

Reporting of health statistics from service data:

Country best practices

**International Workshop,
Bangkok, 10-11 October 2007**

REPORT

**World Health Organization
Health Metrics Network
Ministry of Public Health, Thailand**

Table of Contents

Summary

This report summarizes the presentations, background documentation and discussions at a two-day meeting on Annual Health Statistics Reporting by countries, hosted by the Ministry of Public Health in Bangkok, October 10-11 2007. The purpose of the workshop was contribute to the process of developing standard guidance for the preparation of country health statistics reports based on facility-data.

The workshop participants from 10 countries described strengths and weakness of current practices and identified a series of common challenges such as data quality, comprehensiveness of the report, use of standards and ability to cater for various audiences. Three types of annual health statistical reports were distinguished: raw data, statistical reports, and summary reports with interpretation and further analyses. The focus of the workshop was on the second type of report.

The workshop was framed around key health topics for which data are generated by health services. Three major health indicator areas were identified: health status including mortality and morbidity, health services including coverage and utilization, and health resources. For each health topic the workshop focused on (1) the contents (2) the analytical issues (3) presentation and communication of the data. The country reports and the discussion among participants were the basis for a set of recommendations on each of these areas.

The next steps are to:

- Develop draft guidelines based on the workshop recommendations and further analysis of country reports and practices (late 2007, first quarter 2008)
- Solicit inputs into the draft from workshop participants, disease programmes and other relevant constituencies (2nd quarter 2008)
- Finalize and publish the guidelines; develop template tools for graphs and tables to accompany the guidelines (3rd 2008)
- Disseminate the guidelines through various media to countries (4th quarter 2008)
- Work with selected countries to implement the guidelines, based on country need (late 2008-09)

Background

Annual health statistics yearbooks or reports are one of the routes through which health information is transferred from data producers to end-users or decision makers. Such information is required for multiple purposes from the development of statistical databases to basic analytical public health reports and similar information products.

Every country prepares annual health statistical yearbooks/reports based on data reported by health facilities and statistics generated by other means such as household surveys, civil registration systems, case studies and administrative records¹. The contents of these reports and the details contained therein differ from country to country, but generally comprise of three elements: *health service statistics* (causes of death, causes of admissions and discharges, incidences of institutional maternal mortality, case-fatality rates, bed occupancy rates, outpatient morbidity statistics, and deliveries and complications), *service provision* (vaccination, contraceptives), and *health management or health systems statistics* (drug stockouts, human resources, budgets). In some countries the reports also include program-specific statistics such as HIV surveillance, TB detection and treatment success rates and incidence of other notifiable diseases. In some instances, population-based data are also used to present statistics on life styles and risk factors. Still in others, where civil registration systems are in place, cause of death statistics are also often reported in statistical reports.

While statistics generated by civil registration system and household surveys also find their way to end-users through other routes, for facility-based data country annual health statistics yearbooks/reports remain the main or sole outlet. Yet, there is no standard reporting system for such data.

Standards are necessary for proper comparison of variables of interest across time and political units, and to ensure transparency and accountability in the system. Identification and use of standards is also essential to enable countries to adhere more closely to internationally agreed reporting standards such as the Fundamental Principles of Official Statistics and General Data Dissemination Standards. Such standards would relate not to the contents but also, more critically, on the way in which data are analysed and presented.

The purpose of the workshop is to develop standard guidance for the preparation of country health statistics based on facility-data. This is to be achieved through reviews of existing materials and by seeking inputs from best-practice countries from each region at an international meeting. The present report, which summarizes the outcome of the workshop, will serve us a major input for the forthcoming guideline to be jointly published by WHO-HQ and regions.

¹ In some instances this may also include information from community based health workers.

Workshop objectives

An international workshop on Best Practices in Annual Health Statistics was conducted in Bangkok 10-11 October 2007.

The objectives of the workshop were:

1. To review existing systems of reporting in different contexts, share best practices, and discuss methods for improvement, focusing on four key issues: content, analysis, communication and capacity.
2. To develop draft standard guidance for Annual Health Statistical reporting.

The participating countries had been selected by the regional offices because of their good health statistics reporting. The list of participants and workshop agenda are shown in Annex A and B respectively.

Country experiences in health statistics reporting

Table 1 summarizes samples of reports that participating countries produce. In general, different types of reports can be distinguished including those that mainly include detailed tabulations of data, those that focus on basic summary statistics and those that in addition include interpretation and program and policy implications of the underlying data.

Despite the considerable effort and resources that are directed to generating such reports, they are often underutilized by the health and development community to whom they are ostensibly targeted, because the audience for the reports is rarely explicitly identified. Reports emanating from the operation of health facilities are perceived to be biased towards users of health care and to neglect the needs of the population at large. There is also enormous variation in the contents and formats of these reports. Some reports are cumbersome and poorly presented, with too many tables, and insufficient analysis and visual presentation. Yet the data they contain are often of great potential value and deserve wider dissemination.

Table 1
Annual Statistical reports - current country practices

Country	Report Titles/ types	Pages	Latest year	Hard copy	Flier	CD	Report on web (URL)
Burkina Faso	Annual Health Statistics Report	200	2006	Yes	No	No	www.insd.bf
China	Health Statistics Annual digest	100	2006	Yes	No	No	www.moh.gov.ch
Cuba	Annual Health Statistics Report	100	2006	Yes	Yes	Yes	www.sld.cu
Estonia	Health Statistics Yearbook	280	2004	Yes	No	No	www.sm.ee
Ireland	Annual Health Statistics Report	100	2005	Updated once/3yr	-	No	www.dohc.ie
	Key health trends	30	2007	Yes			
Kenya	Annual Health Performance report	200	2005/06	Out of stock	No	No	www.health.go.ke
Malaysia	Annual Report (MOH)	285	2005	Yes	No	Yes	No
	Malaysia's Health	260	2005	Yes	No	No	No
	Health indicators for all;	190	2005	Yes	No	Yes	No
	Health facts	10	2006	Yes	No	Yes	Yes www.moh.gov.my
Moldova	Public Health	300	2006	Yes	No	No	www.ms.md
Nepal	Annual Report	425	2005/06	Yes	No	Yes	No (updating now) www.dhs.gov.np
Oman	Annual Health Report (statistical report)	420 <i>bi-lingual</i>	2006	Yes	Yes	Yes	www.moh.gov.om (summary)
Thailand	Annual report Thai Health	260	2005	Yes	No	No	www.healthdatacenter.moph-go.th
	(14 health indicators)	130	2007	Yes	No	Yes	www.thaihealth.or.th/en

