Evidence Based Health Management Manual

March 2012 version

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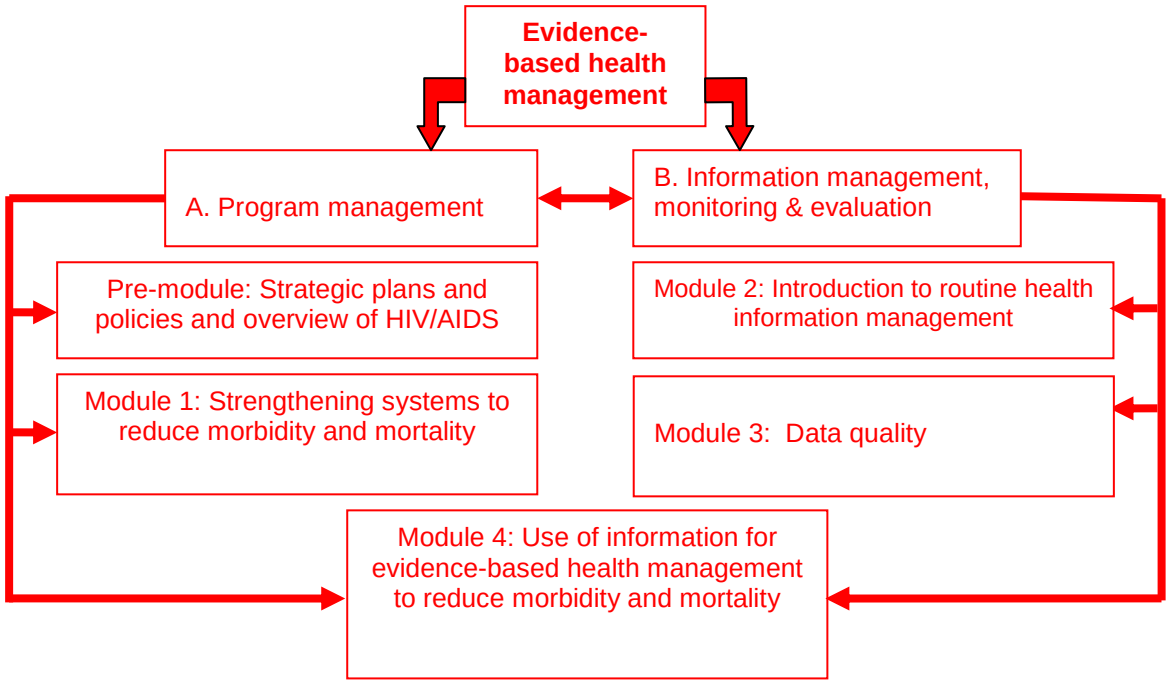
HOW TO USE THIS WORKBOOK

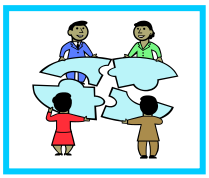
This is a foundation course, designed to strengthen existing health care systems and health programs in their quest to achieve the goals of increasing life expectancy, reducing child and maternal mortality and combat HIV /AIDS and TB. The course will be facilitated over five days. It is an interactive course that requires your participation in various ways.

The content of the course is divided into two broad themes, Program management and Information management with different modules under each theme. Each module is also divided into separate sections. Each section contains practical case studies and group exercises to provide an opportunity to apply the gained knowledge with the necessary skills.



The following icons are used in the manual to assist you in your studies:

Brainstorming
A technique used for generating ideas to clarify a situation or to find a solution for a problem.

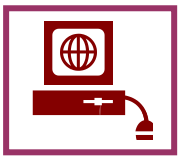


Group work
This is an opportunity for group members to communicate freely and openly with each other, to apply what they have learned.

Concept clarification / definition
This icon is included to clarify important terminology and key concepts.

Important information

Case study
These are examples to explain and clarify the link between theory and practice.



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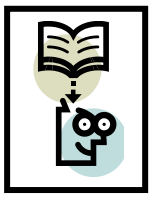
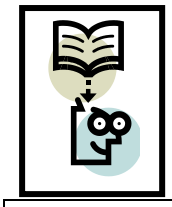
GLOSSARY



Accessibility	Data accessibility is the ease with which data can be obtained.
Baseline	A description of the current situation, usually statistically stated, that provides a point of comparison for future performance.
Benchmark	Refers to a reference point / standard against which achievements can be assessed, in other words, it can be viewed as estimated targets. National or provincial averages are often used as benchmarks where official targets are not available.
Bias	A preference towards a particular perspective or result especially when this preference interferes with ability to be impartial or objective.
Cleaning of data	Process that involves using scientific measures for correcting mistakes in the original data collected, e.g. filling blank areas/gaps and correcting data entered into wrong spaces
Completeness	Data is complete when the information system contains data for each relevant data element, for each of the facilities/reporting units for every month
Confidentiality	Means that clients are assured that their personal data is not disclosed inappropriately and that there is adequate security for the data.
Coverage	The percent (shouldn't it be percentage?) of a target group or population that has received a service or is protected from a disease or a health problem
Data	Raw material in the form of numbers, characters, images that gives information after being processed and analyzed.
Data element	The name of a particular event or factor that must be counted.
Data Quality	Quality data is complete, consistent, valid, reliable and relevant
Dissemination	The process of sharing information or systematically distributing information or knowledge to potential users and/or beneficiaries.
Evidence	Information considered to be true based on available facts.
Evidence-based health management	Using the best available evidence to make informed decisions to improve the results of health care services.
Goal	Broad, general statements that describe long term results
Health information feedback	The dissemination of information on data quality and program progress to relevant stakeholders. In the health system context it includes vertical (to higher and lower levels) as well as horizontal feedback (to line and program managers).
Impact	Longer term changes in health status e.g. mortality, morbidity, and disability
Incidence	The rate at which new disease cases occur in a population during a specified period.
Indicator	A quantitative or qualitative variable (something that changes) that provides a simple and reliable measurement of one aspect of performance, achievement or change in a program or project.
Information	Information usually refers to processed data, or data presented in some sort of context.

Integrity	Measure of truthfulness of the data, i.e. the data generated is free from deliberate bias or manipulation to suit political or personal agendas.
Maternal mortality or death	According to the World Health Organization, "A maternal death is defined as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." http://en.wikipedia.org/wiki/Maternal_Mortality_Ratio [1]
Morbidity	Disease rate usually expressed as the disease prevalence or incidence.
Mortality	Death rate in a population at a specific time.
Objective	Operational statements on intermediate results which can be measured. It must be SMART
Prevalence	The measure of the existing number of disease or illness cases present in a population at a specific point in time.
Proxy indicator	An indirect measurement of a target in the absence of a direct measure. One thing is measured and then used as an indicator for the value of another. For example, the number of TB infections or number of opportunistic infections as an proxy indicator for HIV infection in cases where people are not reporting on their HIV status due to stigma.
Qualitative methods	Gather data by asking people to explain what they have observed, believe or feel. Qualitative data are needed when the attitudes, beliefs, and perceptions of the target population should be known in order to understand its reactions and responses to intervention services.
Quantitative methods	Quantitative data is collected when a number, rate, ratio or proportion related to the target population should be established, for example the number of HCT sessions per month.
Rate	Measure of an event (numerator) within a population who is at risk for an event (denominator) during a specific period of time (1year) multiplied by a constant (1000 or 100 000) The numerator is contained in the denominator Rate is a specific kind of ratio, in which two measurements are related to each other.(http://en.wikipedia.org/wiki/Rate) Example: Under five mortality rate. Number of deaths in children under five per 1000 live births during a specific year.
Ratio	Nominator and denominator measures different units e.g. number of condoms per male of reproductive age. The numerator is not included in the denominator. Example: Maternal mortality ratio. Number of maternal deaths per 100,000 live births in a specific year.
Reliability and Consistency	Degree to which an instrument measures the same way each time. It is used under the same condition with the same subjects.
Target	Desired level of performance that has to be achieved
Timeliness	Relationship between the time of collection, collation, and reporting to the time when the data is needed for decision making processes and reporting.
Utilization	The process of putting information to use, such as to make decisions, to make changes, or to take other specific actions designed to improve outcomes.
Validation	The process of checking if something satisfies a certain criterion. Validation implies that one is able to document that a process or data is

	correct or suitable for its intended use.
Validity	Degree to which you are measuring what you actually intended.



Verification	Verification is usually an internal quality process of assessing compliance with a regulation, standard, or specification.

Term / Abbreviation	**Description**
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal care
ART	Antiretroviral treatment
ARV	Antiretroviral drugs
B	Benchmark
CCMT	Comprehensive Care, Management and Treatment
DHIS	District Health Information System
DHMT	District Health Management Team
DHS	District Health System
DIO	District Information Officers
DoH	Department of Health
DQ	Data Quality
DQP	Data Quality Plan
ESI	Enhancing Strategic Information
ELISA	Enzyme Linked Immunosorbent Assay
GAMET	Global AIDS Monitoring and Evaluation Team
GWMES	Government-Wide Monitoring and Evaluation System
HAART	Highly Active Antiretroviral Therapy
HCS	Health Care System
HCT	HIV counseling and testing
HISP	Health Information Systems Program
HIV	Human Immunodeficiency Virus
HST	Health Systems Trust
IDU	Injecting Drug Use
JSI	John Snow Incorporated

M&E	Monitoring and Evaluation
MDGs	Millennium Development Goals
MERG	Monitoring and Evaluation Reference Group
NACOSA	National AIDS Coordinating Committee of South Africa
NDoH	National Department of Health
NHA	National Health Act
NIDS	National Indicator Data Set
NSP	National Strategic Plan
OVC	Orphans and vulnerable children
PCR	Polymerase Chain Reaction test
PEPFAR	President's Emergency Plan For Aids Relief
PHC	Primary Health Care
PLHIV	People living with HIV
PMTCT	Prevention of Mother-To-Child Transmission
RHIS	Routine Health Information System
SANAC	South African National Aids Council
SDIO	Sub-District Information Officers
STI	Sexually Transmitted Infection
T	Target
TB	Tuberculosis
TOP	Termination of Pregnancy
U5MR	Under five mortality rate
UNGASS	United Nations General Assembly Special Session on HIV/AIDS
USAID	U.S. Agency for International Development
VCT	Voluntary Counseling and Testing *(for HIV)*
WHO	World Health Organization

MODULE 1: STRENGTHENING SYSTEMS TO IMPROVE THE HEALTH STATUS OF THE POPULATION

LEARNING OUTCOMES:
On completion of this module the participants will be able to:

- differentiate between a health system and a health care system
- discuss the components of a health care system
- list strategies which can be used to strengthen health care system
- discuss health information, monitoring and evaluation as integrated sub-systems of the health care system
- develop strategies to strengthen health information and monitoring and evaluation systems

1.1 INTRODUCTION

Inadequate health systems result in health inequities and poor health outcomes because they prevent the implementation of effective interventions. This happens, not because of a lack of money, skills or knowledge, but because healthcare managers fail to apply existing resources and personnel in those areas where most needed (WHO 2006b: 2-5). The World Health Organization (WHO) states that existing effective and affordable interventions can save the lives of many people but that health systems fail to adequately address preventable causes of morbidity and mortality (WHO 2007a: 1, 7).

There is international consensus that "only through building and strengthening health systems will it be possible to secure better health outcomes" (WHO 2007a:1) and to achieve international goals such as the MDGs, but:

- Which aspects of the health care system can be strengthened at service delivery and other levels given the resource constraints?

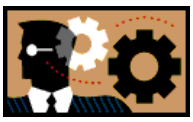
- How can managers at the different levels facilitate, support and monitor strengthening of the health care system?

Managers need basic knowledge of how systems, especially health care systems function, to identify and address shortcomings and to measure progress after corrective strategies have been implemented.

1.2 STRENGTHENING HEALTH CARE SYSTEMS FOR EVIDENCE-BASED HEALTH MANAGEMENT OF HIV/AIDS

The two terms 'health system' and 'health care system' are often used interchangeably in literature. Because this course focuses on evidence-based health management in the Department of Health (DoH) environment, it is necessary to ensure that people are able to distinguish between these terms.

1.2.1 HEALTH SYSTEM AND HEALTH CARE SYSTEM OVERVIEW



Brainstorming

What is the difference between a health system and a health care system?

A **health system** is a set of components and activities that function together to promote, restore or maintain the health of the population. Health systems include other non-health sectors such as the Departments of Education and Agriculture (Katzenellenbogen et al 1997:148; WHO 2006a:3).

The two goals of a health system are to improve:

- the health status of the population in ways that are responsive, financially fair and make the most efficient use of available resources. The best measure of a health system's performance is its impact on health outcomes and the under five mortality rate (U5MR) is a common health status indicator used to assess health system effectiveness (WHO 2007a:iii).

- health equity which is characterized by health services that are fairly distributed in terms of inputs, processes and outputs, in proportion to need, in different areas and by different social groups. Health equity also requires equity in terms of effectiveness and efficiency of health care interventions and management processes (Katzenellenbogen et al 1997:149,150).

A **health care system**, as sub-system of the health system, is a collection of people (clinical and support staff, patients and communities), things (buildings, vehicles, drugs, money, rules and plans), and events (consultations, meetings, procedures and evaluations) which are integrated to promote health, prevent and treat illness and assist those in need of health care (Katzenellenbogen et al 1997:148).

DoH staff and their partners are responsible for strengthening the health care system to optimize the health status of all people and to combat priority causes of death. This can be achieved mainly by means of implementing preventive, screening, diagnostic, treatment and rehabilitative interventions at community and health facility levels.

It is important to understand that, although DoH staff and their partners should be involved in other sectors at each level of the health care system, their main responsibilities lie in the day-to-day work and management of health care services provided at health facility and community levels.

This course focuses on the South African public health care system, from national down to community levels.

1.2.2 COMPONENTS OF A HEALTH CARE SYSTEM

Several authors have compared the health system, of which the health care system is a sub-system, to an industrial system with interdependent input, process, output, outcome and impact components. These components must function together to be effective and changes in one component have an influence on all the other components. This means that improvements in one component cannot be achieved without contributions from the other components. Similarly, shortcomings in one component of the health care system will influence all the other components of the system (Katzenellenbogen et al 1997:151; WHO 2001a:6; WHO 2003b:12, WHO 2007a:5).

The health information monitoring and evaluation (M&E) system can be seen as a sub-system of the health care system. To understand how the health care system can be strengthened to achieve the best possible results, each component of the health care system will be discussed.

The components of inputs, processes and outputs are more related to the implementation of the health care, whilst outcomes and impacts address the results that are envisaged.
An indicator can provide information on more than one component in the implementation phase of health care – it is used as proxy indicator . This will be discussed in detail in Module 4

1.2.2.1 Inputs

Health care inputs include the **availability** and **accessibility** of resources such as finance, facilities, equipment, drugs, staff, policies and specific interventions such as antenatal care in specific geographical areas. One measure of health care inputs can, for example, be the number of doctors per 100,000 people living in a specific province.

- **Availability** is defined as the ratio between the population in a district, province or country and the health care resources (Katzenellenbogen et al 1997:150).

- **Accessibility** is defined as the proportion of a population who use health care facilities or services, given the various barriers to access. These barriers include:

    - *geographical access barriers,* such as distance from a health facility and the traveling time needed to reach appropriate facilities;

    - *financial access barriers*, such as expenses associated with traveling costs, health care fees charged by a hospital, clinic or other facility; and

    - *hours of service delivery barriers*, such as the days or times when needed services are open and available to the public (Katzenellenbogen et al 1997:150).

1.2.2.2 Processes

Health care processes are the activities, interactions and interventions whereby inputs are applied to meet specific needs and to achieve specific results (Katzenellenbogen et al 1997:149). It can be argued that most processes in the health care system can be grouped under service delivery, management and capacity building.

Measurement of processes is aimed at determining how well health care services (inputs) are **accepted** and **used/utilized** by communities in specific geographical areas (WHO 2001a:6; WHO 2003b:12).
Processes should be measured for specific health care interventions, procedures, treatment protocols and other activities, but overall health care processes can be measured in terms of utilization rates that reflect on the acceptability of health care facilities, services and interventions (for example, the percentage of women using health care facilities for delivering their babies) (Katzenellenbogen et al 1997:149-150).

- **Acceptability** is defined as the proportion of the population in need of specific interventions, who regard the services provided to them as relevant to their needs, socially acceptable (for example, in terms of language and the attitude of health workers) and of an adequate quality and standard (Katzenellenbogen et al 1997:150).

- **Utilization** is defined as the proportion of the population that is using available, accessible services or facilities in relation to those who need such services.

Acceptability and utilization also reflect whether health services are effectively managed and whether staff is experienced as being knowledgeable and skilled.

1.2.2.3 Outputs

Health care outputs are measured as the quantity of services provided; for example the percentage of the population that has received (ore was covered by) specific services in relation to those who needed such services in specific geographic areas (WHO 2003b:12).

High **coverage rates** are an indication that interventions (services) have been delivered successfully while low coverage rates indicate that such services have not been successfully delivered. Underperformance requires careful and meticulous investigation into why the interventions are not reaching those who need them. An example of an HIV/AIDS related health care output is the percentage of antenatal clients tested for HIV.

1.2.2.4 Outcomes

Outcomes are measured in terms of quality, effectiveness and efficiency (for example, the HIV incidence and prevalence in pregnant women) (Katzenellenbogen et al 1997:149).

- **Effectiveness** measures success in producing a given result (*did we achieve what we set out to achieve?*); and

- **Efficiency** measures the use of inputs to achieve set objectives in monetary terms (*how cost-effective did we do what we set out to do*?).

1.2.2.5 Impact

The impact of the health care system is measured mainly in terms of life expectancy at birth and levels of **mortality** related to the main health problems of a country (WHO 2001a:6; WHO 2003b:12). Disease-specific or cause-specific mortality rates indicate the impact (or lack of impact) made by specific health care interventions or programs. An example for measuring health care impacts is the U5MR.

To identify and address potential health care system shortcomings and to measure progress in strengthening health care systems, managers need basic knowledge of how systems usually function.

1.2.3 FUNCTIONING OF A HEALTH CARE SYSTEM

In section 1.2.1 health care system was defined as a sub-system of the health system. A health care system is a collection of people (clinical and support staff, patients and communities), things (buildings, vehicles, drugs, money, rules and plans), and events (consultations, meetings, procedures and evaluations) which are integrated to promote health, prevent and treat illness and assist those in need of health care (Katzenellenbogen et al 1997:148).

A system consists of inter-dependent inputs, processes, outputs, outcomes and impacts. Changes or shortcomings in one component of a system will influence all the other components. If the system does not deliver the expected results, all components must be assessed to identify and address potential shortcomings.

To enable effective assessment of any system, data/information is needed on each of the system components.

In a system where outcome and impact targets are not met, inputs, processes and outputs related to these targets need to be assessed to identify potential causes of underperformance (WHO 2003b:35). For example, if the U5MR (impact) is high; it can be argued that the health care inputs, processes and outputs need to be assessed because they may be insufficient for preventing and managing health care problems in children.

The health systems model (Figure 1.1) described by the WHO (2001a:6), illustrates the interdependence between inputs, processes, outputs and outcomes (no impact is included in this model). It also illustrates the fact that health systems co-exist and interact with the political, social, economic and environmental fields that surround them.

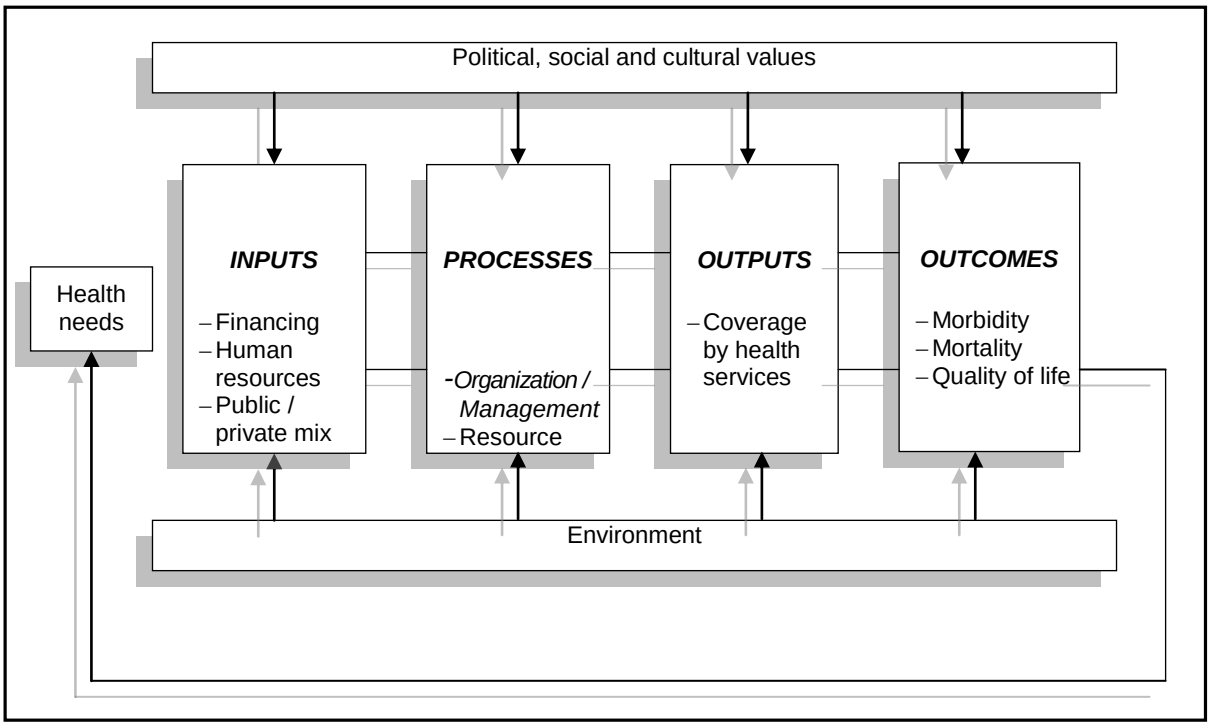


Figure 1 ***World Health Organization Health System Model*** **(WHO 2001a:6)**

Figure 1 displays the key performance information concepts described by South Africa's National Treasury in their information system model. According to National Treasury (2007: 6) managing for results implies that budgets are developed in relation to the inputs, activities (processes) and outputs needed for achieving targeted outcomes and impacts.

