HEALTH METRICS NETWORK

Assessing the National Health Information System

An Assessment Tool

VERSION 4.00

World Health Organization

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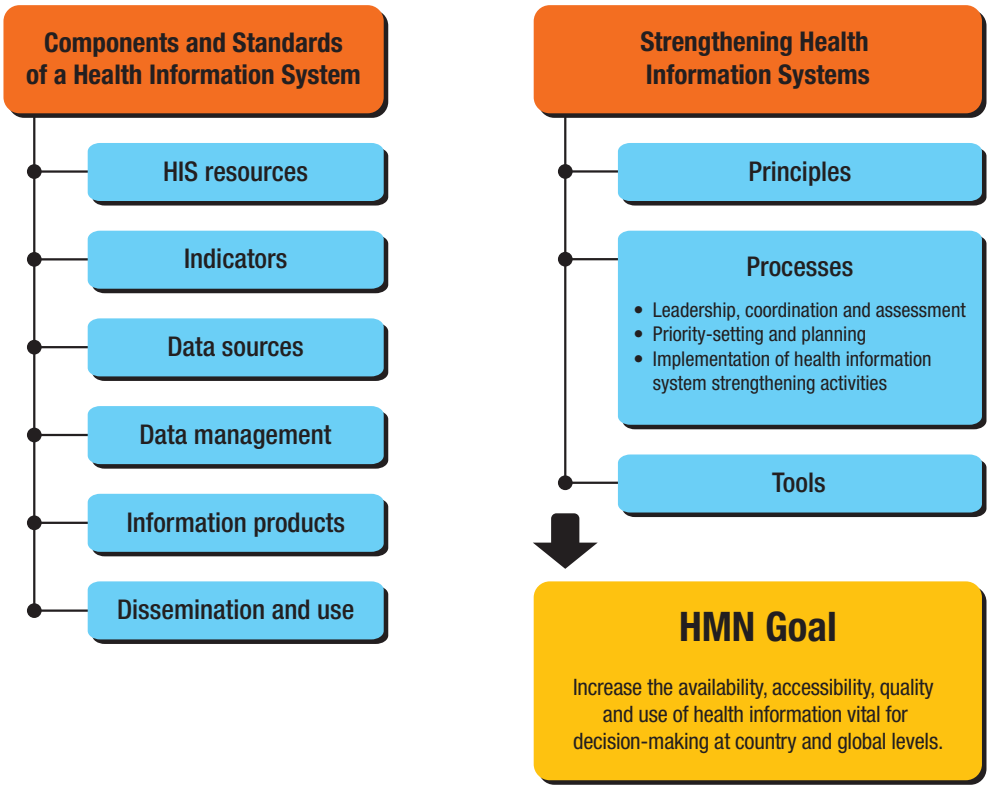
1. Introduction

The Health Metrics Network (HMN) was launched in 2005 to help countries and other partners improve global health by strengthening the systems that generate health-related information for evidence-based decision-making. HMN is the first global health partnership that focuses on two core requirements of health system strengthening in low and low-middle income countries. First, the need to enhance entire health information and statistical systems, rather than focus only upon specific diseases. Second, to concentrate efforts on strengthening country leadership for health information production and use.

In order to help meet these requirements and advance global health, it has become clear that there is an urgent need to coordinate and align partners around an agreed-upon "framework" for the development and strengthening of health information systems. It is intended that the HMN Framework[1] shown in **Fig.1** will become the universally accepted standard for guiding the collection, reporting and use of health information by countries and global agencies. Through its use, it is envisaged that all the different partners working

Fig. 1 The HMN Framework



[1] World Health Organization. *Framework and Standards for Country Health Information Systems*. Geneva, World Health Organization, 2007. http://www.healthmetricsnetwork.org

within a country will be better able to harmonize and align their efforts around a shared vision of a sound and effective national health information system ("national HIS").

As shown in **Fig.1**, the HMN Framework consists of two major parts:

- **Components and Standards of a Health Information System** (left-hand column of **Fig. 1**) – which describes the six components of health information systems and provides normative standards for each.

- **Strengthening Health Information Systems** (right-hand column of **Fig. 1**) – which describes the guiding principles, processes and tools that taken together outline a ***road-map*** for strengthening health information systems.

A crucial early step in this roadmap is the need for an effective assessment of the existing national HIS – both to establish a baseline and to monitor progress. In order to assist countries in this key activity HMN has developed this assessment tool[1] which describes in detail how to undertake a first baseline assessment. An overriding aim of any statistical system assessment is to arrive at an understanding of:

> *…users' current and perceived future requirements for statistical information; their assessment of the adequacy of existing statistics and of where there are gaps in existing and planned data; their priorities; and their ability to make effective use of statistical information.*[2]

Such an assessment is complex, as overall system performance depends upon multiple determinants – technical, social, organizational and cultural. Assessment therefore needs to be comprehensive in nature and cover the many subsystems of a national HIS, including public and private sources of health-related data. It should also address 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). Important "inputs" to assess include the institutional and policy environment, and the volume and quality of financial, physical and human resources, as well as the available levels of information and communications technology (ICT). In terms of "outputs" the integrity of data is also determined by the degree of transparency of procedures, and the existence of well-defined rules, terms and conditions for collection, processing and dissemination. Assessing "outcomes" should include quantitative and qualitative approaches, such as document reviews and interviews with in-country stakeholders at central and peripheral levels, and with external actors.

As described in SECTION 2.2 all major stakeholders should participate in assessing the national HIS and planning for its strengthening. Stakeholders will 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. In countries with decentralized systems, the assessment process should be clearly articulated and involve managers and representatives of care providers at peripheral levels (districts) as well as stakeholders at the central level. Once produced the assessment report and its recommendations for action should be made accessible to all stakeholders, including health professionals and civil society.

Establishing a broad-based coordinating mechanism with links to all relevant ministries, research institutions, NGOs, technical support agencies and donors is a crucial step in the assessment process. It should be the body charged with the goal of reaching agreement on how best to achieve the standards set out in the HMN Framework and developing a

[1] This and other tools may also be downloaded from: http://www.who.int/healthmetrics/tools/en/

[2] PARIS21 Secretariat. *A Guide to Designing a National Strategy for the Development of Statistics* (NSDS), 2004. http://www.paris21.org/pages/designing-nsds/NSDS-reference-paper/

national strategic plan (SECTION 2.5). If a suitable body does not exist, a coordination steering committee under high-level leadership should be constituted to ensure coordination. It should convene regularly, mobilize technical advice, provide guidance and oversight, and disseminate progress reports to all stakeholders. The precise nature of the operational arrangements for taking action will vary depending upon the individual national context.

During the assessment process, workshops must be conducted to build broad-based consensus among key stakeholders in the following three stages:

- First, a workshop is held to mark the launch of national HIS reform, the first stage of which is leadership, consensus-building and assessment activities.
- A second workshop then follows to initiate assessment of the health information system, supplemented by follow-up visits to key stakeholders. Another key function of the second workshop is to assess, and open dialogue on, the strengths and challenges of the existing system.
- The third workshop coincides with the end of the assessment phase and is used to share and discuss findings, highlight existing weaknesses and map a way forward for the planning process.

The coordination steering committee should draw up terms of reference for the baseline assessment, identify the composition of the assessment team, and mobilize the required human and financial resources needed to properly assess the extent to which the national HIS and its various subsystems currently meet the needs of all users.

This HMN assessment tool is intended to achieve more than simply assess the strengths and weaknesses of the elements and operations of a national HIS. The mere process of conducting the assessment reaches and engages all stakeholders in the system. Some of these will interact for the very first time through the assessment process, which is intended to be both catalytic and synergistic. It should move stakeholders towards a shared and broader vision of a more coherent, integrated, efficient and useful system. The gap between the existing system and this new vision will be an important stimulus for moving to the next stage of planning national HIS reform. At this stage, stakeholders are now better prepared to articulate and argue for a new vision of how a national HIS would benefit the country, lead to stronger health system performance, and ultimately to improved public health. Such an assessment process can also be a mechanism for directly engaging stakeholders and for reinforcing broad-based consensus-building.

In many settings, assessments of the national HIS or its individual components may already have been conducted and should be built upon, not duplicated. The findings should provide the foundation for an analytical and strategic assessment of current strengths and weaknesses. Once endorsed, assessment provides the baseline against which future progress in health information system strengthening should be evaluated.

2. Assessment of the national HIS

2.1 What are the objectives of assessment?

National HIS strengthening must start with a broad-based assessment of the system's own environment and organization, responsibilities, roles and relationships; and of the technical challenges of specific data requirements in order to:

- **allow** objective baseline and follow-up evaluations – assessment findings should therefore be comparable over time;
- **inform** stakeholders – for example, of aspects of the HIS with which they may not be familiar;
- **build** consensus around the priority needs for health information system strengthening; and
- **mobilize** joint technical and financial support for the implementation of a national HIS strategic plan – with indications of the priority investments in the short term (1–2 years), intermediate term (3–9 years) and long term (10 years and beyond).

Stakeholders may decide to repeat the comprehensive assessment exercise at appropriate intervals. HMN is working to develop a separate monitoring tool that will permit the monitoring of progress over time.

2.2 Who should assess?

Another initial step in planning an assessment of the national HIS is to identify who should be involved. One basic principle of the HMN approach is that all major stakeholders should participate in assessing the national HIS and planning for its strengthening. Stakeholders will include the producers, users and financiers of health information and other social statistics at various national and subnational levels.

As described in SECTION III, essential HIS data are usually generated either directly from ***populations*** or from the operations of health and other ***institutions***. This produces a range of data sources with numerous stakeholders involved in different ways with each of these sources. For example, ministries of health are usually responsible for data derived from health service records. National statistics offices are usually responsible for conducting censuses and household surveys. Responsibility for vital statistics including births and deaths may be shared between the national statistics office, the ministry of home affairs and/or local government, and the ministry of health. An illustrative list of appropriate representatives of relevant stakeholders would include:

1. Central statistics office

a) Officials and analysts responsible for:

- the national population census; and
- household surveys such as the Demographic and Health Survey (DHS), Living Standard Measurement Study (LSMS) household surveys, and Multiple Indicator Cluster Surveys (MICS).

b) Other leading demographers and statisticians.

2. Ministry of health

a) Senior advisors as well as members of the ministry cabinet and those within the ministry responsible for or coordinating:

- the HIS;
- acute disease surveillance and response;
- disease control, immunization and maternal and child/family planning programmes;
- noncommunicable disease control programmes;
- management of human resources, drugs and other logistics and health finances;
- planning;
- annual monitoring and evaluation and performance reviews; and
- facility-based surveys.

3. Other ministries and governmental agencies

a) Those within the finance and other ministries or agencies responsible for:

- the planning, monitoring and evaluation of social programmes;
- civil registration – typically the ministry of the interior or home affairs or local government;
- planning commissions;
- population commissions; and
- commissions for developing social statistics.

4. Institutes of public health and universities

a) Researchers and directors of the Demographic Surveillance System (DSS) and those in other institutes and universities.

5. Donors

a) Major bilateral and multilateral health sector donors.

b) Global health partnerships such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM) and the Global Alliance for Vaccines and Immunization (GAVI).

c) Donors who finance specific activities of relevance including:

- the national population census;
- large-scale national population-based surveys (DHS, MICS, LSMS);
- the sample vital registration system;
- Demographic Surveillance System (DSS);
- Strengthening of the health management information system
- strengthening of surveillance and Integrated Disease Surveillance and Response (IDSR);
- the national health account (NHA);
- mapping of health risks and health services;
- health facility surveys – for example, Service Provision Assessment (SPA);
- annual health sector performance reviews; and
- systems for the monitoring and evaluation of major disease control programmes in areas such as HIV/AIDS, malaria, tuberculosis and vaccine-preventable diseases.

6. United Nations organizations

a) United Nations organizations active in development and the monitoring of progress towards the Millennium Development Goals (MDGs) include UNICEF, UNDP, UNFPA, WHO and the World Bank.

7. Representatives of key nongovernmental organizations (NGOs) and civil society

a) NGOs and other health-advocacy groups.

b) Private health-professional associations.

c) Associations of faith-based health providers.

To mobilize and coordinate these and other stakeholders it is very useful to identify a high-level and influential country "champion" with decision-making powers. This could be someone within the ministry of health, the national statistics office or from a major programme area involved in health systems. The champion can help ensure that stakeholders understand fully the objectives of the assessment and how it fits into the overall process of national HIS development. In particular, stakeholders should be aware that assessment will rapidly be followed by a comprehensive strategic planning process to which they will also be asked to contribute.

2.3 How can assessment be organized and facilitated?

Once the key stakeholders have been identified a steering committee should be formed to provide ongoing oversight, direction and coordination of national HIS strengthening activities. These will include the planning and implementation of initial and ongoing assessment efforts. Although it must be inclusive, not all stakeholders need to be active on the steering committee. For example, a group of bilateral donors, each financing a different aspect of HIS strengthening, may wish to designate a single representative, possibly on a rotational basis. The stakeholder group and its steering committee should then designate an existing agency (such as the national HIS unit or section within the ministry of health) to carry out certain of the communications, procurement and other administrative tasks required to conduct an assessment.

An assessment may be conducted during a large dedicated national workshop and/or during smaller meetings of several groups. In some countries, individual interviews with key individuals and groups have been used but this does not allow for the stimulation of open discussions with all relevant stakeholders in an open forum. HMN recommends that the assessment be done during large workshops and/or smaller meetings of several groups where all relevant stakeholders are present. A combination of these two approaches is most likely to be effective and time-efficient in obtaining inputs from all key stakeholders. Many participants may not be familiar with certain aspects of the national HIS, and participating in broad discussions of all 197 items included in this assessment tool would be highly time-consuming. Hence, it is usually best if participants are divided into small groups that can work either sequentially or simultaneously (for example, at a national workshop) to reach consensus on a subset of items. However whenever assessment is conducted by only a subset of meeting participants, efforts must be made to ensure feedback and discussion of the findings takes place among all key stakeholders. This will be necessary to meet the objective of informing and building consensus among all stakeholders.

Note 1: It is NOT advisable to administer the assessment as a "questionnaire" to be completed by separate, individual informants. It is important that groups of informants discuss together the assessment items. Even if the individuals in the group end up scoring the items differently, they will learn from the group discussion and the results will better reflect a consensus about the meaning of each item.

Note 2: Persons who are not technically qualified to assess a given item should be asked to NOT score the item. Use of the Group Builder tool helps to reduce the chance that someone who is poorly informed will score a given assessment item.

The HMN *Group Builder* tool[1] has been designed to help those organizing the national HIS assessment to group together the individuals and representatives best qualified to assess particular assessment items. Each group should be composed of key participants in the aspect under consideration with the maximum number of items to be considered by any one group not greatly exceeding 100.

The proposed groupings and an estimation of the number of items that each will contribute are as follows:

1. Members of the national HIS unit or section of the ministry of health – even without further members, this is a key group for assessing almost 100 items.
2. Senior planners and policy-makers with the ministry of health – such senior officials alone are an important group for assessing approximately 75 items.
3. Central statistics office staff together with other available demographers – key in the assessment of approximately 75 items.
4. Programme managers (including coordinators of public health programmes in areas such as maternal and child health, immunization, tuberculosis, HIV/AIDS and disease surveillance) – can assess almost 80 items.
5. Subnational personnel (including managers and national HIS staff at provincial, district and hospital levels) – by assessing about 60 items would complete a subnational assessment.
6. Finance monitoring experts – a specialized group for assessing approximately 30 items.