Basically, existing annual reports can be grouped into three main types:

- **Type 1 report:** provides detailed data as reported by health facilities;
- **Type 2 report:** includes statistical and descriptive reports including analysis of data, comparisons between user groups or geographical areas, and trends over time;
- **Type 3 report:** includes summary reports with detailed interpretations of the statistics and ample attention for program and policy implications.

A review of country experiences found challenges which affect use of the reports for decision-making. These include:

- **Completeness and coverage:** reporting from health facilities is often incomplete or has limited coverage. Statistics from private sector facilities are rarely included, and there are also limitations affecting data completeness due to differentials of access and distribution of facilities.
- **Comprehensiveness of report:** few reports assemble data from sources other than health facilities such as from cancer registries or from special surveillance systems.
- **Data quality and triangulation:** hospital-based statistics are rarely assessed for their quality, and compared and contrasted with household surveys or other relevant sources. Currently there are no standards techniques for data reconciliation methods and countries would welcome guidance. There are frequent problems with the quality of reporting, both with regard to numerators and denominators, and with the calculation of rates and ratios. For instance, mortality statistics from facilities often refer to discharge diagnosis rather than underlying cause, and there is a need for explicit recognition of such issues.
- **Use of standards:** standards for data collection and compilation are rarely strictly enforced. For example, reports include hospital statistics on causes of death that do not adhere to ICD guidelines. Physicians lack training in cause of death ascertainment and there is inadequate attention to skills development for coding clerks.
- **Description of data:** reports do not pay adequate attention to describing definitions of key terms and data collection methods and limitations; the availability of metadata in most reports is limited.
- **Timeliness:** countries often face challenges in balancing the demands for timely reporting with the requirement for completeness. Many reports are delayed in efforts to ensure complete reporting from all facilities but timeliness suffers as a consequence. Reports are issued with a delay of several years are of historical interest only and cannot serve to guide decision-making and resource allocation.
- **Capacity to respond to demands:** Producers of statistical reports face insistent demands from decision-makers for immediate replies to queries but do not have the resources to respond adequately. The tendency to collect too much data is driven by worries about the kinds of demands policy-makers pose.
- **Potential conflict of interest:** Producers of statistics reports recognize the conflict of interest inherent when those producing the data are also charged with achieving progress towards goals and targets.
- **Ability to cater for diverse audience:** few reports consider how to present data to diverse audiences although there are some notable exceptions (Cuba, Thailand).

In this guide, we attempt to provide guidance to enhance the quality of the reports, and make them more relevant to the needs of key users in the health sector and beyond. We focus our attention entirely on Type 2 reports. We suggest that type 1 reports, which present crude or raw data, are of only limited use other than to a small group of researchers. On the other hand, type 3 reports are largely based on type 2 reports with additional interpretation intended to assist a non-technical audience. Type 2 reports are intended to present a report of the activities of the health sector, specifically of the operation of health care facilities. Other reporting mechanisms generally exist to report other types of health data such as the results of health surveys or the statistics on births and deaths from the civil registration system. The Box summarizes the use, target audience and modes of presentation of the three types of reports.

Type 1 - raw data

Use: reports used for in-depth analysis of health service performance, ongoing monitoring of progress and service use

Audience: Health facility and district managers
National planners and managers
Researchers

Presentation: Report rates and ratios as well as numerators and denominators in absolute numbers
Simple tabulations, web-based dissemination, detailed explanations of definitions of variables, descriptions of source

Type 2: statistical reports

Use: mostly derived from service-level data; patient, facility records
reports used to present overall picture of health service performance, permit monitoring and evaluation, report to other sectors, donors, development partners

Audience: High level health policy-makers and planners at national, regional and district levels
Senior managers and planners in health sector
District health planners and local representatives
Development partners, donors
Specialist media,
Academia, researchers

Presentation: Focus on indicators, provide details of meta data
Can include special themes and alerts

Type 3: summary reports with interpretation and analysis.

Use: For annual health sector reviews, situation and trends analyses etc.
Health issues presented in short and simple formats for advocacy and policy purposes

Audience: High level policy makers, especially non health sector (finance, planning etc.)
Development partners, donors
Parliamentarians
Media
Civil society groups and health advocates

Presentation: Short fact sheets, simple charts "dashboard"
Human interest stories

Scope of health statistics reports

The workshop was framed around key health topics for which data are generated by health services. Three major health indicator areas were identified: health status including mortality and morbidity, health services including coverage and utilization, and health resources. For each health topic the workshop focused on (1) the contents (2) the analytical issues (3) presentation and communication of the data. The matrix used to guide country presentations and discussions is shown in Annex C.

Contents of annual health statistics reporting

Recent reviews of the health statistics field have identified more than a thousand health indicators in use across a multitude of intervention areas and programmes. In high quality national reports, however, there is a tendency to focus on fewer indicators and assess those in detail, including data quality and trends. The WHO standard should provide guidance on a core and on supplementary set of intervention areas and indicators.

There may be variation in the contents of the reports, although it would be good to explore if it is possible to define a basic minimum contents. The PAHO Regional Initiative on Core Health Indicators is an example where the consensus around a basic set of indicators has influenced the annual reports on health statistics.

Proposed core contents on reporting of health statistics for mortality, morbidity, health service coverage and utilization and health resources are attached in Annex D.

