



Ministerial Conference on Research for Health in the African Region

**23-26 June 2008
Algiers, Algeria**

REPORT 9

The State of Health Information in the African Region: Data Sources, Information Products and Health Statistics

Parallel Session 3.2

**DRAFT: NOT FOR QUOTATION OR
REPRODUCTION**

REPORT 9

ACKNOWLEDGEMENTS

This report was drafted by Dr Yohannes Kinfu and colleagues in the Measurement and Health Information Systems Department at WHO Geneva.

© World Health Organization, Regional Office for Africa, 2008

DRAFT: NOT FOR QUOTATION OR REPRODUCTION

Available for free from <http://www.tropika.net>

THE STATE OF HEALTH INFORMATION IN THE AFRICAN REGION: DATA SOURCES, INFORMATION PRODUCTS AND HEALTH STATISTICS

1 INTRODUCTION

Health and longevity are universally cherished values to which health systems strive to contribute. Policy makers, planners and health system managers need actionable data to improve the performance of the health system and track progress towards health-related goals including prevention of premature mortality. However, currently, health information systems in many countries are weak and fragmented and unable to supply sound data in a timely way.

Much of the information required by the health system is generated outside the health sector. Population censuses, civil registration systems and household surveys are essential for the measurement of mortality, but these data sources are generally organized and managed outside the health sector, for example by the ministry of the interior, the census bureau, or national statistical office. Some of the administrative and resource records that generate information relevant to the health system are generated outside the health sector: ministries of education or employment produce data about the health workforce; ministries of finance and planning provided data on financial resources for health. Similarly, data on key determinants of health such as socio-economic status, education, nutrition and food security come from other sectors. Administrative statistics from sectors such as justice, police and labour, may be of particular relevance to the health information system, for example, information about road traffic accidents, injuries and violence, or occupational health.

A fully functional health information system must not only identify the types of data needed for specific purposes, but also the data sources that are available and appropriate for generating the required data elements. In this paper, we identify key sources of health information and describe their availability in the 46 Member States of WHO's Africa region. We discuss the use of different data sources for understanding health issues and examine data sources required for monitoring health inequity and progress towards the health-related Millennium Development Goals (MDGs).

2 SURVEY OF KEY SOURCES OF HEALTH INFORMATION IN AFRICA

2.1 Civil registration systems as a source of vital statistics

*Civil registration is 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.*¹

Although the primary purpose of civil registration is the establishment of legal documents as required by law, the system generates continuous data on births and deaths for a whole country: national, regional, and for districts and sub-districts.² In addition to crucial information on vital events (births, deaths), the civil registration system may also be able to supply additional data, for example on birth weight, place of delivery (home, maternity centre, hospital); medical assistance during childbirth; maternal age and parity, and medical attention received prior to death.³ When civil registration of deaths is coupled with medical certification of cause of death using the principles and standards set out in the *International Statistical Classification of Diseases and Related Health Problems (ICD)*,⁴ it is possible to generate accurate and timely data on causes of death in the population. Such information permits the study of mortality differentials by age and sex and other stratifiers, and provides the key input for constructing life tables and estimation probabilities of death at various ages. Information on the number of live births over time, classified by maternal characteristics is essential for analysing reproduction dynamics. The vital statistics generated through the civil registration system enable regular updating of population size and structure, the denominator data needed to calculate population indicators.

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

2 AbouZahr C et al. Who counts? The way forward. *Lancet*, 2007

3 Panel on Data Collection, Committee on Population and Demography, Assembly of behavioural and Social Science. *Data Collection: A Statement for Administrators*, report No.7. Washington, D.C: National Academy Press, 1981, Pp. 1-23.

4 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/>

Figure 1a and 1b show coverage of birth and death registration in the 46 countries of the AHR region.

Figure 1a: Births registration coverage (%), WHO Region for Africa, 2000–2006



In Algeria, Mauritius, and Seychelles, coverage of birth registration is 90% or higher. An additional six countries – Comoros, Congo, Gabon, Madagascar, Rwanda and Togo – have birth registration coverage rates of 75–89%, not ideal but sufficient for some statistical purposes. Fewer than 20% of births are registered in Chad, Ethiopia, Tanzania, Uganda and Zambia. It should be noted that for the majority of the countries in the region the reported rate of coverage of birth registration was calculated on the basis of mothers' responses to questions in household surveys about their most recent births; it is likely that true coverage for the general population is much lower than reported here.