[1] Health Metrics Network (2006). *Group Builder,* version 1.5. Internal document for grantees.

7. Resource tracking – another specialized group composed of those who manage the databases that track human resources, supplies and infrastructure, and who should assess about 20 items.

8. Non-project donors (including the World Bank and those contributing to a "common basket" for funding Sector-Wide Approaches) – about 70 items have been identified for assessment by these partners if they are not already participating in other groups. Donors supporting public health programmes (for example in immunization or surveillance), the population census or national household surveys should be invited to join the group that includes the respective programme manager.

Group Builder allows the membership of each of these groups to be customized by adding or removing members based upon local circumstances and preferences. Care is required to avoid adding too many optional members to groups as this may also increase the number of items that must be assessed. Once group members are identified, a spreadsheet automatically indicates the best items for each group to assess. A separate spreadsheet ("ungrouped") lists key individuals who have not been included in any of the groups and the items for which key participants are lacking. Ungrouped participants may then be invited to join one of the groups, or alternatively separate interviews may be scheduled to gather their assessment inputs.

In addition to a printout of this assessment tool, relevant key documents for each of the groups should be provided in advance to all participants. At present, these key documents include:

- The HMN Framework;[1]
- Fundamental principles of official statistics;[2]
- A Guide to Designing a National Strategy for the Development of Statistics;[3]
- OECD Guidelines for data protection;[4] and
- IMF Data Quality Assessment Framework.[5]

Assessment of certain items may also be supported by external findings such as statistics used in global databases. For example, vital statistics practices may in part be assessed on the basis of statistics compiled by the United Nations Statistics Division or available in the WHO global mortality database.[6]

Certain key individuals (such as senior policy-makers and planners within the ministry of health, the central statistics office, the ministry of finance, and the vital registration authorities) may not be able to attend the entire assessment workshop. If this is the case, then individual appointments should be scheduled by the assessment organizers in order to obtain these key inputs.

It is also essential that one or more facilitators or resource people are available to support the workshops or meetings where this assessment tool is being used. Facilitators should be thoroughly familiar with the complete assessment tool and with the HMN Framework on which it is based. In addition to helping to lead the plenary sessions, the facilitator should

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[1] World Health Organization. *Framework and Standards for Country Health Information Systems*. Geneva, World Health Organization, 2007. http://www.healthmetricsnetwork.org

[2] 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. http://unstats.un.org/unsd/goodprac/bpabout.asp

[3] PARIS21 Secretariat. *A Guide to Designing a National Strategy for the Development of Statistics* (NSDS), 2004. http://www.paris21.org/pages/designing-nsds/NSDS-reference-paper/

[4] For example, the OECD Guidelines for data protection at: http://www.oecd.org/document/18/0,2340,en_2649_34255_1815186_1_1_1_1,00.html

[5] International Monetary Fund Data Quality Assessment Framework (DQAF), 2003. http://dsbb.imf.org/Applications/web/dqrs/dqrsdqaf/

[6] http://www.who.int/healthinfo/morttables/en/index.html

circulate among the smaller groups, helping to clarify the meaning of particular items and answering questions. The facilitator can also explain how to the composite scores for each aspect of the national HIS can be compiled and the findings summarized in the assessment report.

A large number of items will need to be assessed by members of the national HIS unit or section within the ministry of health. Hence, it may support the assessment process if these key participants also met in advance of the workshops and other meetings. Groups that meet subsequently may then be provided with a record of the scores generated by national HIS staff. These same individuals could then play a key role in organizing and facilitating the assessment workshops, meetings and interviews with key personnel as outlined above.

However, the major advantage of a self-assessment approach is that it engages all partners in a shared learning experience. Facilitators may help to speed up the assessment and make the findings more comparable but it is important that they do not interfere with the process of self-discovery among country stakeholders. Self-assessment can often lead to a genuine desire to significantly improve the national HIS.

2.4 How can final consensus be reached and findings disseminated?

Irrespective of the approach used to conduct the initial assessment (interviews with key people, small-group discussions of subsets of items, and so on) efforts should be made to involve all the relevant stakeholders in analysing the findings and identifying the next steps. After all the items have been scored, a plenary session of at least 3 hours should be organized to review and reach consensus on the key assessment findings. Even if some key stakeholders have not been able to participate in earlier meetings during which items were scored, they should be encouraged to join in this final plenary. Ideally the final plenary should be held at a time when participants are well rested and able to reflect on the assessment findings.

If items have been assessed by multiple small groups, a good way to begin the final plenary session is to invite a rapporteur from each group to present the most important findings or insights. Examples of possible key findings include:

- *The legal and policy framework for the national HIS is outdated and poorly implemented.*
- *The health information system is quite fragmented between different health programmes and directorates, and between the ministry of health and the national statistics office.*
- *Insufficient feedback is provided to those who collect data and submit reports.*
- *Many health information officers at subnational level are not well qualified for the tasks they are asked to carry out.*
- *Investments are needed in ICT.*
- *As a top priority, statistics from multiple sources should be pulled together into an integrated data warehouse.*

The remainder of the final plenary might then consist of presenting the scores both of overall national HIS components and of key individual assessment items, followed by discussion of how such scores positively or negatively impact on the key findings. The assessment tool automatically generates summary scores and graphs to assist in this process. In this way the meeting outcomes will go beyond individual item scores to include the comments recorded for each item, and the important points made during subsequent plenary discussions.

A special task force should be established to produce a draft report of the assessment meeting and its results. This should then be distributed for review and comment by a broad range of stakeholders prior to its finalization. In support of this important stage of the assessment process it will be necessary to budget not only for the national workshop itself, but also for the subsequent costs of editing, printing and disseminating the finalized meeting and assessment reports. Once completed, this process should help considerably in identifying the next steps, and should provide a bridge between the assessment findings and strategic planning.

2.5 How can the assessment findings be built upon?

The findings contained in the assessment report should provide information for the development of a comprehensive strategic plan for national HIS strengthening with the following characteristics:

- The plan specifies what is to be done over the coming decade to increase the availability, quality, value and use of timely and accurate health information.
- The plan is based upon consultation with all key constituencies including those supporting the population census, vital statistics, household health surveys, disease surveillance, health service statistics (including those from the private sector), health resource records and health accounts.
- The plan is also based upon the assessment and additional findings regarding the human and financial resources currently available, and likely to be required for the achievement of priorities.
- The various constituencies (those producing, using and financing such health information) should be asked to identify investment priorities and strategies for national HIS strengthening.
- Priority investments in the short term (1–2 years), intermediate term (3–9 years) and long term (10 years and beyond) are identified, sequenced and costed.
- The plan discusses how these investments will be financed and identifies appropriate funding sources at country level including ministry budgets, HIPC debt relief, concessional loans, bilateral and multilateral development agencies and global health partners.
- Consensus on the plan is reached at a national workshop. The plan is subsequently endorsed by the national HIS coordinating committee.

HMN is currently developing guidelines to support the development of strategic plans for national HIS strengthening. A few general principles to keep in mind when preparing for this process are:

- A task force may be established to review findings from the assessment, conduct or commission additional studies and draft the strategic plan. As with the steering committee for organizing and facilitating the assessment meetings, the task force should be representative of all appropriate technical and other stakeholders. To improve coordination and partnership:
  - a range of views and expertise will be essential to reach a consensus that will ultimately be endorsed by a broader range of stakeholders, including those in the ministry of health, the national statistics office and financing partners; and
  - too large a group may make it difficult to reach consensus – essential participants should be identified.
- Decisions on the timing of different activities included in the workplan depend upon several factors such as their perceived urgency; the extent of the gap identified (i.e., assess-

ment scores of 0 or 1); ease of implementation with existing health system and resources; and availability of financing. The assessment process may identify some data sources for which the country has good capacity but has problems with the content of the information produced (for example, a good-quality census is regularly conducted every 10 years but questions on mortality have not been included in the census questionnaire). This may suggest areas where important advances can be made in the short term or with modest resources.

- It is however essential that the strategic plan is not limited only to those activities that are feasible in the short term. More-ambitious or longer-term objectives may be met by mobilizing financial, organizational and technical commitment around a compelling strategic vision. Hence, it is also possible to address problems of weak capacity over the longer term.

- Achievement of the more-ambitious objectives (for example, development of human resources for the national HIS; and strengthening civil registration) depend upon the broader policies, plans and budgets of the ministry of health, the national statistics office and the national government in general. Thus it is essential that the national HIS strategic plan be consistent with these broader policies and plans. It is also important for the advocates of national HIS strengthening to engage in discussions on the reform or development of these broader policies and plans. Implementation of important components of the national HIS strategic plan depends upon continued advocacy, lobbying and negotiation, and participation in related policy formulation and planning processes.

3. Scoring and interpretation of results

For each item included in this assessment tool, a range of possible scenarios is provided allowing for objective and quantitative rating. The highest score (3) is given for a scenario considered *Highly adequate* compared to the gold standard as defined by the HMN Framework. The lowest score (0) is given when the situation is regarded as *Not adequate at all* in terms of meeting the gold standard. The total score for each category is aggregated and compared against the maximum possible score to yield a percentage rating. Each of the questions can potentially be rated by multiple respondents and the replies aggregated to obtain an overall score. The more varied the (informed) respondents involved, the lower the risk of bias in the end results. In some cases, a particular item may be judged as inapplicable. If so, it should be omitted from the scoring process and the reasons for doing so recorded.

For the purposes of the overall report, scores are converted into quartiles. Thus items with scores falling in the lowest quartile are classified as *Not adequate at all*. Scores falling into the next lowest quartile are classified as *Present but not adequate*, followed by *Adequate*, and *Highly adequate* for those in the third and fourth quartiles respectively.

Scores may be awarded by individuals or by groups. On the spreadsheet version of this assessment tool[1] there are spaces for recording the scores awarded by up to 14 individuals, with an adjacent space for recording any detailed comments made about major gaps, constraints, possible solutions and intervention priorities. Early experience of using this assessment tool suggests that it is important to capture these detailed qualitative remarks. If responses are recorded on a paper copy of the assessment tool rather than the spreadsheet version, it is advisable to insert blank rows after each item or to provide several blank pages after each table to capture qualitative remarks.

On the spreadsheet, separate rows are also provided for additional assessment items. The insertion or deletion of rows from the spreadsheet is not recommended as this may lead to errors in the formulae used to sum the scores and colour-code the results. Instead of deleting an item, it should be skipped so that it does not affect the final scores. New items may be added in the blank rows provided in each section of the assessment tool. Assessment scores entered into the cells to the right of these additional items are then averaged, and the results displayed along with the results for the standard items. If such an approach does not meet the needs for adaptation of the tool, assessment organizers are encouraged to contact HMN[2] for assistance. **Table 1** shows the total number of questions in each of the assessment categories.

[1] http://www.healthmetricsnetwork.org

[2] healthmetrics@who.int

Table 1. Number of questions in the Assessment Tool

CATEGORIES	NUMBER OF QUESTIONS
I. Resources	**25**
A. Policy and planning	7
B. HIS institutions, human resources and financing	13
C. HIS infrastructure	5
II. Indicators	**5**
III. Data sources	**83**
A. Census	10
B. Vital statistics	13
C. Population-based surveys	11
D. Health and disease records (incl. surveillance)	13
E. Health service records	11
F. Resource records	25
i. infrastructure and health services	*6*
ii. human resources	*4*
iii. financing and expenditure for health service	*8*
iv. equipment, supplies and commodities	*7*
IV. Data management	**5**
V. Information products	**69**
VI. Dissemination and use	**10**
Total	**197**

The HMN Assessment and Monitoring Tool

VERSION 4

I. Assessing national HIS resources

[Tables I.A–C]

National HIS coordination, planning and policies

Developing and strengthening health information systems will depend upon how key units and institutions function and interact. These include the ministry of health's central health information unit, disease surveillance and control units, and the central statistics office. Institutional analysis can therefore be useful in identifying constraints that undermine policy or hamper the implementation of key strategies for developing the information system. Constraints include those related to reporting hierarchies or relationships between different units responsible for monitoring and evaluation. The national HIS strategic plan outlined in SECTION 2.5 is an essential requirement for effective coordination as it will guide HIS investments, and provide agreed-upon approaches to the maintenance, strengthening and coordination of all the key HIS components.

The legal and regulatory contexts within which health information is generated and used are also highly important as they enable mechanisms to be established to ensure data availability, exchange, quality and sharing. Legal and policy guidance is also needed, for example, to elaborate the specifications for electronic access and to protect confidentiality. Legislation and regulation are particularly significant in relation to the ability of the national HIS to draw upon data from both the private and public health services, as well as non-health sectors. Particular attention to legal and regulatory issues is needed to ensure that non-state health-care providers are integral to the national HIS, through the use of accreditation where appropriate. The existence of a legal and policy framework consistent with international standards, such as the *Fundamental principles of official statistics*,[1] enhances confidence in the integrity of results. A legal framework can also define the ethical parameters for data collection, and information dissemination and use. The health information policy framework should identify the main actors and coordinating mechanisms, ensure links to programme monitoring, and identify accountability mechanisms.

National HIS financial and human resources

Improvements in the national HIS cannot be achieved unless attention is given to the training, deployment, remuneration and career development of human resources at all levels. At national level, skilled epidemiologists, statisticians and demographers are needed to oversee data quality and standards for collection, and to ensure the appropriate analysis and utilization of information. At peripheral levels, health information staff should be accountable for data collection, reporting and analysis. Deploying health information officers within large facilities and districts (as well as at higher levels of the health-care system) results in significant improvements in the quality of data reported and in the understanding of its importance by health-care workers.

[1] 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.

Appropriate remuneration is essential to ensure the availability of high-quality staff and to limit attrition. This implies, for example, that health information positions in ministries of health should be graded at a level equivalent to those of major disease programmes. Within statistics offices, measures should be taken to retain well-trained staff. Establishing an independent or semi-independent statistics office should allow for better remuneration and subsequent retention of high-level staff.

Targeted capacity development is needed, and training and educational schemes should be used to address human resource development in areas such as health information management and use, design and application, and epidemiology. Such training should be for all levels of competency, ranging from the pre-service training of health staff and continuous education, to public health graduate education at the Masters and PhD levels.

National HIS infrastructure

The infrastructural needs of the national HIS can be as simple as pencils and paper or as complex as fully integrated, web-connected, ICT. At the level of the most basic record keeping, there is a need to store, file, abstract and retrieve records. However, ICT has the potential to radically improve the availability, dissemination and use of health-related data. While information technologies can improve the amount and quality of the data collected, communications technology can enhance the timeliness, analysis and use of information. A communications infrastructure is therefore needed to fully realize the potential benefits of information that may already be available.

Ideally, at national and subnational levels, health managers should therefore have access to an information infrastructure that includes computers, e-mail and Internet access. All facilities should have such connectivity, but this is a long-term objective in many countries. Similarly, national and regional statistics offices should be equipped with transport and communications equipment to enable the timely collection and compilation of data at the subnational level.