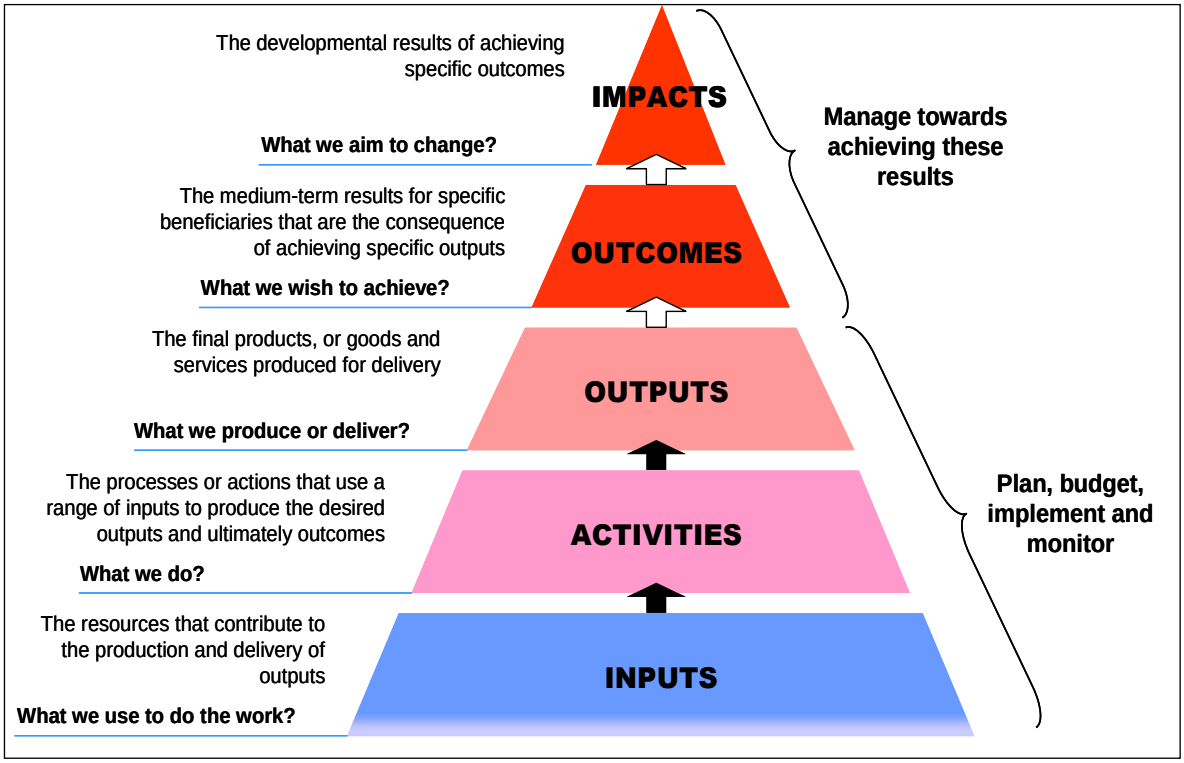


Figure 2 ***Key performance information concepts*** **(National Treasury 2007: 6)**

Figure 3 displays a results-based (evidence-based) monitoring and evaluation (M&E) system model described by Kusek and Rist (2004: 57).They stated that inputs are allocated and processes are implemented to achieve the planned results, which include the set output and outcome targets.

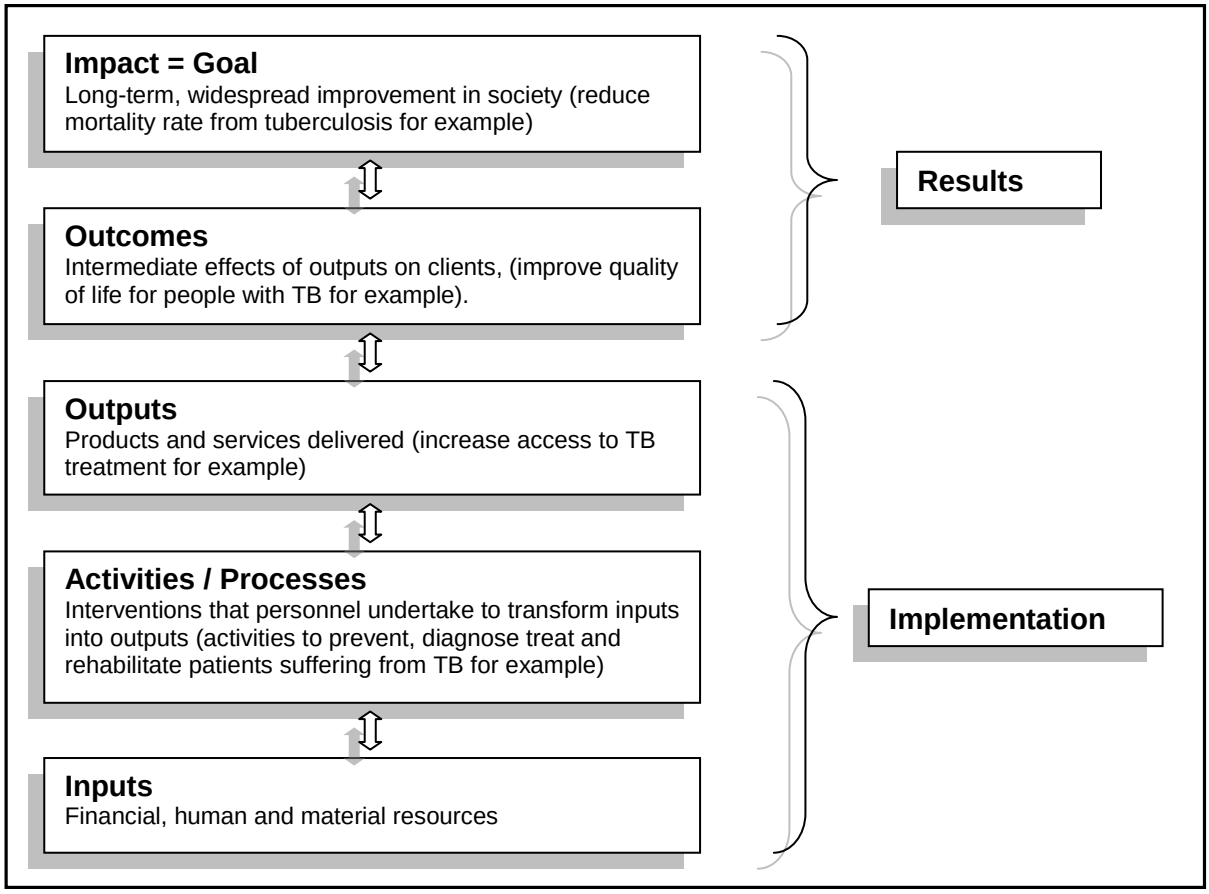


Figure 3 ***A results-based monitoring and evaluation system*** **(Adapted from Kusek & Rist 2004: 18, 99, 104)**

Figure 4 displays the model used by the Department of Health (NDoH NSP 2011 - 2012:31) on how the building blocks of a health care system are integrated to achieve the final goal of increasing life expectancy.

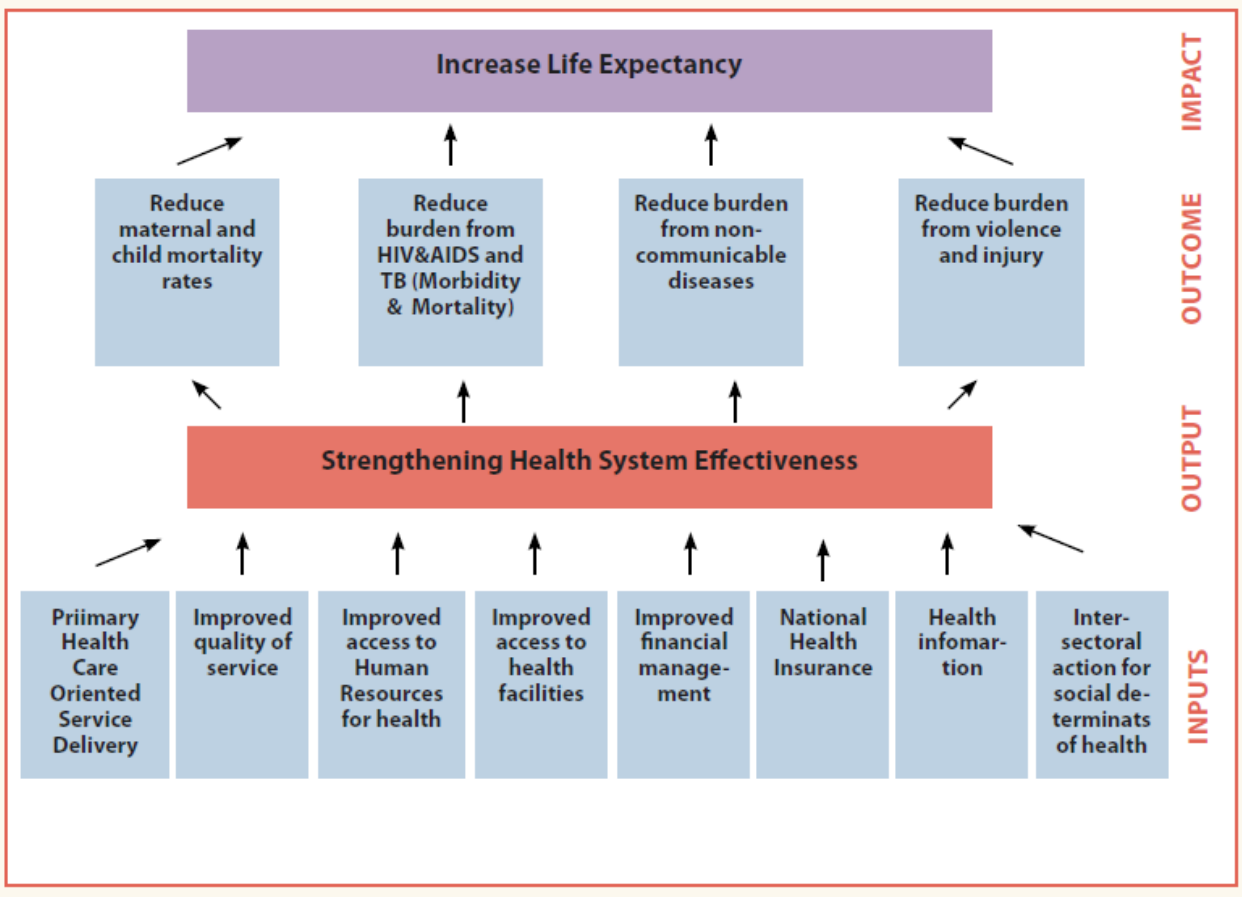


Figure 4 ***Outcome based approach to strengthening health care systems (NDoH NSP 2011-2012:31)***

The following quote emphasizes the importance of using results of the health care system, health programs and health interventions as a starting point for evidence-based health management.

The Power of Measuring Results

If you do not measure results, you cannot tell success from failure

If you cannot see success, you cannot reward it

If you cannot reward success, you are probably rewarding failure

If you cannot see success, you cannot learn from it

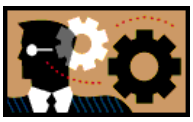
If you cannot recognize failure, you cannot correct it

If you can demonstrate results, you can win… support

(Adapted from Osborne and Gaebler, 1992, Reinventing Government)

Although the different descriptions of the systems theory in the literature may tend to cause confusion (Figures 1, 2 and 3), the principles remain essentially the same.

A system consists of inter-dependent inputs, processes, outputs, outcomes and impacts. Changes or shortcomings in one component of a system will influence all the other components. If the system does not deliver the expected results, all components must be assessed to identify and address potential shortcomings.



Brainstorming

The U5MR mortality rate is the final 'result' or 'impact' of all the health care system interventions to increase life expectancy and reduce child mortality – do you agree with this statement?

- **What potential health care system 'input' shortcomings can contribute to high child mortality rates?**
- **What potential health care system 'process' shortcomings can contribute to high child mortality rates?**

1.2.4 STRATEGIES TO STRENGTHEN HEALTH CARE SYSTEMS

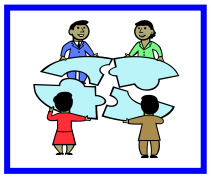
Because changes and/or constraints in one component of the health care system have an influence on all the other components, it is important to identify and address constraints that can contribute towards high morbidity and mortality rates in each component. In other words, health care systems should be strengthened by addressing identified shortcomings in terms of inputs and processes in order to achieve more equitable and sustained improvements in health outputs, outcomes and ultimately impacts (WHO 2007a: 14,15).

Strategies aimed at strengthening public health and the health care system should be guided by the core principles of the systems approach and the principles of Primary Health Care (PHC), which include:

- Focusing on broad population health issues and public health functions such as addressing priority causes of mortality.
- Building on the principles of equity, universal access and community participation that were delineated in Alma Ata.
- Prioritizing effective service provision to poor, vulnerable and excluded groups.
- Organizing and integrating the provision of health services in such a way that prevention, screening, diagnosis, acute and chronic care, are linked across all components of the health care system.
- Continuous assessment and improvement of health care system performance based on evidence (WHO 2003a: 1, 5).

Health care systems can only be strengthened if they are rigorously monitored and evaluated by using frameworks that provide reliable indicators of change and progress in terms of all the system components (inputs, processes, outputs, outcomes and impact) (WHO 2007a: 4, 20). Therefore health information and M&E systems, as sub-systems of health care systems, need to be strengthened to identify best practices and potential shortcomings in each component of the health care system.

1.3 STRENGTHENING HEALTH INFORMATION MONITORING AND EVALUATION SYSTEMS FOR EVIDENCE-BASED MANAGEMENT OF HEALTH PROGRAMS



Divide into pairs for a 5 minute discussion:

1. **What is the difference is between monitoring and evaluation?**
2. **What is the purpose of M&E?**

Each pair will have two minutes for feedback.

Several definitions of M&E can be located from literature. For this course we use the definitions in the *Presidency's Policy Framework for the Government wide Monitoring and Evaluation System* as they are the definitions used by the public sector (and therefore the partners supporting the public sector) in South Africa.

Monitoring is the *routine ongoing assessment* of activities to provide managers, decision makers and other stakeholders with regular feedback on progress in implementation, results achieved and early indications of problems that need to be corrected (DoH 2004: 5; Presidency 2007: 1 - 2). *Monitoring is an ongoing management function aimed at informing day-to-day program management decisions*.
Collection, tabulation and analysis of data on selected indicators is part of the implementation of monitoring

Evaluation is a *time-bound, periodic assessment* that seeks to answer specific questions to guide decisions (Presidency 2007: 2).

It is important to understand that M&E are two complementary, but separate functions with the purpose of strengthening health care systems and health program performance and that both strategies should include measurements for inputs, processes, outputs, outcomes and impacts.

National plans and policies provide guidelines for monitoring and evaluation to be able to assess levels of implementation and results.

1.3.1 PURPOSE OF MONITORING AND EVALUATION

The purpose of M&E has shifted from focusing mainly on upwards reporting towards using information for health program improvement (Figure 5).

Information/evidence is used for management decisions in terms of:

- Setting health care priorities
- Allocating resources and measuring effective and efficient use thereof.
- Measuring health program and service effectiveness and impact.
- Enhancing transparency and supporting accountability when information is shared with partners.
- Informing corrective actions

M&E processes assist the public sector and all other organizations in identifying factors that contribute, or don't contribute, to its service delivery results (Presidency 2007: 1, 7 - 10).

Figure 5 ***The purpose of monitoring and evaluation***

1.3.2 HEALTH INFORMATION, MONITORING AND EVALUATION SYSTEMS

Although M&E and health information is often described as two separate "systems", they mostly function as one integrated sub-system of the health care system.

M&E is part of the management process and an important management function of each health care provider and manager at each level of the health care system. Monitoring, evaluation and reporting form the basis of effective health care system management which in turn results in effective health service delivery.

The importance of creating, implementing and strengthening a unified and coherent M&E system at national and all other levels of the health care system cannot be overemphasized (The Global fund 2006: 8).
Strengthening of information and M&E systems can contribute greatly to improved service delivery, effectiveness and efficiency of health care. An organization's failure to align information and M&E systems with their strategies and objectives can result in wasted resources and poor performance. Obstacles to effective information and M&E systems include:

- a lack of leadership and management
- failure to prioritize
- poor relationships between IT and management
- a lack of senior executive support
- poor understanding and/or a lack of consideration for the objectives and strategies of the organization (Bush, M, Lederer, AL, Li Xun, Palmisano, Jay, Rao, S 2009:446, 447)

The **Government Wide Monitoring and Evaluation System (GWMES**) is the overarching framework for monitoring and evaluation in the South African Government and aims to provide an integrated framework of M&E principles, practices and standards throughout all government services. It is intended to facilitate a clear sequence of management actions in response to analysis of service delivery outcomes and impacts and their associated outputs, processes and inputs (Presidency 2007:4-5).

The Government Wide Monitoring and Evaluation System (GWMES)
Website: *www.thepresidency.gov.za* or
www.samea.org.za/documents/GovernmentWideMESystem.pdf

Figure 6 displays the three data terrains from which the GWMES draw information:

- Program performance information – information collected by institutions to improve structures, systems and processes.
- Social, Economic and Demographic Statistics – information collected by Statistics South Africa through the national census and other surveys.
- Evaluations - information obtained by means of official evaluations to communicate and publish the results of policies and programs.

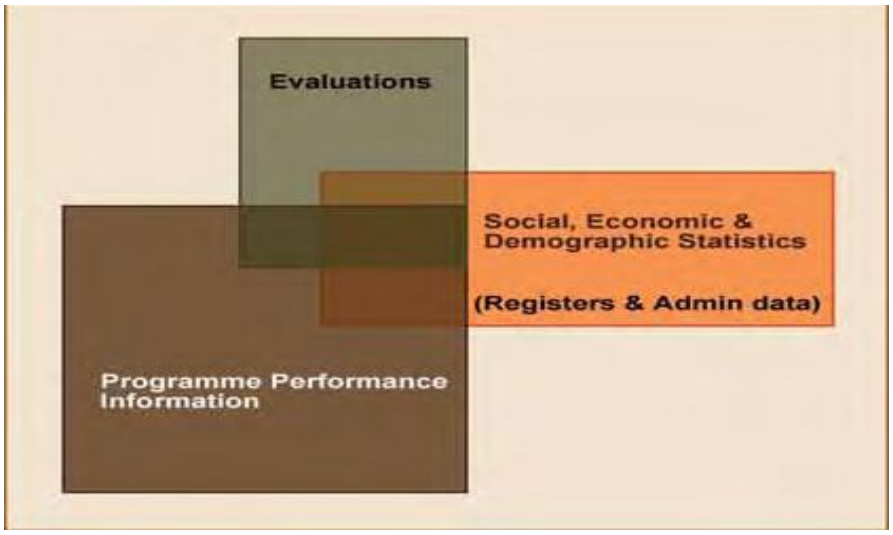


Figure 6 ***The three terrains from which M&E draw information*** **(Presidency 2007: 7)**

For the health care sector "The Program Performance Information" component in Figure 6 represents the routine health information system which, in South Africa, is the DHIS. Effective routine health information systems are crucial for effective health program monitoring and a well functioning routine health information system "ensures the production, analysis, dissemination and use of reliable and timely health information on health determinants, health system performance and health status" (WHO 2007a: vi).

In section 1.2.2 we discussed the components of a health care system as inputs, processes, outputs, outcomes and impacts. Health information and M&E systems, like any other systems, consist of the same interrelated system components. (Presidency 2007: 2). As with health systems, shortcomings and/or changes in one component of an M&E and/or health information system affect all the other components.

- **Inputs** are all the **available and accessible resources** we use to do the work. In M&E systems inputs include a standardised and user-friendly M&E framework, dedicated health information and M&E funding, M&E and health information policies, standards, strategies, staff (knowledgeable and skilled in terms of health information management and M&E), standardised lists of data elements and indicators (to enable measuring of health system inputs, processes, outputs, outcomes and impacts in terms of priority causes of death), together with equipment such as computers, networks and software.

- **Processes** are **actions that use** available and accessible **inputs to produce** the desired **outputs**. Processes related to information and M&E include data collection, collation, validation, entry/capturing, analyses, presentation and dissemination. See Module 3 for more detail.

- **Outputs** are the **products and/or services produced** by a specific system. Outputs of an effective information and M&E system includes relevant, timely and accurate data available and accessible, in a user-friendly format, to line and program managers at each level of the health care system, as well as to other relevant role players and communities.

- **Outcomes** are the **intermediate results** (in terms of **effectiveness, efficiency and quality)** achieved by a specific system. The results of an effective and efficient health information and M&E system include:

    - Health programs that are able to meet their international, national, local and donor reporting requirements (The Global fund 2006: 8).

    - Ultimately reductions in the incidence and prevalence of preventable health conditions (due to effective use of valid and reliable information for identifying and addressing health care system shortcomings).

- **Impact:** The **ultimate goal** of information and M&E systems is to inform interventions to reduce morbidity and mortality as well as to monitor health inequities and effectiveness of health programs (DoH 2004: 5; Presidency 2007: 4; SAMJ September 2009, Vol 99, No 9).

1.3.3 STRATEGIES FOR STRENGTHENING HEALTH INFORMATION AND M&E SYSTEMS

Strengthening of integrated health information systems at local, national and international levels is required to strengthen M&E systems and health care systems. This helps to deal with health threats and to achieve the international health goals such as the MDGs (WHO 2003a: 12 – 15).

In order to strengthen information and M&E systems, shortcomings in the outputs of the system should be used to identify and address potential shortcomings in terms of inputs and processes. For example, if managers and other decision-makers do not have timely access to valid and reliable information (in a user-friendly format) for making program management decisions and for meeting international and national reporting requirements, the M&E and information system need to be assessed to identify and address shortcomings such as:

- Inadequate inputs such as equipment, skilled staff, data collection tools

- Inadequate health information management and M&E processes such as data collection, collation, validation, capturing, analysis, storage and dissemination

Ways of strengthening M&E and health information systems include:

Some of the priority challenges in terms of M&E and information management systems include a lack of clear roles and responsibilities, a lack of capacity in terms of skilled staff, a lack of access to quality data and information, ineffective use of data and information produced by M&E units and non-standardized M&E frameworks**.** In order for monitoring, evaluation and reporting to be effective and efficient, the following needs to be in place:

- A health information management and M&E policy and framework
- Sufficient number of staff members with the necessary knowledge and skills as well as clear roles and responsibilities at all levels
- Effective hardware and software, as well as access to the internet and e-mails
- Standardized data elements, indicators with standardized definitions
- Effective tools and structures for obtaining, organizing, sharing and using information
- Effective data management processes to collect, collate, validate, analyze and disseminate information
- Easy access to quality data in a user-friendly format
- Effective use of data and information for evidence-based health program management

A few examples of how these specific shortcomings can be addressed are discussed below:

1.3.3.1 Unclear roles, responsibilities and skill requirements

The role of information and M&E staff is to support managers in evidence-based decision making aimed at strengthening health care systems to optimize the health status of communities. This supportive role does not replace the responsibility of managers to measure their health programs' impact in the geographical areas they are appointed in.

To ensure effective and participative M&E, information management skills, including skills for data collection, statistical analysis and data quality assurance are important. Organizations have to recruit appropriate skills, train existing staff and facilitate skills transfers from academics and consultants (Presidency 2007:16).

The Policy Framework for the Government Wide Monitoring and Evaluation System (GWMES) stipulates the institutional roles and responsibilities of accounting officers, program & line managers, service providers and designated M&E units, while the National Health Act stipulates the roles and responsibilities at national, provincial and district levels in terms of M&E and information systems. (See Table 1)

Table 1 *Monitoring and evaluation roles, responsibilities and skills requirements (Adapted from Presidency 2007: 14, 17)*

Staff	Roles and responsibilities	Knowledge and skills requirements
Accounting officers	Accountable for the frequency and quality of M&E information, it's production and it's utilization for prompt management action based on evidence	• Intermediate M&E knowledge and skills • High level evidence-based management skills
Information managers, program managers, line managers, service providers and other users of M&E data	Establish and maintaining M&E systems for collecting, capturing, verifying and using data and information	• Generic M&E skills • Routine information management skills • High level evidence-based management skills because they need to respond to M&E findings in an effective and efficient way.
Designated M&E units	Ensure implementation of comprehensive integrated M&E strategies and systems by providing expertise and support	• Advanced M&E skills • Advanced research skills

1.3.3.2 Lack of a standardized and user-friendly information and M&E framework

A standardized M&E framework is crucial for guiding effective M&E of health programs across all levels of the health care system. Several monitoring and evaluation frameworks, such as results frameworks, strategic frameworks and conceptual frameworks are described and implemented world-wide. For this course we use the logical framework (Log Frame) to organize and measure health care system results and potential causes of best practices or shortcomings.