With regard to mortality data, of the 46 countries of the region, only 4 – Mauritius, Seychelles, South Africa and Algeria – have coverage rate of 75% or higher.^{5,6}

Figure 1b: Deaths registration coverage (%), WHO Region for Africa, 2000–2006

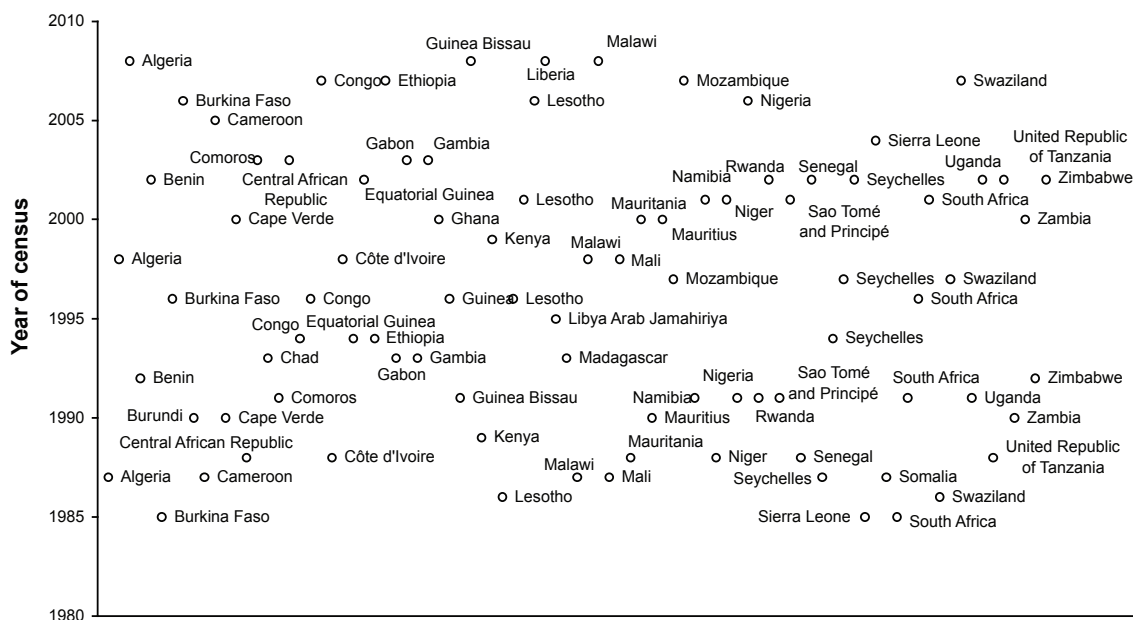


5 Mahapatra P et al. Civil Registration Systems and Vital Statistics: successes and missed opportunities. *Lancet*, 2007

6 Mathers CD et al. Counting the dead and what they died from: an assessment of the global status of cause of death data. *Bulletin of the World Health Organization*, 2005, 83:171–177.

Figure 3 shows information on population censuses in the Africa region. The available data shows that four countries – Angola, Democratic Republic of Congo, Eritrea and Togo – have not conducted a national census in the past twenty years. An additional three countries – Guinea, Liberia, and Madagascar – conducted only one census over the period. Three countries – Lesotho, Seychelles and South Africa – have conducted the census every five years but most have a decennial census program.

Figure 3: Distribution of censuses carried out in the last three census rounds (1980 round, 1990 round, 2000 round), WHO AFRO Region



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

Ideally, data from the census and a comprehensive civil registration system are used together to generate an accurate picture of population change in a country. For example, census fertility questions generate data for calculating lifetime and cohort fertility that are not easily available from civil registers. Other advantages of the census include: the ability to tabulate for small geographical areas and its use for drawing up the sampling frame for health and social welfare surveys. The census is also an important source of data on persons with disabilities, particularly for monitoring their social and living conditions in terms of school attendance, employment, family arrangements and the houses in which they live in.¹⁰ The census is also one of the few sources of data on the distribution of health care workers. In practice, where civil registration systems are weak the census serves as the sole source of comprehensive population data. Census data should not be viewed as a substitute for reliable birth and death statistics from civil registers but are particularly valuable in countries such as those in Africa where birth or death registration is incomplete.

2.3 Household Surveys

Practically every country in the African region has conducted at least one population census. However, the census is, by design, conducted only once a decade and can only provide relatively limited amounts of information due to the magnitude of the operation involved. Given the ongoing weakness of civil registration in the region, population-based surveys are the single most important source of population health information.

