data quality, covers institutional environments, statistical processes, and characteristics of the statistical products. The DQAF is used for comprehensive assessments of countries' data quality, covers institutional environments, statistical processes, and characteristics of the statistical products. The generic DQAF serves as an umbrella for seven dataset-specific frameworks but no health-specific DQAF has been developed.

[http://dsbb.imf.org/vgn/images/pdfs/dqrs\\_factsheet.pdf](http://dsbb.imf.org/vgn/images/pdfs/dqrs_factsheet.pdf)

[http://dsbb.imf.org/vgn/images/pdfs/dqrs\\_Genframework.pdf](http://dsbb.imf.org/vgn/images/pdfs/dqrs_Genframework.pdf)

accessed 15 July 2008

United Nations (1994) *Fundamental Principles of Official Statistics*

The Fundamental Principles of Official Statistics were adopted by the Statistical Commission in 1994. While not an assessment tool, the *Principles* provide a general quality framework for national statistics offices to review performance, identify strengths and weaknesses, and make recommendations for improvement. There are ten principles covering:

1. Relevance impartiality and equal access
2. Professional standards and ethics
3. Accountability and transparency
4. Prevention of misuse
5. Cost-effectiveness
6. Confidentiality
7. Legislation
8. National Coordination
9. International standards
10. International Cooperation

<http://unstats.un.org/unsd/methods/statorg/FP-English.htm>

accessed 15 July 2008

Statistical Commission Thirty-fifth session, 2–5 March 2004 *Implementation of the Fundamental Principles of Official Statistics*, Report of the Secretary-General

The Statistical Commission has developed a questionnaire allowing national statistical offices to report their experiences with the Fundamental Principles in a uniform way. The most recent review of experiences was conducted in 2003.

<http://unstats.un.org/unsd/statcom/doc04/2004-21e.pdf>  
accessed 15 July 2008

World Bank (2006) *Statistical Capacity Improvement in IDA Countries* Progress Report

The **World Bank Statistical Capacity Indicator** is calculated on the basis of a desk review by external technical experts. This summary measure provides an overview of the statistical capacity of developing countries and is based on a diagnostic framework developed with a view to assessing the capacity of statistical systems using metadata information generally available for most countries. The framework has three dimensions: statistical practice (the ability to adhere to internationally recommended standards and methods); data collection (frequency of censuses/surveys and completeness of vital registration); and indicator availability (availability and frequency of key socioeconomic indicators). Countries are scored against specific criteria, using information available from the World Bank, IMF, UN, UNESCO, and WHO. A composite score for each dimension and an overall score combining all three dimensions is derived for each country on a scale of 0–100. A score of 100 indicates that the country meets all the criteria and suggests good statistical standing. The assessment is carried out annually

[http://siteresources.worldbank.org/SCBINTRANET/Resources/Statistical\\_Capacity\\_Improvement\\_in\\_IDA\\_Countries-May16\\_2006.pdf](http://siteresources.worldbank.org/SCBINTRANET/Resources/Statistical_Capacity_Improvement_in_IDA_Countries-May16_2006.pdf)  
accessed 15 July 2008

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### **Assessment of data quality in international agencies**

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Organization for Economic Cooperation and Development (OECD), (2003) *Quality dimensions, core values for OECD statistics and procedures for planning and evaluating statistical activities*. Paris, France, STD/QFS(2003)1

The guidelines are aimed at ensuring that OECD published statistics meet specific quality criteria. The OECD has defined statistical standards, guidelines, and best practices on development indicators. Explanatory metadata are collected and published to accompany all data and enable users to assess data quality, i.e., fitness for use. Based on these metadata, comparability across countries can be assessed.

<http://www.oecd.org/dataoecd/26/38/21687665.pdf>  
accessed July 15 2008