The purpose of a logical framework is to ensure that M&E is focused and that information derived from the framework informs management decisions. In line with the systems approach, the logical framework supports measuring of interrelated health care system inputs, processes, outputs, outcomes and impacts.

The logical framework for M&E supports the health care system approaches illustrated in Figures 1 and 2 by providing a framework for grouping data elements and indicators into inputs, processes, outputs, outcomes and impacts – this stimulates and supports logical thinking and evidence-based decision-making.

Figure 7 shows a basic logical framework that can be used for measuring progress towards reducing the U5MR as one of the MDGs by focusing on PMTCT. When creating a logical framework for measuring a health program or a specific cause of mortality, the existing goals, objectives, indicators and targets related to the program and/or health condition to be measured need to be taken into consideration. As described in the pre-module on HIV/AIDS, the epidemiology of the disease has to be monitored (including basic principles about the prevention, diagnosis and treatment) is crucial for monitoring progress towards the set goals.

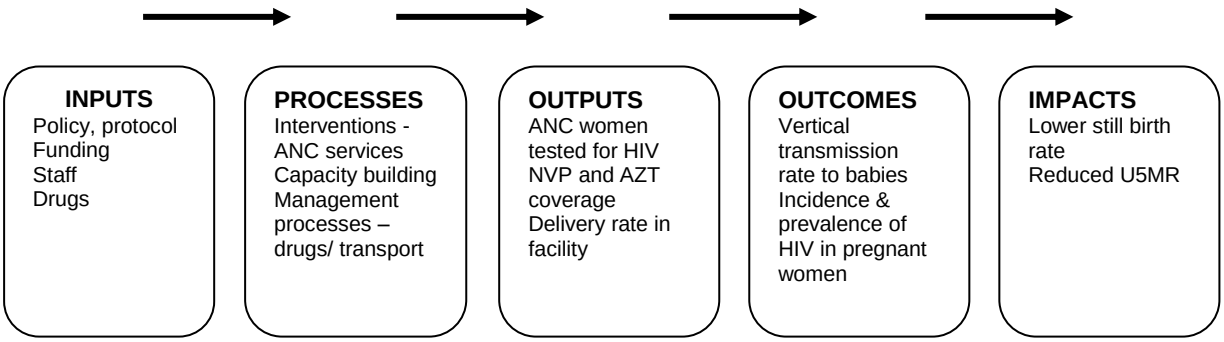


Figure 7 ***Basic logical framework for measuring progress towards reducing the HIV-related U5MR***

If a results-based management approach is followed (Figure3), the logical framework components are organised from right to left; it starts with impacts, then outcomes, outputs, processes and inputs. Information on the results of the health interventions (impact and outcome indicators) serves as the point of departure and is used to determine whether targets were met. Output, process and input indicators are then used to identify potential reasons for best or under performance and for developing action plans to address shortcomings.

For more information on logical frameworks, the following sources can be explored.

Monitoring and Evaluation Handbook for Health Managers: A Practical Handbook for Designing and Implementing Monitoring and Evaluation Systems (2007).
http://www.ceecis.org/remf/Service3/unicef_eng/module2/part2.html

http://www.hrhresourcecenter.org/hb_me

http://www.fantaproject.org/focus/monitoring.shtml

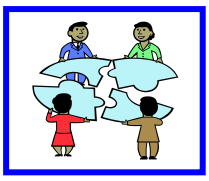
http://www.cdc.gov/eval/logic%20model%20bibliography.PDF

1.3.3.3 Insufficient access to timely, valid and reliable health data/information

Timely, valid and reliable data should be easily available and accessible to managers at all levels of the health care system to inform effective decision making and reporting.

Public access to quality, trustworthy, timely and relevant information on the performance of programs or projects (their successes and failures), derived from evidence-based M&E systems is also viewed as important in developing strategies to ensure greater accountability and to strengthen the M&E system (Kusek & Rist 2004:18-21).

Each organization and/or health program should have a central point at which M&E outputs (data, reports, graphs etc.) are stored to encourage their utilization. This central data point should provide managers with easy access to updated data and information in a user-friendly format (Presidency 2007:13).



Divide into three groups for a 10 minute discussion.

1. **The purpose of information and M&E systems is to provide evidence for management decisions (aimed at improving health programs to optimise the health status of communities) Do you agree with this statement? Give reasons for your answer**

2. **Health program managers in South Africa often state that they don't have access to routine health information to inform their decisions and to meet their reporting requirements.**

3. **Do you have access to timely, valid and reliable routine health information in a user-friendly format?**

   If yes, please share good practices/experiences

   If no, what can you personally do to address this problem/need?

Each group will have 5 minutes for feedback.

Module 2 introduces health information management as an essential component of strengthening health care and M&E systems.

THEME B: INFORMATION MANAGEMENT

MODULE 2: INTRODUCTION TO ROUTINE HEALTH INFORMATION MANAGEMENT

LEARNING OUTCOMES:
On completion of this module the participant will be able to:

- Define the important terminology related to information management
- Discuss the routine health information process
- Select and critique indicators in terms of RAVESS principle

Utilise different graphs, tables and maps to present health information

2.1 INTRODUCTION

Sources show that, while data/information is available, it is generally not accessible in a user-friendly format. The mix of data/information that is available to health managers is often inappropriate, difficult to understand and is generally only obtained through annual and other reports.
Data and information should form the foundation of policy development, monitoring and strengthening of health programs. The reality is that data use for policy making, strategic decisions, planning and monitoring of service delivery (in terms of availability, accessibility, utilization, effectiveness and efficiency) as well as for strengthening health programs and systems and providing feedback to stakeholders (in terms of data quality and progress of health programs/interventions towards goals and targets) is limited.
Poor data quality is one of the most often cited reasons for managers not using information for decision-making. Because data quality is so important, Module 4 of the manual will focus on how data quality problems (for example in terms of completeness, consistency and accuracy) can be identified and addressed in an effort to optimize the quality of data needed to support effective evidence-based health management.

Brainstorming

1. What is the difference between data and information?

2. What do you use routine health information for?

3. What are the potential reasons why managers often do not use data/information optimally?

2.2 DEFINITIONS

Data is raw / unprocessed numbers.
Information is processed/analyzed data that adds context through relationships between data to allow for interpretation & use.
Knowledge adds understanding to information which is communicated and acted upon.

Data → **Information** → **Knowledge**

Process of data to information is as follows:

Input - raw data

- Quantity and quality of data elements (NIDS)
- Data collection tools (tally sheets, registers, client cards)

Process - analysis

- Use planning tools to turn raw data into useful information
- Use indictors to convert data to information (DHIS)

Output - information

- Used for effective decision-making
- Assessment tools (aggregation, graphs, reports)

Types of data/information:

- **Quantitative data/information** is information that can be expressed numerically. Quantitative data can be obtained by means of the population census, population based surveys, patient charts, logs and tally sheets, checklists and questionnaires. Measurement must be objective, and statistically valid.
- **Qualitative data/information** is based on opinions and feelings expressed/described by participants. Qualitative data is mainly obtained through individual in-depth interviews and is subjective of nature.

Figure 8 illustrates the main differences between quantitative and qualitative data by using a painting as example.

Examine the differences between qualitative and quantitative data.

Qualitative Data	Quantitative Data
Overview: • Deals with descriptions. • Data can be observed but not measured. • Colours, textures, smells, tastes, appearance, beauty, etc. • Qualitative → Quality	**Overview:** • Deals with numbers. • Data which can be measured. • Length, height, area, volume, weight, speed, time, temperature, humidity, sound levels, cost, members, ages, etc. • Quantitative → Quantity
Example 1: *Oil Painting* 	**Example 1:** *Oil Painting* 
Qualitative data: • blue/green color, gold frame • smells old and musty • texture shows brush strokes of oil paint • peaceful scene of the country • masterful brush strokes	**Quantitative data:** • picture is 10" by 14" • with frame 14" by 18" • weighs 8.5 pounds • surface area of painting is 140 sq. in. • cost $300

Figure 8 *Differences between qualitative and quantitative data*

Difference between routine and non-routine data/information

- **Routine data/information** is defined by RHINO (2001:2) as "*information that is derived at regular intervals of a year or less through mechanisms designed to meet predictable information needs*". The routine health information system is an aspect of local service delivery that has been created to capture data about health care provision, management, service delivery, administration and financing (includes surveillance and vital registration [births and deaths]. Routine data can be collected as aggregated data (for example on tally sheets or tick sheets from which only total patients and priority interventions are counted, or patient-based data by means of tools containing more detailed data for each individual patient.

- **Non-routine data/information** is data obtained by means of surveys, population censuses or other research methods. Several surveys, such as *Demographic and Health Surveys, Living Standards Measurement Studies, Census Surveys* (Global Equity Gauge Alliance 2003: 11) and research studies are conducted nationally and internationally to obtain the kind of sound evidence and data on which policy makers and health care professionals need to base their decisions. Results are usually generalized to country and/or provincial levels.

As stated before, this course focuses on using existing routine health information for monitoring and management decisions.

2.3 ROUTINE HEALTH INFORMATION MANAGEMENT

Although non routine, population based surveys are the primary sources of data in most low income countries, up-to-date and reliable routine health information is essential for ensuring adequate health system performance. It is increasingly evident that timely and reliable routine health information improves health care system performance and that routine health information systems should be strengthened to support effective and cost-effective monitoring (Bryce et al 2006:1068; Campbell 2003:3; RHINO 2001:1; Shaw 2005:635; WITFOR Health Commission 2003:1). Results-based management and monitoring requires the availability of health care data for districts and local areas (Murray et al 2003:716).

Routine health information includes information such as PHC visits and vaccines administered to children. In South Africa health service data is summarized for each public health care facility and is entered into the DHIS every month. Regular updates enable early identification of specific problems in particular communities down to the level of service delivery. This provides a basis for implementing whatever corrective measures will make the most effective impact and thereby support the continuous measurement of inequities and definable progress towards established targets.

The DHIS, like any other information system, is comprised of five key components: hardware, software, data, processes and people (Shelly, Cashman & Rosenblatt 2001: 1, 5; Shaw 2005: 632). The software component of the DHIS was developed by the Health Information Systems Program (HISP) as a tool for monitoring the effect of PHC service provision on the health status of the people of South Africa. The DHIS software was first introduced into the South African health care system in 2000 (SA 2002: 2) and the abbreviation “DHIS” is used interchangeably for the DHIS and the DHIS software.

In module 1 strengthening of routing information management and M&E systems, as sub-systems of health care systems, was discussed. Section 1.2.4 stated that health information management and M&E processes include data collection, collation, validation, capturing, analysis, interpretation, presentation, dissemination and use. Each of these processes is of utmost importance to enable effective health management at all levels of the health care system.

The routine data/information management process or cycle, as displayed in Figure 9, can assist in availing valid and reliable data/information to managers in a user-friendly format. These processes/activities are integrated and interdependent and require effective planning, leadership and support to optimize data quality and use of data/information for decision-making.

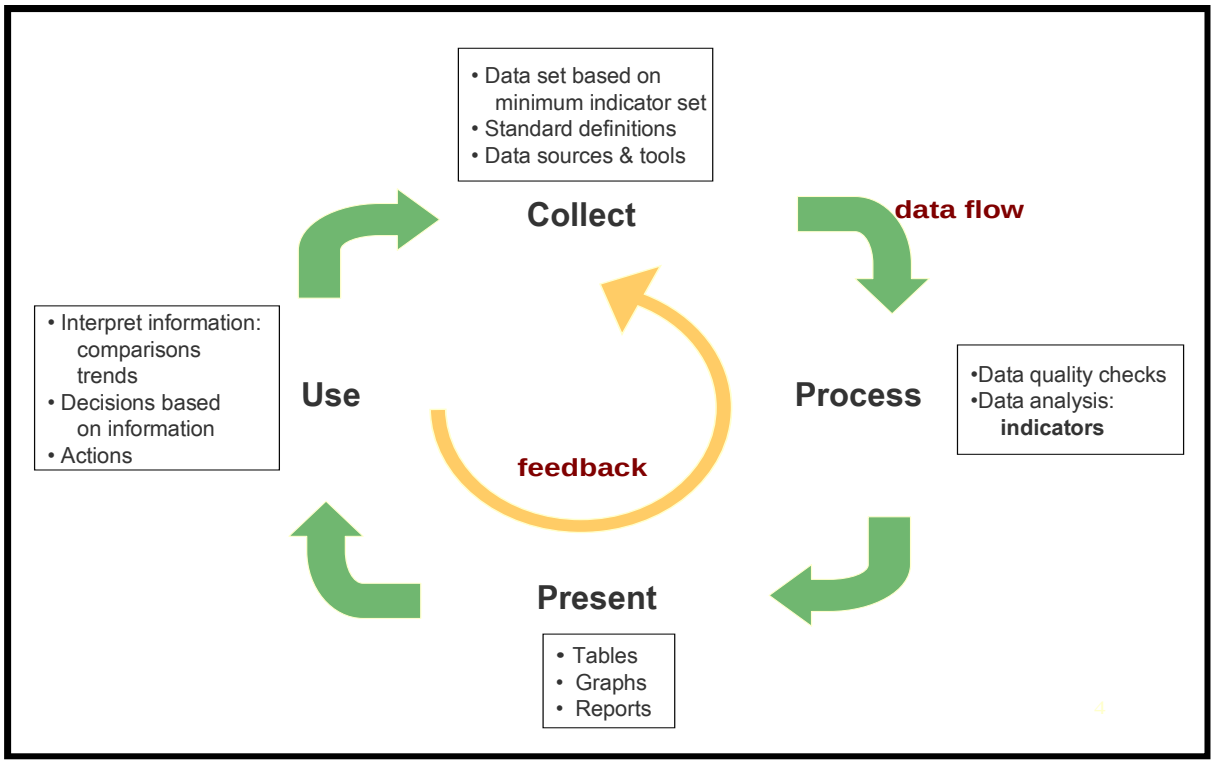


Figure 9 ***Routine Data Handling/information management Process***

There are several stages in the data handling process:

- **Data collection** is based on a standardized set of data elements and indicators AND on available resources such as people to collect the data as well as available paper-based or electronic systems.
- **Data processing** includes data capturing, validation, analysis and interpretation.
- **Data presentation/dissemination** is the systematic process of making information available and accessible to potential users, stakeholders and/or beneficiaries. The goal of dissemination is to facilitate and/or optimize utilization.
- **Utilization of information** is the process of using information for planning, policy making, program management and monitoring of services

Each of these processes in the information management cycle/process will now be discussed in more detail, while the use of data/information for evidence-based management decisions will be addressed in detail in Module 4.

2.3.1 DATA COLLECTION

Routine data collection terminology that is important is:

***Aggregated data* – these are the tick and tally sheets important for public health decisions**
***Patient data* – these are collected in longitudinal patient registers or directly into patient care databases (monitoring OR patient management)**

To collect data the following is required:

- **Standardized data element and indicator sets with clear standardized definitions (only selected elements are used for routine data collection)**
- **Standardized data collection tools**

Routine health facility data are mainly ***collected as:***

- data for each patient in the form of a longitudinal or daily register

OR

- in the form of aggregated data by means of tick or tally sheets.

The ***purpose*** of routine data also differs – routine data can be used for patient care OR for public health and/or health program monitoring purposes.

- Patient care/management requires detailed data for each individual patient,

WHILE

- Public health monitoring needs less elements and indicators to identify priority needs, interventions and the results thereof in specific geographical areas.

Routine health facility data are mainly ***collected by:***

- the health care providers by means of tick sheets or tally sheets while they provide services

OR

- data clerks using data collection tools to summarize relevant data from patient records (the notes made by professional staff).

Effective routine data collection requires the following:
A standardized data element and indicator set, developed to measure progress towards priority international, national and local goals, objectives and targets. This indicator set usually includes data to be collected by means of routine and non-routine methods and elements. Therefore indicators to be collected routinely should be selected based on the purpose of monitoring and available resources (people and equipment and time).
(*See annexure 4 for the standardized 2010 PMTCT data element and indicator set of South Africa and annexure 5 for NSDA indicators).*

Effective data collection tools take the service delivery environment, available resources and the purpose for which data will be used, into consideration

Effective data collection practices aim at obtaining valid and reliable data without disturbing effective and efficient service delivery AND is time-cost-effective.

2.3.1.1 Tools for routine data collection

Tools for collecting research data **MUST** be standardized, but
Tools for collecting routine data **MUST** take into consideration the health facility environment and available resources (staff and time).

For example, in a large facility providing services in a specialized way (e.g. all PMTCT patients in one consultation room) a PMTCT register or PMTCT tick sheet may be suitable, BUT in a one person clinic providing fully integrated services, the data collection tools should be developed for collecting information for various programs using one integrated tool. In this type of environment, many different registers will lead to a waste of patient care time and it may impact negatively on data quality as well.
The purpose of any data collection tool must be taken into consideration before development starts. Tools for collecting aggregated data differ from tools to collect patient-based data.
The following must be kept in mind when designing data collection tools:

- Purpose of data collection (patient care or monitoring)
- Type of data to be collected (patient or aggregated)
- Health facility environment (number of patients, small facility with integrated care, large facility with specialized care)
- Available resources (staff, computers, networks)

Data collection tools can be centrally or locally printed to suit particular facility needs using the DHIS software.
Examples of data collection tools are:

- Client Record Cards - Record details of the client's interaction with the health service, e.g. Child Health Booklet, patient treatment card, etc.
- Tally Sheets - Easy way of counting identical events that do not have to be followed-up (e.g. headcounts, children weighed)
- Tick sheets
- Registers - Record data that need follow-up over long periods such as TB

Data collection tools can be paper based (tick and tally sheets, daily or longitudinal registers) or electronic registers or patient management systems.

Chart Number

Date of Birth

ADULT CLINICAL RECORD

Eastern Cape Department of Health

Comprehensive HIV / AIDS Care and Treatment Program

Name: (Last, First)	
Nick name (Also Known As):	
ID Number: (DOB if none)	
Contact Info: phone	
Address	

Gender	Date of First HIV+ Test	Source of Referral
M F		PHC OPD VCT TB pMTCT Other
Height (in cm)	WHO Stage at Enrollment	If other, specify:
	1 2 3 4	

Previous ART	none sdNVP	ARVs (list drugs & dates)_____		
Transfer In (on ART)	yes no	If yes, facility name:		
TB history	start treatment date		start treatment date	
	stop treatment date		stop treatment date	
	type (TBM,PTB, etc.)		type (TBM,PTB, etc.)	
	Rx outcome (circle)	C/TC/RF/RD	Rx outcome (circle)	C/TC/RF/RD

OI Prophylaxis	Start Date	Stop Date	Reason*	Notes
Cotrimoxazole				
Fluconazole				

Figure 10 ***Client Record***

ANTENATAL, DELIVERY REGISTER

SERIAL NO	NAME	HOME ADDRESS	AGE	# OF CHILD LIVING	LMP	1st ANC	WEIGHT	HB	URINE	WR	TET TOX	DATE OF ANC				RISK FACTORS	DELIVERY PLAN	TRANS
												2nd	3rd	4th	5th			
					/ /	/ /						/ /	/ /	/ /	/ /			
					/ /	/ /						/ /	/ /	/ /	/ /			
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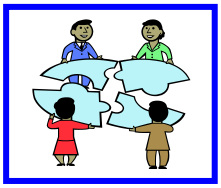
Figure 11 ***Antenatal Delivery Register***



Divide into three groups for a discussion of 15 minutes.

1. **Which different types of tools are used in facilities for collecting data**
2. **What are the advantages and disadvantages of each type**
3. **What best practices/recommendations can you share in terms of data collection tools**

Each group will have 10 minutes for feedback.

2.3.1.2 Data collection and collation strategies and processes

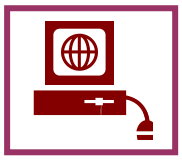
Data collection strategies, tools and processes, as well as the knowledge and skills levels of people collecting data, play an important role in data quality and monitoring of program progress.
Data is mainly collected directly by health care providers (for example doctors, professional nurses and counselors) OR by data capturers / clerks who use the health care provider notes on the patient card, to collect data in a standardized format.
In public health care facilities in South Africa routine data is mostly collected on paper, but in more resourced environments health care providers may capture data directly into databases during patient care encounters.
Routine health care data can be collected for aggregated use (for example using tally sheets) or for analysis by patient, using data collection tools on which data is collected for each patient by gender, age and other patient-specific variables.
It is of crucial importance that data quality is prioritized during data collection – once the data is on a tool and/or in a system, validation becomes very time consuming and cumbersome.

2.3.2 DATA PROCESSING

Data processing includes data capturing, validation (or data quality checks) analysis and interpretation.
Errors made in this phase of data handling can impact directly on data quality

2.3.2.1 Data capturing

Data capturing is a crucial step in optimizing data quality, which impacts directly on management decisions. Data should be validated before and during the capturing process to optimize quality. In order to do this, sufficient resources (for example staff with appropriate skills as well as suitable hardware and software for capturing, storing and disseminating data) should be available at all levels of the health care system.



More information about the DHIS can be obtained from the document "An overview of the District Health Information Software (DHIS)"
Website: *www.hisp.org*

2.3.2.2 Data analysis and interpretation

Data analysis is the process of systematically applying techniques to describe, summarize and compare raw data.
Interpretation involves looking at the information and making sense of it. It involves examining the following:

- How are our services performing in terms of our goals, objectives and targets?
- How are our services performing compared with benchmarks?
- What is happening in our services over time? (trends)
- How are our services performing compared to services in other facilities?
- Do our facilities meet the quality standard to deliver services?

- How is our facility/district/province performing compared to others?
- Why are we doing well (or badly)?
- What are others doing that we can learn from?
- How can we do better?
- Can we improve quality of care with existing resources?
- How can we be more effective or efficient?"

Interpretation is only possible when we know the following:

- How to obtain the data;
- How to make sure the data is of good quality;
- How to turn data into usable information in the form of indicators;
- How to present information in ways that are easy to understand.

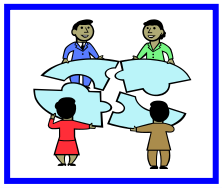
Interpretation of health data is dependent on the health care context for example:

- A clinic in an isolated area serving a small community will report lower numbers of patients than a clinic situated in an urban area. A facility that is known for rendering a specialized type of service, e.g. Termination of Pregnancy (TOP), will attract clients from a large area, not only from within the normal clinic catchment population.
- A community that has high unemployment rates, poor food security, low education rates etc, usually has more children with diarrhea and pneumonia than more developed communities.

This means that it is important to know the demographics of the area that one is assessing before making any conclusions based on the available information.
It is important to remember that population based routine indicators can exceed 100% due to incorrect population figures as denominators and/or patients using facilities in geographical areas other than where they live (cross boundary flow of patients).

2.3.2.3 Presentation and access to health information

Information needs to be displayed/presented in ways that can be easily seen, understood and discussed by managers (Heywood & Rohde undated: 62).