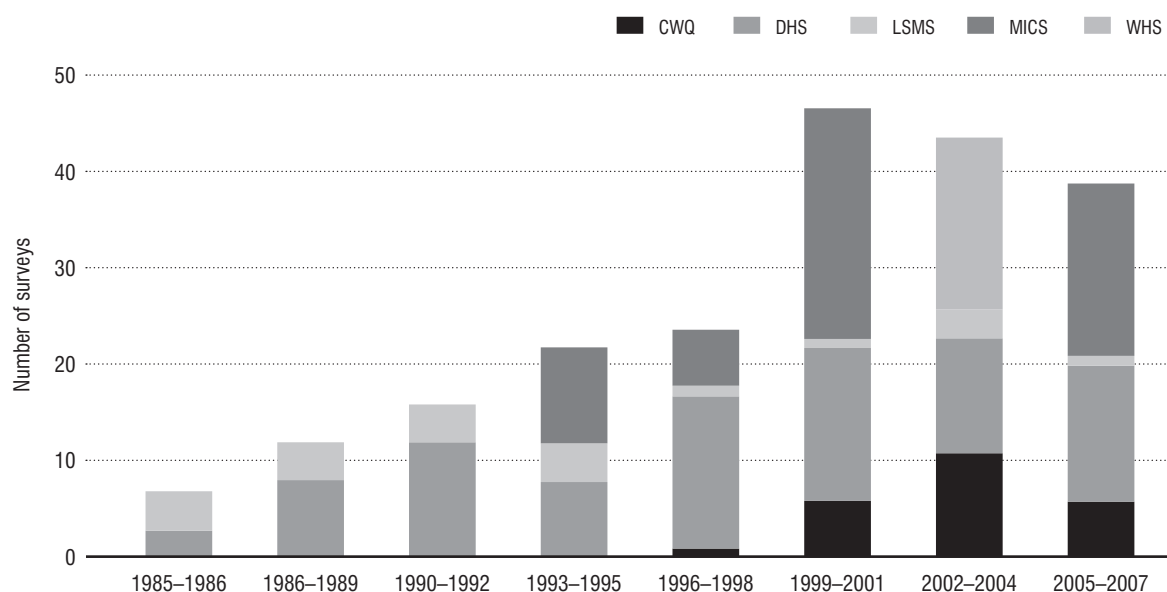
Household surveys can provide data on child and maternal health, nutrition, use of health services, knowledge and practices related to health care, health state valuations and descriptions, determinants of health, and knowledge, beliefs and practices related to disease prevention and transmission (especially in HIV), and household expenditure on health. Surveys are the preferred source of information on individual behavioural risk factors such as unsafe sex, smoking, substance abuse, and poor nutritional status. More recently, household surveys have also been the vehicle for clinical data; the inclusion of clinical measurement and bio-markers generates more accurate and reliable information on health status than self-reports. A significant number of surveys include questions on the characteristics and socio-economic condition of respondents such as living standards, education or employment. By linking such information with data on health care use and health status, it is possible to generate important information on the links between health and its socio-economic determinants.

¹⁰ United Nations. *Principles and recommendations for Population and Housing Censuses, Revision 2*, Series M No. 87/Rev. 2, Department of Economic and Social Affairs, Statistics Division: New York.

Although household surveys are routinely and effectively instruments to generate data on levels of child mortality, either through detailed questions to mothers about birth histories or through indirect methods (children ever born–children still alive), they are less effective when it comes to the measurement of adult mortality or cause-specific mortality in general because of the limitations of sample size.

Household surveys vary in complexity and emphasis. They can be single or multi-round; they can be multi-thematic or focused on a specific theme; they can be part of an international survey programme or purely national in orientation. The gold standard is a well-integrated, demand driven household survey programme, that is part of a national health information and statistical systems and generates essential high quality information on population health and socio-economic status on a regular basis.