In many settings, computers are already used in discrete vertical health information programmes and electronic medical records systems, resulting in many non-compatible systems being used within countries. This often aggravates rather than alleviates duplication and overlap. Coherent capacity building in electronic and human resources throughout the health system is a far more effective and cost-efficient approach.

TABLE I.A – ASSESSING NATIONAL HIS RESOURCES: Coordination, planning and policies

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.A.1	The country has up-to-date legislation providing the framework for health information covering the following specific components: vital registration; notifiable diseases; private-sector data (including social insurance); confidentiality; and fundamental principles of official statistics	Legislation covering all aspects exists and is enforced	Legislation covering some aspects exists and is enforced	Legislation exists but is not enforced	There is no such legislation	
I.A.2	The country has up-to-date regulations and procedures for turning the fundamental principles of official statistics into good practices, and for ensuring the integrity of national statistical services (by ensuring professionalism, objectivity, transparency and adherence to ethical standards in the collection, processing and dissemination of health-related data)	Yes, regulations and procedures exist and are fully implemented. Integrity of national statistical services is regularly assessed	Regulations and procedures exist and are widely disseminated, but no regular assessment of the integrity of national services is performed	Regulations and procedures exist, but are not yet disseminated and implemented	No, there are no written regulations and procedures for ensuring the integrity of national statistical services	
I.A.3	There is a written HIS strategic plan in active use addressing all the major data sources described in the HMN Framework (censuses, civil registration, population surveys, individual records, service records and resource records) and it is implemented at the national level	Yes, comprehensive HIS strategic plan exists and is implemented	The comprehensive strategic plan exists, but the resources to implement it are not available	The strategic plan exists, but it is not used or does not emphasize integration	There is no written HIS strategic plan	
I.A.4	There is a representative and functioning national committee in charge of HIS coordination	Yes, a functional national HIS committee exists	There is a functional national HIS committee, but without resources	There is a national HIS committee, but it is not functional	There is no national HIS committee	
I.A.5	The national statistics office and ministry of health have established coordination mechanisms (e.g., a task force on health statistics); this mechanism may be multisectoral	Yes, fully operational, meets regularly and meets needs for coordination	Yes, but meets only occasionally on an ad hoc basis or agenda is too full	Yes in theory, but these mechanisms are not operational	No	
I.A.6	There is a routine system in place for monitoring the performance of the HIS and its various subsystems	Yes, it exists and is used regularly	Yes, but it is seldom used	Yes, but it is never used	No	

TABLE I.A – *Continued*

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.A.7	It is official policy to conduct regular meetings at health-care facilities and health-administration offices (e.g., at national, regional/provincial or district level) to review information on the HIS and take action based upon such information	Yes, the policy exists and is being implemented	The policy exists, but meetings are not regular	The policy exits, but is not implemented	There is no policy	

TABLE I.B – ASSESSING NATIONAL HIS RESOURCES: Financial and human resources

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.B.1	The ministry of health has adequate capacity in core health information sciences (epidemiology, demography, statistics, information and ICT)	Highly adequate	Adequate	Partially adequate	Not adequate	
I.B.2	The national statistics office has adequate capacity in statistics (demography, statistics, ICT)	Highly adequate	Adequate	Partially adequate	Not adequate	
I.B.3	There is a functional central HIS administrative unit in the ministry of health to design, develop and support health-information collection, management, analysis, dissemination and use for planning and management	HIS central unit is functional with adequate resources	HIS central unit is functional but lacks adequate resources	HIS central unit has very limited functional capacity and under-takes few HIS-strengthening activities	There is no functioning central HIS administrative unit in the ministry of health	
I.B.4	There is a functional central HIS administrative unit responsible for population censuses and household surveys that designs, develops and supports health-information collection, management, analysis, dissemination and use for planning and management	Central unit is functional with adequate resources	Central unit is functional but lacks adequate resources	Central unit has very limited functional capacity and under-takes few HIS-strengthening activities	There is no functioning central administrative unit in the ministry of health	
I.B.5	At subnational levels (e.g., regions/provinces and districts) there are designated full-time health information officer positions and they are filled	Yes – 100% of health offices at subnational level have a designated and filled full-time health information officer position	Yes – more than 50% of health offices at subnational level have a designated and filled full-time health infor-mation officer position	Less than 50% of health offices at sub-national level have a designated full-time health information officer position	No positions	

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.B.6	HIS capacity-building activities have taken place over the past year for HIS staff of the ministry of health (statistics, software and database maintenance, and/or epidemiology) at national and subnational levels	Sufficient capacity-building has taken place as part of a long-term government-driven human resources development plan	Sufficient capacity-building, but largely dependent upon external (e.g., donor) support and input	Limited capacity-building	No	
I.B.7	Capacity-building activities have taken place over the past year for staff of the national statistics office (statistics, and software and database maintenance) at national and subnational levels	Sufficient capacity-building has taken place as part of a long-term government-driven human resources development plan	Sufficient capacity building, but largely dependent upon external (e.g., donor) support and input	Limited capacity-building	No	
I.B.8	HIS capacity-building activities have taken place over the past year for health-facility staff (on data collection, self-assessment, analysis and presentation)	Sufficient capacity-building has taken place as part of a long-term government-driven human resources development plan	Sufficient capacity-building, but largely dependent upon external (e.g., donor) support and input	Limited capacity-building	No	
I.B.9	Assistance is available to health and HIS staff at national and subnational levels in designing, managing and supporting databases and software	Excellent	Adequate, usually available for occasional assistance and back-up	Limited, does not meet the needs of staff for assistance and support	Not available	
I.B.10	Acceptable rate of health-information staff turnover at national level in the ministry of health	Low turnover, not a problem	Moderate turnover but manageable	Turnover rate is problematic	Turnover rate is unacceptably high	
I.B.11	Acceptable rate of health-information staff turnover at national level in national statistics office	Low turnover, not a problem	Moderate turnover but manageable	Turnover rate is problematic	Turnover rate is unacceptably high	

TABLE I.B – *Continued*

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.B.12	There are specific budget-line items within the national budget for various sectors to provide adequately for a functioning HIS for all relevant data sources in the ministry of health	Yes, there are specific budget-line items within the national budget to provide adequately for a functioning HIS for all relevant datas sources	National HIS budget-line items are limited but allow for adequate functioning of all relevant data sources	National HIS budget-line items are limited and do not allow for adequate functioning of all relevant data sources	There are no national HIS budget-line items and the functioning of most relevant data sources is inadequate	
I.B.13	There are specific budget-line items within the national budget for various sectors to provide adequately for a functioning statistics system for all data sources in the national statistics office	Yes, there are specific budget-line items within the national budget to provide adequately for a functioning statistics system for all relevant data sources	National statistics budget-line items are limited but allow for adequate functioning of all relevant data sources	National statistics budget-line items are limited and do not allow for adequate functioning of all relevant data sources	There are no national statistics budget-line items and the functioning of most relevant data sources is inadequate	

TABLE I.C – ASSESSING NATIONAL HIS RESOURCES: Infrastructure

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.C.1	Recording forms, paper, pencils and other supplies that are needed for recording health services and disease information are available	Yes, recording forms, paper, pencils and other supplies are always available for recording required information	Occasionally there are "stock-outs" of recording forms, paper, pencils and other supplies but this does not affect the recording of required information	There are "stock-outs" of recording forms, paper, pencils and other supplies which affect the recording of required information	The health service is not able to meet reporting requirements due to a lack of recording forms, paper, pencils and other supplies	

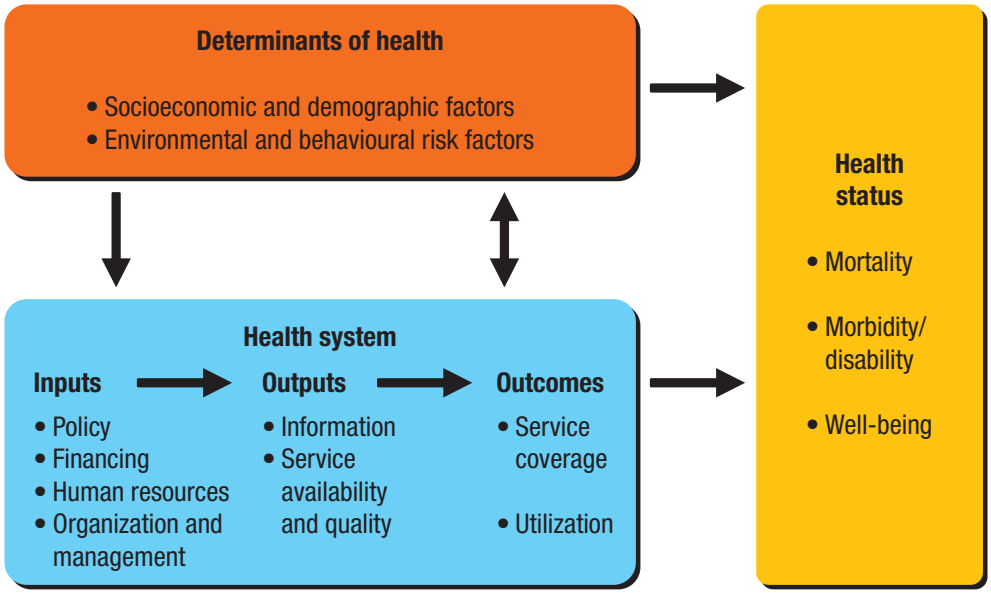
	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
I.C.2	Recording forms, paper, pencils and supplies that are needed for reporting vital statistics are available	Yes, recording forms, paper, pencils and other supplies are always available for recording required information	Occasionally there are "stock-outs" of recording forms, paper, pencils and other supplies but this does not affect the recording of required information	There are "stock-outs" of recording forms, paper, pencils and other supplies which affect the recording of required information	Health service is not able to meet reporting requirements due to a lack of recording forms, paper, pencils and other supplies	
I.C.3	Computers are available at the relevant offices at national, regional/ provincial and district levels to permit the rapid compilation of subnational data	Yes, all relevant offices at district, regional/ provincial and national levels have computers for this purpose	Some relevant district offices and most national and regional/ provincial offices have computers for this purpose	Some relevant regional/provincial offices and the majority of national offices have computers for this purpose	No, only relevant national offices have computers for this purpose	
I.C.4	A basic ICT infrastructure (telephones, internet access and e-mail) is in place at national, regional/provincial and district levels	Yes, basic ICT infra-structure is in place at national, regional/ provincial and district levels	Basic ICT infrastructure is in place at national level; more than 50% at regional/provincial level; but less than 50% at district level	Basic ICT infrastructure is in place at national level; but less than 50% at regional/ provincial and district levels	Basic ICT infrastructure is in place only at national level	
I.C.5	Support for ICT equipment maintenance is available at national, regional/ provincial and district levels	Yes, there is support for ICT equipment maintenance at national, regional/ provincial and district levels	There is support for ICT equipment maintenance at national level; more than 50% at regional/ provincial level; but less than 50% at district level	There is support for ICT equipment maintenance at national level; but less than 50% at regional/ provincial and district levels	There is support for ICT equipment maintenance at national level only	

II. Assessing national HIS indicators

[Table II]

The boundaries of a national HIS are not confined to the health sector alone and overlap with information systems in other fields. In addition, data is required for various needs, including information for improving the provision of services to individual clients, statistics for planning and managing health services, and measurements for formulating and assessing health policy. For each of the three major domains of measurement shown in **Fig. 3**, core indicators are required to track progress and assess change.

Fig. 3 Domains of measurement for health information systems



■ Determinants of health – indicators include socioeconomic, environmental, behavioural, demographic and genetic determinants or risk factors. Such indicators characterize the contextual environments in which the health system operates. Much of the information is generated through other sectors, such as agriculture, environment and labour.

■ Health system – indicators include inputs to the health system and related processes such as policy, organization, human and financial resources, health infrastructure, equipment and supplies. There are also output indicators such as health service availability and quality, as well as information availability and quality. Finally there are immediate health system outcome indicators such as service coverage and utilization.

■ Health status – indicators include levels of mortality, morbidity, disability and well-being. Health status variables depend upon the efficacy and coverage of interventions and determinants of health that may influence health outcomes independently of health service coverage. Health status indicators should be available stratified or disaggregated by variables such as sex, socioeconomic status, ethnic group and geographical location in order

to capture the patterns of health in the population and to permit analysis of inequities in health.

The core indicators selected should reflect changes over time in each of the three domains. As with any indicator, health indicators should be valid, reliable, specific, sensitive and feasible/affordable to measure. They must also be relevant and useful for decision-making at data-collection levels, or where a clear need exists for data at higher levels. The precise indicators used and their number will vary according to the epidemiological profile and development needs of individual countries.

If carefully selected and regularly reviewed, the use of core indicators are a vital part of national HIS strengthening and can be viewed as the backbone of the system, providing the minimum information package needed to support macro and micro health system functions. All countries therefore need a nationally defined minimum set of health indicators used regularly in national programme planning, monitoring and evaluation.

Although health indicators are needed to monitor local and national priorities, indicator definitions must also meet international technical standards. Moreover, national indicators should be consistently linked and harmonized with key indicators in major international and global initiatives, such as the MDGs,[1] GFATM and GAVI. Core health indicators and related data-collection strategies should also be linked to a broader national statistics strategy, and notably a poverty-monitoring master plan in countries with a poverty-reduction strategy paper (PRSP). National and international stakeholders should therefore take part in defining core indicators, and targets set for the number of indicators that match national plans or international goals.

[1] http://www.who.int/mdg/publications/mdg_report/en/index.html

TABLE II – ASSESSING NATIONAL HIS INDICATORS

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
II.1	National minimum core indicators have been identified for national and subnational levels, covering all categories of health indicators (determinants of health; health system inputs, outputs and outcomes; and health status)	Yes, minimum core indicators are identified at national and subnational levels and cover all categories	Minimum core indicators are identified at national and subnational levels but they do not cover all categories	Process initiated – Discussions are under way to identify essential indicators	Process not initiated – No minimum indicators nor data set identified	
II.2	There is a clear and explicit official strategy for measuring each of the health-related MDG indicators relevant to the country	Yes, all the appropriate health-related MDG indicators are included in the minimum core indicator set	Not all, but at least 50% of the health-related MDG indicators are included in the minimum core indicator set	At least one but less than 50% of the appropriate MDG indicators are included in the minimum core indicator set	None of the MDG health-related indicators are included in the minimum core indicator set	
II.3	Core indicators are defined in collaboration with all key stakeholders (e.g., ministry of health (MoH), national statistics office (NSO), other relevant ministries, professional organizations, subnational experts and major disease-focused programmes)	Yes, all the relevant stakeholders collaborated in the selection of the core indicators	Relevant ministries and the NSO are involved but more external participation would be desirable	Collaboration between the MoH, the subnational level and some disease programmes but no involvement of the NSO	No, each programme requests data according to own requirements	
II.4	Core indicators have been selected according to explicit criteria including usefulness, scientific soundness, reliability, representativeness, feasibility and accessibility	Yes, the core indicators have been selected according to explicit criteria including usefulness, scientific soundness, reliability representativeness, feasibility, and accessibility	Mostly – but not all criteria for selection were clear and explicit	There are guidelines but they do not include explicit criteria for the selection of indicators	There are no guidelines or explicit criteria for the selection of indicators	
II.5	Reporting on the minimum set of core indicators occurs on a regular basis	Reporting is regular (e.g., annual or biannual)		Reporting is irregular and incomplete	Reporting is very limited	

III. Assessing national HIS data sources

[Tables III.A–F]

The national HIS should draw upon a set of key data sources. The role and contribution of each source will vary due to overlap in the type of information best collected by each source. In many cases, measurement of the same indicators with data from multiple sources may contribute to better-quality information while maintaining efficiency. In other cases, it is more efficient to avoid duplication. The optimal choice will depend upon a range of factors including epidemiology, specific characteristics of the measurement instrument, cost and capacity considerations, and programme needs. In addition, each source may generate data on a range of indicators. The frequency and mode of data collection will depend upon the likelihood of change and the ability of the indicator to detect this change over time. In all settings an appropriate combination of data sources should be used to provide the priority information required.