Quality assessment and adjustment

To fully exploit facility-based mortality statistics for further analysis and health intervention, it is important to understand the nature, and limitation of these data. The limitations should be part of any statistical reporting, and should be communicated to users. However, in almost all national reports data quality ascertainment is often lacking and there is no attempt to adjust for under-reporting or other biases. Basic assessment of coverage, completeness and consistency should be done to inform the resulting statistics and interpretation of trends. Below are some basic guidelines, while specific proposals for each topic are presented in Annex D.

Coverage refers to the number of districts, and health facilities or hospitals whose reports are used for statistical purposes. In any report the number and proportion of districts and the number and proportion of hospitals (e.g. for inpatients) will have to be specified and form the basis for any adjustments. A district figure for e.g. institutional deliveries or vaccinations can suddenly differ considerably than in previous years (this requires a way to determine a 'baseline' number). This could be a genuine increase (which would only be accepted if

validated with qualitative or other information e.g. supplies), could be related to completeness of reporting (e.g. a big hospital misses a year, or more clinic reports). Similarly, if a few large hospitals are missed out, this will affect the number of maternal deaths in a year. If these hospitals reported in the previous year one could falsely conclude that the number of maternal deaths has dropped. It would be possible to adjust for coverage problem by restricting analyses to a consistent set of facilities across time period. But, this requires one to have access to facility level data for multiple years.

It should be known that even if all facilities are covered in the reporting system, the data may still be incomplete because some events may occur outside of health institutions or that hospital services do not reach the entire population. For instance, in countries where service provision is limited to selected localities or where attendance is not universal, events recorded in hospitals may not be exhaustive and representative of the total population. A well known case is the facility-based mortality and morbidity data, which tend to exclude isolated localities or under-represent people of certain characteristics, such as the elderly who prefer to die at home.

Data triangulation, involving internal and external consistency checks, can be a powerful tool for ascertaining the validity of facility-based data. One simple procedure of consistency check is to compare data with known patterns or with data for previous years at the national and sub-national level. For some diseases certain patterns are expected, e.g. the seasonality of malaria or the age-sex distribution of HIV and TB cases. Similarly, there should be consistency between the number of new antenatal visits, deliveries and children receiving vaccinations in the first year of life. If there are large differences, this may raise questions about the quality of the data which should be investigated further, and/or mentioned in the report. There is however no good method to make adjustments, except for omitting or correcting outliers.

Reconciliation with other data sources is another important method. For several health statistics health surveys, such as DHS and MICS, are a reliable source of coverage estimates and can be considered as the gold standard for comparison if the survey quality was high and the sampling size was large. For instance, the combination of the two data sources can provide much more accurate trend statistics for coverage of interventions such as immunization or institutional delivery rate or for adjusting facility-based mortality estimates. However, for most morbid conditions no population-based data are available for comparison. If a country has completed a health examination survey with biological and clinical data collection, it is possible to obtain data on specific conditions. This may include HIV prevalence, others.

Presentation and communication of annual health statistical reports

Review of existing reports revealed great variations in the presentation of these reports, which ranged from impenetrable and dull to very innovative and accessible to a lay user, with lots of ideas on how to present trends, link data with decision making, etc. The best practices in this area need to be compiled

and translated into basic guidance on how to present annual health statistical reports, bearing in mind that such reports need to address the information needs of different users, including health service planners and managers, policy-makers, health advocates and civil society. First and foremost, it will be important to bring in analysis and interpretation of the key tables and figures. Countries have used approaches like top ten health problems of the year and basic trend analysis, and comparative analysis with other countries. There are also country examples that have reduced the publication of large volume of numbers of data and statistics in the reports by focusing on analysis and interpretations while using web-based public access to the data for the dissemination of details.

Basic principles for good presentation and dissemination include:

- Presenting statistics in different formats depending on user needs;
- Using graphs, diagrams, and tables as appropriate but including explanatory notes in order to avoid misinterpretation;
- Discussing strengths and limitations of the data openly and honestly.

Although all countries recognize the importance of data presentation and dissemination, there is much still to be done to ensure that statistics are accessible to all potential users, including the general public. Currently, the traditional "yearbook" is the most common dissemination vehicle with several countries moving into the preparation of summary version and web-based distribution. All countries complained that there is still an imbalance between the production of huge amounts of data that are little used and the specific information needs of various audiences. Even when the data have been gathered and summarised to high standards, further analysis is usually needed before the information can be disseminated and communicated to non-technical audiences and used as the basis for policymaking. This step remains one of the most difficult in many countries and many reports are characterised by the absence of summaries or interpretation to guide attention to the essentials.

Information technology is perceived to be a useful tool for expanding capacities for data dissemination and use. Several countries have local area network systems in place to ensure connectivity between health facilities and across districts. Currently these systems tend to serve internal purposes first and foremost but some countries have moved to the next level to provide access to the general public through open databases that have user-friendly querying options.

Several countries, such as Burkina Faso are experimenting with innovative approaches such as the use of mapping, dashboard presentations and access to databases.

Customized computer applications have been developed to assist data entry, data presentation and the production of periodic reports but it is essential to ensure that relevant staff have training in such applications. Workshops on data and information use can be helpful in sharing the perspectives of producers and users of health statistics who tend to meet only rarely in most countries. Measure Evaluation has developed the Decision support system, a tool to improve the production, presentation and communication of Annual Health

Statistical Reports (reference).² This is a computerized application allowing health managers to visualize health indicators and data elements in graphical and geographical presentations. The system is based on the principle that comparison is one the most powerful analytical methods and an essential tool for data presentation. Comparison has a number of dimensions that include:

- spatial: by health facility, district, province etc.;
- temporal: trends by week, month, year, etc.;
- indicators: between inputs and outputs;
- benchmark: expected versus achieved;
- cross country: with countries at similar stages of socio-economic development, regional etc.

Enhancing country capacity for annual statistical reports

The fourth element would build upon successful models developed by countries who have ensured consistent high quality and timely annual health statistical reports. This includes capacity in efficient and effective data compilation and ascertainment of completeness of reporting, adjustment for underreporting, reconciliation of data from different sources, trend analysis and presentation and dissemination skills.