Figure: Household health surveys in AFR, 1985–2007



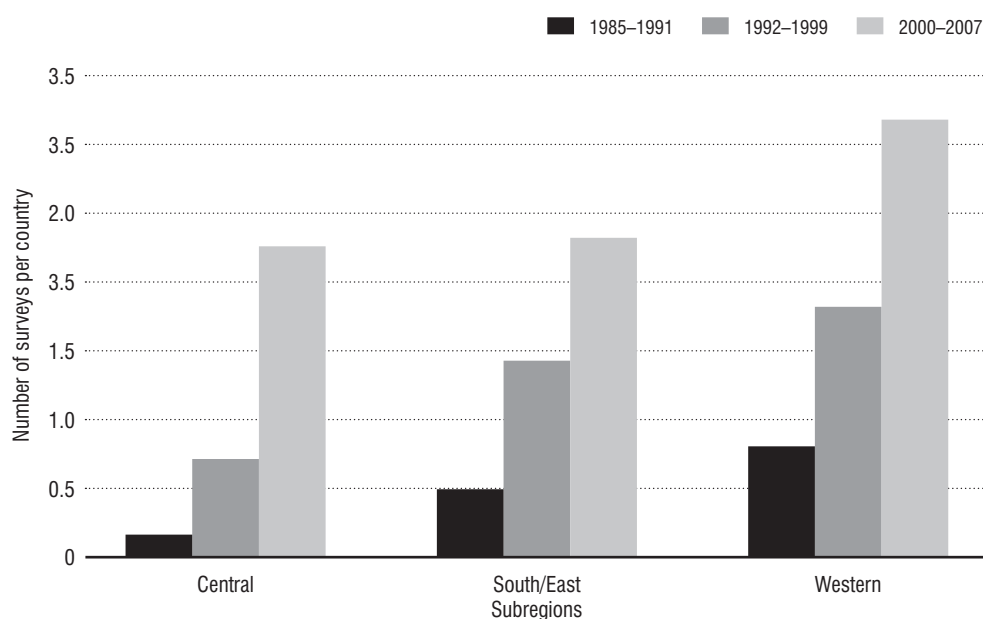
Between 1985 and 2007 a total of 211 household surveys were conducted in the AFRO region of which 121 were conducted after 2000. The number of surveys has increased over the years, reaching a peak of 50 during 2002–2004 alone. Given that 17 of the 23 health-related MDG indicators can be generated through household surveys, the increase in the number of surveys is not surprising. However, concerns have been expressed by country statistics offices that the increasing frequency of surveys is burdensome given limited country capacity, especially for data analysis. In addition, there is insufficient coordination across the different surveys, almost all of which are externally supported and many of which are driven by disease specific programme interests.¹¹

In terms of frequency, 43 countries have conducted at least one survey since 2000. In both Ghana and Malawi there have been six surveys since 2000. In Ghana, Kenya and Côte d'Ivoire, ten or more surveys have been conducted over the past twenty years. On the other hand, during the same period, Cape Verde and Mauritius each had only one survey while Equatorial Guinea and Seychelles had none.

The number of surveys per country has accelerated in recent years in all three AFRO sub-regions from less than one survey during 1985–1991 to two or more surveys in the first half of 2000 in Eastern, Central and Southern regions and to three or more in the Western region. The number of surveys per country is highest in the Western sub-region followed by the South and Eastern region with the Central region having the smallest number.

The most commonly applied survey instrument in the AFRO region is the USAID-supported Demographic and Health Survey (DHS). Since 1985, 98 DHS have been conducted and 37 of the 46 WHO Member States had at least one DHS between 1985 and 2007, 29 of which were carried out after 2000. The second most common survey instrument is the UNICEF-supported Multiple Indicator Cluster Survey (MICS). A total of 58 such surveys have been carried out since 1995. In recent years, a number of disease-focused surveys (such as the Malaria or AIDS Indicator Surveys) have been undertaken. In addition to these internationally sponsored surveys, many countries conduct their own surveys, but these are not included in this review due to lack of data.

11 International Household Survey Network www.surveynetwork.org

Figure: Household health surveys in AFR, 1985–2007

Despite the heavy reliance on household surveys for many health indicators, the method has a number of disadvantages. Foremost among these is that surveys do not generate recent data. For example, for calculating child mortality, the methods rely heavily on the responses of mothers to questions about the survival of their children and thus relate to a period some time in the past, on average around three years prior to the survey. Similarly, questions about the use of maternal health care relate to most recent births (generally live births only) and so are similarly retrospective in nature. These methodological considerations, coupled with the inevitable fact that surveys cannot be conducted annually, mean that much of the information used to report on the MDGs is several years out of date. In addition, all household surveys generate data that have margins of uncertainty associated with both sampling and nonsampling errors.