The selection of data sources should also be based upon assessments of feasibility, periodicity, cost-effectiveness and sustainability. Periodicity of measurement depends on the likely speed of change of the indicator and the costs of generating it. Determining which items of information are most appropriately generated through routine health information systems – and which require special surveys – should be a central feature of the national HIS strategic plan.

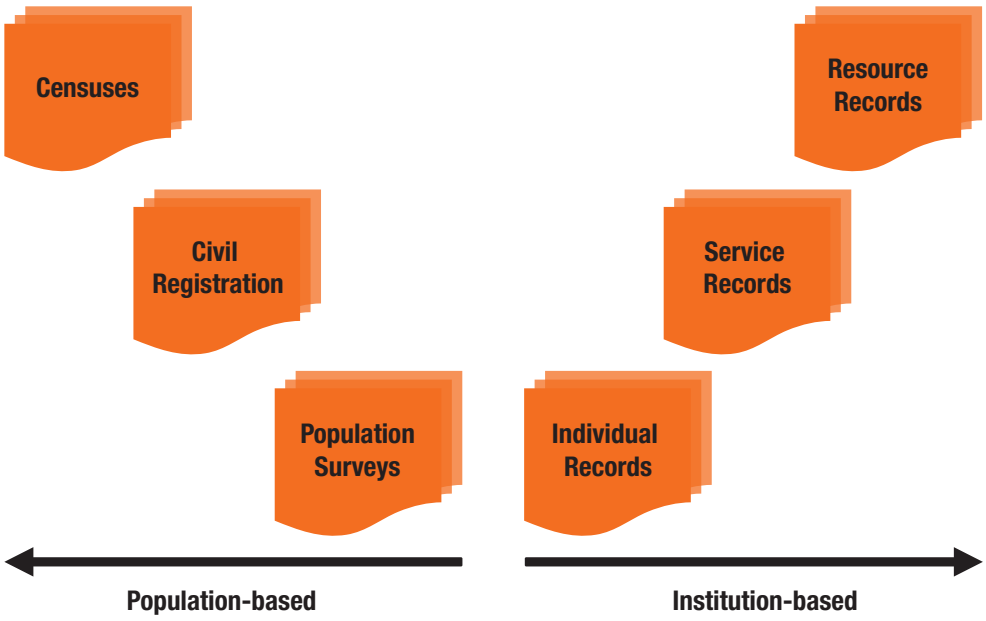
As shown in **Fig. 4**, national HIS data are usually generated either directly from populations or from the operations of health and other ***institutions***.

- ***Population-based*** sources generate data on all individuals within defined populations and can include total population counts (such as the census and civil registration) and data on representative populations or subpopulations (such as household and other population surveys). Such data sources can either be continuous and generated from administrative records (such as civil registers) or periodic (such as cross-sectional household surveys).

- ***Institution-based*** sources generate data as a result of administrative and operational activities. These activities are not confined to the health sector and include police records (such as reports of accidents or violent deaths), occupational reports (such as work-related injuries), and food and agricultural records (such as levels of food production and distribution). Within the health sector, the wide variety of health service data includes morbidity and mortality data among people using services; services delivered; drugs and commodities provided; information on the availability and quality of services; case reporting; and resource, human, financial and logistics information.

A. Censuses – ideally carried out at least once every 10 years with results made available within 2 years of the data being collected. Unfortunately, only a small number of questions may be included on a census questionnaire, and the data are often of variable quality. To assess census-data quality, it is standard practice to conduct a post enumeration survey (PES) during which the census questionnaire is re-administered to a small sample of the population. If civil registration captures less than 90% of deaths, then including fertility and mortality topics in a population census is particularly important.

Fig 4. Health information data sources



B. Civil registration – refers to the comprehensive ongoing monitoring of births and deaths by age and sex, and with attribution of the cause of death. The gold standard is a system that provides a complete record of all births and deaths with medically certified causes of death. Achieving the gold standard may not be attainable in many developing countries for the foreseeable future. The use of a sample registration system (SRS) has been shown to be effective in bringing about improvements in the relatively short term. In the near future, packages such as sample vital registration with verbal autopsy (SAVVY) could considerably improve knowledge about basic health statistics in a population. A Demographic Surveillance System (DSS) may also provide a data source for continuous surveillance of births and cause-specific mortality. Novel approaches use a hybrid set of consolidated methods based on demographic surveillance; sample registration; and the periodic use of sample cause-of-death modules using verbal autopsy within household surveys.

C. Population surveys – the gold standard is a well-integrated demand-driven household survey programme that is part of the national HIS, and which generates regular essential high-quality information on populations, health and socioeconomic status. Whether national or part of an international survey programme, international standards and norms must be adhered to. More recently, population-based surveys have also been the vehicle for biological and clinical data collection (health examination surveys), providing much more accurate and reliable data on health outcomes than self-reports.

D. Individual records – include individual health records (for example, growth monitoring, antenatal, delivery outcome) and disease records (consultation, discharge) routinely produced by health workers as well as by special disease registries. One of the most important functions of these records is to support the quality and continuity of care of individual patients.

E. Service records – capture information on the number of clients provided with various services and on the commodities used. To the extent possible, the national HIS should capture service statistics from the private sector as well as communities and civil society organizations. Such records also include reports of notifiable conditions, diseases or health events of such priority and public health significance that they require enhanced reporting through surveillance systems and an immediate public health response. Integrating reporting for disease surveillance and monitoring of focused public health programmes reduces

the burden on those completing or reviewing reports and increases the likelihood that information will be acted on.

F. Resource records – a related component of service records concerned with the quality, availability and logistics of health service inputs and key health services. This includes information on the density and distribution of health facilities, human resources for health, drugs and other core commodities and key services. The minimum requirement is a database of health facilities and the key services they are providing. The next level of development of this aspect of the national HIS involves the mapping of facilities, human resources, core commodities and key services at national and district levels. Mapping the availability of specific interventions can provide important information from an equity perspective, and can help promote efforts to ensure that needed interventions reach peripheral areas and do not remain concentrated in urban centres. For the purposes of policy development and strategic planning, financial information is compiled using the National Health Account (NHA) methodology. The NHA provides information on the financial resources for health, and on the flow of these resources across the health system. In the case of resource records (**Table III.F**) there are four subgroups:

- Infrastructure and health services;
- Human resources;
- Financing and expenditure for health; and
- Equipment supplies and commodities.

Criteria for assessment of data sources

Tables III.A–F respectively provide the assessment criteria and standards for each of the six types of data source (**A–F**) outlined above and shown in **Fig. 4**. For all sources, a set of common principles applies. These include the need for procedures to ensure data quality (such as standard definitions, appropriate data-collection methods, metadata and data audit trail, use of routine procedures to correct bias and confounding, and the availability of primary data). In addition, standards for obtaining consent and ensuring confidentiality in data collection and use must be maintained.[1]

As shown in **Tables III.A–F** each of the six types of data source are assessed against the following four key criteria of data collection and use:

1. Contents

- events or measures of public health importance identified explicitly and captured by the data source;
- data elements defined (for example, case definitions of notifiable conditions) and definitions consistent with global standards used (for example, with HMN standards);
- appropriate data-collection method used; and
- cost-efficiency and effectiveness issues considered.

[1] Guidance available in this area includes the OECD Guidelines on the Protection of Privacy and Transborder Flows of Personal Data. http://www.oecd.org/document/18/0,2340,en_2649_34255_1815186_1_1_1_1,00.html

2. Capacity and practices

- country capacity exists to collect data and manage and analyse the results;
- standards applied to data collection; and
- documentation available, accessible and of high quality.

3. Dissemination

- analysis of results available and disseminated;
- microdata available for public access; and
- metadata available.

4. Integration and use

- the number of reports required and surveys conducted are kept to an optimal level through agreements on indicators and the harmonized design of formats and questionnaires;
- results from different data-collection methods are compared; and
- appropriate methods are used to estimate need and coverage.

TABLE III.A – ASSESSING NATIONAL HIS DATA SOURCES: Censuses

core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.A.1 **Contents**	**A.1.1:** Mortality questions were included in the last census: • questions to estimate child mortality – children ever born and children still alive; • questions to estimate adult mortality – household deaths in the past 12 (or 24) months including sex of deceased and age-at-death **Note:** Skip this question if civil registration covers at least 90% of deaths	Questions to estimate child mortality and questions to estimate adult mortality, paired by questions concerning injury and pregnancy-related deaths	Questions to estimate child mortality and questions to estimate adult mortality	Only questions to estimate child mortality, or only questions to estimate adult mortality	No mortality questions	
III.A.2 **Capacity & practices**	**A.2.1:** The country has adequate capacity to: (1) implement data collection; (2) process the data; and (3) analyse the data	Adequate capacity for all 3	Adequate capacity for 2 of the 3	Adequate capacity for only 1 of the 3	Adequate capacity for none of the 3	
	A.2.2: A census was carried out in the past 10 years	Yes			No	
	A.2.3: A Post enumeration survey (PES) has been completed and a written report is available and widely distributed	PES undertaken and report is available on the web	PES undertaken and printed report is available	PES undertaken but no report available	No PES undertaken	
	A.2.4: Evaluation of completeness of adult mortality data from the last census has been undertaken and the results published along with the published mortality statistics **Note:** Skip this question if the last census did not include questions on adult mortality (household deaths)	Evaluation has been undertaken and the results published along with the published mortality statistics		Evaluation has been undertaken but the results have not been published	No evaluation	
III.A.3 **Dissemination**	**A.3.1:** A report including descriptive statistics (age, sex, residence by smallest administrative level) from the most recent census is available and widely distributed (online or paper copy)	All districts (lowest administrative health offices) have immediate access	All regions/provinces (intermediate administrative health offices) have immediate access	Central/national health officials have immediate access	Not available	

TABLE III.A – *Continued*

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
	A.3.2: Lag between the time that data were collected and the time that descriptive statistics (age, sex, residence by enumeration area) were published	Less than 2 years	2 or 3 years	4 or 5 years	No census results available for at least 10 years	
	A.3.3: Accurate population projections by age and sex are available for small areas (districts or below) for the current year **Note:** Skip this question if no census results available for more than 10 years	Accurate projections are available for the smallest administrative level	Accurate projections are available for districts	Accurate projections are available for regions/provinces	No projections for current year, or projections are not considered to be accurate	
	A.3.4: Microdata are available for public access **Note:** Skip this question if no census results available for more than 10 years	Available on request	Available on request with restrictions		Not available	
III.A.4 **Integration & use**	**A.4.1:** Population projections are used for the estimation of coverage and planning of health services **Note:** Skip this question if no census results available for more than 10 years	Projections used by most subdistricts	Projections used by most districts	Projections used at national and/or regional/provincial levels	Population projections are not used for health	

TABLE III.B – ASSESSING NATIONAL HIS DATA SOURCES: Civil registration

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.B.1 **Contents**	**B.1.1:** There is a reliable source of nationwide vital statistics: civil registration; Sample Registration System (SRS); or Demographic Surveillance System (DSS)	Nationwide civil registration	Sample Registration System	Demographic Surveillance System	There is no reliable source	
	B.1.2: Coverage of deaths registered through civil registration	90% or more	70–89%	50–69%	Less than 50%	
	B.1.3: Cause-of-death information is recorded on the death registration form if civil registration is in place **Note:** Skip this item if civil registration is not in place	90% or more	70–89%	50–69%	Less than 50%	
III.B.2 **Capacity & practices**	**B.2.1:** The country has adequate capacity to: (1) implement data collection; (2) process the data; and (3) analyse the data from civil registration or SRS or DSS	Adequate capacity for all 3	Adequate capacity for 2 of the 3	Adequate capacity for only 1 of the 3	Adequate capacity for none of the 3	
	B.2.2: Frequency of the assessment of completeness of civil registration	Each time census is conducted (every 5–10 years)	Each time census is conducted	Less periodically than census	Never conducted or do not know	
	B.2.3: The *International Statistical Classification of Diseases and Related Health Problems* (ICD) is currently in use for cause-of-death registration **Note:** Score 0 if there is no cause-of-death registration	ICD-10 detailed	Tabulation List ICD-10	ICD-9	No ICD used or ICD-8 or earlier or there is no cause-of-death registration	
	B.2.4: Proportion of all deaths coded to ill-defined causes (%) (garbage codes) **Note:** Skip this item if there is no cause-of-death registration	Less than 5%	5–10%	11–19%	20% or more	
	B.2.5: Published statistics from civil registration or SRS are disaggregated by: (1) sex; (2) age; and (3) geographical or administrative region (or urban/rural) **Note:** Score 0 if there is no civil registration or SRS	All 3	2 of 3	1 of 3	None of 3, or there is no civil registration and no SRS	

TABLE III.B – *Continued*

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
	B.2.6: Sample Registration System (SRS) developed and generating timely and accurate data **Note:** Skip this item if there is no SRS	Nationally representative		Partially representative	None	
	B.2.7: Demographic Surveillance System (DSS) sites developed and generating timely and accurate data **Note:** Skip this item if there is no DSS		Partially representative (at least 1 urban and 2 rural sites)	Non-representative	None	
	B.2.8: Verbal autopsy (VA) tool **Note:** Skip this item if there is no DSS or SRS	VA tool validated; questionnaire publicly available and consistent with international standards	VA tool validated	VA tool not validated	No verbal autopsy used by SRS and/or DSS	
III.B.3 **Dissemination**	**B.3.1:** Lag between the time that data were collected and the time that statistics from civil registration/SRS/DSS were published **Note:** Score 0 if there is no civil registration or SRS or DSS	Less than 3 years	3 years	4 or 5 years	More than 5 years or statistics not published or no vital statistics system (civil registration, SRS, DSS) exists	
III.B.4 **Integration & Use**	**B.4.1:** Information from civil registration/SRS/DSS on: (1) mortality rates; and (2) causes of death is used for national and subnational analysis **Note:** Score 0 if there is no civil registration or SRS or DSS	Both mortality rates and cause-of-death information are used	1 of 2 used		Not used or statistics not published or no vital statistics system (civil registration, SRS, DSS) exists	