Several countries have initiated capacity-building activities, often with a focus on data collection and presentation at district and facility levels. The aim is to ensure early reporting, on the principle that the most important characteristic of such reports from the perspective of decision-makers should be their timeliness with completeness a secondary consideration. Some countries – Kenya being one example – convene meetings with local users such as health committees at district level. Other mechanisms for capacity-building for users of statistical reports include annual "health days" and annual "health summits" which bring together providers of health care and producers of statistical information with health care users, advocacy groups and NGOs.

The single most urgent need in terms of capacity-building is in relation to the reconciliation of statistical values arising from different sources and measurement techniques. Whereas it is recognized that data reconciliation should be a standard part of all analysis, presentation, and dissemination endeavours, capacity to do so is often lacking at country level with the result that countries often do not understanding the reconciliation exercises conducted by global agencies and academics.

² MEASURE Evaluation Website: <http://www.cpc.unc.edu/measure>
Middle Earth MOH Demo: <http://snisnet.net/DSSDemoInstallFiles.zip>
Web-based Decision Support System: <http://snisnet.net/smipf.htm> and <http://dssbase.net/smipf.htm>
RHINONet: <http://rhinonet.org>

WHO Regional Offices are seeking to address capacity-building needs through workshops and the encouragement of horizontal collaboration among countries in the areas of indicator rationalization, the development of country health profiles, integration of data collection and analysis across disease-focused programmes, and training courses in epidemiology, demography and statistics. The Health Metrics Network will be developing guidance materials including software packages designed to facilitate data reconciliation and to promote better targeted data dissemination.

Annex A List of participants

AFRO

Dr Wassi Landry Boussari
Epidemiologist/medical Officer
Ministry of health
Burkina Faso

Dr Pepela Wanjala
Ministry of Health
Afya House, HMIS LG 37
P.O. Box 300016, Nairobi
Kenya

Tel: + 254 20 271 7077 ext-45097
Fax: + 254 72 237 5633
E-mail: wnajala2p@yahoo.com
: hmis@health.go.ke

AMRO

Dr Eduardo Zacca
Director
Nacional de Estadistica
Ministerio de Salud Publica de Cuba
Calle 23 No 201 Entre M y N
Vedado, Plaza de la Revolucion
Ciudad Habana
Cuba

Tel: + 53 7 838 3398
Fax: + 53 7 835 3925
E-mail: zacca@infomed.sld.cu

EMRO

Dr Medhat Kamal El Sayed
Expert
Health Information and Epidemiology
Muscat
Oman

Tel: + 968 994 24095
Fax: + 968 246 96533
E-mail: medhatelsayed@gmail.com

Dr Salah Al Muzahmi
Director
Health Information and Statistics
Muscat
Oman

Tel: + 968 246 05474
Fax: + 968 246 96533
E-mail: medhatelsayed@gmail.com

EURO

Dr Hugh Magee
Senior Statistician and Head
Information Unit
Department of Health and Children
Dublin
Ireland

Tel: + 968 246 05474
Fax: + 968 246 96533
E-mail:
Hugh_magee@health.irlgov.ie

Dr Liis Roovali
Head of Health Statistics
Department of Health Information and
Analysis, Ministry of Social Affaire
Gonsiori 29
15027 Tallinn
Estonia

Tel: + 372 6 269 158
Fax:
E-mail: Liis.roovali@sm.ee

Dr Otilia Scutelnicu
Monitoring and Evaluation of National Health
Programs
Scientific and Practical centre of Public Health
and Health Management
3, A Cosmescu Street
Chisinau
Republic of Moldova

Tel/Fax: + 373 22 73 51 25
Fax:
E-mail: Otilia_sc@yahoo.com

SEARO

Mr Anil Thapa
Statistician
Health Management Information System
Department of Health services
Kathmandu
Nepal

Tel: + 977 1 425 0320
Fax:
E-mail: anilthp@yahoo.com

Mr Ram Krishna Regmi
Statistical Officer
Ministry of Health and Population
Kathmandu
Nepal

Tel: + 977 984 159 9576
Fax:
E-mail: rkgregmi@yahoo.com

Dr Pinij Faramnuayphol
Director, Health Information System
development Office
Health Systems Research Institute
Ministry of Public Health
Bangkok
Thailand

Tel: + 662 580 0931-32
Fax: + 662 580 0933
E-mail: pinij@hiso.or.th

Dr Narong Kasitipradith
Deputy Director, Bureau of Policy & Strategy
Director, Health Information Group
Bureau of Policy & Strategy
Ministry of Public Health
Bangkok
Thailand

Tel: + 662 590 1691
Fax:
E-mail:

WPRO

Dr Wang Liping
Researcher
Information Centre
Centre for Disease Control
China

Tel: + 86 10 6302 2996
Fax: +
E-mail: wanglp@chinacdc.cn

Dr Wu Xiaolin
Division Director
Centre for Health Statistics and Information
Ministry of Health
Beijing
China

Tel: + 86 10 6879 2482
Fax:
E-mail: wycl@moh.gov.cn

Dr Nora`l Binti Mohd Daid
Medical Officer
Ministry of Health
Kuala Lumpur
Malaysia

Tel: + 6 19 240 3060
Fax: + 6 38 889 0180
E-mail: pkpj@wp.moh.gov.my

Dr Lee Fuei Siong
Assistant Director
Family Health Development Division
Ministry of Health
Kuala Lumpur
Malaysia

Tel: + 6 19 273 7318
Fax: + 6 38 883 2210
E-mail: drfslee2@gmail.com
: drfslee@yahoo.com

Facilitators

Dr Mounkaila Abdou
MEASURE/JSI
JSI Research and Training Institute
1616 N. Fort Myer Drive
Arlington, VA 22209
USA