A final point to note is that the vast majority of household surveys are funded and supported by external agencies. Inevitably this means that country planners are not the main decision-makers when it comes to determining when and where a survey will be carried out. The increasing number and frequency of single disease focused surveys increases risks of overlap, duplication and overloading of country capacity. Despite the fact that considerable efforts have been made to use the externally supported surveys to build national capacities in data generation and analysis, the fact remains that in the absence of external technical and financial support, few countries in the region would be able to maintain household survey programmes at the current level.

2.4 Health service statistics

All countries routinely collect data from health facilities and assemble and report them in annual (or bi-annual or five-yearly) health statistical abstracts or reports. Such information is often described as the health management information system (HMIS). The information generally derives from reports from health facilities on health status (leading causes of death in hospitals, admissions and discharges by diagnosis, institutional maternal deaths, case-fatality rates, outpatient morbidity, deliveries and complications), service provision including type and utilization of services, and statistics on supplies and financial and human resources available for the provision of services. In general, only the operations of public facilities are included in the HMIS.

Despite the volume and variety of data generated through the routine health management information system, the information is systematically under analysed and under utilized for planning and programme reviews. Completeness, timeliness and quality of reporting are often described as problematic and the data are inevitably biased because they relate only to the populations using public health services. Investments in the information system are often minimal, and there are major lacunae in the availability and statistical capabilities of those charged with collecting, compiling and analysing the statistics. As a result, data generated through the routine system are rarely assessed for their quality and used to support decision-making. Few, if any, countries compare and contrast the routine statistics with survey data or other relevant sources.

However, the fact that routine statistics are a by product of an administrative process make it relatively inexpensive. Once due adjustment are made for possible biases, it should, therefore, be possible to use the data for policy guidance and program reviews.

Below are some examples of best practices in Africa:

- Burkina Faso provides a very comprehensive analysis of all clinical reports, including assessment of reporting rates and data quality. Very high reporting rates are achieved.
- Ghana produces annual updates of the new results for a select set of indicators, with emphasis on a trend analysis for the last five years, including annual data and by region.
- Uganda developed a set of indicators on which all district report monthly, and some of the results are published in the newspaper. A small set of indicators is used to compare the results between districts and summarize them in league tables.
- South Africa has developed a district health information system (DHIS) which evolves around a minimum set of indicators which much emphasis on quality control. The results are used by Health Systems Trust to assess performance in the District Health Barometer.

In September 1998, the World Health Organization (WHO) Regional Committee for the African Region adopted the Regional Strategy on Integrated Disease Surveillance (IDS) with the aim of strengthening national surveillance and response capacities. To date, 43 out of 46 countries have initiated IDSR and launched training of district health staff, of which 33 had attained the objective of training at least 60% of their districts by 2007. Integrated disease surveillance is a multi-disease approach for conducting surveillance across all levels of the health system with a strong emphasis on linking surveillance with public health response.

2.5 Health facility assessments

Population-based data sources such as censuses, civil registration and household surveys are useful, particularly for monitoring health status and for assessing access to services. However, they do not provide information on health system resources nor on the type, nature and range of services available to the population. For instance, population-based measures, such as service coverage, derived from health surveys, provide useful proxy indicators for improvements in health (e.g., a community with 90% of the children fully immunized is expected to have lower child mortality rates). Such measures, however, are not appropriate for tracking the successful treatment of illnesses within the system. Health facility assessments can provide data on availability and quality of health services and the health system resources that are required for their success. Facility assessments are a unique source of statistics on service availability, generating data on facility infrastructure, infection control, services offered, staffing, laboratory facilities, treatments, guidelines and supplies. Indicators can be calculated to track the percentage of health facilities in a given country or region that offer a specific, measurable treatment or service. For example, infection-control indicators include the presence or absence of disposable syringes, sharps containers, and other equipment, while laboratory indicators measure whether or not a facility can test for HIV, syphilis, TB, and other diseases. Additional aspects of facility assessment is the ability to associate each service delivery point with specific geo-coordinates, which enables comparison with geographic, population and epidemiological profiles.

Basically, five kinds of health facility assessments can be identified, and all have been applied in the AFRO region:

1. **Facility census:** This involves a visit to all public and private health facilities in an area and collect detailed information about the physical assets of all the public and semi-public health facilities in a region or nation. The aim is to identify health facilities which do not meet criteria in the following areas: availability and condition of physical infrastructure, availability and condition of equipment; availability of services and location of health service delivery points; and headcounts of health workers. By identifying facilities that lack these resources or abilities, the facility census provides a baseline assessment for deciding how to invest resources into an area. In the AFRO region, facility censuses have so far been conducted in Malawi and Zambia.