Divide into three groups for a discussion of 10 minutes
1. Identify the ways in which data can be presented / displayed / reported.
2. What are the advantages and shortfalls of each one of them?
Each group will have 10 minutes for feedback

Some information is effectively displayed as a table, while other information is more easily understood when presented in a graph or a map. It is important to think about which format best displays the information when taking the target user group into consideration (HST & HISP 2005: 128).
Irrespective of the method used for displaying data/information, the following basic principles should be adhered to:

- ***Titles / labels*** should clearly indicate the contents/data displayed in terms of person, place and time (what, who, where, when). For example: Immunization *coverage by province for 2005 to 2009*

- Indicate the ***source of the data***. When data from the DHIS is used, also indicate the date when the data was extracted together with the level where the data was extracted from. For example: *DHIS at NDoH – January 2010*.

- Never display too much ***information*** in one table, graph or map. Keep them simple & uncluttered to convey clear messages that enable users to draw the necessary conclusions from what is presented in terms of:

    - data quality (gaps, correctness, completeness and consistency)
    - trends over time – for example differences in coverage
    - poor performing areas where support is needed to meet goals
    - well performing areas where best practices can be learned from
    - comparisons between different programs and/or units such as facilities, districts or provinces (Heywood & Rohde undated: 62 – 64).

a) Tables

Tables are often used in reports. If used properly tables deliver messages more effectively than the written text and enables the presenter to explain the data to managers, community members and other relevant stakeholders. The best way to use tables is to "eyeball" or visually inspect them.
Tables are easy to make, but may be intimidating and difficult to use, especially if they are big. It is critical that rows and columns be clearly labeled and, where appropriate, all the categories should be clearly shown. Tables 2 and 3 provide an example of how color coding (based on targets or benchmarks) can be used to enhance understanding of information displayed in tables. These two tables contain the same information but the color coded ranges in table 2.2 assist managers in identifying best performing areas and interventions as well as critical areas where support is needed urgently.

- **Green means target achieved – congratulations, continue your good work**
- **Blue means improvement is needed**
- **Red means critical, immediate intervention is required.**
- **Black means unrealistic values – validate and explain**

Table 2 ***HIV/AIDS related indicator values by district in Province X for 2006***

Districts	Antenatal client HIV first test (Target 95% NSP p 73)	Antenatal client Nevirapine uptake (Target 95% NSP p 73)	Baby Nevirapine uptake (Benchmark 100%)	Antenatal coverage (Benchmark = 90%)
District 1	77	68	38	83
District 2	44	56	27	119
District 3	65	67	47	94
District 4	55	78	38	91
District 5	71	73	50	95
Province X – Average	**60**	**68**	**38**	**96**

Table 3 ***Color coded HIV/AIDS related indicator values by district in Province X for 2006***

Districts	Antenatal client HIV first test (Target 95% NSP p 73)	Antenatal client Nevirapine uptake (Target 95% NSP p 73)	Baby Nevirapine uptake (Benchmark 100%)	Antenatal coverage (Benchmark = 90%)
District 1	**77**	**68**	**38**	**83**
District 2	**44**	**56**	**27**	**119**
District 3	**65**	**67**	**47**	**94**
District 4	**55**	**78**	**38**	**91**
District 5	**71**	**73**	**50**	**95**
Province X Average	**60**	**68**	**38**	**96**

Pivot tables

Pivot tables are Excel files that have been arranged in a specific way to enable data to be viewed at different levels (for example province, district, sub-district and facility) and over different periods (for example yearly, quarterly and monthly). During this course you will be taught how to use DHIS pivot tables for assessing data quality and to monitor progress of health programs towards goals and targets.

b) Graphs

Graphs are very important for making sure that information is fully understood, as it is easier to get a point across visually than with a mass of figures. Graphs should tell a 'story' by themselves and are best used to:

- Detect trends over time,
- Search for patterns among large amounts of data,
- Display the relationships between variables

When using graphs to present data/information;

- Never mix different activities: stick to one group of people, diseases or services.
- Label axes stating clearly what is shown
- Provide a legend which explains each of the lines or bars.
- Select scales that fill the entire graph on both axes. Use scales that best illustrate what is being shown, e.g. percentages may work better than raw numbers.
- Use same scale consistently in graph
- Where possible, show a target line or reference point
- Remember to consider colors and shading if the graph will be printed or photocopied in black and white.

Types of graphs

Different types of graphs are used for different purposes. It is important to think which kind of graph will work best to show the information.

- **Line graphs** (figure 12) are usually used to help identify patterns for one variable of between two variables. These are the easiest graphs to draw, with data plotted as points joined to form a continuous line (Heywood & Rohde undated: 65 – 67).

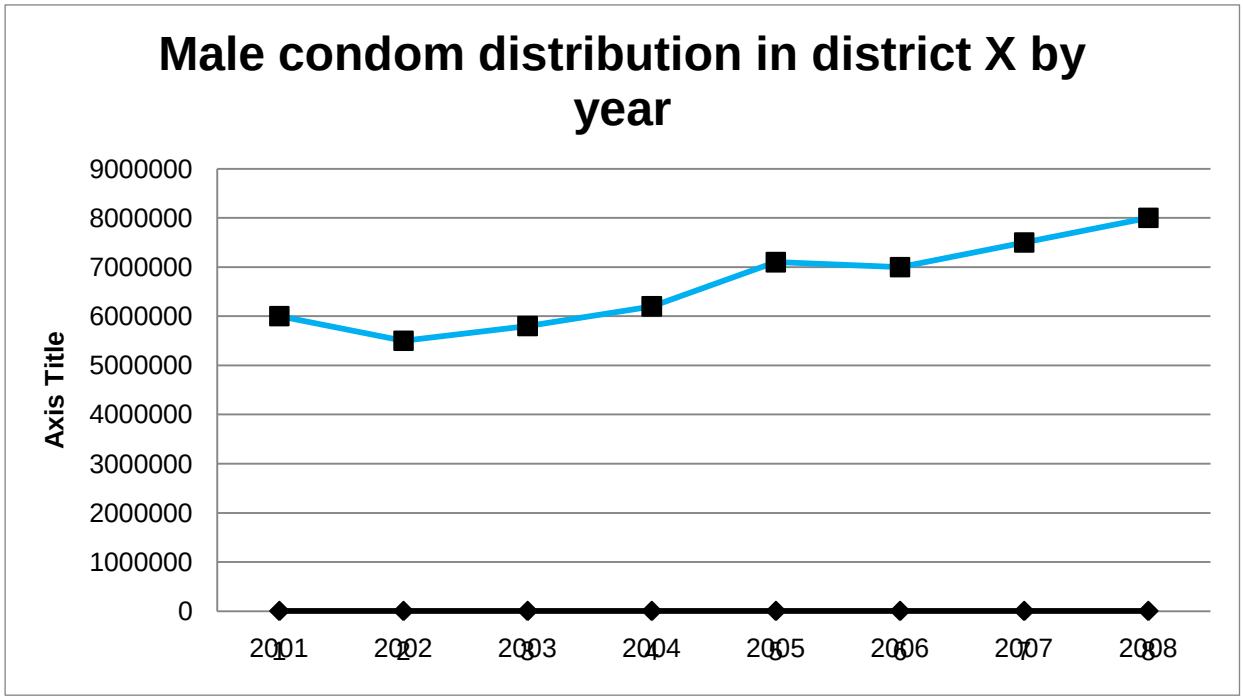
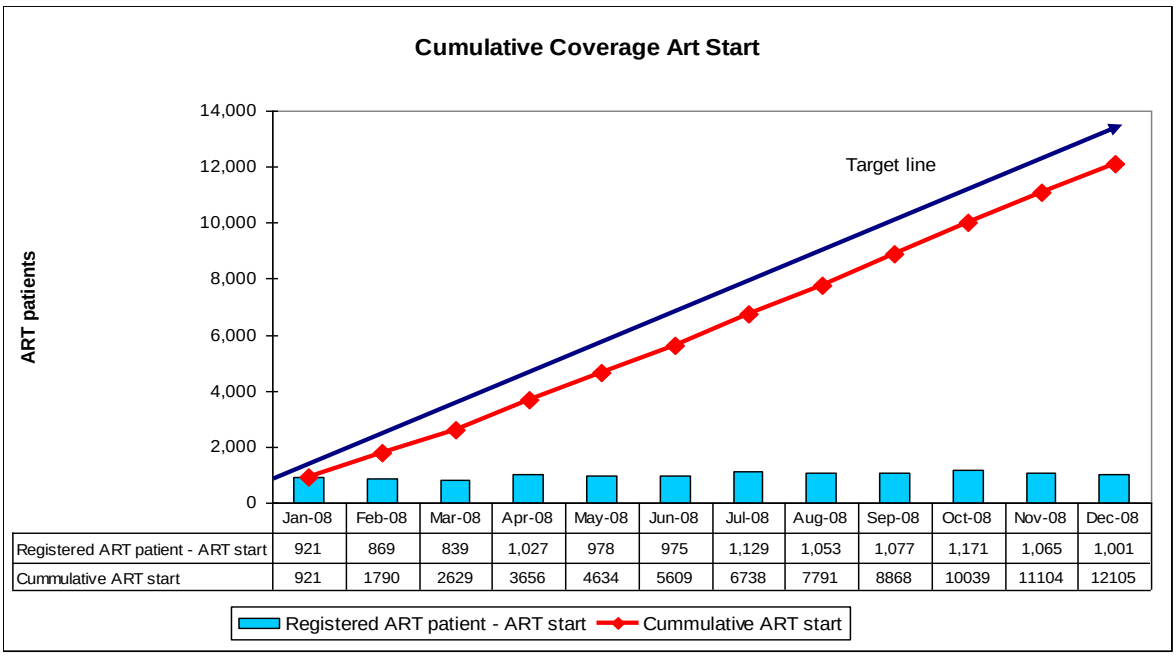


Figure 12 ***Line graph***

- **Cumulative coverage graphs** (figure 13) can be used to show monthly progress towards a fixed target. The activities for the month are added to the cumulative total of the preceding months and this total is compared to the target line to see whether the target is being reached. Used when targets are set for a year (Heywood & Rohde undated: 67)



	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08	Oct-08	Nov-08	Dec-08
Registered ART patient - ART start	921	869	839	1,027	978	975	1,129	1,053	1,077	1,171	1,065	1,001
Cummulative ART start	921	1790	2629	3656	4634	5609	6738	7791	8868	10039	11104	12105

Figure 13 ***Cumulative coverage graph***

- **Bar graphs** (figure 14) are used to plot individual data values next to each other, for example to compare different facilities, activities or indicator values (Heywood & Rohde undated: 68).

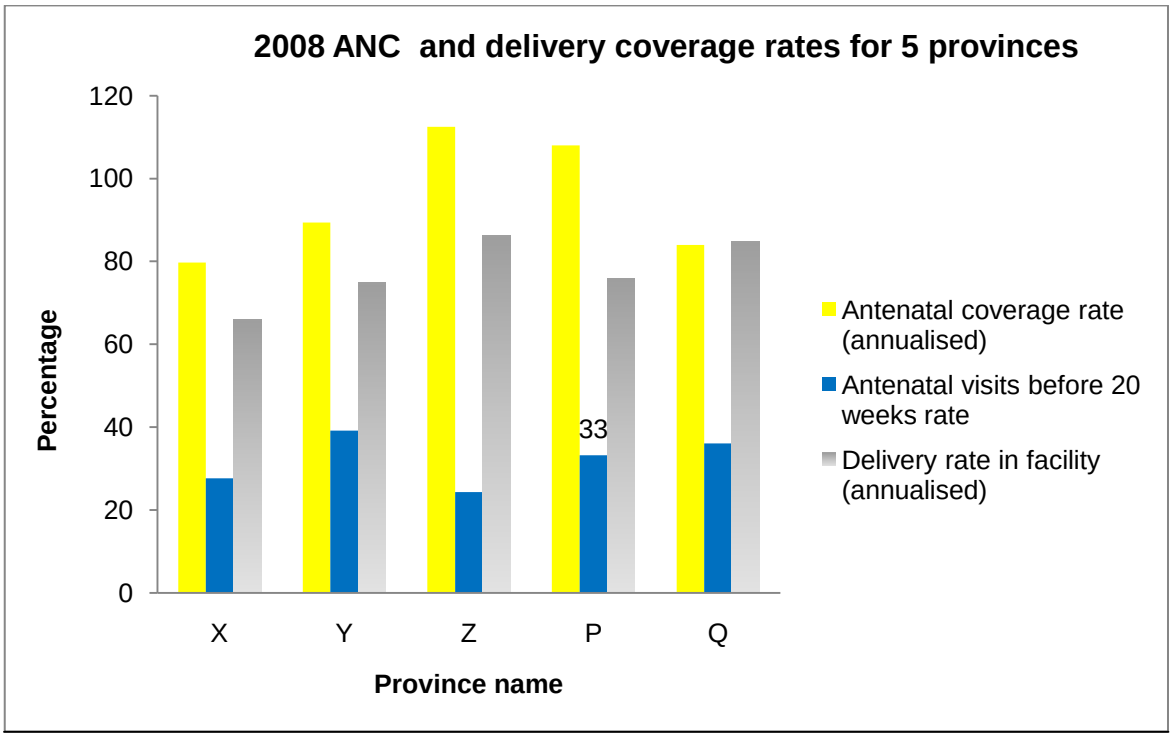


Figure 14 ***Bar graph***

- **Pie charts** show the proportion of an activity as part of the whole (like the slice of a pie) as a 'slice' in a circle (Heywood & Rohde undated: 69).

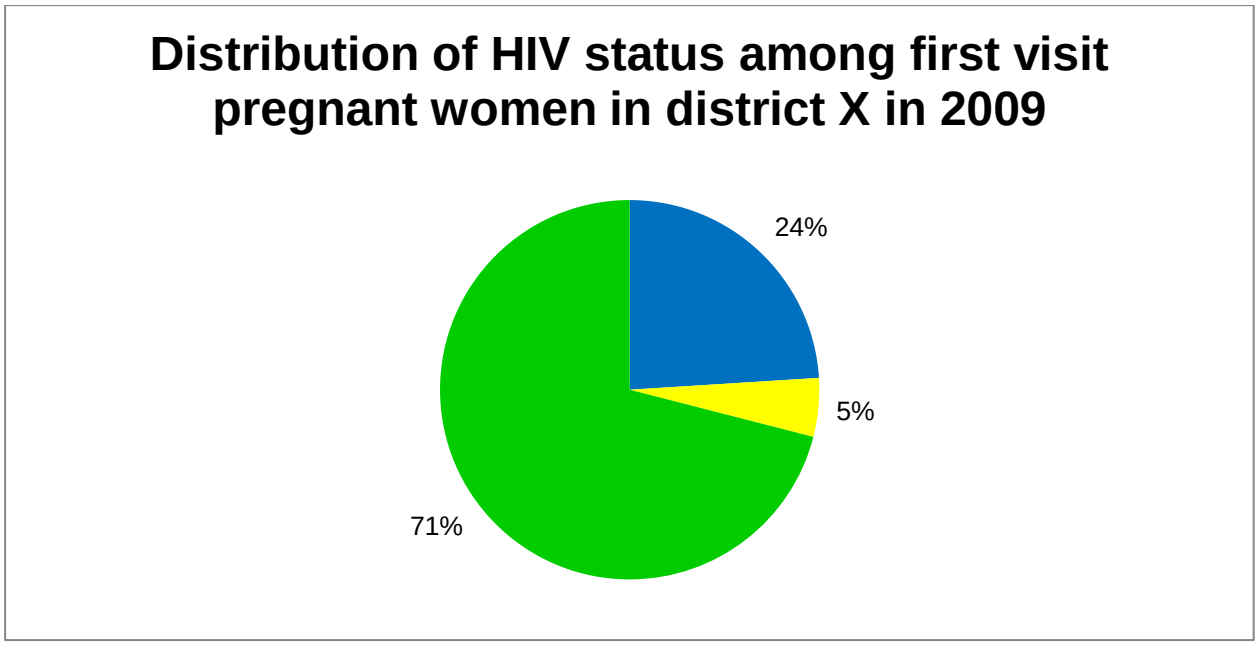


Figure 15 ***Pie chart***

c) Maps

Different types of maps can be used to display different types of information for several purposes at a glance.

A **catchment area map** (figure 16) is an effective tool to enable facility staff to understand the area and the population they are serving. These maps can be used to depict problems in terms of availability and accessibility to health care (e.g. potential reasons for BBA's) and distribution of population and facilities. The can assist to determine distances to health district boundaries, effect of roads on accessibility, etc. (Heywood & Rohde undated: 74).

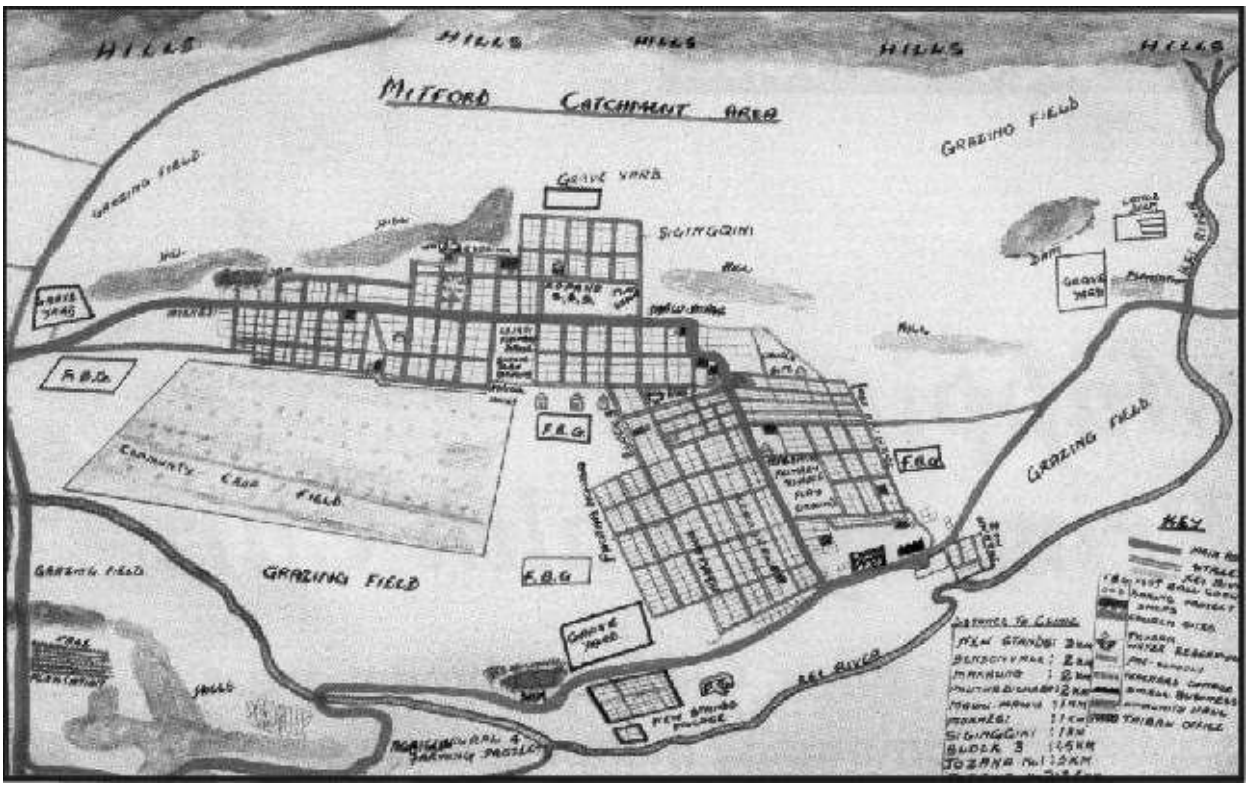


Figure 16 ***Hand drawn catchment area map*** **(Heywood & Rhode: 76).**

Spot maps show where facilities are situated and what effect location may have on health indicators and health care results. The basic GIS functionality of the DHIS permits managers to extract this type of information and to take the location of facilities into consideration when they make evidence-based decisions to meet the health needs of communities in specific geographical areas in the most effective and efficient way.

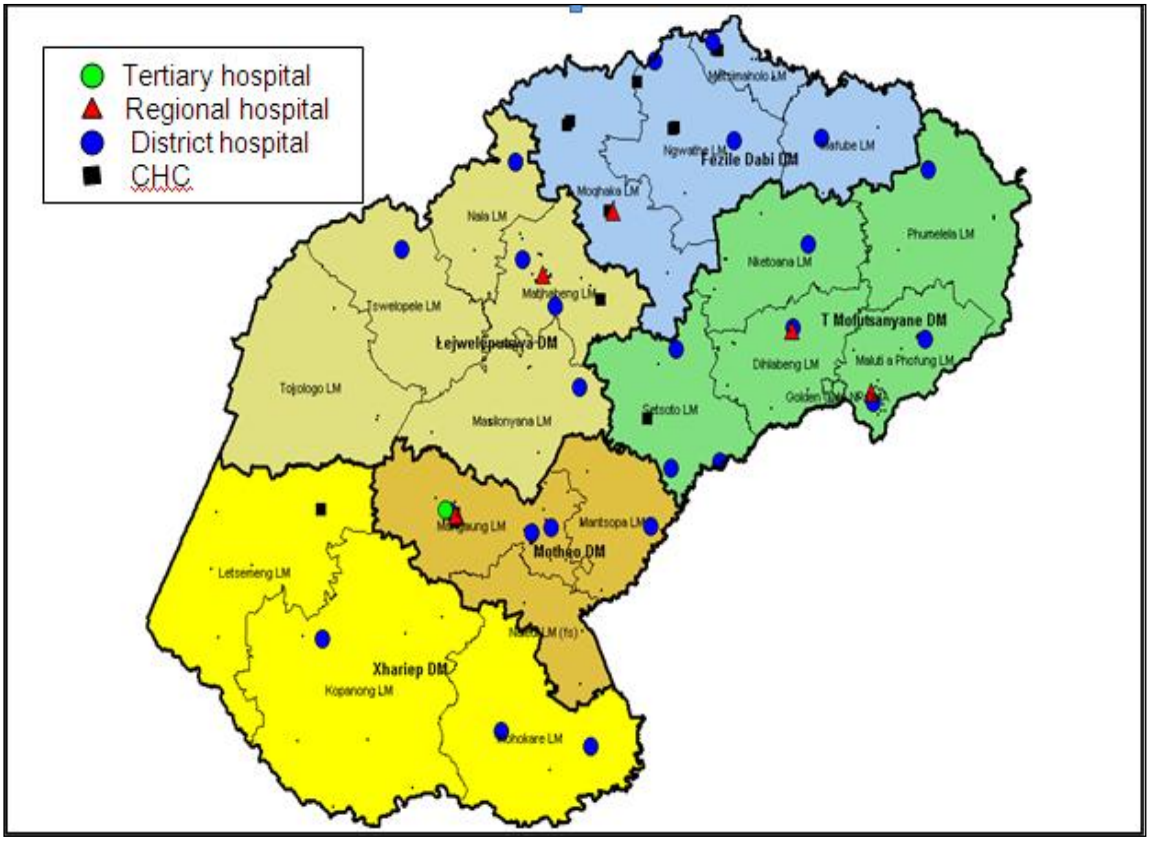


Figure 17 ***Free State province - Map of the districts, sub-districts and public health facilities providing delivery services*** **(DHIS 2007).**

Maps can be used to display several other types of health information. It can provide a global, national, provincial or district view of the prevalence of a disease or infection. This can give a clear picture of best performing areas and where most support is needed.
Whilst similar data can be illustrated in a graph or a map, a map provides a geographical 'picture' at one glance whilst a graph can be used to compare indicator values for different years in each province and differences between provinces over time in an understandable way.