TABLE III.C – ASSESSING NATIONAL HIS DATA SOURCES: Population surveys

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.C.1 **Contents**	**C.1.1:** In the past 5 years, a nationally representative survey has measured the percentage of the relevant population receiving key maternal and child health services (e.g., family planning, antenatal care, professionally attended deliveries, immunization)	Yes			No	
	C.1.2: In the past 5 years, a nationally representative survey has provided sufficiently precise and accurate estimates of infant and under-5 mortality	Yes			No	
	C.1.3: In the past 5 years, nationally representative population-based survey(s) have measured the prevalence of some priority noncommunicable diseases/health problems (e.g., disability, mental illness, hypertension, diabetes, accidents, violence) and leading risk factors (e.g., smoking, drug use, diet, physical inactivity) "Biomarkers" – substance used as an indicator of a biologic state. This includes screening for antibodies in blood and urine sample, for example.	Yes, nationally representative surveys have measured biomarkers and at least 3 priority non-communicable diseases/health conditions or risk factors	Surveys have not measured any additional biomarkers but have measured the prevalence of at least 1 priority non-communicable disease/ health problem or risk factor	In the past 5 years, population-based surveys have not measured the prevalence of any priority noncom-municable disease/ health problem or risk factor	No population-based surveys have been organized in the past 5 years	
III.C.2 **Capacity & practices**	**C.2.1:** The country has adequate capacity to: (1) conduct household surveys (including sample design and field work); (2) process the data; and (3) analyse the data	Adequate capacity for all 3	Adequate capacity for 2 of the 3	Adequate capacity for only 1 of the 3	Adequate capacity for none of the 3	
	C.2.2: Surveys follow international standards for consent, confidentiality and access to personal data (e.g., OECD guidelines)	Yes			No	
	C.2.3: The data allow disaggregation by age, sex and locality (e.g. urban/rural, major geographical or administrative region)	All 3	2	1	None	
	C.2.4: The data allow disaggregation by socioeconomic status: (1) income; and (2) education	Yes, both		Only by education	No	

TABLE III.C – *Continued*

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.C.3 **Dissemination**	**C.3.1:** Metadata (design, sample implementation, questionnaires) are available from recent surveys	Publicly available			Not available	
	C.3.2: Microdata are available from recent surveys	Available on request	Available on request with restrictions		Not available	
III.C.4 **Integration & use**	**C.4.1:** There are meetings and a multiyear plan to coordinate the timing, key variables measured and funding of nationally representative population-based surveys that measure health indicators	Yes, a coordination mechanism and plan coordinate all nationally representative surveys	Coordination group and long-term plan coordinate >75% of nationally representative household surveys	Plan exists but is incomplete and/or coordination group is unable to effectively coordinate surveys	Neither a coordination group nor a long-term plan exist	
	C.4.2: The health and statistical constituencies in the country work together closely on survey design, implementation and data analysis and use	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	

TABLE III.D – ASSESSING NATIONAL HIS DATA SOURCES: Individual records

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.D.1 **Contents**	**D.1.1:** For each of the key epidemic-prone diseases (e.g., cholera, diarrhoea with blood, measles, meningitis, plague, viral haemorrhage fevers, yellow fever, SARS, bird flu) and diseases targeted for eradication and/or elimination (e.g., poliomyelitis, neonatal tetanus, leprosy) appropriate case definitions have been established and cases can be reported using the current reporting format	True for all key epidemic-prone diseases and diseases targeted for eradication and/or elimination	True for all except 1 or 2 key epidemic-prone diseases and diseases targeted for eradication and/or elimination	There are 3 or more key diseases for which case definitions remain to be established or for which the reporting form is not adequate	No system for notification or a system that does not report on most of the key diseases	
	D.1.2: For health conditions of substantial public health importance other than those listed above in D.1.1 (e.g., leading causes of mortality, morbidity and disability such as pneumonia and diarrhoea with dehydration in children less than 5 years of age, malaria, tuberculosis, HIV/AIDS, sexually transmitted diseases, and noncommunicable diseases) a surveillance strategy exists	True for all leading causes of morbidity, mortality and disability	True for most leading causes of morbidity, mortality and disability	True for some leading causes of morbidity, mortality and disability diseases	No good surveillance system exists other than epidemic-prone	

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
	D.1.3: Mapping of specific at-risk populations in place (e.g., populations with high levels of malnutrition and poverty) and of general population exposed to specific risks (e.g., vectors, and environmental and industrial pollution)	Maps are up to date and comprehensive and there is capacity to promptly add new features	Maps are up to date and reasonably comprehensive	Mapping of only a few public health risks	No mapping of public health risks	
III.D.2 **Capacity & practices**	**D.2.1:** The country has adequate capacity to: (1) diagnose and record cases of notifiable diseases; (2) report and transmit timely and complete data on these diseases; and (3) analyse and act upon the data for outbreak response and planning of public health interventions	Adequate capacity for all 3 activities	Adequate capacity to carry out activities (1) and (2)	Adequate capacity to carry out activity (1) only	Adequate capacity for none of the 3 activities	
	D.2.2: Percentage of health workers making primary diagnoses who can correctly cite the case definitions of the majority of notifiable diseases	90% or more	75–89%	25–74%	Less than 25%	
	D.2.3: Percentage of health facilities submitting weekly or monthly surveillance reports on time to the district level	90% or more	75–89%	25–74%	Less than 25%	
	D.2.4: Percentage of districts submitting weekly or monthly surveillance reports on time to the next-higher level	90% or more	75–89%	25–74%	Less than 25%	
	D.2.5: Proportion of investigated outbreaks with laboratory results	90% or more	75–89%	25–74%	Less than 25%	
	D.2.6: Use of facility-retained patient medical records to support quality and continuity of care	90% or more of patient records are completed adequately and can be retrieved for 90% or more of patients in time to promptly inform clinical decision-making	Records are usually completed adequately and can be retrieved for the majority of patients in time to promptly inform clinical decision-making	Essential patient information is usually not recorded and/or records cannot be retrieved for most patients	No system for patient medical records in most health facilities	
	D.2.7: *International Statistical Classification of Diseases and Related Health Problems* (ICD) is currently used for reporting hospital discharge diagnoses **Note:** Not applicable if there is no ICD coding of discharge diagnoses	ICD-10 detailed	Tabulation List ICD-10	ICD-9	No ICD used or ICD-8 or earlier	

TABLE III.D – *Continued*

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.D.3 **Dissemination**	**D.3.1:** Surveillance data on epidemic-prone diseases are disseminated and fed back through regularly published weekly, monthly or quarterly bulletins	Bulletin produced regularly during past year and available at all district health offices		Bulletin not produced regularly during past year or not distributed to districts	No bulletin produced	
III.D.4 **Integration & use**	**D.4.1:** Integration of reporting for disease surveillance and other focused public health programmes (e.g., maternal care, family planning and growth monitoring)	A single form is used for notification of key diseases. Reporting of other public health programmes is also well integrated	Although there are a number of reporting forms, there is good coordination and efforts to integrate the reporting requirements of public health programmes		Health workers and managers face a heavy burden in completing and reviewing separate reports for numerous public-health programmes	
	D.4.2: Proportion of epidemics noted at regional/provincial or national level (through analysis of surveillance data) first detected at district level	At least 90% of epidemics noted at regional/provincial or national levels are first detected at district level	At least 75% of epidemics noted at regional/provincial or national levels are first detected at district level		Less than 75% of epidemics noted at regional/provincial or national levels are first detected at district level	

TABLE III.E – ASSESSING NATIONAL HIS DATA SOURCES: Service records

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.E.1 **Contents**	**E.1.1:** There is a health service based information system that brings together data from all public and private facilities	Yes, it covers both public and private facilities	Integrated but covers few private facilities (e.g., for-profit and not-for-profit)	Covers few private facilities (e.g., only not-for-profit)	No data from private facilities	

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
	E.1.2: There is a systematic approach to evaluating the quality of services provided by health facilities. This includes both: (a) systematic standardized supervision with reporting of findings to district and national levels; and (b) a health-facility survey of all facilities or of a nationally representative sample at least once every 5 years	There is both systematic standardized supervision with reporting and a nationally representative health-facility survey	There has been at least 1 nationally representative health-facility survey in the past 5 years	There is information on quality of services but only from a convenience sample of health facilities	Records of findings from structured supervision or health-facility surveys are not available	
III.E.2 **Capacity & practices**	**E.2.1:** The health information system has a cadre of trained health information staff who have at least 2 years of specialized training and are in place at the district level	At least 75% of districts	10–74% of districts	1–9% of districts	Not in any district	
	E.2.2: Health workers in health facilities (clinics and hospitals) receive regular training in health information that is either integrated into continuing education or through in-service training in the public sector	Most health workers have received such training in the past 5 years	25–49% of health workers have received such training in the past 5 years	5–24% of health workers have received such training in the past 5 years	Less than 5% of health workers have received such training	
	E.2.3: There are mechanisms in place at national and subnational levels for supervising, and receiving feedback on, information practices in the public sector	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
	E.2.4: There is a mechanism in place from district up through national level for verifying the completeness and consistency of data from facilities	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
III.E.3 **Dissemination**	**E.3.1:** The time elapsed since an annual summary of health service statistics was published with statistics disaggregated by major geographical or administrative region	Less than 2 years ago	2–3 years ago	4–5 years ago	6 years ago or more	
	E.3.2: Degree to which districts or similar administrative units compile their own monthly/quarterly and annual summary reports, disaggregated by health facility	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
III.E.4 **Integration & use**	**E.4.1:** Degree to which vertical reporting systems (e.g., for tuberculosis or vaccination) communicate well with the general health service reporting system	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	

TABLE III.E – *Continued*

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
	E.4.2: Degree to which managers and analysts at national and subnational levels frequently use findings from surveys, civil registration (or other vital statistics systems) to assess the validity of clinic-based data	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
	E.4.3: Degree to which data derived from health service records are used to estimate the coverage of key services (e.g., antenatal care, delivery with a skilled attendant and immunization)	Yes, always	Yes, sometimes	Occasionally	Never	

TABLE III.F – ASSESSING NATIONAL HIS DATA SOURCES: Resource records

Infrastructure and health services

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.F.1 **Contents**	**F.1.1:** There is a national database/roster of public and private-sector health facilities. Each health facility has been assigned a unique identifier code that permits data on facilities to be merged	Yes	There is a database/ roster of public health facilities with a coding system that permits integrated data management		No	
	F.1.2: Global Positioning System (GPS) coordinates for each health facility are included in the database	True for 90% or more of public and private facilities	True for 90% or more of public facilities	True for less than 90% of public facilities	Not adequate at all	
III.F.2 **Capacity & practices**	**F.2.1:** There are human resources and equipment for maintaining and updating the database and maps on health facilities and services	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
	F.2.2: Period since the national database of facilities was updated	Less than 2 years ago	2–3 years ago	More than 3 years ago	There is no national database	

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.F.3 **Dissemination**	**F.3.1:** Maps are available in most districts showing the location of health infrastructure, health staff and key health services	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
III.F.4 **Integration & use**	**F.4.1:** Managers and analysts at national and district levels commonly evaluate physical access to services by linking information about the location of health facilities and health services to the distribution of the population	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	

Human resources

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.F.5 **Contents**	**F.5.1:** There is a national human resources (HR) database that tracks the number of health professionals by major professional category working in either the public or the private sector	Yes, the national HR database tracks numbers of health professionals by professional category in both the public and private sectors	The national HR database tracks numbers by professional category but only those working in the public sector	The national HR database does not provide statistics disaggregated by professional category	No national HR database	
	F.5.2: There is a national database that tracks the annual numbers graduating from all health-training institutions	Yes		Numbers graduating from certain health training institutions (e.g., nursing or private institutions) are not tracked	No	
III.F.6 **Capacity & practices**	**F.6.1:** There are human resources for maintaining and updating the national HR database	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
	F.6.2: Period since national HR database statistics were last updated:	0–1 year ago	2–3 years ago	4–5 years ago	6 years ago or more	

TABLE III.F – *Continued*

Financing and expenditure for health services

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.F.7 **Contents**	**F.7.1:** Financial records are available on general government expenditure on health and its components (e.g., by ministry of health, other ministries, social security, regional and local governments, and extra budgetary entities) and on private expenditure on health and its components (e.g., household out-of-pocket expenditure, private health insurance, NGOs, firms and corporations)	All components, public and private	Only public and household out-of-pocket expenditure	Only public expenditure	No system or incomplete	
	F.7.2: There is a system for tracking budgets and expenditure by all the financial agents listed above in F.7.1 disaggregated by subnational or district level	All sources of finance are disaggregated by subnational or district level	Sources other than household out-of-pocket expenditure (e.g., government including social security and local government, donors, and health insurance) by subnational level	Government budget/ expenditure plus at least 1 more source (such as donors) but only at national level	No tracking or only tracking of national government expenditure	
III.F.8 **Capacity & practices**	**F.8.1:** Adequate numbers of qualified, long-term staff are regularly deployed to work on the National Health Account (NHA) whether or not they are employed by the ministry of health **Note:** Not applicable if no NHA conducted	Yes	Adequate numbers and skills but staff are not employed long-term by any in-country agency or are not regularly deployed to work on the NHA	Inadequate numbers of skilled staff, or adequate numbers but staff require external technical support	Ad hoc staff chosen when activity takes place	
	F.8.2: Periodicity and timeliness of routine NHA **Note:** Not applicable if no NHA conducted	Estimates every year with 1-year lag between year reported and publication year	Estimates every year with 2-year lag between year reported and publication year	Estimates every 2–5 years	At least 5 years between estimates or no estimates	

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
	F.8.3: NHA routinely provides information on the following 4 classifications of financial flow: (1) financial sources; (2) financial agents; (3) providers; and (4) functions *functions* – the types of goods and services provided and activities performed **Note:** Not applicable if no NHA conducted	All 4	Any 3	Any 2	None or only 1	
	F.8.4: NHA provides information on health expenditure by major diseases, health programme areas, geographical or administrative region and/or target populations (according to major policy concerns) **Note:** Not applicable if no NHA conducted	Health expenditure information is available for at least 2 major disease programmes and another area of policy concern	Health expenditure information is available for 1 major disease programme and another area of policy concern	Estimates are available of expenditure on some areas of policy concern but they exclude some important sources of finance (e.g., out-of-pocket)	None	
III.F.9 **Dissemination**	**F.9.1:** NHA findings are widely and easily accessible **Note:** Not applicable if no NHA conducted	NHA findings have been widely disseminated and are cited in a document accessible on a web site	NHA findings have been disseminated to the public	NHA findings are available within the agency but have not been widely disseminated	Written report on NHA findings not available	
III.F.10 **Integration & use**	**F.10.1:** NHA has been used for policy formulation and resource allocation **Note:** Not applicable if no NHA conducted	There is at least one major policy document that has been substantially influenced by (or prominently cites) NHA findings	At least some findings from the NHA have been used in budgeting and planning	Policy-makers and other stakeholders are aware of the NHA findings but there is no evidence that these findings have shaped policy and planning	There is no evidence that policy-makers are aware of NHA findings	

TABLE III.F – *Continued*

Equipment, supplies and commodities

Core dimensions	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
III.F.11 **Contents**	**F.11.1:** Each facility is required to report at least annually on the inventory and status of equipment and physical infrastructure (e.g., construction, maintenance, water supply, electricity and sewage system) in the public sector	Yes			No	
	F.11.2: Each facility is required to report at least quarterly on its level of supplies and commodities (e.g., drugs, vaccines and contraceptives) in the public sector	Yes			No	
III.F.12 **Capacity & practices**	**F.12.1:** There are sufficient and adequately skilled human resources to manage the physical infrastructure, and the logistics of equipment, supplies and commodities in the public sector	Highly adequate	Adequate	Present, but not adequate	Not adequate at all	
	F.12.2: Periodicity and completeness of reporting on equipment and physical infrastructure in the public sector	Complete quarterly reporting	Complete annual reporting	Incomplete reporting	None	
	F.12.3: Periodicity and completeness of reporting on supplies and commodities in the public sector	Complete monthly reporting	Complete quarterly reporting	Incomplete reporting	None	
III.F.13 **Integration & use**	**F.13.1:** Degree to which reporting systems for different supplies and commodities are integrated in the public sector	Fully	Partially	Somewhat	All supplies and commodities separately reported	
	F.13.2: Managers at national and subnational levels routinely attempt to reconcile data on the consumption of commodities with data on cases of disease reported in the public sector	Routine monthly reconciliation	Occasionally	Rarely	Never	

IV. Assessing national HIS data management

[Table IV]

Data management is a set of procedures for the collection, storage, processing and compilation of data. Countries should have a centralized (preferably electronic) data depository that brings together all information for the national HIS and is made available to all – ideally via the Internet. The availability of such a data depository facilitates the cross-referencing of data among programmes, promotes adherence to standard definitions and methods, and helps to reduce redundant and overlapping data collection. It also provides a forum to examine and understand data inconsistencies and to facilitate the reconciliation of data reported through different systems.