Tel: + 1 703 528 7474
Fax: + 1 703 528 7480
E-mail: Mounkaila_Abdou@jsi.com

Dr Vincent Shaw
Senior Consultant
Bureau of Policy & Strategy
Health Information Systems Program (HSIP-
SA)
P.O. Box 86813
Eros
Windhoek
Namibia

Tel: + 264 81 351 5165
Fax:
E-mail: vpshaw@gmail.com
: vshaw@hisp.org

Ministry of Public Health Thailand

Dr Churnrutai Kanchanachitra
Institute for Population and Social Research
Mahidol University
Nakhom Pathom 73170
Thailand

Tel: + 662 441 9520
Fax:
E-mail: prckc@mahidol.ac.th

Dr Supakit Sirilak
Director
Bureau of Policy and Strategy
Office of the Permanent Secretary
Ministry of Public health
Bangkok
Thailand

Tel: + 662 591 8195
Fax: + 662 590 1393
E-mail: konc62@yahoo.com

Dr Suwit Wibulpolprasert
Office of the Permanent Secretary
Ministry of Public health
5th Floor, first Building, Tiwanond Road
Muang District, Nonthaburi 11000
Thailand

Tel: + 662 590 1122
Fax: + 662 591 8513
E-mail: suwit@health.moph.go.th

Health Metrics Network

Mrs Carla AbouZahr
Deputy Executive Secretary
Health Metrics Network
20 Ave Appia
CH-1211 Geneva 27
Switzerland

Tel: + 41 22 791 3367
Fax: + 41 22 791 1584
E-mail: abouZahrc@who.int

World Health Organization

Dr Ties Boerma
Director
Measurement and Health Information
Systems
World Health Organization
20 Ave Appia
CH-1211 Geneva 27
Switzerland

Tel: + 41 22 791 1481
Fax: + 41 22 791 1584
E-mail: boermat@who.int

Dr Yohannes Kinfu
Statistician
Measurement and Health Information
Systems
World Health Organization
20 Ave Appia
CH-1211 Geneva 27
Switzerland

Tel: + 41 22 791 3726
Fax: + 41 22 791 1584
E-mail: kinfuy@who.int

Dr William Soumbey-Aaley
Regional Adviser
World Health Organization
Regional Office for Africa
B. P 6
Brazzaville
Republic of Congo

Tel: Fax:
E-mail: soumbeye@afro.who.int

Dr Anton Fric
Regional Adviser
World Health Organization
Regional Office for South-East Asia
Indrapastha Estate
Mahatma Gandhi Road
New Delhi 110002
India

Tel: + 91 11 2337 0804
Fax:
E-mail: frica@searo.who.int

Dr. Ilsa Nelwan
Public Health Administrator
World Health Organization
Nepal Country Office
UN House Pullchowk
Kath Mandu
Nepal

Tel: + 977 1 552 3993
Fax: + 977 1 552 7756
E-mail: nelwani@searo.who.int

Dr Alejandro Giusti
World Health Organization
Chile

Tel:
Fax:
E-mail: giustia@chi.ops-oms.org

Dr Sunil Senanayake
Acting Regional Adviser/Health Information
World Health Organization
Western Pacific Regional Office
P.O. Box 2932, UN Avenue
1000 Manila
Philippines

Tel: + 63 2 528 9812
Fax: + 63 2 526 0279
E-mail: Senanayakes@wpro.who.int

Observers

Dr Songphan Singkaew
Director
Office of Health Economic Affairs
Bureau of Policy and Strategy
Ministry of Public Health
Thailand

Tel: + 662 590 1388
Fax:
E-mail:
songphan@health.moph.go.th

Ms Phandhipaya Dharmasaroja
Policy and Plan Analyst
Bureau of Policy Strategy
Ministry of Public Health
Thailand

Tel: + 662 590 1499
Fax:
E-mail:
panshar@health.moph.go.th

Ms Pandbaudee Ekachampaka
Policy and Plan Analyst
Bureau of Policy Strategy
Ministry of Public Health
Thailand

Tel: + 662 590 1646
Fax:
E-mail: pandee@health.moph.go.th

Ms Pintusorn Hemptisut
Policy and Plan Analyst
Bureau of Policy and Strategy
Ministry of Public Health

Tel: + 662 590 1376
Fax:
E-mail: yolk@health.moph.go.th

Mrs Auraphin Sublin
Statistical Officer
Bureau of Policy and Strategy
Ministry of Public Health

Tel: + 662 590 1491
Fax:
E-mail: aura_boon@yahoo.com

Mrs Roongjit Termtor
Statistical Officer
Bureau of Policy and Strategy
Ministry of Public Health

Tel: + 662 590 1494
Fax:
E-mail: roontjit@health.moph.go.th

Dr Sinchai Tawwattanakidgul
Director
Information and Communication technology
Centre
Ministry of Public Health
Thailand

Tel: + 662 590 1214/1217
Fax:
E-mail: sinchai@health.moph.go.th

Dr Rungnapa Prasanthong
Deputy Director
Bureau of Epidemiology
Ministry of Public Health

Tel: + 662 590 1731
Fax:
E-mail: rungnapa@health.moph.go.th

Dr Weerasak Putthasri
Deputy Director
International Health Policy Program
Thailand

Tel: + 662 590 2374
Fax:
E-mail: weerasak@ihpp.thai.go.th

Dr Kanitta Bundhamcharoen
Researcher
International Health Policy program
Thailand

Tel: + 662 590 2383
Fax:
E-mail: kitta@ihppp.thaigov.net

Dr Siriwan Pitayarangsarit
Researcher
International Health Policy Program
Thailand

Tel: + 662 590 2366
Fax:
E-mail: siriwan@ihppp.thaigov.net

Mrs Waraporn Suwanwela
Health Insurance Officer
National Health Security Office
Thailand

Tel: + 662 831 4000 ext: 8322
Fax:
E-mail: waraporn@nhso.go.th

Mr Narisa Mantharngkol
Health Insurance Administration Officer
National Health Security Office
Thailand