However, there are some limitations to this data source. Facility census, as currently undertaken, does not typically collect information on quality of care practices, patient satisfaction, and details of available human resources such as educational background and training experiences.

2. **Facility surveys:** In some cases, instead of conducting a census of all facilities a sample of facilities are selected and detailed data are collected through inventory and through interviewing health workers in facilities. By collecting information on staff qualifications, training, and supervision collected through provider interviews; examining adherence to standards in practice, collected through observation of client-provider interactions, and client interviews and; assessing adequacy of available infrastructure and resources for providing a given service, facility surveys fill the gap on service quality which is often missing in facility censuses. The recommended frequency of implementation is once every three to five years. An example is the USAID-supported Service Provision Assessment (SPA) conducted in several countries, including Kenya (1999, 2004), Ghana (2002), Rwanda (2001) and Zambia (2005). Current SPA modules include: family planning, child health (outpatient services), maternal health, STI services, TB services, and an extensive module for HIV/AIDS services.

3. **SPA** is designed for system-wide national level monitoring, but when the interest is on specific intervention(s) or a project or on a specific district, more focused measurement tools such as the *Prevention service availability mapping (PSAM)* and *Facility Audit of Service Quality (FASQ)* have been used. These are low-cost tools that provide district planners, project managers and other stakeholders information on what is available and where which can be used to monitor scale-up and assess equitable and appropriate distribution of services and resources. Such surveys have been conducted in Kenya (2001/2002), Botswana (2002) and Tanzania (2005).
4. **District key informant surveys:** This rapid assessment method is used to assess service availability, human resources, supplies, coverage of national programmes through interviews with the district medical officer and the district health management team. Such surveys are more comprehensive if they can build on existing data bases of facilities and human resources. Countries that have conducted such assessments (called Service Availability Mapping) include Nigeria, Tanzania (2006), Uganda (2004), Zambia (2005), Kenya (2005), Rwanda (2005), Botswana, Ethiopia and Ghana.
5. **Operational research studies:** such studies are conducted in a small number of facilities to assess the quality of care, e.g. waiting time, or patient flows.

Facility assessments are one of few sources of health statistics for which the health sector has primary responsibility. In addition to these health sector specific assessments many countries also conduct establishment censuses and censuses of buildings which can be used to assess the status of health facilities. However, the potential for these is yet to be seen, and its success will also very much depend on the extent to which the health sector will closely work with the national statistical agencies that are mandated to conduct such censuses.

2.6 Demographic Surveillance Sites

Health information collected from health facilities are useful sources of timely statistics for health service planning and resource allocation, but they alone do not provide a complete picture of the health sector nor of the health status of the population. For instance, not all population groups have geographic or economic access to health facilities, which means that, despite being timely, data on health status derived from facilities are inherently biased and fragmentary. To meet the need for unbiased, timely and continuous information on vital events, demographic surveillance is proposed as a possible interim solution.

Demographic surveillance sites have the following functions:¹²

- To provide health information that accurately reflects the prevailing disease burden of the population;
- To assist in monitoring and tracking new health threats and alert stakeholders for appropriate response; and
- To serve as platform for testing and evaluating health interventions.

In Africa, there are about 19 such sites scattered across thirteen countries, mostly operating as part of a cross-country research network, known as the INDEPTH Network. Enumeration of births and deaths is a key aspect of demographic surveillance but the data are largely used for research purposes and generally not considered integral to the health information system. However, one useful outcome of these sites was the publication of a model life table for sub-Saharan Africa based on the mortality data gathered in these sites in the course of 1995-99.¹³

3 HEALTH INFORMATION DOMAINS AND LINKS TO MAJOR DATA SOURCES

The responsibility of a country health information system is to provide data for decision-making at different levels of the health care system. Sound data underpins the most basic function of the health system, the provision of care to individuals in need. More than this, the health information system should provide the information needed for the planning and management of health care services, for understanding the determinants and causes of ill-health, for public health decision-making, and for the formulation and assessment of health policy, financing and resource allocation. The health information system comprises information in three major domains: the underlying causes of ill health, the health system responses to health care needs and demands, and population health status, including distribution. Health information needs thus comprise indicators on:

- **Determinants of health** – 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.