Whatever the source of a data item, it is essential to pay special attention to the activities and subsystems concerned with data collection, storage, analysis and dissemination (**Table IV**). The aim is to carefully assemble data from a variety of disparate sources – both within the health system and beyond – and to ensure its quality by cleaning and checking prior to releasing information to a broader public.

Metadata is *data about data*. It covers definitions of data elements/variables, their use in indicators, data-collection method, time period of data-collection, analysis techniques used, estimation methods and possible data biases. Metadata is captured and managed within an integrated data repository to support the disparate needs of the technical, administrative and health user groups of the data-management system. It is essential for providing accurately described common data-element definitions and for ensuring that other vital information is understood (such as data time periods, geographical designations and other dimensions). To relate data from multiple sources, it is essential to develop common definitions and to understand the characteristics of each data element.

Data processing and compilation also has a number of other broad requirements, among which are ensuring that relevant and appropriate information is made easily accessible and its contents understandable. At the same time, this also means securing and protecting the information assets of the system. For example, a system may contain disaggregated patient information affected by privacy and security considerations. It is therefore essential to control access to confidential information.

The results of data processing and compilation are a variety of reporting mechanisms that may be generalized to include both online and conventional reports. Where Internet access is available, the system reporting mechanisms can be accessed directly. Conventional reports can be produced where online access is not yet practical or appropriate to provide sophisticated data analysis and presentation tools developed centrally and benefiting from data-quality procedures. The reports may contain comparative information from other areas or programmes to improve understanding of the data and promote their use.

TABLE IV – ASSESSING NATIONAL HIS DATA MANAGEMENT

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
IV.1	There is a written set of procedures for data management including data collection, storage, cleaning, quality control, analysis and presentation for target audiences, and these are implemented throughout the country	Yes, a written set of procedures exists including all the steps in data management and these are implemented throughout the country	Yes, a written set of data-management procedures exists, but these are only partially implemented	Yes, a written set of data-management procedures exists, but these are not implemented	No written procedures exist	
IV.2	The HIS unit at national level is running an integrated data warehouse containing data from all population-based and institution-based data sources (including all key health programmes) and has a user-friendly reporting utility accessible to various user audiences	Yes, there is a data warehouse at national level with a user-friendly reporting utility accessible to all relevant government and other partners	Yes, there is a data warehouse at national level but it has a limited reporting utility	Yes, there is a data warehouse at national level but it has no reporting utility	No national data warehouse exists	
IV.3	At the subnational level, a data warehouse equivalent to the national one exists and has a reporting utility that is accessible to various users	Yes, there is a data warehouse at the subnational level with a user-friendly reporting utility accessible to users at all levels, including users at the district level	Yes, there is a data national level but it has a limited reporting utility	Yes, there is a data warehouse at the sub-national level but it has no reporting utility	No subnational data warehouse exists	
IV.4	A metadata dictionary exists which provides comprehensive definitions about the data. Definitions include information in the following areas: (1) use of data in indicators; (2) specification of collection methods used; (3) periodicity; (4) geographical designations (urban/rural); (5) analysis techniques used; and (6) possible biases	Yes, there is a metadata dictionary which provides definitions in all 6 areas	Yes, there is a metadata dictionary but it only provides definitions in 3–5 areas	Yes, there is a metadata dictionary but it only provides definitions in 1–2 areas	No metadata dictionary exists	
IV.5	Unique identifier codes are available for administrative geographical units (e.g., region/province, district or municipality) to facilitate the merging of multiple databases from different sources	Unique identifier codes are used in different databases or a complete relational table is available to merge them	Identifier codes are used in different data-bases and work is required to harmonize these across databases or to create a relational table to allow merging	Identifier codes are available but do not match up between different databases	Not available	

V. Assessing national HIS data quality

[Tables V.A–J]

The national HIS should aim to have accurate and reliable data available for a select set of core indicators within each domain shown in **Fig. 3**. Most indicators are estimated on the basis of empirical data sources. To ensure data quality, a wide range of policies and processes are required. One overall guiding principle is to reduce the necessary amount of information to a "minimum dataset". This will then reduce the burden of data collection and this alone should improve data quality. Other management actions to improve data are regular local quality control and data-use checks, the use of clear definitions of data elements, up-to-date training, and frequent feedback to data collectors and users. When electronic communication facilities are available, data can be entered at decentralized locations to provide immediate reporting to all levels.

Strong health information systems ensure that data meet high standards of reliability, transparency and completeness. It is important to assess source data and the statistical techniques and estimation methods used to generate indicators. Building on the IMF Data Quality Assessment Framework (DQAF)[1] and IMF General Data Dissemination System (GDDS),[2] the following criteria can be used to assess the quality of health-related data and indicators:

- **data-collection method** – sometimes there is only one gold-standard data-collection method for a given indicator; more often, however, different sources can be used.
- **timeliness** – the period between data collection and its availability to a higher level, or its publication;
- **periodicity** – the frequency with which an indicator is measured;
- **consistency** – the internal consistency of data within a dataset as well as consistency between datasets and over time; and the extent to which revisions follow a regular, well-established and transparent schedule and process;
- **representativeness** – the extent to which data adequately represent the population and relevant subpopulations;
- **disaggregation** – the availability of statistics stratified by sex, age, socioeconomic status, major geographical or administrative region and ethnicity, as appropriate; and
- **confidentiality, data security and data accessibility** – the extent to which practices are in accordance with guidelines[3] and other established standards for storage, backup, transport of information (especially over the Internet) and retrieval.

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[1] International Monetary Fund Data Quality Assessment Framework (DQAF), 2003. http://dsbb.imf.org/Applications/web/dqrs/dqrsdqaf/

[3] International Monetary Fund General Data Dissemination System (GDDS), 2003. http://dsbb.imf.org/vgn/images/pdfs/gdds_oct_2003.pdf

[3] For example, the OECD Guidelines for data protection at: http://www.oecd.org/document/18/0,2340,en_2649_34255_1815186_1_1_1_1,00.html

- **adjustment methods** – the extent to which crude data are adjusted in order to take into account bias and missing values. Specifically refers to adjustments, data transformation and analysis methods that follow sound and transparent statistical procedures.

Tables V.A–J provide an approach for assessing data quality for the following 10 selected indicators covering the three domains of health information shown in **Fig. 3**:

Health status domain

- **Table V.A** – under-5 mortality (all causes)
- **Table V.B** – maternal mortality
- **Table V.C** – HIV prevalence

Health system domain

- **Table V.D** – measles vaccination coverage
- **Table V.E** – attended deliveries
- **Table V.F** – tuberculosis treatment
- **Table V.G** – general government health expenditure (GGHE) per capita
- **Table V.H** – private expenditure
- **Table V.I** – workforce density

Determinants of health domain

- **Table V.J** – smoking prevalence

Although these largely reflect the MDG indicators, the assessment group may wish to add to or replace these with indicators more relevant to their situation, applying the same set of assessment criteria.

TABLE V.A – ASSESSING NATIONAL HIS DATA QUALITY: Under-5 mortality (all causes)

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
A. Under-5 mortality (all causes)	**V.A.1** Data-collection method	Data-collection method used for estimate published most recently or to be published	Vital registration of at least 90% of under-5 deaths	Birth history from household survey or Sample Registration System	Other methods (such as indirect methods) based on household surveys or censuses	No data	
	V.A.2 Timeliness	For the most recently published estimate, number of years since the data were collected	0–2 years	3–5 years	6–9 years	10 years or more	
	V. A.3 Periodicity	Number of times measured in the past 10 years	3 or more	2	1	None	
	V.A.4 Consistency	Datasets from major data sources consistent during past 10 years	No major discrepancies	Several discrepancies	Multiple discrepancies	Not applicable	
	V.A.5 Representativeness	Coverage of data upon which the most recently reported estimate is based	All deaths (>90%)	Sample of deaths	Local studies	Not applicable	
	V.A.6 Disaggregation	Most recent estimate disaggregated by: (1) demographic characteristics (e.g., sex, age); (2) socioeconomic status (e.g., income, occupation, education of parent); and (3) locality (e.g., urban/ rural, major geographical or administrative region)	All 3	2	1	None	
	V.A.7 Adjustment methods	In-country adjustments use transparent, well-established methods	Yes			No	

TABLE V.B – ASSESSING NATIONAL HIS DATA QUALITY: Maternal mortality

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
B. Maternal mortality	**V.B.1** Data-collection method	Data-collection method used for the estimate published most recently or to be published	Vital registration of at least 90% of deaths and with good medical certification of cause of death	Sample Vital Registration with Verbal Autopsy	Direct methods from household survey or censuses (such as sibling history, recent deaths with verbal autopsy)	No data	
	V.B.2 Timeliness	For the most recently published estimate, number of years since the data were collected	0–2 years	3–5 years	6–9 years	10 or more years	
	V.B.3 Periodicity	Number of times measured in the past 10 years	3 or more	2	1	No data	
	V.B.4 Consistency	Data consistent over past 10 years	No major discrepancies	Several discrepancies	Multiple discrepancies	Not applicable	
	V.B.5 Representativeness	Coverage of data upon which the most recent estimate is based	All deaths	Sample of deaths	Local studies	No data	
	V.B.6 Disaggregation	Estimate that was published most recently (or will be published) is disaggregated by: (1) demographic characteristics (e.g., age); (2) socioeconomic status (e.g., income, occupation, education); and (3) locality (e.g., urban/rural, major geographical or administrative region)	Disaggregation available for all 3 elements	Disaggregation available for 2 elements	Disaggregation available for 1 element	Disaggregation not possible	
	V.B.7 Adjustment methods	In-country adjustments use transparent, well-established methods	Yes			No	

TABLE V.C – ASSESSING NATIONAL HIS DATA QUALITY: HIV prevalence

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
C. HIV prevalence	**V.C.1** Data-collection method	Data-collection method used for estimate published most recently or to be published					
		1. If generalized epidemic	1. General population survey + ANC surveillance	1. ANC surveillance	1. HIV case-reporting	1. Any other method	
		2. If concentrated or low-level epidemic	2. Surveillance among population at high risk with random sampling	2. Surveillance among population at high risk with purposive sampling	2. HIV case-reporting	2. Any other method	
	V.C.2 Timeliness	For the most recently published estimate, number of years since the data were collected	<2 years	2 years	3–4 years	5 years or more	
	V.C.3 Periodicity	Number of times measured in past 5 years	5	3–4	2	1 or none	
	V.C.4 Consistency	Data consistency over time during past 5 years	No major discrepancies	Several discrepancies	Multiple discrepancies	Not applicable	
	V.C.5 Representativeness	Coverage of data upon which the most recent estimate is based					
		1. If generalized epidemic	1. Nationally representative survey + both urban and rural ANC clinics	1. Both urban and rural ANC clinics	1. Inadequate sample of clinics	1. Any other method	
		2. If concentrated or low-level epidemic	2. All major populations at high risk with random sampling	2. At least one major population at high risk in multiple locations	2. One population at high risk in one location	2. Any other method	
	V.C.6 Disaggregation	Estimate that was published most recently (or will be published) is disaggregated by: (1) demographic characteristics (e.g., sex, age); (2) socioeconomic status (e.g., income, occupation, education); and (3) locality (e.g., urban/rural, major geographical or administrative region)	Disaggregation available for 3 elements – specifically, prevalence among 15–24 year olds is estimated with an adequate sample size	Disaggregation available for 2 elements	Disaggregation available for 1 element	Disaggregation not possible	

TABLE V.D – ASSESSING NATIONAL HIS DATA QUALITY: Measles vaccination coverage

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
D. Measles vaccination coverage by 12 months of age	**V.D.1** Data-collection method – administrative statistics	Coverage can be estimated from routine administrative statistics submitted by at least 90% of immunizing health facilities. These statistics are systematically reviewed at each level for completeness and consistency, and inconsistencies investigated and corrected. To calculate coverage, reliable estimates of population are available	Yes. Administrative statistics are complete (>90%) and quality control is good; population denominators are based upon full (>90%) birth registration	Administrative statistics are evaluated for completeness and consistency; population denominators are based upon population projections	There is little evaluation of the completeness or consistency of administrative statistics or they are submitted by less than 90% of relevant facilities, or no population projections are available	Measles vaccination coverage cannot be estimated from administrative statistics	
	V.D.2 Data-collection method – household survey statistics	Coverage has been measured by at least 2 nationally representative household surveys in the past 5 years and immunization cards were shown during each survey for at least two thirds of children	Yes, in the past 5 years there have been at least 2 nationally representative household surveys measuring measles vaccination coverage, during which cards were shown for at least two thirds of children	In the past 5 years there has been 1 nationally representative household survey measuring measles vaccination coverage, during which cards were shown for at least two thirds of children	During the household survey, immunization cards were shown for less than two thirds of children	No coverage estimate, or estimate based on a household survey more than 5 years old	
	V.D.3 Timeliness	For the most recently published estimate, number of months since the data were collected	0–11 months	12–17 months	18–29 months	30 months or more	
	V.D.4 Periodicity	Number of times in the past 5 years that an annual estimate was published based on administrative statistics	5 times	3–4 times	Once or twice	None	
	V.D.5 Consistency	Data consistent between recent surveys and reports	No major discrepancies	Several discrepancies	Multiple discrepancies	Not applicable	

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
	V.D.6 Representativeness	Coverage of data upon which the most recent estimate is based	(1) Data from at least 90% of health facilities and outreach sites that immunize children including all major hospitals and both public and private sector; or (2) nationally representative household sample	Data from at least 80% of health facilities and outreach sites that immunize children	Data from less than 80% of health facilities and outreach sites that immunize children	Anything less than this	
	V.D.7 Disaggregation	Estimate that was published most recently (or will be published) is disaggregated by: (1) demographic characteristics (e.g., sex, age); (2) socioeconomic status (e.g., income, occupation, education of parents); and (3) locality (e.g., urban/rural, major geographical or administrative region)	Disaggregation available for all 3 elements	Disaggregation available for 2 elements	Disaggregation available for 1 element	Disaggregation not possible	