Tel: + 662 831 4000
Fax:
E-mail: narisa.m@nhso.go.th

Mrs Srisama Sapyaprapa
Socio-Economic Statistician
National Statistics Office

Tel: + 662 281 033: ext 1218
Fax:
E-mail:

Ms Porn-tip Sriwatcharin
Socio-Economic Statistician
National Statistics Office

Tel: + 662 281 033: ext 1215
Fax:
E-mail:

Annex B Agenda

Day 1, October 10

OPENING SESSION		
9:00 - 10:00	Welcome and introductions	Ministry of Public Health, Thailand
	Health Metrics Network	Carla Abou-Zahr, HMN/WHO
	Objectives and background to the workshop, general overview	Ties Boerma, WHO
	Annual Health Statistics Report: summary of a meeting in Nepal, September 2007	Anton Fric, WHO -SEARO
10:00-10:30	Discussion	
10:30-11:00	Coffee break	
11:00-12:30	1: Mortality statistics from health facility data	
	Mortality and cause of death statistics from hospital data	Wassi Boussari, Burkina Faso
	Mortality and cause of death statistics from hospital data	Medhat Kamal El Sayad and Salah Al Muzamhmi, Oman
	Mortality statistics from hospital data: general analysis of country practices and proposed standards	Yohannes Kinfu, WHO
	Discussion	All
12:30-14:00	Lunch break	
14:00-15:30	2: Morbidity statistics and surveillance	
	Reporting of morbidity statistics from service data	Liis Roovali, Estonia
	Disease surveillance and morbidity statistics	Wu Xiaolin and Wang Liping, China
	Morbidity statistics	Pinij Faramnuayphol and Narong Kasitipradith, Thailand
	General analysis: Morbidity statistics used in PAHO's annual summary	Alejandro Giusti, WHO-AMRO
	Discussion	All
15:00	Coffee break	
15:30-17:00	3: Service provision	
	Health service coverage statistics from facility data	Pepela Wanjala, Kenya
	Health service coverage statistics from facility data	Nra'l Binti Ohammed Said, Lee Fuie Siong, Malaysia
	Data quality assessment	Vincent Shaw, University of Western Cape, South Africa
	General analysis	Ties Boerma, WHO
	Discussion	All

Day 2, October 11

9:00-10:30	4: Service management	
	Health statistics related to service management	Anil Thapa and Ramakrishna Regmi, Nepal
	Developing health service evaluation – the role of health statistics reports	Hugh Magee, Ireland
	Health statistics from service data including management	Eduardo Zacca, Cuba
	Discussion	All
10:30-11:00	Coffee break	
11:00-12:30	5: General issues	
	Communicating results and annual reports	Abdou Monkaila, JSI / RHINO, USA
	General analysis of country presentations	Carla AbouZahr, HMN/WHO
	Enhancing country capacity: Regional strategies	Panel with 6 WHO regions
12:30 - 14:00	Lunch break	
14:00 -15:30	Development of guidelines: contents, approaches, process	Group work
15:30 - 16:00	Coffee break	
16:00 - 17:00	Group reports, general discussion and next steps	
17:00	Closure	

Annex C Guidance for analysis of current practices

1. What is the core contents? What are the key characteristics of the reporting system? Are sub-national data reported? What level of dis-aggregation is used, is useful?
2. How is the quality of data assessed? This includes *coverage*: what proportion of reports are received? What facilities are missing? *Completeness*: do the data include all events of interest ? What adjustments are made for incomplete reporting? *Data quality*: how is data accuracy assessed? What measures are taken to correct for outliers? Are special studies done? What adjustments are made for inaccurate reporting?
3. Has data been triangulated? Are data from multiple source reconciled to obtain the best estimates for the health statistics? How is this done?
4. What lessons can be learned about effective and ineffective ways of presenting the statistics? How are the quality and analytical issues presented?

Health topic	Contents	Quality assurance procedures	Reconciliation with other sources	Communication and use
Mortality	Causes of death lists; ranking Time trends Age and sex disaggregation Subnational data Case fatality rates Survival rates by diagnosis	Completeness Accuracy - ICD use, garbage codes, undefined etc. Validation work	Civil registration Local demographic surveillance studies Verbal autopsy data GBD patterns	Examples of effective presentation Ways to present data quality issues and adjustments
Morbidity and disability	Outpatient attendance and diagnoses (ranking) In-patient admissions and discharges (levels and ranking) Disaggregation Tuberculosis notification HIV/AIDS Cancer registries	Completeness Accuracy - ICD use Validation work Completeness Accuracy Completeness Accuracy	Household surveys Household surveys (HIV)	As above
Service provision	Immunization Maternity care: delivery in institutions, birth weight, still births, abnormal deliveries (CS) ARV, PMTCT, VCT TB treatment Surgical procedures Quality of care (waiting times, complications, survival)	Completeness Accuracy (e.g. GAVI DQA)	Household surveys	As above
Service management	Health facility Hospital beds Length of stay Occupancy rates Drug and equipment availability Health workforce Laboratory data	Completeness Accuracy	Facility surveys	As above

Annex D Contents of health statistical reporting

The following sections present the results of the group work on the contents of health statistical reporting. A draft was presented based on the discussion during the previous sessions and an initial analysis of the contents of the country reports shared at and prior to the meeting.

Mortality statistics

Contents

Vital registration is the gold standard for mortality estimation. However, in the absence of (or in connection with) these data, facility-based mortality statistics could be used to generate number of deaths and age-specific rates by leading causes as well as case fatality ratios. Data should be obtained from all institutions, but if these are restricted to public facilities or a select group of sentinel hospitals, this should be clearly indicated. It is also important to make proper distinction between mortality statistics based on discharge diagnosis and those based on underlying causes use derived from death registration data.

At the very minimum statistical reporting of mortality data should aim at providing information on number, rate per 1,000 population and percent distribution of deaths as well as on case fatality rates for leading causes. Separate but similar information should also be presented for maternal deaths. In both cases, total or catchments area-specific population numbers used for computation of rates should be reported.

List of leading causes should be consistent with ICD 10, and guided by the following standard criteria.