Figure 18 displays how a 'sub-map' can be used to display indicator values that cannot be seen clearly from the main map.

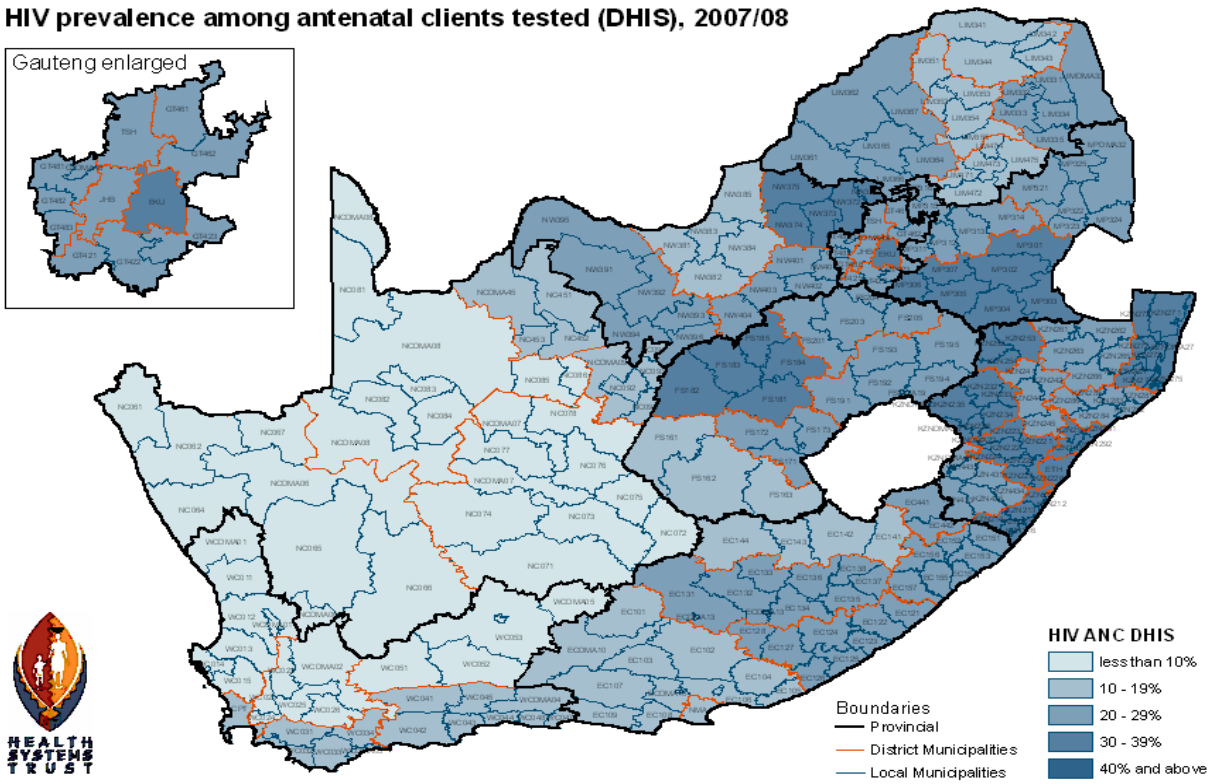


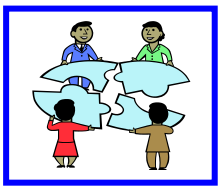
Figure 18 ***HIV prevalence among antenatal clients tested 2007/2008 (DHIS at NDoH)***

(Please refer to Annexure 6 for information on manual preparation of graphs and maps)

2.3.3 DATA/INFORMATION USE

Information is required for monitoring and evaluation of services and health programs.
Managers need information to:

- Influence policy making and strategic decisions
- Empower users with information about services available, their quality, relevance and appropriateness
- Strengthen health care programs by allocating resources more equitable and improving accessibility
- Give feedback to health care providers and management teams at all levels of the health care system to improve strategies and processes in terms of data quality, trends in health service delivery and quality of services provided



Divide into three groups for a discussion of 10 minutes.

1. **Why don't managers use data optimally?**
2. **Make two most important suggestions to improve use of data for decision-making**

Each group will have 5 minutes for feedback.

Why are managers not using information?

- Incomplete data
- Poor quality data
- Insufficient information to inform decisions
- Inaccessible data
- Data that does not become available in time
- Too much information
- Lack of systemic, reliable flow of information
- Employees underestimate data importance
- Information sharing is not part of corporate culture
- Unsure of data relevance or reliability
- Managers suppress information that might reflect negatively on their performance

For data to be useful, it should be:

- Available on time (fixed dates for reporting)
- Available at all levels (who reports to whom – feedback mechanisms must be in place)
- Reliable and accurate (check that all data is correct, complete, consistent)
- Comprehensive (collected from all possible data sources)
- Useable (if no action, throw data out)
- Comparable (same numerator and denominator definition used by all)

The entire routine health information management process exists because health and other managers need information to

- make decisions about how to meet priority health needs, goals and targets in the most effective and efficient way and
- guide actions and decisions to compare and determine trends. Information management is essential in order to monitor service delivery on an ongoing basis.

It was mentioned that lots of data/information exist, but are often not available and accessible to managers and, where managers are able to access data/information it often doesn't meet their planning, decision-making and monitoring needs. Managers often also don't have the necessary knowledge and skills to use information in a meaningful way.

2.3.4 INDICATORS

An **indicator** is a quantitative or qualitative ***variable*** (something that changes) that provides a simple and reliable ***measurement*** of ***one aspect*** of performance, achievement or change in a program or project.

Indicators can easily show inconsistencies and differences that signal the need for corrective management action.

Indicators are **tools** to:

- Help direct resources to areas where the needs are greatest;
- Provide information about a broad range of conditions through a single measure;
- Reduce a large amount of data down to its simplest form;
- Monitor progress towards achieving goals and targets;
- Measure change, directly or indirectly;
- Measure trends over time;
- Provide a yardstick whereby institutions or teams can compare themselves to others doing similar work;
- Provide evidence as to the results (or lack of results) of interventions and activities (Frankel & Gage 2007: 35, PEPFAR 2007: presentation, Williamson & Stoops 2003: presentation)

2.3.4.1 Indicator structure:

Indicators are made up of a ***numerator*** (top figure) that is divided by a ***denominator*** (bottom figure)

Numerators are the things we count

Denominators are the group with which the things we count are compared

Example:

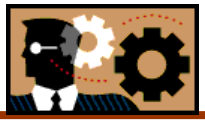
Indicator	**Structure description**
Proportion of HIV exposed babies receiving Nevirapine prophylaxis	Nevirapine prophylaxis to babies born to HIV positive woman (numerator) Live births to HIV positive women (denominator)

2.3.4.2 Classification of indicators

Indicators are also classified in terms of a logical health care system framework component they intend to measure, for example input, process, output, outcome and impact indicators.

Table 4 ***Classification of indicators according to logical framework***

Indicator	Description
Input indicator	Measure **resources** needed to carry out activities e.g. DTP-Hib 1st coverage (**Availability, accessibility and equitable distribution** of services, staff, drugs, lab)
Process indicator	Measure the **activities** in which the program resources are used e.g. proportion of HIV exposed infants PCR tested around 6 weeks (**Acceptability and utilization**)
Output indicators	Measure the **products, services and systems** that are put in place through activities of the plan (**Coverage**) e.g. proportion HIV exposed babies receiving NVP
Outcome indicators	Measure **changes** that result from the outputs (shorter term) (**effectiveness and efficiency**) e.g. Baby PCR positive at 6 weeks
Impact indicators	Measure the **extent** to which the goal has been achieved (long term) e.g. Infant Mortality Rate



Give examples of health care system inputs, processes, outputs, outcomes and impacts

Table 5 displays the four main types of indicators

Table 5 ***Types of indicators***

Type of indicator	Description	Example
Count indicator – Counts the number of events that occurred.	There is no denominator so no calculation is required.	Number of people tested for HIV
Proportion indicator - compares two different values in the same group (for example newborn babies)	A numerator (things we count) is divided by the denominator (things with which we compare the numerators) and is expressed as a percentage. The numerator is contained in the denominator.	Baby Nevirapine uptake rate 15 **of the** 20 babies born to HIV positive mothers received Nevirapine prophylaxis = 75%
Rate indicator – measures the frequency of an event during a specific time period in a specific population	The numerator is contained in the denominator and is usually expressed per 100, 1,000, 10,000 or 100,000 of the population.	Under 5 mortality rate Number of deaths in children under 5 per 1,000 live births during a specific period

Type of indicator	Description	Example
Ratio indicator – compares two different groups (for example mothers and babies)	Numerator is not included in the denominator	Maternal mortality ratio Number of maternal deaths expressed per 100,000 live births in a specific period

2.3.4.3 Developing indicators

An ideal indicator can be developed by following the RAVESS criteria

R	**Reliable**	It gives the same result if used by different people in different places. They should also be comparable across relevant population groups, geography and other program factors.
A	**Appropriate**	It is the best way of measuring what we want to know. It fits in with local needs, capacity and culture and the decisions to be made.
V	**Valid**	It truly measures what it is supposed to measure.
E	**Easy**	It is feasible to collect the data. The indicator is easy to calculate, interpret and explain.
S	**Sensitive**	Changes in the program or project is immediately reflected by the indicator. It is able to measure changes over time.
S	**Specific**	It only measures the specific condition or event.

Each indicator should be directly related to the program or project objective to be measured (Heywood & Rohde undated: 56, Frankel & Gage2007: 38, HST & HISP 2005: 18-19). Indicators should be independent, meaning that they are non-directional. For example: an indicator should measure the number of clients receiving counseling rather than increase the number of clients receiving counseling.
One of the most critical steps in designing a M&E system is selecting appropriate indicators. According to Stancefield (2005:562), "*choices made in the collection and use of information will determine the system's effectiveness and efficiency in detecting health problems, defining priorities, identifying innovative solutions and allocating resources to improve health outcomes*".
The selection of indicators (as well as the format for providing feedback to managers, health professionals and policy makers) is therefore of crucial importance for improving the performance of any health care system.
In evidence-based management, the priorities to be addressed, as well as the detail and precision of data required and the indicators selected, depend on aspects such as:

- the purpose of the assessment,
- the level of assessment (e.g. national, provincial or district),
- the health program being assessed (e.g. the HIV program),
- the specific geographical areas to be covered (e.g. a province or a district),
- the period under assessment (for example a specific quarter or year under review),
- the sector under review (for example the public sector),

- the service levels and health system components under review.

Managers at national level will, for example, use evidence to identify best practices, problems and needs at provincial and district levels, while provincial managers will focus on district and sub-district levels. The above factors should be clear to all relevant role players before assessment starts.
Indicators for routine monitoring should be reviewed annually to determine whether they are (still) relevant.
Below are tips for developing and/or selecting indicators:

When selecting indicators for the first (baseline) assessment (before a program, project or specific new interventions start), the following needs to be taken into account:

1. **International health priorities (main causes of morbidity, disability and mortality) for example HIV/AIDS and relevant international health goals, objectives, indicators, targets and reporting requirements.**
2. **Relevant national health priorities, goals, objectives, indicators, targets and reporting requirements.**
3. **Relevant indicators used in national censuses and surveys (such as the Demographic Health, Household and ANC HIV surveys) as well as those used in priority international and national reports.**
4. **Because this evidence should be used to strengthen the health care system, the selected indicators must include input, process, output, outcome and impact indicators**

When selecting indicators for a re-assessment (for example for annual or quarterly reports), it is important to use the same indicators used for the previous assessment, together with those to measure progress to relevant intermediate objectives and targets.

Though many different indicators could potentially be used to measure the progress of a program, data collection has costs in terms of material and human resources, so the number of indicators should be kept to a minimum. Furthermore, the quality of the information may be compromised when the time and effort involved in collecting large volumes of data becomes very demanding and too much evidence may disrupt critical messages.

Figure 19 provides a 'reminder' that:

- Only the core or 'must know' data must be collected.
- 'Nice to know' data can be added if sufficient resources are available AND if core data quality is good
- 'Dangerous to know' data is the less important data that is time consuming and/or costly to collect and process, while it has limited or no management use – this data should not be collected

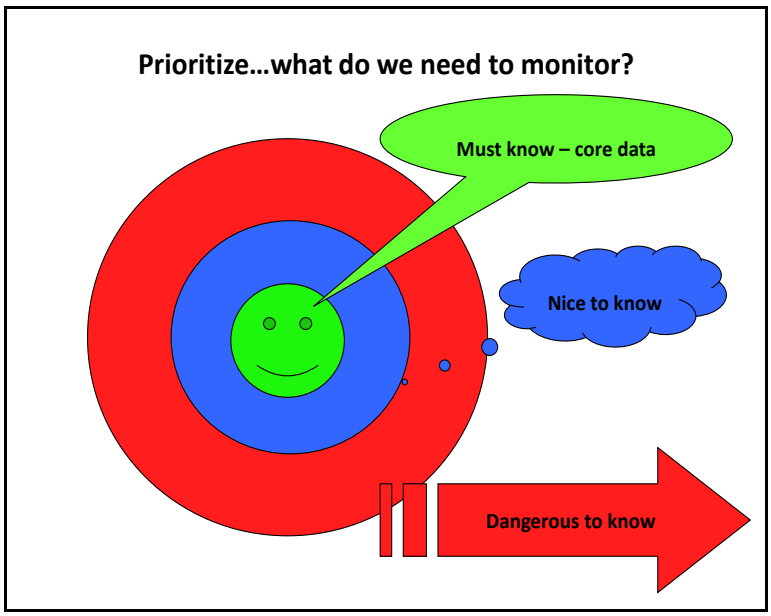


Figure 19*: Selection of priority indicators*

The information pyramid (Figure 20) provides a 'reminder' that the core indicators selected should include priority international and national program indicators. Once the priority and/or mandatory indicators are effectively managed and used, each level of the health care system (for example provinces, districts and sub-districts) may add additional indicators to increase their understanding of the local situation (Heywood & Rohde undated: 26, 94).

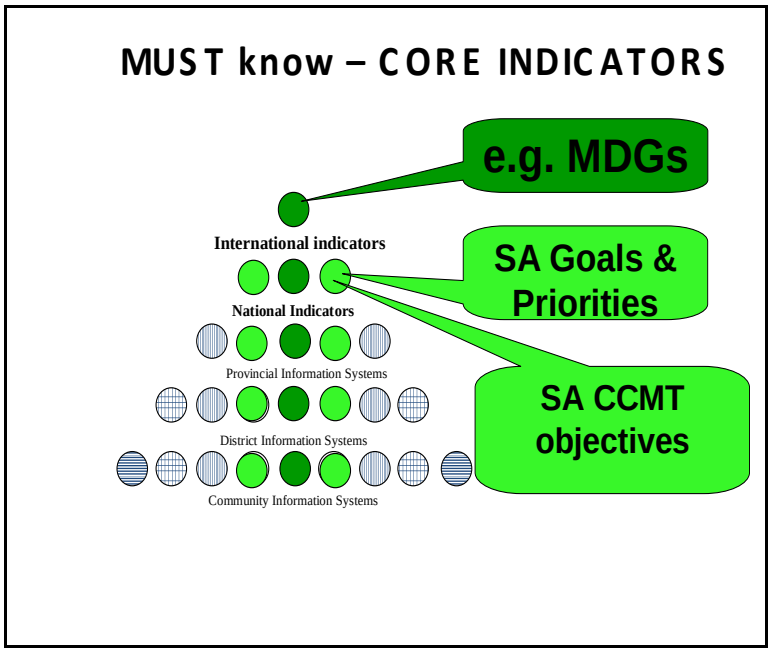
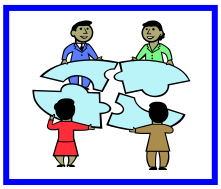


Figure 20 ***The information pyramid***



Divide into three groups for a discussion of 15 minutes.

1. **Use the indicators sheet in annexure 4 and critique the indicators in terms of "RAVESS": Reliable, Appropriate, Valid, Easy, Sensitive and Specific**

2. **Indicate where in the logical framework each indicator fits best (input, process, output, outcome and impact)**

Each group will have 10 minutes for feedback.

Because use of data and information is a priority for managers at all levels, information use for evidence-based health management will be addressed in depth in Module 4.
As poor data quality is stated as the main reason for managers not using data/information, Module 3 will focus on assessing and optimizing data quality.

MODULE 3: INTRODUCTION TO DATA QUALITY

LEARNING OUTCOMES:
On completion of this module the participant will be able to:

- Define data quality
- Discuss the criteria for quality data (validity, reliability, integrity, precision, timeliness)
- Implement strategies to address data quality problems in routine health information management
- Identify potential threats to data quality
- Understand the role of DHIS and software to optimize data quality

3.1 INTRODUCTION

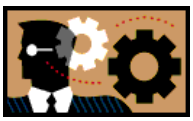
Although information is actually processed data, in the context of Health Information Systems, the words *data* and *information* are often used synonymously. Unless otherwise specified, *data* will be used interchangeably with *information* in this module.

The basic principle of data quality is centered on the usefulness of the data. Data must be available in time for management decisions and managers need to know whether they can **trust** the data they use for making decisions.
Good quality data can only be obtained when an information system accurately collects, processes and disseminates information on health needs, health care interventions and the results of these activities to all relevant stakeholders.
If data quality is bad (or *perceived* to be bad), there is a risk that entire evidence-based health management process may break down because "unreliable data can impact on the appropriateness of management decisions" (US General Accounting Office 2006).
Some of the threats to data quality documented in literature are only applicable to research (for example sampling error), but some threats are equally important in routine data management while routine data management also have unique threats.

3.2 WHY IS DATA QUALITY IMPORTANT

Data quality directly influences the effectiveness and efficiency of decisions made at all levels of the health care system from community and patient care to policy making level.
As stated before, good quality data (evidence that can be trusted) enables managers to make the best possible decisions to optimize health care coverage, quality and ultimately health care results in terms of health status (reduced morbidity and mortality) by:

- forming accurate pictures of health needs and available services in specific geographical areas
- informing appropriate planning
- allocating and using resources effectively and efficiently;
- ongoing monitoring to identify best practices to learn from and areas where support and corrective measures are needed



What are the key data quality issues in your organization?

What are the reasons for these data quality issues?

3.3 WHAT IS DATA QUALITY

Statistics South Africa defines data quality in terms of its "fitness for use" depending on the intended use.
For data to be fit for use, they should be free of duplications, misspellings, omissions and unnecessary variations (Chapman, 2005).
Data quality reflects the value / accuracy of data and is a measure of how well an information system represents the real world - the real world in this instance, being health program activities and their results (Data Quality Assessment Tool, 2007).
Quality data:

- Is available to managers according to schedule and in time to meet their monitoring and reporting responsibilities (in other works are collected, collated, captured, validated and availed quickly enough).
- Is accurate and reflects true performance.
- Meets reasonable standards for validity, reliability, integrity, precision and timeliness. (complete, consistent)

There is a cost (time and other resources) to optimizing data quality BUT there is also a cost associated with poor data quality – incorrect decisions may result in ineffective planning, resource utilization, low stakeholder confidence and ultimately high morbidity and mortality.
Often managers request more accuracy (especially from routine data) than they need for making effective management decisions. Routine health information cannot be expected to meet the same level of accuracy that is found in a research environment where all factors are controlled. The quality of the information must, however, be *good enough* in order for sound decisions to be based on.

So what is good enough?

There is no standard prescription for this simply because environments differ so widely when considering resources, policies, programs, skills and a number of other factors. Data of which the quality is good enough refers to an acceptable margin of error in terms of what the data is used for. For example, PEPFAR reporting expects that reported figures are within a 10% margin of error. This means that the reported figures should not differ with more than 10% from those in the sources when traced and verified. While data used for research reports should have a small margin of error, aggregated routine data needed for monitoring public health trends is useful within a 10% margin of error.

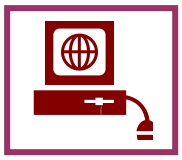
No margin of error is identified in the DHMIS policy (DoH 2011) since no errors are allowed for by Auditor General

3.4 WHAT ARE THE CRITERIA FOR QUALITY DATA

Module 2 described RAVESS, i.e. the list of criteria to assess the quality of an indicator according to its reliability, appropriateness, validity, ease, sensitivity and specificity. These criteria are some of many discussed in literature to assess data quality as well.
In South Africa, a widely used model for assessing data quality are the three Cs: **Correctness, Completeness and Consistency**.

In this module we will map these three Cs and other data quality criteria into five basic criteria for the establishment of data quality and adapt them from those described in the PEPFAR South Africa Strategic Information Manual, 2007. These criteria originate from various statistical methods and techniques and have evolved to be equally applicable to both quantitative and qualitative data. In essence, all data, whether at the point of collection or post manipulation must address:

- Validity; [V]
- Reliability; [R]
- Integrity; [I]
- Precision; [P]
- Timeliness. [T]



To view the PEPFAR Strategic Information Manual go to Website:
http://www.sharing.org.za/uploads/SASIManual%20v4%20JUL2007%20FINAL.doc

3.4.1 *VALIDITY* - Do data elements and/or indicators clearly, directly, and completely measure what they intend to measure?

The greatest risk to validity is in the design and definition of elements and indicators.

In other words, managers cannot expect data to be valid if:

- elements and indicators and their definitions are not standardized
- data collection tools and data elements / indicators in these tools are not aligned

For instance, if the definition of an OVC is a child under 18, and your data includes children aged 18 and 19, you did not measure what your definition intended to measure and therefore the data is not valid.

For this reason, having an indicator reference guide with standardised definitions and paying attention to the design of the data collection instruments are crucial components of the health program and M&E design process.

Problems should be identified and the level of effort required to correct these errors should be determined to establish the most effective and efficient way of obtaining the information needed for the specific purpose.

Sometimes, in the absence of indicators that can be used for direct measurement, or if the level of effort is too high for available resources, a proxy or replacement indicator can be used. Proxy indicators need to be selected carefully to prevent serious validity issues.

3.4.2 *RELIABILITY* - Do we get the same results repeatedly if we replicate the measurement methods?

Reliability is a pre-requisite for validity. For the purposes of data quality, reliability is the ability of an instrument to consistently collect data of the same quality over time. In the broadest sense reliability is associated with the concepts of *accuracy/correctness, precision and consistency*.

- **Accuracy** relates to the reliability of the data source and data collection processes and measures *correctness*.

- **Consistency** is a measure of internal validity. It describes the absence of apparent contradictions – in other words it measures the extent to which the same definitions, codes and formats are followed for the same data across different sources (Wakibi 2008).

- **Precision** refers to how consistently an indicator produces the same results.

Examples of assessing reliability include:

- If you weigh yourself on a scale 10 times, does the scale give you the same reading for weight or does it give vastly different readings?
- Are the same data collection methods used across geographic areas and across time? If the data collection instrument changes / new versions are developed, do we continue to get the same results?

Documenting the data handling process helps with transparency and encourages consistency in the processes followed at all levels of the health information system. Standardization and effective versioning of tools is a prerequisite to having reliable data.
It is crucial to review data handling processes and verify how well the documented procedures are being followed. During the review needs for training on indicator protocols or guidelines should be identified and addressed.