12 INDEPTH Network. Population and Health in Developing Countries. Volume 1: Population, Health, and Survival at INDEPTH Sites. International Development Research Centre: Ottawa.

13 INDEPTH Network. INDEPTH Model life tables for sub-Saharan Africa. TJ International Ltd: Padstow, Cornwall.

- **Health system** – inputs to a health system and related processes such as policy, organization, human resources, 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.
- **Health service utilization** – outcomes of the health system such as service coverage, utilization and responsiveness to user needs.
- **Health status** – 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.

Sometimes there will be only one gold-standard measurement strategy for a given indicator, but more often, data for particular indicators may need to be generated from more than one source. An example is health outcome such as maternal or infant or child mortality, where both vital statistics as well as household surveys can be used. In some instances, population censuses can also be used for assessing health outcome, but require the application of indirect techniques and assumptions on the nature of errors in the data. Mortality and morbidity statistics from facilities and surveillance sites also serve similar purposes, but their use for nation-wide monitoring depends on the extent to which they are representative of the general population.

Table 1: Relationship between health information domains and key data sources

	Health system		Outcomes	Service availability and utilization	Health outcomes (status)
	Determinants of health	Inputs and outputs			
Population census	✗	✗			✗
Civil registration	✗				✗
Household surveys	✗	✗	✗	✗	✗
Patient records and service statistics	✗	✗	✗	✗	✗
Administrative records		✗			
Facility assessments		✗	✗	✗	
Surveillance statistics	✗			✗	✗

Another example is immunization coverage, which can be generated from service statistics and from household surveys. Each data source has relative advantages and disadvantages; service records are available on a continuous basis and provide data for lower administrative levels but are subject to bias because they cover only the populations using health facilities. Household surveys are free from reporting and representation biases but are time-consuming, expensive and require highly skilled personnel. Generally, household surveys are not suitable for small geographical areas or for providing annual estimates, and when such data are available, they are subject to high sampling errors.

When statistical values for a given indicator are generated from multiple sources, as the is often the case, quality assessment and reconciliation of data are necessary before data are used for programme and policy guidance. A good example of this is the measurement of HIV prevalence among adults in countries with generalized epidemics. Antenatal clinic-based surveillance systems provide annual data on HIV prevalence trends among pregnant women, but this is a biased population sample. Through nationally representative household surveys that include HIV testing, unbiased estimates can be generated that cover all regions in a country and include non-pregnant women and men. However, cost considerations preclude annual population-based surveys of HIV prevalence. Antenatal surveillance results are used to monitor progress and occasional household survey results provide data to calibrate and adjust surveillance findings. The precise combination of different data sources depends on the indicator in question and the methodologies available to generate the data.

4 MONITORING HEALTH RELATED MDGS AND HEALTH INEQUITIES

4.1 Monitoring health related MDGs:

In September 2000, at the United Nations Millennium Summit, world leaders agreed to a set of time bound and measurable goals and targets for combating poverty, hunger, disease, illiteracy, environmental degradation and discrimination against women. Three of the eight Millennium Development Goals (MDGs) directly pertain to health: reduce child mortality, improve maternal health, and combat HIV/AIDS, malaria and other diseases.

A summary of data sources used by the international agencies for monitoring the health-related MDGs is presented below. For reasons of space it focuses on 9 of the 19 health related indicators only, namely, the under five mortality rate (indicator 4.1), the proportion of 1 year-old children immunized against measles (indicator 4.3), the maternal mortality ratio (indicator 5.1), antenatal coverage (indicator 5.5), HIV prevalence among population aged 15-24 years (indicator 6.1), proportion of children under 5 sleeping under insecticide-treated bednets (indicator 6.7), the proportion of tuberculosis cases detected and cured directly observed treatment course (indicator 6.10).

It should be emphasized that this table summarizes the methods used by the international development community to report on progress towards the health-related MDGs. Country reports may differ from what is reported here. Specifically, WHO and UNICEF use a variety of adjustment and statistical techniques to report on progress towards the mortality goals (child and maternal) because of the need to reconcile data from multiple sources and address problems associated with lack of timeliness, comparability and quality of data from different sources.