TABLE V.E – ASSESSING NATIONAL HIS DATA QUALITY: Attended deliveries

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
E. Deliveries attended by skilled health professionals	**V.E.1** Data-collection method – administrative statistics	The percentage of deliveries attended by a skilled health professional can be estimated from routine administrative statistics submitted by at least 90% of relevant health facilities. These statistics are systematically reviewed at each level for completeness and consistency, and inconsistencies are investigated and corrected. To calculate coverage, reliable estimates of population are available	Yes. Administrative statistics are complete (>90%) and quality control is good; population denominators are based upon full (>90%) birth registration	Administrative statistics are evaluated for completeness and consistency; population denominators are based upon population projections	There is little evaluation of the completeness or consistency of administrative statistics, or they are submitted by less than 90% of relevant facilities, or no population projections are available	The percentage of deliveries attended by a skilled health professional cannot be estimated from administrative statistics	

TABLE V.E – *Continued*

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
	V.E.2 Data collection method – household survey statistics	The percentage of deliveries attended by a skilled health professional has been measured by at least 2 nationally representative household surveys in the past 5 years	Yes. In the past 5 years at least 2 nationally representative household surveys have measured coverage	In the past 5 years there has been 1 nationally representative household survey measuring coverage		No coverage estimate, or estimate based on a household survey more than 5 years old	
	V.E.3 Timeliness	For the most recently published estimate, number of months since the data were collected	0–11 months	12–17 months	18–59 months	60 months or more	
	V.E.4 Periodicity	Number of times measured in the past 10 years	3 or more	2	1	None	
	V.E.5 Consistency	Datasets consistent between recent surveys and reports	No major discrepancies	Several discrepancies	Multiple discrepancies	Not applicable	
	V.E.6 Representativeness	Coverage of data upon which the most recent estimate is based	Data from at least 90% of professionally supervised deliveries and from complete (>90%) registration of births	Nationally representative household sample	Local studies; incomplete reporting on professionally supervised deliveries with limited or no evaluation of completeness	None	
	V.E.7 Disaggregation	Most recent estimate disaggregated by: (1) demographic characteristics (e.g., age); (2) socioeconomic status (e.g., income, occupation, education); and (3) locality (e.g., urban/rural, major geographical or administrative region)	Disaggregation available for all 3 elements	Disaggregation available for 2 elements	Disaggregation available for 1 element	Disaggregation not possible	

TABLE V.F – ASSESSING NATIONAL HIS DATA QUALITY: Tuberculosis treatment

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
F. Tuberculosis (TB) treatment success rate under DOTS	**V.F.1** Data-collection method	Source of data and method used for most recent data	Clinic reports with evaluation of reporting rate	District reports with evaluation of reporting rate	National reports with limited evaluation of reporting bias	None	
	V.F.2 Timeliness	For the most recently published estimate, number of years since the data were collected	1 year	2 years	3-4 years	5 or more years	
	V.F.3 Periodicity	Number of times measured in the past year (should be quarterly)	4		<4	None	
	V.F.4 Consistency	Consistency of treatment success rates during past 10 years (fluctuation due to non-standardized data-collection procedure, definitions, etc.)	No major discrepancies	Several discrepancies	Multiple discrepancies	Not applicable	
	V.F.5 Representativeness	Coverage of data upon which the most recent estimate is based -- % of subnational DOTS quarterly reports received by national TB programme in most recent year	Over 90%	75%–89%	50%–75%	Less than 50%	
	V.F.6 Disaggregation – 1	Estimate that was published most recently or will be published is disaggregated by demographic characteristics (e.g. age), socioeconomic status (e.g. income, occupation, education) and locality (e.g. urban/rural, major geographical or administrative region)	Disaggregation available for 3 elements	Disaggregation available for 2 elements	Disaggregation available for 1 element	Disaggregation not possible	
	V.F.7 Disaggregation – 2	Most recent estimate disaggregated by HIV status and by drug resistance	Disaggregated by both	Disaggregated by 1 of these		Neither	

TABLE V.G – ASSESSING DATA QUALITY: GGHE

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
G. General government health expenditure (GGHE) per capita (ministry of health, other ministries and social security, regional and local governments, extra budgetary entities)	**V.G.1** Data-collection method	Data-collection method used for most recent data	Data compiled using National Health Accounts (NHA) methodology	Data compiled from administrative sources (i.e. primary sources of each component)	Data imputed from secondary sources (e.g. report from third party)	No data	
	V.G.2 Timeliness	For the most recently published estimate, number of years since the data were collected	0–1 years	2 years	3 or more years	None	
	V.G.3 Periodicity	Periodicity	Yearly	Every 1–2 years	More than every 2 years	No data	
	V.G.4 Consistency	Consistency of definitions of expenditure on health across components (ministry of health, other ministries and social security, regional and local governments, extra budgetary entities) and over time	Single source with no break in series	Various sources that are harmonized	Various sources that are not harmonized	None	
	V.G.5 Representativeness	Components represented	All components: ministry of health, other ministries and social security, regional and local governments, extra budgetary entities	Ministry of health, regional and local governments and social security	Ministry of health as well as social security	Only ministry of health (or none)	

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
	V.G.6 Disaggregation – 1	Availability of disaggregated estimates of general government expenditure (all components: ministry of health, other ministries and social security, regional and local governments, extra budgetary entities) by subnational or district level	All components: ministry of health, other ministries and social security, regional and local governments, extra budgetary entities	Ministry of health, regional and local governments and social security	Ministry of health as well as social security	Only ministry of health (or none)	
	V.G.7 Disaggregation – 2	Availability of disaggregated estimates of externally funded government expenditure by source of funding (i.e. multilateral, bilateral, private foundations, NGOs, others)	Disbursed external resources from multi-lateral, bilateral, private foundations, NGOs, others	Disbursed external resources from multi-lateral and bilateral	Committed external resources from multi-lateral and bilateral	None	
	V.G.8 Adjustment methods	Availability of detailed information on sources and statistical methodologies, and recording of any departures from international guidelines, for all adjustments carried out and their resulting estimates	Resulting estimates are completely replicable through data audit trail	Based on the available information, resulting estimates are replicable at 75%	Based on the available information, resulting estimates are replicable at 50%	Resulting estimates are not replicable	

TABLE V.H – ASSESSING DATA QUALITY: Private expenditure

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
H. Private expenditure on health per capita (households' out-of-pocket, private health insurance, NGOs, firms and corporations)	**V.H.1** Data-collection method	Data-collection method used for most recent data	Data compiled using National Health Accounts (NHA) methodology	Data compiled using 1 household survey for out-of-pocket, a survey for at least 1 other component, and imputations for remaining components	Data compiled using 1 household survey for out-of-pocket and imputations for the other components	No data	

TABLE V.H – *Continued*

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
	V.H.2 Timeliness	For the most recently published estimate, number of years since the data were collected	0–1 years	2 years	3–4 years	None	
	V.H.3 Periodicity	Periodicity	Data for all components available yearly	All components surveyed at least once in past 5 years	Households expenditure surveyed at least once in past 5 years	No data	
	V.H.4 Consistency	Consistency of definitions of expenditure on health across components (households' out-of-pocket, private health insurance, NGOs, firms and corporations) and over time	Single source with no break in series	Various sources that are harmonized	Various sources that are not harmonized	No data	
	V.H.5 Representativeness	Coverage of population	Nationally-representative including all components: households' out-of-pocket, private insurance, NGOs, firms and corporations	Nationally-representative only for households' out-of-pocket plus 1 other component	Nationally-representative only for the households' out-of-pocket	Local studies or otherwise	
	V.H.6 Disaggregation – 1	Availability of disaggregated estimates of private expenditure (all components: households' out-of-pocket, private health insurance, NGOs, firms and corporations) by subnational or district level	All components: households' out-of-pocket, private insurance, NGOs, firms and corporations	Households' out-of-pocket and 1 other component	Households' out-of-pocket only	No disaggregated data	
	V.H.7 Disaggregation – 2	Availability of disaggregated estimates of private expenditure by source of funding (i.e. multilateral, bilateral, private foundations, NGOs, others)	Disbursed external resources from multilateral, bilateral, private foundations, NGOs, others	Disbursed external resources from multilateral and bilateral	Committed external resources from multilateral and bilateral	No data	
	V.H.8 Adjustment methods	Availability of detailed information on sources and statistical methodologies, and recording of any departures from international guidelines, for all adjustments carried out and their resulting estimates	Resulting estimates are completely replicable through data audit trail	Based on the available information, resulting estimates are replicable at 75%	Based on the available information, resulting estimates are replicable at 50%	Resulting estimates are not replicable	

TABLE V.I – ASSESSING DATA QUALITY: Workforce density

Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
I. Density of health work-force (total and by professional category) by 1000 population	**V.I.1** Data-collection method	Routine administrative records are validated with findings from a regularly conducted health facility survey/census, labour-force survey and the population census	Routine administrative records validated with population census, labour-force surveys, health facility census/ surveys and adminis-v trative records	Administrative records validated with either health facility census/ surveys or labour-force surveys	Only administrative records without validation by any census or survey	No data	
	V.I.2 Timeliness	For the most recently published estimate, number of months since the data were collected	0–5 months	6–11 months	12 months or more	No data	
	V.I.3 Periodicity	Number of times measured in past 5 years	5 or more	3–4	1–2	No data	
	V.I.4 Consistency	Variables and data definitions and classifications consistent over time and across different sources	All sources are consistent. The variables have the same definitions/ classification in all sources	Most of the sources are consistent. The variables have the same definitions/ classification in most of the sources	Only some of the main sources are consistent	The main sources are not consistent; definitions/ classification of variables vary across sources	
	V.I.5 Disaggregation – 1	Categories of health workers ISCO: International Standard Classification of Occupations	15 or more occupations or ISCO 4 digits or national equivalent	4–14 occupations or ISCO 3 digits or national equivalent	Less than 4 or ISCO 2 digits or national equivalent	Otherwise	
	V.I.6 Disaggregation – 2	Estimate that was published most recently or will be published is disaggregated by (1) gender, (2) urban/rural, (3) major geographical or administrative region and (4) public/private sector	The data allow disaggregation by all 4 variables	The data allow disaggregation by 3 variables (excluding public/private sector)	The data allow disaggregation by 2 variables (excluding public/private and urban/rural)	The data allow disaggregation only by gender or no disaggregation possible	

TABLE V.J – ASSESSING DATA QUALITY: Smoking prevalence

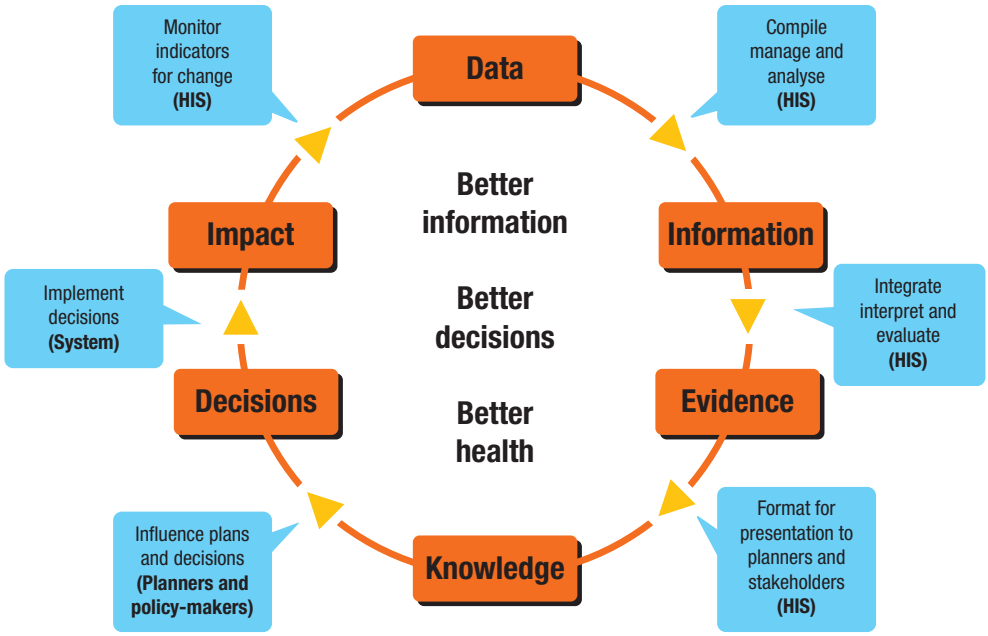
Indicator	Quality assessment criteria	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
			3	2	1	0	
J. Smoking prevalence (15 years and older)	**V.J.1** Data-collection method	Data-collection method used for most recent data	Population-based survey with self-report, daily smokers over previous month			No data	
	V.J.2 Timeliness	For the most recently published estimate, number of years since the data were collected	0–2 years	3–5 years	6 or more years	None	
	V.J.3 Periodicity	Number of times measured in past 10 years	3 or more	2	1	None	
	V.J.4 Consistency	Data consistent over time	No major discrepancies	A few discrepancies	Multiple discrepancies	Not applicable	
	V.J.5 Representativeness	Type of sample upon which most recent estimate is based	Nationally representative sample	Purposive or other non-random national sampling	Local studies	Any other method apart from those already mentioned	
	V.J.6 Disaggregation	Estimate that was published most recently or will be published is disaggregated by demographic characteristics (e.g., sex, age), socioeconomic status (e.g., income, occupation, education) and locality (e.g., urban/rural, major geographical or administrative region)	Disaggregation available for all 3 elements	Disaggregation available for 2 elements	Disaggregation available for 1 element	Disaggregation not possible	

VI. Assessing national HIS information dissemination and use

[Tables VI.A–E]

Although data are the raw materials of the national HIS, they have little intrinsic value in themselves. Only after data have been compiled, managed and analysed do they produce information (**Fig. 13**).[1] Information is of far greater value, especially when it is integrated with other information and evaluated in terms of the issues confronting the health system. At this stage, information becomes evidence that can be used by decision-makers. This synthesis of evidence becomes even more powerful when it is formatted for presentation, communication or dissemination to decision-makers in a form that changes their understanding of health issues and needs. This is the process of transforming evidence into knowledge, and once applied can result in decisions which will directly impact upon health and health equity. The actual impact on health can then be monitored by the national HIS by measuring changes in health indicators. This is how HMN visualizes the enabling of a culture of iterative and evidence-based decision-making built on a comprehensive national HIS.

Fig. 13 Transforming data into information and evidence



[1] Adapted from de Savigny D, Binka F. Monitoring future impact on malaria burden in sub-Saharan Africa. *Am J Trop Med Hyg*, 2004. 71:224–231.