- List should have epidemiological basis associated with the idea of control measure. For instance, a *preventability* based criteria could consist of the following:
 - deaths that can be avoidable by vaccination (e.g. measles or tetanus).
 - deaths avoidable by early diagnosis and timely and adequate treatment (e.g: TB, maternal mortality, malaria, dengue).
 - deaths avoidable by application of hygienic measures, environmental sanitation and health condition (e.g: intestinal infectious disease).
 - deaths avoidable by application of a combination of measures.
 - deaths that are difficult to avoid with current knowledge & technology.
 - External causes.
- A balance should be sought between grouping and disaggregating causes so that the first five causes of death should account 40-50 %, and the first 10-15 about 60-70 % of all deaths.
- Overloaded and frequently heterogenous categories should be avoided.
- The list should be as informative as possible, avoiding residual categories usually defined by expressions "other", the "reminder" or not specified".

- There should be only one category for "all remaining causes", and ideally this should not account more than 10-12 per cent of total deaths.
- Ill-defined causes should be shown separately, and should not be a category in the list.
- List must be mutually exclusive, and collectively exhaustive.

It is necessary that the data are dis-aggregated by sex, age (under 1, under 5, under 5, 5-14, 15-59, 60+), health or political regions, and possibly by private/public facilities, if there are policy or data quality reasons to do so.

Quality ascertainment

To fully exploit facility-based mortality statistics for further analysis and health intervention, it is important to understand the nature, and limitation of these data. The limitations should be part of any statistical reporting, and should be communicated to users.

Assess and report on coverage

The number and proportion of districts (for OPD) and the number and proportion of hospitals will have to be specified and form the basis for any adjustments.

Assess and report on completeness

The total expected number of deaths in the population, and an indicator of access to facilities will have to be specified. The data should be used to assess the proportion of deaths occurring in health facilities, which is the sole basis of hospital mortality statistics.

Completeness of death reporting can also be assessed using standard internal and external validity checks: ratios of deaths between different ages, age-specific sex ratio of deaths, and standard age-specific death rates should be computed, and compared against expected patterns.

Data triangulation

The age-specific death rate as well as the list of leading causes should be compared with data from demographic surveillance sites, sample registration databases or mortality estimates from sample surveys to ascertain the quality (or limitation) of the data. In the absence of (in conjunction with) these data, the WHO global burden of death estimate for the country or data from a neighboring country or a country with similar mortality profile should also be used to check the validity of facility-based mortality data.

Presentation of results

In general, the table should include all leading causes (such as top ten or 15 causes) using the ICD shortlist, disaggregated by main age and sex groups, with previous years. A graph can show the trend over time.

Tables should also include case fatality rates for leading cause as well as for maternal deaths.

All tables should be accompanied by information on the coverage and completeness of the data, and any limitations associated with the data.

Morbidity statistics

Contents

Morbidity reports include disease incidence and prevalence rates, generated from a wide range of data sources, including:

- Outpatient diagnoses reports
- Hospital discharge diagnoses reports
- Health insurance records
- Surveillance of notifiable diseases
- Surveillance of priority diseases, such as TB and HIV/AIDS (intensified monitoring)
- Cancer registries
- Special service reports, e.g. mental health, dental health

A minimum standard annual report should include:

Outpatient diagnoses:

- Proportion of districts reporting data / required adjustments for incomplete or inaccurate reporting
- Number, rate per 1,000 population and percent distribution for the main (e.g. 20) diagnostic categories
- Disaggregation:
 - demographic - sex, age (under 5 and 5 and over as a minimum; if possible under 5, 5-14, 15-59, 60+)
 - geographic - region/province/district
- Core list of diagnoses, consistent with ICD 10

Hospital discharge diagnoses

- Proportion of hospitals reporting data / required adjustments for incomplete or inaccurate reporting
- Number, rate per 1,000 population and percent distribution for the main 20 diagnostic categories
- Disaggregation:
 - demographic - sex, age (under 5 and 5 and over as a minimum; if possible under 5, 5-14, 15-59, 60+)
 - geographic - region/province/district
 - hospital - annex table
- Core list of diagnoses, consistent with ICD 10

Notifiable diseases

- Evaluation of the completeness of reporting

- Number of reported cases for the diseases; disease incidence
- Disaggregation:
 - demographic - sex, age (under 5 and 5 and over as a minimum; if possible under 5, 5-14, 15-59, 60+)
 - geographic - region/province/district
- Core list of diagnoses, consistent with ICD 10
- All notifiable diseases should be presented in the report, even the incidence is very low or 0.

Surveillance of priority diseases, such as TB and HIV/AIDS (intensified monitoring)

- Proportion of districts reporting TB data / required adjustments for incomplete or inaccurate reporting
- TB notification: number and rate, by sex, geographic region
- Location of sentinel clinics; assessment of completeness of AIDS case reporting
- HIV:
 - HIV surveillance among sentinel populations: pregnant women, high risk populations, others
 - HIV infection new diagnosis, by age group (child under 5, 5-14, 15-24 etc.), sex, geographic region
 - Incidence of AIDS, by sex, major age group, geographic region

Cancer registries

- Incidence of most common cancers by site: sex and age-specific

Quality ascertainment

Assess and report on completeness

The number and proportion of districts (for outpatient diagnoses - OPD) and the number and proportion of hospitals (for inpatient diagnoses - IPD) will have to be specified and form the basis for any adjustments.

Assess and report on accuracy / consistency

Comparison with previous years at the national and subnational level is done to assess any outliers and will form the basis for any adjustments.

For some diseases certain patterns are expected, e.g. the seasonality of malaria or the age-sex distribution of HIV and TB cases. If there are large differences, this may raise questions about the quality of the data which should be mentioned in the report. There is however no good method to make adjustments.

Assess the external validity of the statistics derived from facility data (correctness) / reconciliation with other sources

For most conditions no population-based data are available for comparison. If a country has completed a health examination survey with biological and clinical data collection, it is possible to obtain data on specific conditions. This may include HIV prevalence, diabetes, hypertension and others.