				Health related MDGs					
	4.1	4.3	5.1	5.2	5.5	6.1	6.7	6.1	
Algeria	Vital registration	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Angola	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Benin	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Botswana	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Burkina Faso	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Burundi	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Cameroon	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Cape Verde	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Central African Republic	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Chad	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Comoros	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Congo	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Côte d'Ivoire	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Democratic Republic of the Congo	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Djibouti	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Equatorial Guinea	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Eritrea	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Ethiopia	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Gabon	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Gambia	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Ghana	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Guinea	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Guinea Bissau	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Kenya	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Lesotho	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Liberia	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Madagascar	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Malawi	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Mali	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Mauritania	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Mauritius	Model based	survey + routine data	Adjusted to account for mis-coding	survey + routine data	survey + routine data	survey	survey	Model based	
Mozambique	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Namibia	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Niger	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Nigeria	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Rwanda	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Sao Tomé and Príncipe	Model based	survey + routine data	-	survey + routine data	survey + routine data	survey	survey	Model based	
Senegal	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Seychelles	Vital registration	survey + routine data	-	survey + routine data	survey + routine data	survey	survey	Model based	
Sierra Leone	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
Somalia	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	
South Africa	Vital registration	survey + routine data	No adjustment	survey + routine data	survey + routine data	survey	survey	Model based	
Swaziland	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Togo	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Uganda	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
United Republic of Tanzania	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Zambia	Model based	survey + routine data	Corrected estimate from sisterhood method	survey + routine data	survey + routine data	survey	survey	Model based	
Zimbabwe	Model based	survey + routine data	Predicted (derived from statistical model)	survey + routine data	survey + routine data	survey	survey	Model based	

4.2 Monitoring health inequities

Thus far we have focused on the challenges of national level monitoring but a true understanding of the health situation and trends in a country requires knowledge about the health status and use of services among different population groups. All MDG indicators should be disaggregated by key stratifiers including socio-economic status, ethnicity, sex and geographic area.¹⁴ Socioeconomic status can be reflected by household income/expenditure/wealth status, education, and/or occupation. Education and occupation are important indicators of social status in their own right, but should not be viewed as proxies for wealth or income. Sex or gender are meaningful equity stratifiers for many, but not all, health measures. For example, low birth weight according to sex of the infant is not meaningful for equity analysis because it is not amenable to social policy, but analyzing differences in prevalence rates of malnutrition between boys and girls is meaningful because it indicates discriminatory treatment. Discrimination against ethnic or racial groups can have serious health and social effects. Indicators for characterizing ethnicity include self-identification, social perception of race or ethnicity, religion, language spoken at home, tribal affiliation, or status as an immigrant or native-born citizen. Finally, groups can be advantaged according to the geographical area (e.g. urban versus rural, or provinces or districts) where they live or work. Resources are often allocated on a geographical basis, reflecting both logistic issues such as distance, topography and transport as well as the tendency for political power to be concentrated in urban areas or particular regions. Comparing allocations of health measures across different provinces and districts is useful, and such comparisons are easily understood by non-specialists.

5 CONCLUSIONS

As a general rule in the information field, it is wiser to have multiple sources of data and to avoid reliance on single methods, after all no method is perfect and all have their strengths and weaknesses. Unfortunately the situation in AFRO is characterized by a high degree of homogeneity in the data sources used to track progress towards health-related goals. In almost all countries there is very heavy reliance on household surveys for most indicators. Few countries in the region have civil registration systems that permit adequate and regular tracking of mortality and cause of death. Health management information systems generate considerable data but the information is rarely used because of concerns about bias, quality and timeliness. Demographic surveillance sites function in several countries but tend to be viewed as research efforts and their data are not integrated into the national health information system because of concerns about representativeness. The great advantage of household surveys, especially those supported by USAID and UNICEF, is the high degree of standardization, with great attention paid to quality control, training of interviewers, and careful data analysis. There is a need for a much greater degree of standardization and quality control in other sources of information in the region, in particular with regard to the routine health management information system.

Countries need to develop comprehensive national plans for health information that address the full range of data needs and data sources and that include provision for building national capacities for data generation, analysis and dissemination. These national plans should serve as the platform for external funding so that eventually countries will be able to draw on a broad base of reliable, standardized and timely data to support decision-making in health. A number of countries are currently receiving support through the Health Metrics Network to analyse the current status and develop comprehensive national plans. These efforts need to be accelerated and extended to cover all countries in the region.

14 Nolen LB, Braveman P, Dachs JN, Delgado I, Gakidou E, Moser K, Rolfe L, Vega J, Zarowsky C. Strengthening health information systems to address health equity challenges. *Bulletin of World Health Organization*. 2005 ;83(8):597-603.

Notes

A series of 25 horizontal dotted lines for writing notes.