3.4.3 *INTEGRITY* – Is data complete and truthful

Sometimes the loss of data integrity occurs from human error (for example typing errors) or actual human interference (for example capturing inflated numbers). On other occasions, loss of data integrity occurs when technology fails us (for example non-standardized data elements or incorrect electronic formulas lead to data being lost.

From a data quality perspective it is essential to know what risks exist to the integrity of the data, where in the data management process these risks exist, and to ensure that we have contingency plans to manage such risks. In other words, are mechanisms in place to protect data from errors, manipulation, misrepresentation, or loss?

Measures needed to put in place to prevent and identify data integrity problems. Obvious deterrents such as passwords, locked cabinets, disciplinary action or spot checks can be helpful. What is more important is to ensure that everyone, everywhere verifies the data, that responsibilities for data are included in job descriptions and that action is taken if data handlers cannot account for the integrity of the data.

3.4.4 *PRECISION* – Is precision or error within an acceptable margin for the type of management decisions to be taken?

Like reliability, precision is a pre-requisite for validity. Precision should be carefully planned, measured and monitored to make sure that data is as free as possible of errors in terms of over and/or under reporting.

As stated before, there is a cost to getting data with a high level of accuracy and that it can also be a trade-off for timeliness of data for monitoring and reporting. PEPFAR South Africa, for example, has established a margin of error of 10% for the data that partners report on. This means that if more than 10% of the data is not 'perfect', errors should be traced and corrected. This is a reasonable margin of error for routine data in cases where the cost of data collection and reporting exceeds the value of the data itself. The size of the dataset also determines the level of precision that is required, i.e. large numbers require less precision than smaller numbers.

The required level of precision should be balanced against the types of decisions that need to be made and the cost benefit of the various levels of precision.

3.4.5 *TIMELINESS* - Is recent data available to inform management decision- making and reporting at the appropriate times?

Data is only useful when it is received in time for meeting budgeting, monitoring, decision making and reporting requirements.

It is important for each player in the data management process to meet their timelines. An agreed upon schedule that clarifies the dates for each part of the process, as well as who the audience is, will go a long way towards improving the timeliness of the data. Managers, however, need to be realistic in terms of their expectations of when they will receive data and flexibility of the schedule might be required – remember there is a trade-off between timeliness and accuracy.

Annexure 2 shows that the National Data Flow Policy of the Department of Health does not support managers in meeting the reporting time lines as specified by National Treasury. (Data must reach national accounting officers within 30 days after the end of each quarter, while validated DHIS data only reaches the NDoH after 60 days). This is an example of 'unrealistic expectations' requiring a realistic compromise.

National Treasury
Website:
www.treasury.gov.za/legislation/pfma/public%20entities/pfma%20and%20treasury%20regulations%20compliance%20chewck%20list.pdf

The South Africa Statistics Quality Assessment Framework (SASQAF) covers the various quality aspects of data collection, processing and dissemination.
It specifies four categories or levels of data quality and how each level of information can be utilized.
This applies only to quantitative data.
More information about the SASQAF can be found at Website:
http://www.statssa.gov.za/insidestatssa/standardisation/StatisticsSAStatistical_QualityAssessmentFramework.pdf

3.5 WHAT SHOULD MANAGERS AND DO TO IDENTIFY AND ADDRESS DATA QUALITY PROBLEMS IN ROUTINE HEALTH INFORMATION

In South Africa, the quality of DHIS data has improved over the past few years. Common sources of error, however, still occur (Heywood & Rohde undated: 42).

Some data quality problems are widely known and acknowledged but some bubble under the surface, i.e. they are known but not addressed because correcting them requires too much time and effort. Poor data quality is unfortunately also often used as a scapegoat for poor management decisions leading to ineffective and inefficient health care.

In module 1 we saw that, if managers are not satisfied with the outputs of any system, (including the routine information system - in other words if data is not timely, valid, reliable and accessible in a user-friendly format) potential reasons need to be identified in terms of inputs and processes.

Therefore managers must have the skills and take the responsibility to:

- Conduct rapid data quality assessments and to provide reasons about why they say the quality of their data is not good enough (within acceptable margin of error) for the decisions they need to make,
- identify potential health information and M&E system shortcomings contributing to poor quality data,
- address identified shortcomings in an effective and efficient way
- monitor progress towards improvement in data quality

Each of these aspects will be addressed in more detail:

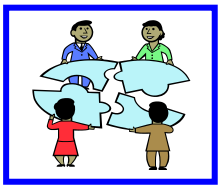
3.5.1 Rapid data quality assessment

Data quality audits and a basic tool for conducting basic data quality audits will be discussed in another course. As stated before, this course focuses on routine data management, monitoring and use of evidence for day-to-day public health care decision-making.

What is important for everyday management, monitoring and decision-making is that managers should be able to conduct rapid quality assessments (with factual feedback) on the data they have access to.

The most effective way to assess data quality is to look at the data (called visual scanning or eyeballing). First look across each line and then from top to bottom to identify data quality problems such as:

- Missing data (gaps) – data missing for specific elements and/or indicators for one or more months
- Outliers / inconsistencies between linked data elements and/or over time / obvious fluctuations / values outside expected normal / expected ranges without an explanation
- Same values for more than one month or for more than one facility – can indicate duplication OR incorrect capturing
- Preferential end data – for example numbers ending with 5 or 0 (may indicate thumb suck OR ineffective use of data collection and collation tools)
- Unlikely values – for example male being pregnant (may indicate capturing problems such as entering data into the wrong field)
- Contradictions between values for variables – for example 7 low birth weight babies (< 2.5 kg) at a facility where only 3 babies were born (can be due to capturing/typing or calculation errors)
- Mathematical errors
- Inappropriate use of zeros, for example a 0 for deliveries every month in a mobile NOT providing delivery services routinely. In routine information management, a zero should be entered if a facility that is equipped to provide a service routinely did not have any clients for that reporting month. The field should be left BLANK if a facility is NOT providing a service/intervention routinely (for example mobiles are not providing delivery services routinely) to prevent reports with thousands of meaningless zeros. If a mobile conducted an emergency delivery, it must be captured for that month, after which months without emergency deliveries should be left blank again.



Divide into three groups for a discussion of 10 minutes.

Identify potential data quality problems in Table 3.1 – look for outliers, gaps, duplicates, inconsistencies, etc.

Each group will have 5 minutes for feedback.

Table 6 ***Data table for exercise***

DataElementName	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	Total
Antenatal 1st visit	429	506	482	441	554	548	481	439	409	612	584	515	6,000
Antenatal 1st visit before 20 weeks	142	157	158	132	163	134	156	148	118	199	186	198	1,891
Antenatal client on HAART at 1st visit	4	8	10	11	12	10	9	12	9	2	52	4	143
Antenatal client known HIV positive but NOT on HAART at 1st visit	60	92	65	58	88	79	96	58	93	28	118	69	904
Antenatal client eligible for HIV 1st test CALC	365	406	407	372	454	459	375	369	307	582	414	442	4,952
Antenatal client HIV 1st test	369	437	378	336	470	477	523	402	363	159	524	433	4,871
Antenatal client HIV 1st test negative CALC	309	355	324	287	388	407	437	346	271	134	431	366	4,055
Antenatal client HIV 1st test positive	60	83	54	49	82	70	86	56	92	25	93	67	817
Antenatal client eligible for CD4 1st test CALC	142	177	126	112	178	161	195	116	187	56	236	141	1,827
Antenatal client CD4 1st test	25	27	44	43	45	54	63	52	57	25	106	68	609
Antenatal client eligible for HAART		3	1	2	11	9	18	8	6	2	23	15	98
Antenatal client initiated on HAART				2	7	11	6	6	7		15	12	66
Antenatal client INITIATED on AZT	29	12	44	30	40	72	31	43	36	26	50	31	444
Antenatal client HIV re-test at 32 weeks or later	22	33	55	48	90	118	139	67	81	20	117	66	856
Antenatal client HIV re-test positive at 32 weeks or later		2	6	3	6	9	10	2	1	3	25	2	69
Total births in facility	322	343	372	358	375	408	323	177	366	371	344	384	4,143
Live birth in facility	316	338	366	355	372	403	319	171	365	362	338	376	4,081
Live birth to HIV positive woman	61	54	60	66	41	78	7	3	25	27	36	41	499
Antenatal client on AZT before labour										9	7	14	30
Antenatal client Nevirapine taken during labour	48	42	41	43	31	57	10	2	7	4	9	10	304
Baby given Nevirapine within 72 hours after birth	57	56	57	62	40	75	4	3	7	4	7	11	383
DTP-Hib 1st dose	375	331	496	579	409	459	268	166	97	87	185	183	3,635
Baby initiated on Co-Trimoxazole around 6 weeks		9	12	22	27	20	28	22	20	2	12	13	187
Baby PCR test around 6 weeks	5	18	28	21	40	32	44	29	24	1	29	34	305
Baby PCR test positive around 6 weeks			3	8	2	1	3	4		2	1	1	25
Baby HIV antibody test at 18 months	1	8	5	2		5	1	2	3		6	1	34
Baby HIV antibody test positive at 18 months							1		1		1	1	4
Delivery in facility	335	330	369	366	354	378	324	160	351	373	322	369	4,031
PHC total headcount	46,857	48,115	47,399	49,481	52,595	50,981	50,459	48,774	43,376	46,202	50,513	48,123	582,875
Female condoms distributed		12	135	895	1,185	1,665	2,117	1,787	1,039	1,151	974	1,653	12,613
Male condoms distributed	29,020	34,589	31,301	33,319	37,234	32,534	40,954	36,955	39,767	44,875	42,949	28,846	432,343
Termination of Pregnancy performed	22	51	34	30	46	69			19			26	297
Rapid HIV test stock out	2	3	2	1	3	2	3	1		4	3	3	27
Any ARV drug stock out at fixed facility	4	1			3		1	3	2	1	3	1	19

3.5.2 Identify potential reasons for poor data quality

Managers should be able to trust the data they use for decision-making.

This implies that managers should be able to trust:

- The standardized element and indicator sets to meet their priority monitoring and reporting needs
- The sources of data,
- The people collecting and capturing the data,
- Quality control strategies in terms of validation, cleaning and normalizing the data,
- Reporting and feedback strategies (accessibility of data) in a timely and user friendly way.

If managers do not trust the quality of the routine data they have for decision-making, the potential reasons for distrust need to be identified, prioritized and addressed in the most effective and efficient way.

In module 1 we saw that the components of any system are interrelated and when the outputs of a system (quality data in this case) do not meet expectations, it usually indicates shortcomings in terms of inputs and processes. This means that, if managers are not satisfied with the data they receive, they should facilitate assessments to identify and address shortcomings in terms of data management:

- Inputs (for example routine data management policy, guidelines, standardized elements and indicators, tools, staff [number and skills] and equipment,
- Processes (for example data collection and validation, capturing, processing, flow and reporting / making data available and accessible to relevant stakeholders).

As stated before, managers should keep in mind that all data has an associated quality risk and that higher quality data implies more time and higher costs - sometimes the cost outweighs the additional benefit to be gained from improving the quality of the data. Evidence-based health program management requires information that is 'good enough' for general day-to-day public health care decision-making and therefore a 10% error margin should be acceptable in most instances.
The prescripts of the DHMIS policy should however be implemented at all times to prevent qualified audit report of facility.

3.5.3 Address identified shortcomings - Data Quality Improvement Plan

In order for good quality data to be produced by the data/information system, data quality checks should be performed at each stage of the information management process, starting with planning which data should be collected and the actual data collection process right through to the point where data is used for evidence-based decision making at national and international levels.

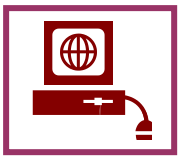
To optimize data quality and to avoid unnecessary and costly data repairs, a Data Quality Plan (DQP) should be developed as part of each health program management plan/strategy and priority report. The DQP should aim at ensuring that the five critical elements of data quality namely validity, reliability, integrity, precision and timeliness, are considered at all levels during each stage of the information management process, based on the standardized Element and Indicator Reference Sheets.

The DQP should list priority data quality shortcomings and specify how data quality will be optimized. Program, line and information managers must ensure that data is collected, collated, analyzed and reported in line with the data quality plan.

In line with the systems approach followed in this course, potential threats are listed in terms of inputs, processes, outputs and outcomes in table 7. This table also contains potential strategies and activities which may be included in the data quality improvement plan.

3.5.4 Monitor progress towards improvement in the quality of routine data

Managers also have to put measures in place to monitor progress towards improvement of data quality and to address shortcomings as they arise. Rapid data quality assessments should be conducted and reported on as part of each report program and line managers compile. Feedback should be provided to all levels of staff in the routine health information cycle and each person should be held accountable for his/her acts and omissions impacting on data quality.



Websites:

http://www.marylandpublicschools.org/NR/rdonlyres/B6302AAD-B2F5-4D76- 905E-887133FAD6F0/9264/DQTips1.pdf

http://www.sharing.org.za/uploads/SASIManualv4JUL2007FINAL.pdf

http://www.tsfsouthernafrica.com/guides/me_hivaids/folder1.htm

Identify:

- **5 data quality problems in your work situation**
- **the possible reasons for it and**
- **steps for each problem that YOU can take to improve data quality and data use**

Write it down in table format and hand in to facilitator

You can refer to Table 7 for guidance on identifying quality problems

Table 7 ***Strengthening the routine health information management system to optimizing data quality***

Stage or steps	Threats to data quality	Strategies and activities to optimize data quality
1. INPUTS FOR DATA MANAGEMENT AND MONITORING	**Policies & guidelines** - Absence or variations among policies, guidelines and practices	• Written policies guidelines and procedures. • Effective and realistic M&E plans • Data quality improvement plans and manuals (spot checks and data quality assessments every 3 years). • Disciplinary procedures for data tampering or breach of confidentiality. • Maintain an audit trail
	Unrealistic reporting time lines for lags between data collection, collation and reporting (e.g. it may take a month for data to flow from facility to national level) and/or actions to be taken based on data. The fact that data will always be one month 'behind' the end of the reporting month must be built into reporting expectations.	• Set data collection dates that are relevant to the actions that will be taken following the reporting of the data (e.g. why must data be available at national level 10 days after the end of the reporting quarter if no critical decisions are to be made). • Documented data collection and reporting time lines.

	Standardized data element and indicator sets
	• Too many data elements and indicators especially when paper-based systems and inadequate resources
	  ○ decisions on which data to include and exclude not well managed
	  ○ suitable proxy indicators may not be used because managers insist on direct indicators which may take too long and may be too expensive to collect
	  ○ Selection of indicators unrealistic in terms of resources available
	• Data definitions are not clear and standardized
		• Make sure what the purpose for collecting the data is, and what the needs of the target groups are.
		• Existing data elements, indicators, definitions and data should be explored before new elements and indicators are developed.
		• Clear definitions of data elements and indicators consistently used at all levels (indicator guide).
		• Improve elements and indicators that are not clear / cause confusion.
		• Select the minimum number of data elements and indicators needed for monitoring – if an element is not used for calculating an indicator that is meaningful for evidence-based health management, it is not worth spending resources on collecting it.
		• Selected data elements and indicators must be aligned to the interventions to be measured, intended use of data, the required level of accuracy, time frames for collection and the resources needed for collection.
		• Proxy data elements and indicators may have to be used if the direct data elements and indicators are too expensive to collect OR if the data is available only after and unacceptable long period.

	Data collection tools ○ Different tools or different versions of tools for data	• Standardized/compatible and well designed data collection and reporting which are suitable for the purpose

Stage or steps	Threats to data quality	Strategies and activities to optimize data quality
	collection, validation and collation	
	Hardware and software • Lack of computers, outdated or poorly performing computers & networks • Software ineffective and or outdated / different versions • Ineffective IT support • Ineffective database management support	• Well functioning information systems needs effective hardware and software • Effective IT support
	Human Resources • Inadequate number of staff members / shortages • Inadequate knowledge and skills levels • Unclear roles & responsibilities • Poor attitudes, motivation and lack of information culture • High staff turnovers • Unrealistic post levels and salaries	• Descriptions of roles and responsibilities at all levels. • People must take responsibility (and must be held accountable) for their data from the point of data collection to the highest point of evidence-based decision-making. Taking responsibility for data is not simply taking the blame when data are wrong, but making the data so central to one's real job that its quality becomes important for day-to-day work.
2. PROCESSES FOR DATA MANAGEMENT Data management systems (paper or electronic) are not tamper proof **2.1 Data collection & validation** (from registers, patient files, tick or tally sheets etc. who, when and where….and how)	• Ineffective and/or inconsistent data collection practices ○ Information officers/data capturers are required to capture data from patient records that are incomplete or illegible ○ Health care providers make notes in books/on scrap paper and enter data into data collection tools at the end of the day ○ Health care providers are required to keep longitudinal paper-based patient registers containing detailed patient care data while there is insufficient resources available for such intensive paper-based systems ○ Health care providers record interventions at the end of the day instead of after each patient – impossible to remember everything = underreporting, gaps and poor quality in general • Tools that are incomplete (missing information) • Illegible data entries and/or inaccurate or wrong data captured	• Written procedures in place for data collection. • Data collection methods must minimize errors. • Consistent collection process. • Test data collection methods and tools before implementation. • Consistency of data collection tools – version numbers, dates etc. • Clear instructions on data collection tools • Training of people who are responsible for collecting data • Processes for collection of aggregated data and patient-based data differ and should be implemented in a suitable way

Stage or steps	Threats to data quality	Strategies and activities to optimize data quality
	• Data collected and captured by individuals who have bias (choose to collect only what they choose)	
2.2 Data collation (summarizing) and validation (who, when and where….and how)	• Instruments used for collation, manipulation and storage produce errors or bias (e.g. excel spreadsheet formulas has been corrupted).	• Use standardized written processes and procedures & train responsible people • Standardize paper tools for summarizing data • Implement well developed standardized electronic tools for summarizing data
2.3 Data capturing (into an electronic database who, what, when, where….and how)	• Transcription - Incorrect data entry/typing error • Irregular or last minute data entry. • Duplication of records or double entry/counting. • Incorrect grouping of data.	• Keep source documents maintained and readily available • Keep original paper work from which data was collected or entered into the database.
2.4 Data storage (who, what, when where….and how)	• Improper storage – data kept in an non-secure environment OR inaccessible place such as a personal laptop • Ineffective backups – technical catastrophe such as hard drive crash, network problems or software problems leading to data losses	• Standardized processes for: o Who stores the data, where and how? • Policy for filing practices and data storage that allows retrieval of documents for auditing purposes (leaving an audit trail).
2.5 Data validation / data cleaning – who, what, when and where….and how)	• No or unclear data validation processes • Inconsistent or no data quality checks at different levels • Lack of feedback on data quality	• Policy and guidelines for standardized data validation processes o Documented steps to address data quality challenges (e.g. missing data, double counting & lost data) o How are duplicate/double counted data detected? o How often are spot-checks & data reviews done? o How often are data sampled and reviewed? o Documented data review procedures to be performed at all levels. • Clear roles and responsibilities • Are findings / reports / outputs triangulated to verify consistency • Are data reviewed by other stakeholders? • Documentation of data quality checks at different levels (can be part

Stage or steps	Threats to data quality	Strategies and activities to optimize data quality
		of M&E manuals or job descriptions). • Adjust, supplement or replace problematic data. • Triangulate – use multiple data sources taking into consideration strengths and limitations. • Develop indicators for measuring data quality for example 'facility reporting rate' and 'data input coverage'
2.6 Data analysis – process of systematically applying techniques to describe, summarize and compare raw data (who, what, when & where….and how)	• Incorrect type of analysis. • Calculation errors (manual OR incorrect formulas) • Arithmetic methodologies that leads to inconsistencies. • Inconsistent analysis. • Misinterpretation of results. • Margin of error is not evaluated and calculated • Manipulation error – intentional or unintentional	• Documented guidelines • Training of staff • Set up auto-calculation and reporting functions in the software to reduce human error
2.7 Data presentation, feedback, reporting, dissemination & electronic access in a user-friendly format (who, what, when, where …..and how)	• No feedback policy, strategies and guidelines • Insufficient or no feedback to lower levels as well as to program and line managers at the 'same' level (data is only sent 'up' to meet reporting requirements). • Incorrect formats. • Report compromises client confidentiality. • Too little or too much information. • Not presenting information as useful knowledge. • Incorrect and inconsistent analysis. • Misinterpretation and incorrect presentation of results	• Documented policy, strategies and guidelines • Data quality improvement depends on continuous feedback and use of data. Continuous feedback is best accomplished by putting each data element to as many uses as possible. • Monitor feedback • User-friendly auto reports based on monitoring and reporting needs of managers, for example reports containing data and information on health care system inputs, processes, outputs, outcomes and impacts , primary, secondary and tertiary prevention of priority diseases etc. • Compile easy to use pivot tables that enable managers to identify best practices and areas where support is needed
2.8 Data use (who, what, when, where …..and how)	• Insufficient or no use of data • Misinterpretation of findings and reports	• Use data to improve data quality. • Report data limitations and their implications for assessing performance • Develop skills of managers and other stakeholders who need to use data.

We are now going to apply the principles of data quality by focusing on how the DHIS software can be used to optimize data quality at different levels of the South African health care system.

3.6 USING THE DISTRICT HEALTH INFORMATION SYSTEM (DHIS) AND SOFTWARE TO OPTIMIZE DATA QUALITY

The DHIS provides tools which can assist with the process of monitoring and optimizing data quality in terms of validity, reliability, integrity, precision and timeliness.

3.6.1 OVERVIEW OF FACILITIES

The DHIS pivot tables contain a sheet providing an overview of facilities, by type of facility per sub-district, district and province. This data provides managers with an idea of which facilities should report from different geographical areas and which number of reports should be expected.

3.6.2 OUTSTANDING INPUT FORMS

These reports, both as a standard report and as a Microsoft Excel pivot table sheet, allow users of the DHIS data to assess what data is, or is not, in the system. It identifies outstanding monthly reports or input forms by facility, sub-district, district and province in a user friendly format.

An indicator for measuring facility reporting rates will also help to determine how complete the data in the system is.