As we move up the health-system pyramid, the link between data and decision-making seems more tenuous, and many factors come into play when strategic decisions on resource allocation are made. In a large and complex society, policy-making is fragmented and decisions are sometimes difficult to make because of the competing interests of different players and agencies. Behavioural, organizational and environmental factors thus greatly influence the extent to which information is used. The Routine Health Information Network has even postulated that the scarcity of evidence-based decision-making is not the result of technical issues related to data generation but of institutional and behavioural barriers that impede the effective use of information. The PRISM framework and tools[1] allow countries to assess such factors prior to intervention(s) to improve use of information, and to later evaluate the change brought about by the intervention(s). Examples of organizational and behavioural interventions for improving the use of information in decision-making and planning are:

- mechanisms linking data/information to actual resource allocation (budgets and expenditure);
- indicator-driven, short- (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 programme addressing behavioural 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 health information system 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;
- ensuring that data are relevant to strategic decision-making and to planning;
- engaging all key constituencies in determining which information to collect in order to ensure broad ownership and involvement;
- making maximum efforts to ensure confidence in the reliability and validity of information;
- avoiding offering too much information with excessive detail, and making sure that important aggregations are provided;
- providing essential disaggregations, such as health status by major measures of equity;
- customizing data presentation to the needs of specific target audiences; and
- ensuring the timeliness of data.

One important function of the national HIS is to connect data production with its use. Those responsible for collecting data should also benefit from its use. Users comprise those delivering care and managing and planning health programmes. More broadly, users include those financing health-care programmes both within countries (health and finance ministries) and externally (donors, development banks and technical support agencies). Users of health data are not confined to health-care professionals, managers or statisticians. Decision-making around country health priorities necessarily involves the wider community (including civil society) as well as policy-makers at senior levels of government. Among the many advantages of developing a culture of evidence-based decision-making is that many diverse types of users can all benefit from the national HIS in line with their own needs and requirements. Health-care planners and managers responsible for tracking epidemiological trends and the response of the health-care system generally require more detailed data

[1] https://www.cpc.unc.edu/measure/publications/DDIU/DDIU_PRISM_Tools.pdf

than policy-makers who need data for broader strategic decision-making and investment. Thus, the national HIS should present and disseminate data in appropriate formats for all its different audiences.

Tables VI.A–VI.E provide an approach for assessing the information dissemination and use in the following areas:

- **Table VI.A** – demand and analysis
- **Table VI.B** – policy and advocacy
- **Table VI.C** – planning and priority-setting
- **Table VI.D** – resource allocation
- **Table VI.E** – implementation and action

TABLE VI.A – INFORMATION DISSEMINATION AND USE: Demand and ANALYSIS

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
VI.A.1	Senior managers and policy-makers demand complete, timely, accurate, relevant and validated HIS information	Yes	Yes, but they do not have the skills to judge	Demand from managers is ad-hoc, usually as a result of external pressure (e.g., questions from politicians or the media)	Negligible demand from managers	
VI.A.2	Graphs are widely used to display information at subnational health administrative offices (e.g., regional/provincial, district) and health facilities. They are up to date and clearly understood	True at all levels (regional/provincial, district health offices, health facilities)	True at health offices (regional/provincial, district), but not at health facilities	True at regional/ provincial health offices only	No graphs used	
VI.A.3	Maps are widely used to display information at subnational health administrative offices (e.g., regional/provincial, district) and health facilities. They are up to date and clearly understood	True at all levels (regional/provincial, district health offices, health facilities)	True at health offices (regional/provincial, district), but not at health facilities	True at regional/ provincial health offices only	No maps used	

TABLE VI.B – INFORMATION DISSEMINATION AND USE: Policy and advocacy

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
VI.B.1	Integrated HIS summary reports including information on a minimum set of core indicators (including those used to measure progress towards achieving the MDGs and those used by Global Health Partnerships, if applicable) are distributed regularly to all relevant parties	Regular integrated reports at least annually to national and local relevant partners	Regular integrated reports at least annually, but distributed only to the ministry of health	Occasional reports, but not annually	No integrated reports	

TABLE VI.C – INFORMATION DISSEMINATION AND USE: Planning and priority-setting

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
VI.C.1	Health information (population health status, health system, risk factors) is demonstrably used in the planning and in the resource-allocation processes (e.g., for annual integrated development plans, medium-term expenditure frameworks, long-term strategic plans, and annual health sector reviews)	Yes, systematically used with methods and targets aligned between different planning frameworks	Commonly used for diagnostic purposes to describe health problems/ challenges, but no synchronised use of health information between different planning frameworks	Health information is occasionally used	Never used	

TABLE VI.D – INFORMATION DISSEMINATION AND USE: Resource allocation

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
VI.D.1	HIS information is widely used by district and subnational management teams to set resource allocations in the annual budget processes	The majority of targets/ budget proposals are backed up by HIS information	Some targets/budget proposals are backed up by HIS information	Few targets/budget proposals are backed up by HIS information	None of the targets/ budget proposals are backed up by HIS information	
VI.D.2	HIS information is used to advocate for equity and increased resources to disadvantaged groups and communities (e.g., by documenting their disease burden and poor access to services)	HIS information is systematically used to promote equity	HIS information is regularly used to promote equity	HIS information is used for equity purposes only on an ad hoc basis	Not used for equity purposes	

TABLE VI.E – INFORMATION DISSEMINATION AND USE: Implementation and action

	Items	Highly adequate	Adequate	Present but not adequate	Not adequate at all	Score
		3	2	1	0	
VI.E.1	Managers at health administrative offices at all levels (national, regional/ provincial, district) use health information for health service delivery management, continuous monitoring and periodic evaluation	Health information is used by managers at all levels for health service delivery management, continuous monitoring and periodic evaluation	Health information is used by managers at national and regional/ provincial levels but not at district level	All key decisions are centralized to the national level	HIS information is occasionally used	
VI.E.2	Care providers at all levels (national, regional/provincial, district hospitals and health centres) use health information for health service delivery management, continuous monitoring and periodic evaluation	Health information is used by care providers at all levels for health service delivery management, continuous monitoring and periodic evaluation	Health information is used by care providers at national, regional/ provincial and district hospitals but not at health centres	Health information is used by care providers at national and regional/provincial hospitals but not at district hospitals or health centres	Care providers other than those at national level do not use health information for service delivery management, continuous monitoring or periodic evaluation	
VI.E.3	Information on health risk factors is systematically used to advocate for the adoption of lower-risk behaviours by the general public and by targeted vulnerable groups	Such indicators are systematically used and tailored to fit the risk profile and situation facing each vulnerable group	Such indicators are regularly used, but generally not tailored to each vulnerable group	Only used on an ad hoc basis	Not used	

ANNEX I

Glossary of terms

Causes of death – the causes of death to be entered on the medical certificate are defined as "all those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced any such injuries".

Civil registration – defined by the United Nations as: "the continuous, permanent, compulsory and universal recording of the occurrence and characteristics of vital events (live births, deaths, foetal deaths, marriages and divorces) and other civil status events pertaining to the population as provided by decree or regulation, in accordance with the legal requirements in each country. Civil registration establishes and provides legal documentation of such events. These records are also the best source of **vital statistics**."[1]

Data management – a set of procedures to collect, store, analyse and distribute data. Once data are collected, a sound management approach is essential. Firstly, a metadata dictionary is necessary to accurately describe the data elements. Next, effective data-storage procedures require a well-designed logical structure to permit data retrieval and analysis. Data analysis and presentation include calculating indicators and preparing tables and graphs. Finally, the data should be made available to all those who can use and act upon them.

Data warehouse – an integrated information-storage area that consists of a data repository bringing together multiple databases from various data sources, and a report-generating facility.

Demographic surveillance system (DSS) – the continuous demographic monitoring of a geographically defined population with timely production of data on all births, deaths and migration. DSS sites cannot provide nationally representative indicators because of their circumscribed geographical representation. Efforts are being made to provide estimates that can be generalized using several existing DSS sites as resources for training, quality control and supervision.

Enumeration – distinct from registration; the means by which the presence of individuals in a household or other group is recorded; normally used in reference to a census or survey. Enumeration is anonymous and does not provide any direct benefit to the individual.

Information and Communications Technology (ICT) – includes the computers, software, data-capture devices, wireless communication devices, and local and wide area networks that move information, and the people that are required to design, implement and support these systems.

[1] United Nations Statistics Division. *Principles and Recommendations for a Vital Statistics System*. Revision 2, Series: M, No.19/Rev.2. New York, United Nations, 2001. Sales No. 01.XVI.10. http://unstats.un.org/unsd/publication/SeriesM/SeriesM_19rev2E.pdf

International Standard Classification of Occupations (ISCO)[1] – one of the main international classifications, for which ILO is responsible. ISCO is a tool for organizing jobs into a clearly defined set of groups according to the tasks and duties undertaken.

International Statistical Classification of Diseases and Related Health Problems (ICD)[2] – a classification maintained by WHO for coding diseases, signs, symptoms and other factors causing morbidity and mortality; used worldwide for morbidity and mortality statistics, and designed to promote international comparability, collection, processing, classification, and presentation of statistics.

Medical certification of cause of death – medical practitioners or other qualified certifiers use their clinical judgement to diagnose the cause(s) of death to be entered on the medical certificate.

Metadata (dictionary) – metadata is "data about data". To relate data from multiple sources, it is essential to develop common definitions and understand the characteristics of each data element. The tool for achieving this is the metadata dictionary. It covers definitions of data elements/variables, their use in indicators, data-collection method, time period of data-collection, analysis techniques used, estimation methods and possible data biases.

Microdata – non-aggregated data about the units sampled. In the case of population and household censuses and surveys, microdata consists of records of the individuals and households interviewed.

Mortality rate – the ratio of the number of people dying in a year to the total mid-year population in which the deaths occurred. This rate is also called the crude death rate. The mortality rate may be standardized when comparing mortality rates over time (or between countries) to take account of differences in the population. This rate is then called the age-standardized death rate.

National Health Account (NHA) – a tool for the systematic, comprehensive and consistent monitoring of resource flows in a national health system. It provides a framework with standard definitions, boundaries, classifications and a set of interrelated tables for standard reporting of expenditures on health and its financing. NHAs are designed to capture the resource flows for the main functions of health-care financing, namely: resource mobilization and allocation; pooling and insurance; purchasing and providing of care; and the distribution of expenditures by disease, socioeconomic characteristics and geopolitical areas.[3]

Sample registration system – longitudinal enumeration of demographic events, including cause of death via verbal autopsy, in a nationally representative sample of clusters such as exists in China and India.

Sample Vital Registration with Verbal Autopsy (SAVVY) – proposed by MEASURE Evaluation and the International Programs Center, United States Census Bureau to generate data needed to estimate mortality. Builds on experience from both sentinel demographic surveillance and sample vital registration systems. SAVVY uses a validated verbal autopsy tool to ascertain major causes of death, including those from HIV/AIDS.[4]

Sentinel demographic surveillance system – the longitudinal enumeration of all demographic events, including cause of death via verbal autopsy, in a geographically defined population.

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[1] http://www.ilo.org/public/english/bureau/stat/isco/index.htm

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

[3] http://www.who.int/nha/docs/English_PG.pdf and http://webitpreview.who.int/entity/nha/Glossary%20English.pdf

[4] MEASURE Evaluation, Carolina Population Center, University of North Carolina at Chapel Hill, USA. http://www.cpc.unc.edu/measure/leadership/savvy.html accessed 08 August 2007.

Statistical Data and Metadata Exchange (SDMX)[1] – an organization of interest promoted by the IMF, WB, UNSD, EUROSTAT, FAO, OECD, BIS and ECB, and the Global Administrative Unit Layers (GAUL).

Underlying cause of death – (a) the disease or injury which initiated the train of morbid events leading directly to death; or (b) the circumstances of the accident or violence which produced the fatal injury.

Verbal autopsy – a structured interview with caregivers or family members of households after a death occurs; used to determine probable cause(s) of death where most deaths occur outside of health facilities, and where direct medical certification is rare.

Vital event – defined by the United Nations as: "the occurrence of a live birth, death, foetal death, marriage, divorce, adoption, legitimation, recognition of parenthood, annulment of marriage, or legal separation."[2]

Vital registration – all sanctioned modes of registering individuals and reporting on vital events.

Vital statistics – data on vital events drawn from all of sources of vital events data. Particularly in developing country settings, where civil registration functions poorly or not at all, the United Nations acknowledges that a variety of data sources and systems are used to derive estimates of vital statistics.

Vital statistics system – as defined by the United Nations: "the total process of (1) collecting information by civil registration or enumeration on the frequency of occurrence of specified and defined vital events as well as relevant characteristics of the events themselves… and (2) of compiling, processing, analysing, evaluating, presenting and disseminating these data in statistical form".[2]

[1] http://www.sdmx.org/

[2] United Nations Statistics Division. *Principles and Recommendations for a Vital Statistics System*. Revision 2, Series: M, No.19/Rev.2. New York, United Nations, 2001. Sales No. 01.XVI.10. http://unstats.un.org/unsd/publication/SeriesM/SeriesM_19rev2E.pdf

ANNEX II

Abbreviations and acronyms

AHPSR	The Alliance for Health Policy and Systems Research
AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal care
APHRC	Africa Population and Health Research Center
CBO	Community based organization
CDC	Centers for Disease Control and Prevention
DANIDA	Danish International Development Agency
DFID	UK Department for International Development
DHS	Demographic Health Survey
DOTS	Directly observed treatment – the internationally recommended strategy for tuberculosis control
DPT3	Diphtheria, pertussis (whooping cough) and tetanus vaccine
DSS	Demographic Surveillance System
EC	European Commission
GAVI	Global Alliance for Vaccines and Immunization
GDDS	General Data Dissemination System
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GHP	Global health partners
GIS	Geographic Information System
GPS	Global Positioning System
HIGH	Harvard Initiative for Global Health
HIS	Health information system
HIV	Human immunodeficiency virus
HMN	The Health Metrics Network
HR	Human resources
ICD	International Statistical Classification of Diseases and Related Health Problems
ICT	Information and communications technology
IDR	Integrated data repository
IDSR	Integrated disease surveillance and response

IHME	The Institute for Health Metrics and Evaluation
IHR	International Health Regulations
IMF	International Monetary Fund
IMMPACT	Initiative for Maternal Mortality Programme Assessment
ISCO	International Standard Classification of Occupations
LAN	Local area network
LDCs	Least-developed countries
LSMS	Living Standard Measurement Study
MDGs	Millennium Development Goals of the United Nations
MICS	Multiple Indicator Cluster Survey
MoH	Ministry of Health
NGO	Nongovernmental organization
NHA	National Health Account
NSDS	National strategies for the development of statistics
NSO	National Statistics Office
OECD	Organisation for Economic Co-operation and Development
PARIS21	Partnership in Statistics for Development in the 21st Century
PC	Personal computer
PDA	Personal digital assistant
PEPFAR	President's Emergency Plan for AIDS Relief
PES	Post enumeration survey
PRSP	Poverty-reduction strategy paper
SARS	Severe acute respiratory syndrome
SAVVY	Sample vital registration with verbal autopsy
SIDA	Swedish International Development Cooperation Agency
SPA	Service provision assessment
SRS	Sample registration system
TB	Tuberculosis
USAID	United States Agency for International Development
UNDESA	United Nations Department of Economic and Statistical Affairs
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNSD	United Nations Statistics Division
VA	Verbal autopsy
WB	World Bank
WHO	World Health Organization