Presentation of results

In general, the table should include all lead causes using the ICD shortlist, disaggregated by main age and sex groups, with previous years. A graph can show the trend over time.

A summary top ten OPD and in-patient diagnosis is a useful way of communicating the results of the most recent year.

Health service coverage

Contents

The estimates of coverage are based on the number of events (service provision) obtained from the health facilities and an estimate of the target population, such as children under 5, pregnant women or total population.

Disaggregation is limited because of the work burden with manual recording but is possible for a limited number of variables. Some indicators may be available by sex. The main variable is district or province/region. Urban-rural distinction is mostly not available.

Vaccination coverage

Indicator	Definition
BCG vaccination coverage	Proportion of children under age 1 who have received the specific vaccination
DPT 1 / 2 / 3 vaccination	Ditto
Polio at birth / 1 / 2 / 3	Ditto
Measles	Ditto
Hib	Ditto
Hep B	Ditto
DPT 1 to 3 dropout rate	Proportion of children who have received the third dose among those who received the first dose

Other child health

Indicator	Definition
Vitamin A supplementation	Mean number of doses of vitamin A per child among children 6-59 months
Bednets distributed	Mean number of ITN distributed per child among children under 5 years of age

Antenatal and maternity care

Indicator	Definition
Antenatal care attendance rate	Proportion of pregnant women who have made at least one antenatal care visit
Mean number of antenatal visits	Mean number of visits per pregnancy among those who attended antenatal care
Institutional delivery rate	Proportion of women who deliver in institutions
Caesarean section rate	Proportion of all babies who have been born by

	Caesarean section
Postnatal care attendance rate (?)	Proportion of women who delivered who made at least one postnatal care visit

Tuberculosis

Indicator	Definition
TB DOTS success rate	Proportion of people on TB treatment who have successfully completed treatment under DOTS

HIV/ AIDS

Indicator	Definition
PMTCT coverage	Proportion of antenatal women who have been tested for HIV infection
ARV coverage	Proportion of people in need of ARV who have received ARV during the last year
VCT coverage	Proportion of adults (15 years and over) who have been HIV tested and counselled during the last year

Contraceptive use

Indicator	Definition
Contraceptive prevalence rate	Couple years of protection per 1,000 population

Parking lot

- Male condom distribution rate (through health facilities)
- Treatment
- Antibiotics for pneumonia
- ORS sachets for dehydration / diarrhea

Quality ascertainment

Assess and report on completeness

The number and proportion of districts that are reporting will have to be specified and form the basis for any adjustments.

Assess and report on accuracy / consistency

Comparison with previous years at the national and subnational level is done to assess any outliers and will form the basis for any adjustments.

For some diseases certain patterns are expected, e.g. the seasonality of malaria or the age-sex distribution of HIV and TB cases. If there are large differences, this may raise questions about the quality of the data which should be mentioned in the report. There is however no good method to make adjustments.

Assess the external validity of the statistics derived from facility data (correctness) / reconciliation with other sources

For most health interventions population-based data are available for comparison. A transparent adjustment can be made if there are discrepancies.

For immunization coverage, the following criteria can be used, following the same principles as WHO/UNICEF:

- Estimate is equal to reported data if reported data are:
 - Consistent with quality survey results (+/- 5% points)
 - Consistent across years (no sudden, unexplained changes).
 - Consistent between vaccines (DTP3 = OPV3).
 - No other data are available.
- If data are inconsistent select most "likely" value.
- 100% coverage is unlikely

For delivery care, the main challenge is to determine the proportion of deliveries that occur in private facilities. This can be obtained from the household health survey such as the DHS:

- percent in private facilities obtained in the most recent survey is added to the facility data-derived public facility coverage, until new population-based data become available.
- Percent of deliveries in public facilities from facility data is adjusted to match survey-based public facility delivery coverage figure if the difference is more than 5%.

The same procedure can be used for antenatal care.

Presentation of results

Plots of trends in coverage, year by year, derived from facility data (unadjusted and adjusted), with survey data.

Health service resources and management

Contents

Facilities / infrastructure

- Number and density of hospitals / health facilities
- Number and density of hospital beds
- Disaggregation by public / private sector; geographic distribution
- Availability of ambulances
- Availability of radiological services

Hospital rates

- Average length of stay
- Bed occupancy rate

Health workforce

- Number and density of health workers for main cadres: doctor, nurses, midwives, dentists, pharmacists, laboratory personnel and others
- Disaggregation: distribution of health workers in the country
- Output of training institutions by main cadre

Financial statistics

- Public expenditure review: per capita health expenditure, primary/ secondary / tertiary care. Other classifications include: hospital care, ambulatory care, pharmaceutical.

Service utilization

- PHC service utilization rate: average number of visits per person per year to a public / private PHC facility; disaggregation by major age group (e.g. under 5, 5+, or 5-14 and 15-59, 60+), geographic region
- Hospital admission rate: number of people admitted to hospital per 10,000 population per year; disaggregation by major age group, geographic region
- Surgical procedures: major, minor; number and rate per 10,000 population
- Radiological procedures: plain X-ray, ultrasonographic
- Blood donations per capita: distribution
- Number and utilization rate of screening for cervical cancer
- Number and utilization rate of mammography

Performance indicators

- Workload for key health worker (e.g. patients per day nurse)
- Availability of essential drugs: stockouts by month, tracer drugs
- Access to specific services: laboratory/diagnostic services, less common services (e.g. ARV therapy, PMTCT)

Quality ascertainment

- Regular assessment of completeness
- Comparison with previous years for consistency
- Comparison with other sources to assess validity / correctness
- Private sector: ensuring that data are included, or estimates are made
- Use of multiple sources on e.g. human resources for health: facility surveys and censuses, population census (data on occupations), medical professionals databases and payrolls

Presentation of results

How can a performance dimension be brought in?

Setting of targets or guidance for specific indicators

Importance of distribution of services within the country by district or region/province