3.6.3 VALIDATION RULES

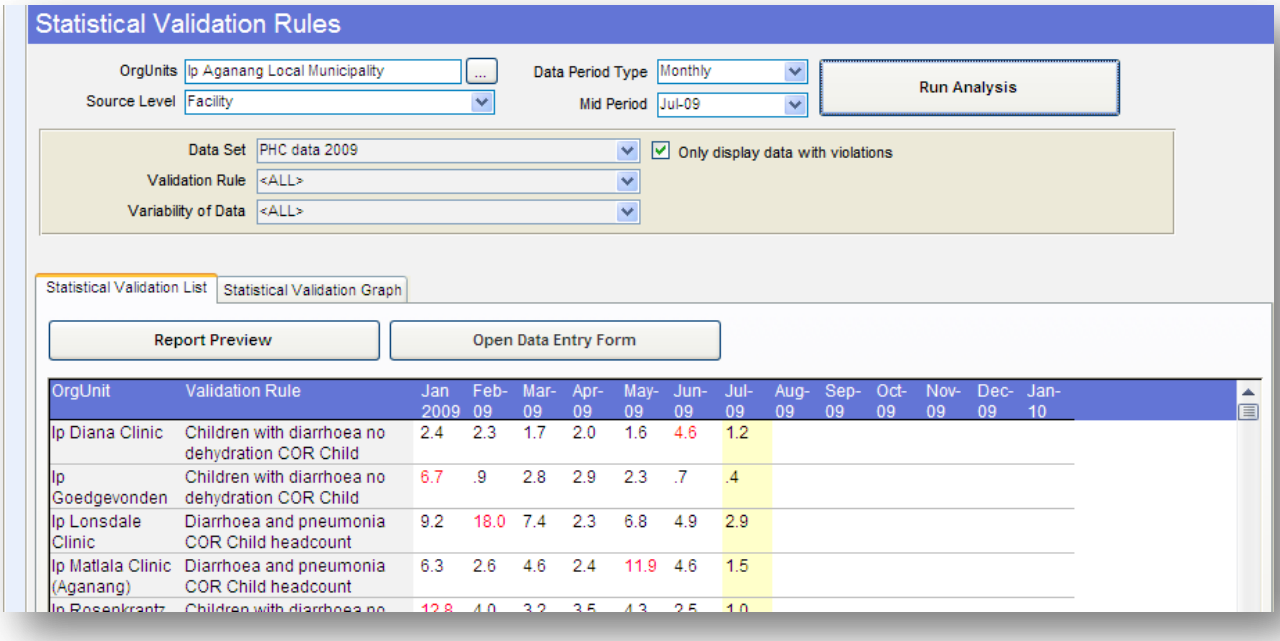
Validation rules define the relationship between 2 variables. These rules can be either absolute or statistical. These rules can be run against the data for a facility for any time period.

- Absolute validation rules compare one variable with another in terms of their relationship. For example, a facility cannot have more or less total births than the total of live births plus stillbirths.

OrgUnit and Period	Description of left side	Value	Operator	Value	Description of right side
mp Matikwana Hospital (Mar-10)	Total deliveries	447	must be Less Than OR Equal To	381	Total births
mp Sabie Hospital (Oct-10)	Live births plus stillbirths	46	must be Equal To	45	Total births
mp Sabie Hospital (Jul-10)	Live births plus stillbirths	41	must be Equal To	44	Total births

In this example there were more or less total births that there were live births plus stillbirths.

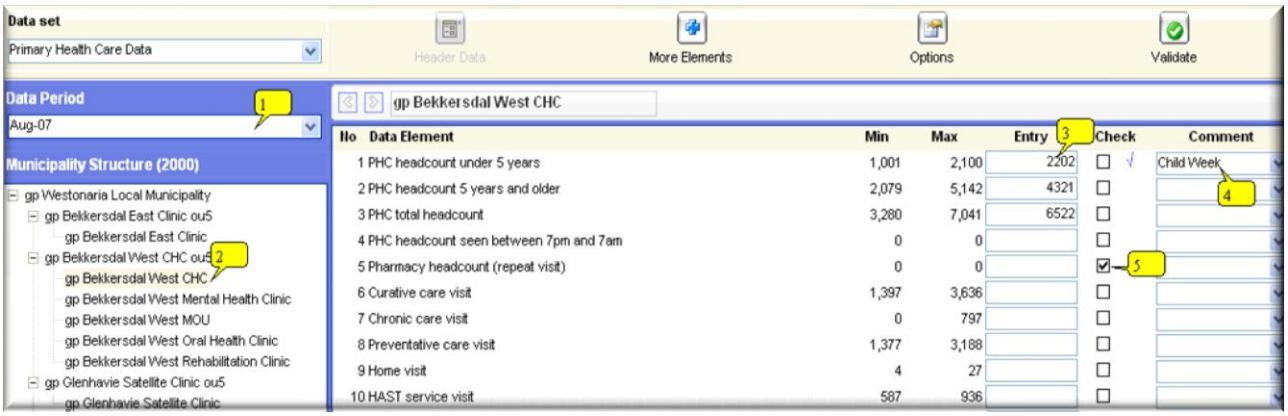
- Statistical validation rules look at the correlation between variables.



3.6.4 DATA ENTRY VALIDATION PROCESSES

The Data Entry/Edit screen in the DHIS provides many processes that assist with data quality issues.

Each of the data elements for each facility has a minimum and maximum range value. This helps 'trap' data that is outside the pre-determined range for that data element and tests the precision of the data - is it within an acceptable margin of error?



The graph in figure 21 shows the maximum value – the red line and the minimum value – the green line. If these values are correctly set, any value that is outside this range will trigger a warning sign which should prompt an appropriate action.

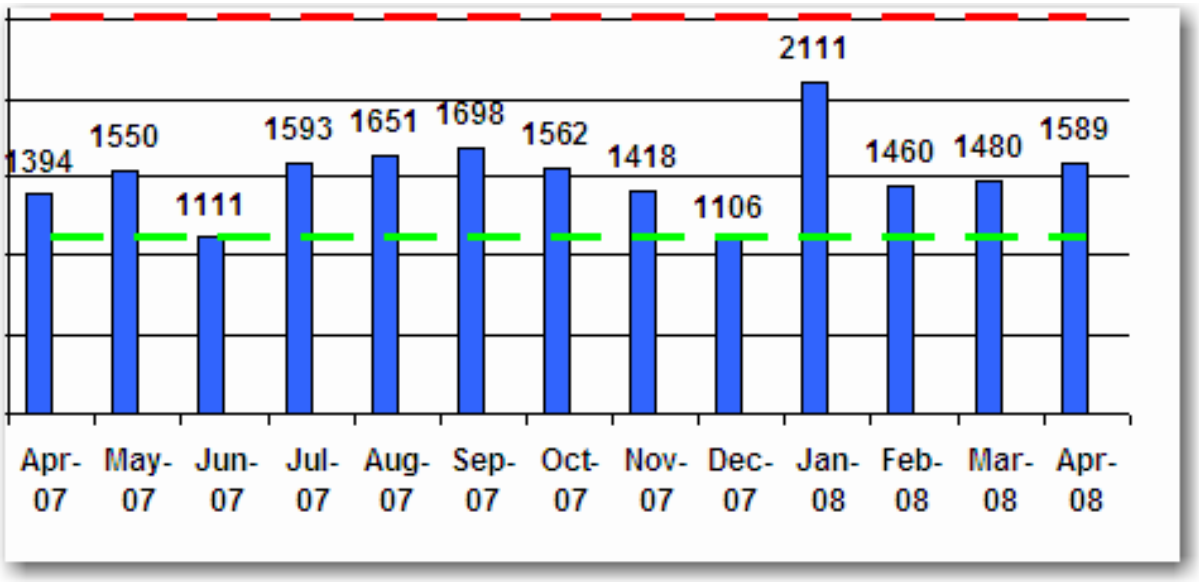


Figure 21 ***Checking Precision using Max and Min Values in the DHIS***

At the end of the data entry process, a simple validation process can be run that will pick up the values outside the range and any absolute validation rules. This allows the person capturing the data to keep track of what problems were initially identified (see figure 22 and figure 23).

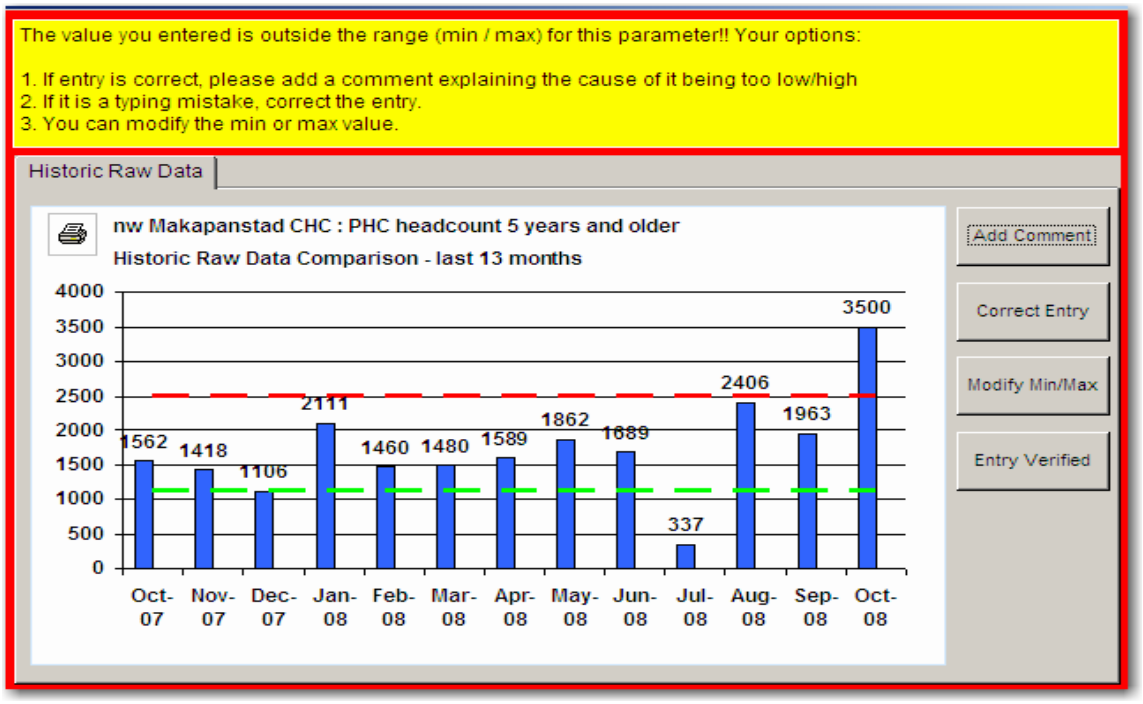


Figure 22 ***Data Validation prompt in the DHIS***

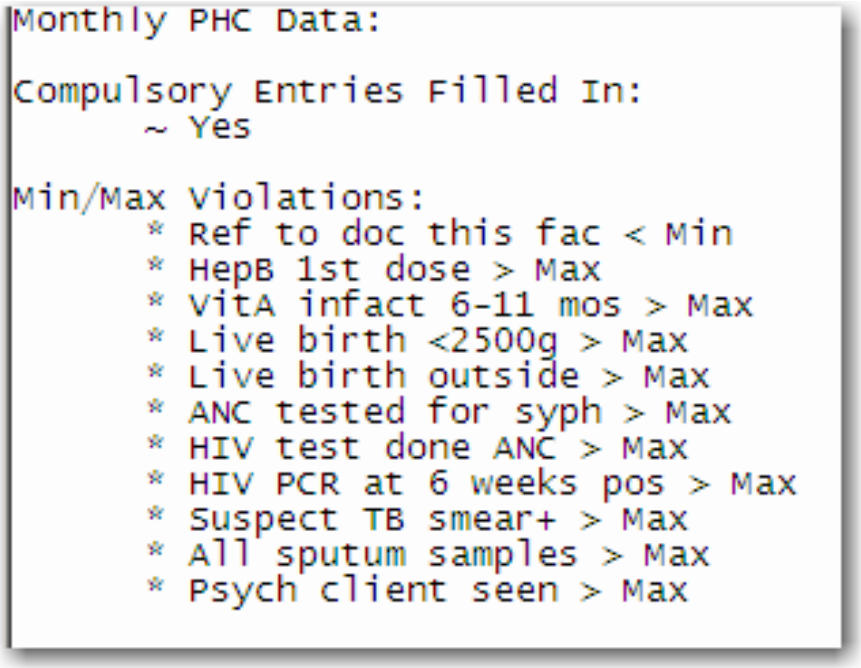


Figure 23 ***Validation report in the DHIS***

The DHIS has a feature that permits only current data to be entered, i.e. data for February cannot be entered until the administrative month-end for February and the database is then open for data entry. Data capturers cannot enter data in advance which ensures the integrity of the dataset. The DHIS's audit log, which keeps track of all edits made to the dataset, is another feature that contributes to the integrity of the data set.

3.6.5 PIVOT TABLES IN THE DHIS

The DHIS data quality improvement tools discussed above focuses mainly on using the DHIS software at the point where data is captured. Most managers (at all levels) do not have time to use the above measures, but they need to assess data quality to identify and address potential data quality problems. The DHIS has standardized user friendly pivot tables to which data is exported for further analysis in terms of data quality and health program progress.

Pivot tables are easily accessible since most users already have the Microsoft Office suite which includes Microsoft Excel installed on their computers and simply need to spend some time learning how to use pivot tables.

Main reasons for organizing data into a Pivot Table are:

- To summarize the data contained in a lengthy list into a compact format.
- To find relationships within the data that is otherwise hard to see because of the amount of detail.
- To organize the data into a format that's easy to chart.
- To assess data quality.

Many people are not familiar with, or are intimidated by Pivot Tables, one of the most powerful features in Excel. We are now going to use the DHIS pivot tables to guide you in using available data to assess

potential data quality shortcomings in your routine information, as well as the impact of data quality on management decisions.

The basic Excel tutorial you received with this manual contains the following to assist you in using DHIS pivot tables:

- guidelines for developing basic Excel skills
- guidelines for using DHIS pivot tables
- guidelines for pivoting existing Excel data
- guidelines for basic Excel conditional formatting (color coding of element and indicator values)
- guidelines for making graphs

MODULE 4: USE OF INFORMATION FOR EVIDENCE-BASED HEALTH MANAGEMENT TO REDUCE MORBIDITY AND MORTALITY

LEARNING OUTCOMES:

On completion of this module the participant should be able to:

- Understand the steps in the evidence-based management cycle
- Develop a logical framework for measuring progress towards reducing the U5MR-related deaths in an effort to achieve the SA MDG of 20 deaths per 1,000 live births in children under 5 years of age
- Demonstrate basic knowledge about baseline and end-of reporting period assessments
- Use proxy indicators for measuring the impacts and outcomes of interventions to reduce the U5MR
- Use available data/information to identify potential reasons for outstanding and under performance

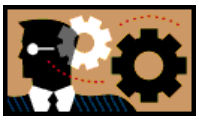
4.1 INTRODUCTION

Module 4 is aimed at integrating the principles and knowledge on national, provincial and local objectives, data flow, monitoring and criteria for quality data, to utilize health information to manage health care services based on evidence to reduce the impact of HIV/AIDS epidemic on the U5MR in South Africa.

Service delivery cannot be monitored without quality health information. Without health information there is not enough evidence to claim failure or success in service delivery.

4.2 OVERVIEW OF PREVIOUS MODULES AND PRINCIPLES

In the **Pre-module** we discussed the HIV/AIDS epidemic as priority health problem in South Africa and the response to the epidemic internationally and in South Africa specifically and the strategies and plans to address it. The goal to reduce the U5MR has been identified as the most difficult MDG to achieve in Sub-Saharan Africa and the unacceptably high South African U5MR was identified as a health care system challenge.



What is the MDG for U5MR in South Africa?

What is the current U5MR in South Africa?

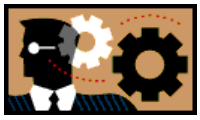
What are the major causes of mortality in under 5's in South Africa?

What are the major HIV/AIDS related causes of mortality in under 5's in South Africa?

Based on the basic epidemiology (including primary, secondary & tertiary prevention) we covered in this course and on your real live experiences, how can HIV-related deaths in children be prevented / reduced?

In Module 1 health care, M&E and information systems were discussed. M&E was described as a management function to improve health care services and to strengthen the health care system with the ultimate goal to reduce morbidity, disability and mortality. In module 1 it was also emphasized that managers require valid, reliable and relevant information timely and in a user-friendly format. This requires well-developed and effective M&E systems supported by a well developed and effective health information system. Strengthening of M&E and health information systems was discussed and sources were provided for additional reading. The Logical framework was introduced as a tool for guiding monitoring and evaluation in line with the systems approach.

Inadequate information systems lead to poor utilization of evidence which is an obstacle to effective health care system management as well as to effective and efficient health care system performance. Effective information supply and use results in cost savings, increased quality and coverage of services and improved health outcomes. Evidence has also been used in many developing countries to hold politicians accountable for health indicators and to advocate for increases in overall resources for health (Stancefield 2005:562).



Identify the components of a health care system, an M&E system and an information system

Explain the following concepts:

Evidence **Monitoring** **Evaluation**

In Module 2 data and information management were explored with an emphasis on indicators and the use of information. **Indicators** were discussed as quantitative or qualitative variables that provide a simple and reliable measurement of one aspect of performance, achievement or change in a program or project. The selection of indicators and the format for feedback to managers, health professionals and policy makers are of crucial importance for evidence-based health management aimed at strengthening the health care system to improve performance.

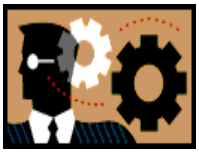
As mentioned before, the **minimum** number of indicators must be selected to produce a sufficient amount of valid and reliable evidence for identifying achievements and health care system shortcomings, BUT it is not necessary to provide a detailed picture about all aspects – too much evidence may disrupt clear and concise messages about the most critical health needs. Indicators must be selected on the basis of the most important health problems where evidence can be used to facilitate action for reducing health inequities and mortality. A complete and appropriate set of indicators should include at least one indicator for each important program activity and one indicator to measure each program related component of the health care system (inputs, processes, outputs, outcomes and impacts).

Remember:

"Decisions must be taken and systematic assessment of evidence – even if highly uncertain – are a better basis for decisions than no evidence at all" (Murray et al 2003: 715).

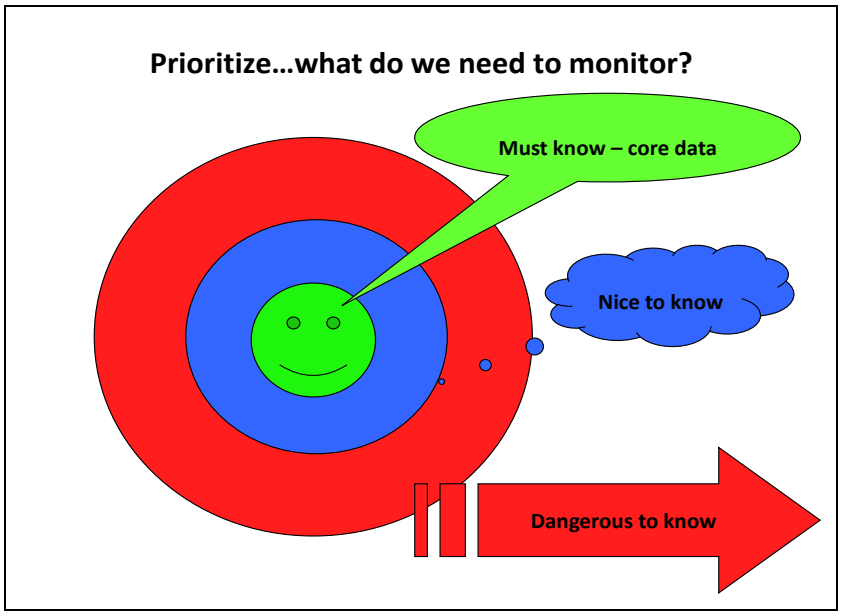
"Within the health care system choices made in the collection and use of information will determine the system's effectiveness in detecting health problems, defining priorities, identifying innovative solutions and allocating resources to improve health." "Health information system improvement can accelerate broad improvements in health if they are engineered to reflect, reinforce, evaluate and even drive improved performance" (Stancefield 2005:562).

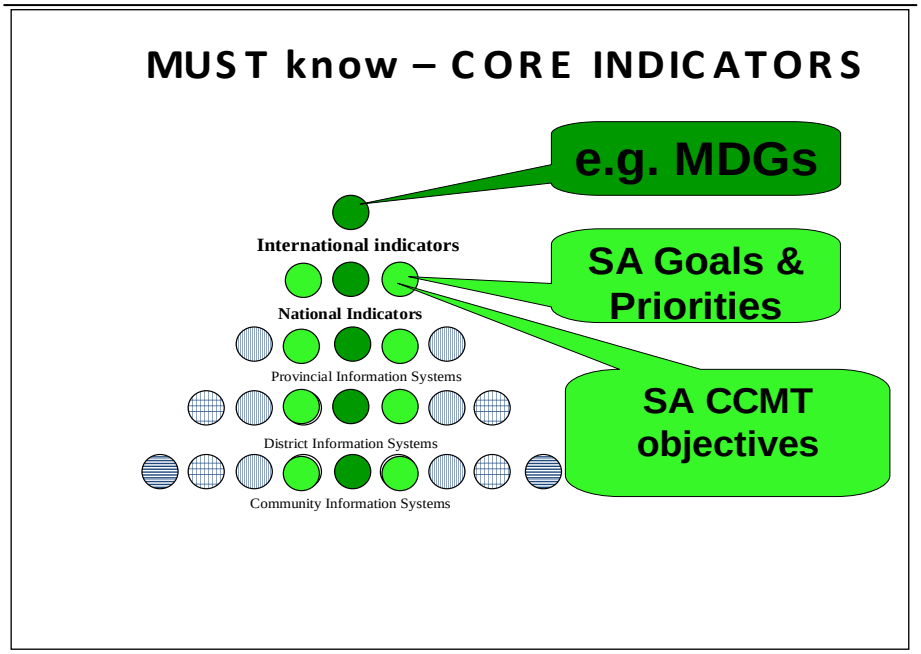
Proxy indicators can be used where direct indicators are not available or too resource intensive to collect. Some indicators can be used as proxy indicators for measuring more than one component of the health care system for example; HIV testing rate, which is a output/coverage indicator, can also be used as a proxy indicator to measure availability and accessibility (inputs) of facilities providing HIV testing services and/or to measure acceptability and utilization (processes) of HIV testing services. It should also be kept in mind that we need to measure inputs, processes and outputs in terms of facilities and interventions for primary, secondary and tertiary prevention of specific diseases.



What do the two figures below 'tell' us about selection of data elements and indicators?

The important principles to remember about selection of indictors were illustrated by the following two figures.





Module 3 focused on the importance of quality data and on ways to measure and optimize data quality. Good quality data and information is needed to inform decision-making at all levels. The differences between routine health information and non-routine health information were discussed and it was emphasized that routine health information cannot be expected to meet the same level of accuracy that is found in a research environment where all factors are controlled. The quality of the information must however be *good enough* in order for sound decisions to be based on it.

Divide into three groups for a 30 minute discussion:

Arrange the indicators provided by the facilitator into the given logical framework.
Use the descriptions in table 8 for selecting the most appropriate fit

The group will have 30 minutes for feedback in plenary

Table 8 ***Description of fit of indicators into logical framework***

Result indicators		**Implementation indicators** (should cover primary, secondary and tertiary interventions)		
Impact Measure **health status** in terms of mortality	**Outcome** Measure **effectiveness and efficiency** in terms of: • incidence and prevalence • specific interventions implemented • management of personnel and expenditure	**Output** Measure **coverage** by specific services or interventions in relation to the population in need of those services Coverage is only meaningful if it is measured in terms of specific interventions aimed at addressing leading health problems	**Process** Measure how well services are planned, managed and delivered. General health care processes are measured in terms of the **acceptability** and **utilization** of health facilities and specific interventions	**Inputs** Measure **availability, accessibility and equitable distribution** of: • facilities, in terms of numbers and types • staff • interventions to address priority health needs • essential drugs • laboratories

4.3 EVIDENCE-BASED HEALTH MANAGEMENT

Managers need to compare and account for what they have done to what they have planned to do. Before we start integrating the knowledge and skills obtained during this course by means of working through the evidence-based health management process or cycle, we need to emphasize the importance of goals, objectives targets and benchmarks in guiding management and monitoring activities.

Goals are general statements that describe the result (impact) the health program hopes to achieve. Goals represent the future direction in which political decision makers, senior health care managers and program managers feel a program should be developing. Each program should have their goals clearly stated and should take the international (for example the MDGs) and national health priorities (as stated in the National Strategic Plan) into consideration when setting their goals. An example of a goal that is an international and national priority, is to '*reduce child mortality*'.

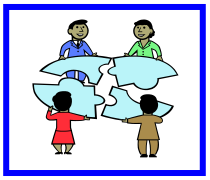
Objectives are operational statements to specify accomplishments in terms of intermediate results (outcomes) which can be measured and to which people can be held accountable. Objectives address **what** results should be achieved and **when** these results should be achieved. Objectives must be expressed in a specific and measurable way. An example of an objective flowing from the goal to '*reduce child mortality"* is to '*reduce the mother-to-child transmission of HIV to 2% at 6 weeks and less than 5% at 18 months by the end of 2016'.*

Objectives need to be **SMART**

S	**Specific**:	Is the desired outcome clearly specified? Does it cover only one rather than multiple activities?
M	**Measurable**:	Can it be measured or counted in some way?
A	**Appropriate**:	Is the objective appropriately related to the goal?
R	**Realistic**:	Can the objective realistically be achieved with the available resources? Does it fit to local needs, capacities and culture?
T	**Timely**:	In what time period will the objective be achieved?

Targets state the desired level of performance that has to be achieved. **Interim targets** are short term steps that must be reached along the way to meet the goals, objectives and final targets.

Benchmarks are 'estimated targets'. A benchmark refers to a reference point or standard (the performance achieved in the recent past by other comparable organizations in similar circumstances) against which performance or achievements can be assessed. A benchmark should be the minimum standard that should be aimed for (Frankel & Gage 2007: 15, Heywood & Rohde undated: 17-18, 53-56, 94, Kusek & Rist 2004: 225). In the absence of 'official' targets and/or benchmarks, averages (for example national or provincial indicator averages) can be used as interim benchmarks.



Discuss with participant on your right hand side for 5 minutes.

- **What services / interventions do you/your organisation provide?**
- **How do your services / interventions contribute towards achieving the MDGs and NSDA?**
- **Can these interventions be linked to primary, secondary or tertiary prevention of HIV/AIDS?**

Effective and efficient health information and M&E systems containing quality data are meaningless if managers cannot or do not use the information. To understand the roles and responsibilities of managers and informed management decisions, management needs to be explored further.

4.3.1 DEFINITION OF MANAGEMENT

Management is described as a process of planning, organizing, motivating/leading and controlling to focus the resources of the organization on achieving the goals and objectives of the organization. In other words, management is the act of getting people together to accomplish the desired organizational goals in the most effective and efficient way

Control in a management context means setting standards, measuring actual performance and taking corrective actions to address shortcomings. In other words, the management function of control includes monitoring, evidence-based decision making to address problems and then monitoring again to determine whether corrective interventions were successful (http://en.wikipedia.org/wiki/Control(management)).

4.3.2 MANAGEMENT APPROACHES

Many different approaches to management are described in the literature - some examples are mentioned below. Important to remember is that, irrespective of which management approach is followed, monitoring, evaluation, reporting and controlling are part of each manager's responsibilities and are NOT something to be left to information and/or M&E officers. Managers need information to measure progress on meeting goals, objectives and targets and therefore they need the knowledge and skills to:

- establish whether the data they receive is valid and reliable,

- use the available information (evidence) for identifying health inequities, progress towards targets, best practices and critical areas where support is needed. Poor utilization of health information is an obstacle to effective health system management and performance internationally and in South Africa (RHINO 2001: 1).

Managers are also responsible for ensuring that all components of the health information and M&E system are in place and functioning well. Therefore they should not only use evidence to make management decisions aimed at strengthening the health care system to reduce morbidity and

mortality - they should also use available evidence to identify and address shortcomings to strengthen the health information and M&E system as important sub-systems of the health care system.

4.3.2.1 Strategic management

Strategic management is a process of specifying an organization's mission, vision, strategic goals and objectives, developing policies and plans for implementing projects or programs and allocating resources for implementation. Strategic management seeks to coordinate and integrate activities to achieve long term goals, for example to reduce the U5MR in a country (Wikipedia website).

4.3.2.2 Results-based management

Results-based management is a management strategy focusing on measuring the performance/results/achievement of an organization or project in terms of outcomes and impacts. Strengths and/or weaknesses (shortcomings) in terms of inputs, processes and outputs are then used to identify potential reasons for best practices and/or underperformance after which corrective measures, such as additional resources or different strategies, are implemented (Kusek & Rist 2004:225).Best practices can be shared to improve overall health services.

4.3.2.3 Evidence-based management

Evidence is defined as proof or information that is considered to be true based on available facts (Booth 2005: 1).

Evidence-based health management is described as using the best available evidence to make informed operational and strategic management and policy decisions for improving the performance of the health care system (Booth 2005:1).

Practicing evidence-based management includes:

- tracking of results,
- timely evidence,
- effective dissemination of evidence to decision makers and
- monitoring of evidence-based management processes

4.3.2.4 Functioning in the workplace – characteristics of manager versus leader

To manage successfully based on evidence, we need to make difficult choices and LOTS of motivation is needed to implement this approach to management.
There are three main ways of functioning in the work place in which most members of teams function. Each has a more dominant way, influenced by knowledge, age, personality, personal and professional maturity and health status.

BUT each person has a choice. Roles can be studied and practices to become more effective and efficient in the workplace in implementing evidence based health management. It is sometimes required to be more of a manager than leader and vice versa depending on the situation.

The different ways of functioning in the work place is outlined in Table 9.

Table 9 ***Functioning in the work place***

Aspect	Indefinite role	Manager	Leader
Policy	Don't really bother with policy	Carry out policy	Participate in formulating policy
Goals	No definite goals Passive attitude	Formulate goals in reaction to forces outside Impersonal to passive attitude Seek and then follow direction	Formulate goals in an effort to bring about change to create a "better" future Provide vision and strategic alignment
Planning	No definite planning Functions from day to day Mostly implementing role	React to everyday problems, pressures and events Often implementing role	Long term planning Develop vision for future and way to get there Create opportunities Often guiding /influencing role
Activities	No definite way – depends on how they feel	See that things are done correctly Work in the system Control risks Coordinate effort	See that correct things are done correctly Work on the system Seeks opportunities Inspire achievement and energize people
Sub-ordinates	No definite attitude/ approach	Usually sees self as being served by sub-ordinates Control people by pushing them in right direction	Usually sees self as serving others Motivate people by satisfying basic human needs
Power	Use no power Do not motivate people	Use threats and rewards to motivate people Enforce organizational rules	Develop a sense of purpose and hope to develop people's intrinsic motivation Change organizational rules
Control	Do not use (avoid) control strategies/ measures	Use power of authority as control strategy Provide instructions	Give power in order to get power Motivate people to control themselves Coach, create self-leaders and empower
Change	Resists change	Accept and maintain present situation	Actively effect change to create a better future Change the way people think about innovation and development
Sense of self	Don't really thing about themselves or others Not assertive (either passive or aggressive)	Derive their sense of self from their work roles/ authority Sometimes assertive	Exhibit strong sense of their own identity and do not rely on others or their work Assertive

See link below for more information on managers and leaders.

Website: http://www.1000ventures.com/business guide/crosscuttings/**leadership vs mngmt.html**

Figure 24 provides a conceptual framework for evidence-based health management.

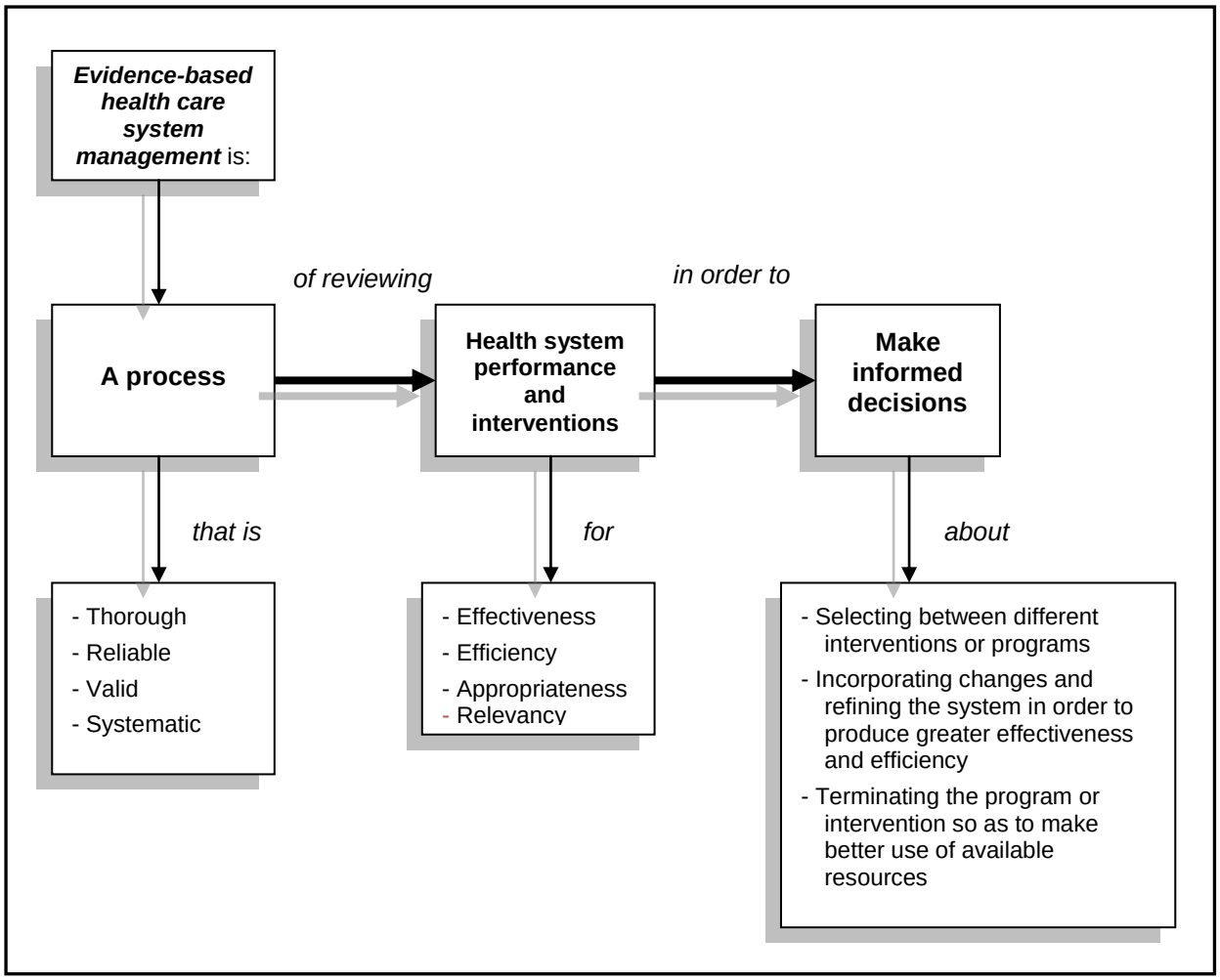


Figure 24 ***The concept of evidence-based health care system management (adapted from Kumar 2005:275)***

We are now going to apply all these principles step-by-step to demonstrate how existing routine data can be used for evidence-based health management to improve the results of programs to improve the health status of the population(or in other words, to reduce morbidity, mortality and disability), using the U5MR as an example.

4.3.3 EVIDENCE-BASED HEALTH MANAGEMENT PROCESS/ CYCLE

The evidence-based health management process or cycle was developed by integrating the principles discussed in Modules 1, 2 and 3 in an effort to reflect real life health management situations. The evidence-based health management cycle (Figure 25 and Table 10) can be defined as an ongoing process of assessment, analysis and action, aimed at strengthening the health care system (including the M&E and information sub-systems) to reduce morbidity, disability and mortality. In this cycle, information (evidence) supports the entire process and is at the centre of all the steps.

Analysis and use of information provides answers to four fundamental management questions, namely:

- **Where are we now?**

  Use available evidence - mainly impact and outcome indicators - to conduct a baseline or end-of-reporting period assessment to determine what the results of health care interventions are when compared to international, national and local impact and outcome targets. Monitoring and periods differ depending on which health care aspects should be measured and what the reporting requirements are. Most monitoring and reporting timeframes are quarterly, six-monthly, annually or five yearly.

- **Why are we there?**

  Use available evidence - mainly input, process and output indicators - for a critical review to determine the potential reasons for achievements and underperformance.

- **Where do we want to go?**

  Use available evidence to set intermediate impact and outcome objectives and targets (for the next monitoring period) to address the identified shortcomings WITHIN the framework of international, national and local health priorities, goals, objectives and targets. Also use available evidence to set realistic intermediate output, process and input targets to address the identified reasons for underperformance in terms of outcomes and impacts.

- **How will we get there?**

  Use available evidence to develop and implement an action plan and to allocate resources in order to meet the objective and targets that were set during the 'where do we want to go' stage.

- **Repeat** the 'where are we now' assessment after the planned intervention, monitoring and reporting period.

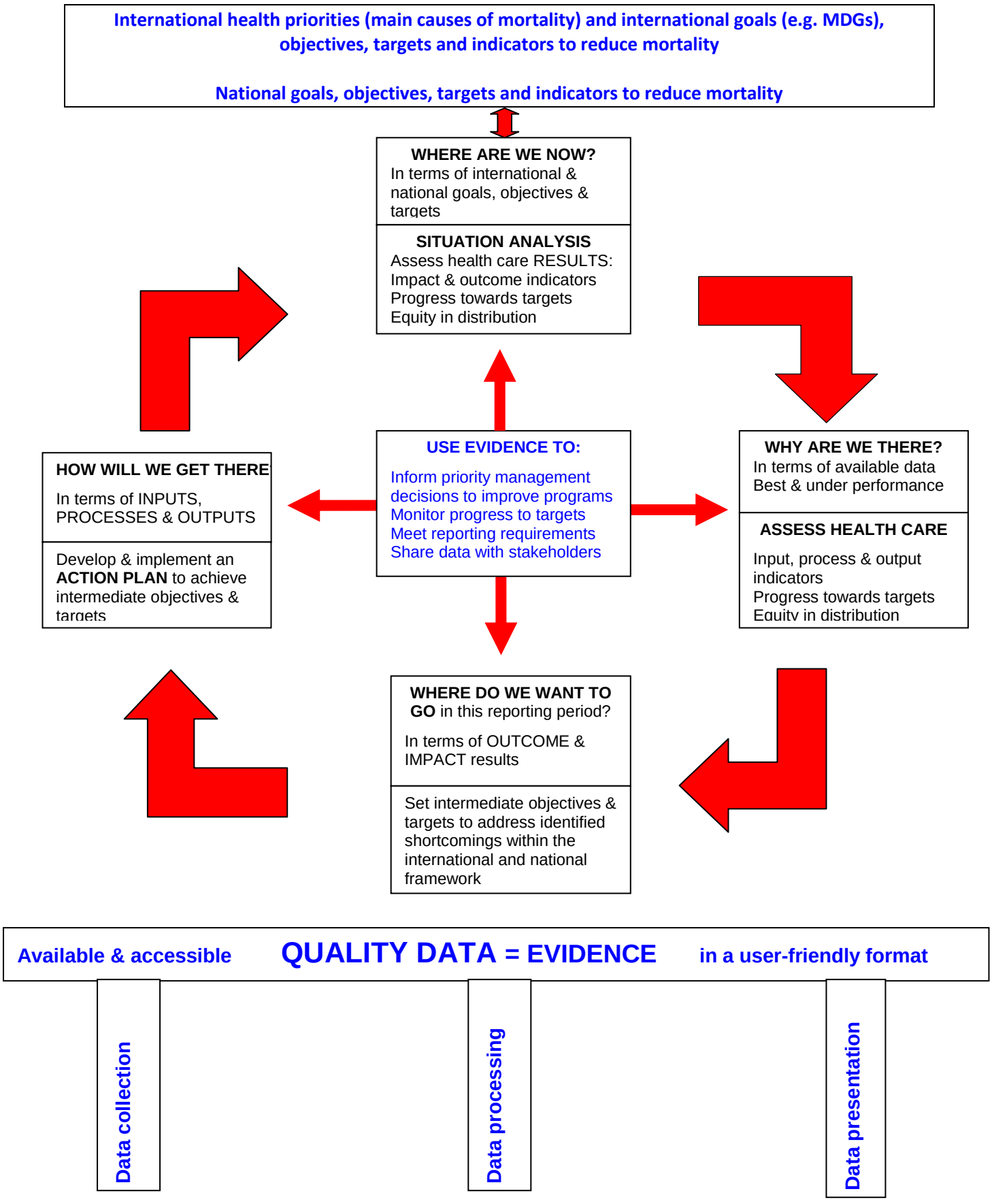


Figure 25 *The evidence-based health management process / cycle*

4.3.4 EVIDENCE BASED HEALTH MANAGEMENT IN PRACTICE

Table 10 summarizes the preparations and steps for evidence-based health management process /cycle using examples for reducing the HIV/AIDS related U5MR.

Table 10 ***Evidence-based health management for reducing the HIV/AIDS related U5MR***

Step	Description / Remarks
1. Pre-assessment	
1.1 Identify the health priorities, context and period under assessment	For example: The high HIV/AIDS-related U5MR in South Africa must be reduced to meet the MDG by 2015.
1.2 Identify priority international goals**,** objectives, indicators, targets, benchmarks & priority reports	For example: MDG 4 - to reduce the *U5MR* by two thirds between 1990 and 2015.
1.3 Identify priority national goals, objectives, indicators, targets, benchmarks & priority reports	For example: The MDG for South Africa is 20 deaths in children under five per 1,000 live births by 2015. Priority reports include MDG reports as well as national and provincial annual and quarterly reports.
1.4 Identify existing sources of data/information	• The DHIS • Previous reports • Relevant survey results for example the annual ANC HIV survey. • Stats SA mortality reports.
1.5 Select indicators for assessing the ***results*** of health care in children under five years of age AND the potential *shortcomings that may contribute to successes or underperformance* of the health care system.	Use a logical framework to group the relevant existing indicators under each health system component. Make sure that you include indicators to measure primary, secondary and tertiary prevention. ***Because we are managing for results, start with impact***, then outcome, output, process and input indicators to measure health care results and identify potential causes of best and underperformance.

Step	Description / Remarks
2. Evidence-based health management (for results) process or cycle	
2.1 Where are we now in terms of health care system results? Use impact and outcome indicators to measure. Use available evidence to determine: • What are the results of previous interventions? • What is the progress towards international, national and local health goals, objectives and targets? • Are results equitably distributed? • What are the shortfalls between 'what is' and 'what ought to be'? • What and where are best practices to learn from? • What and where are critical areas for which support is needed urgently? • Are there gaps in crucial evidence – is additional information needed urgently? • What and how should additional information be obtained?	Use the most recent existing (preferably routine) data for proxy impact and outcome indicators to conduct a rapid assessment on the results of health care for a: • Baseline report if a new project or intervention starts. • Progress report if the assessment is part of an existing project or program. Populate the logical framework with existing impact and outcome data/indicator values. Compare performance / results of health care interventions against the stated international, national and local goals, objectives and targets, as wells as against previous results. Use color coding in tables when large amounts of data need to be displayed (see table 5.4) and use graphs and maps to illustrate findings in a clear, concise, accurate and user-friendly way.
2.2 WHY are we here / have we achieved these results? Use output, process and input indicators to measure. Use available evidence to determine: • Why did interventions in some areas lead to 'best results'? • Why did interventions in some areas lead to 'critical results'? • Why do inequities exist?	From a results-based perspective it can be argued that poor results (e.g. high mortality rates) of the health care system interventions are caused by inadequate health care inputs, processes and/or outputs (WHO 2003b:35-36). Therefore input and process (and sometimes output) indicators should be assessed to identify potential reasons for exceptionable and under performance. Populate the logical framework with existing output, process and input indicator values and color code them using conditional formatting in Excel. Compare these values against:

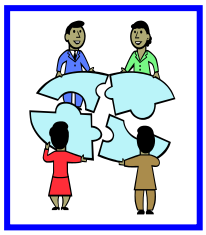
Step	Description / Remarks

	• Values achieved during the previous reporting period (if available)
	
	• Other relevant indicators for example:
	  ○ a low facility delivery coverage together with a high born before arrival (BBA) rate can indicate that facilities providing delivery services are not available and accessible
	
	  ○ a high HepB1st dose coverage and a low ANC coverage can indicate that PHC facilities are available and accessible but that all don't provide ANC
	
	• outcome and impact indicator values, for example:
	  ○ where the U5MR is high and Nevirapine coverage to HIV pos mothers and their babies are low, it can be assumed that inadequate prevention of mother-to-child transmission may contribute to high mortality rates

2.3 WHERE do we want to go (in terms of results) during the following reporting period? The aim is to achieve the best possible results in the shortest possible period and in the most effective and efficient way Use available evidence (findings of the assessment) to set intermediate objectives and targets: • Given the results we achieved and the potential reasons – what do we need to do differently? • What do we need to improve & what are our priorities for the next reporting period? • What are realistic intermediate outcome and impact targets for the next reporting period? • Which input, process and output targets do we need to achieve during the planning period to reach the outcome and impact	Priority stakeholders and managers accountable for the health program or area (such as a district or province) should participate in this phase. They should debate and agree on what health care results they want to accomplish during the next monitoring and/or reporting period. Document intermediate objectives, targets, monitoring periods and indicators to be used for assessment of progress. It is important to set realistic intermediate targets for the reporting period WITHIN the international and national goal and target frameworks and time frames. If the existing indicators will not be suitable for measuring progress, select or develop additional indicators (only when crucial).

Step	Description / Remarks
targets? • Will the current indicators enable us to measure progress to our intermediate targets?	
2.4 HOW will we get there? - Action plan Use available evidence (results of the assessment, the potential reasons identified and the intermediate objectives and targets) to determine: • What our potential strategies are – which will be the most effective and efficient solution to address the identified shortcomings? • What processes / activities (interventions) are needed where to achieve intermediate targets? • Who will execute which activities over what time period? • What inputs (resources) are needed where to achieve the intermediate targets? Assign these resources. • Which health information management, M&E interventions are needed to measure progress? • When and how will we measure progress?	Identify different ways of achieving the set objectives and targets to address the identified shortcomings – select activities and interventions that will lead to the biggest possible difference in the shortest possible period and in the most effective and efficient way. Take monitoring and reporting time frames as well as resources into consideration. Develop and implement the action plan.

To integrate and assess your understanding of evidence based management, a group exercise will be done.



Divide into three groups for a 30 minute discussion.

You are members of the provincial management team of province X. There is national concern that your province won't achieve the MDG for the U5MR and that your province's performance will impact negatively on the national U5MR.

Table 4.3 contains a few selected color coded child health care related indicators. Use the evidence-based health management cycle to plan for reducing the U5MR during the next financial year.

1. **Where is province X in terms of the results (impacts and outcomes) of under 5 health care? Motivate your answers.**
   - **Are the results of under five health care acceptable?**
   - **Are the values for the result indicators equitably distributed?**
   - **Which district in Province X was the best performing district?**
   - **Which district in Province X was the poorest performing district?**
2. **Why are you here?**
   - **Identify potential output, process and input shortcomings that could have contributed to these poor results. Motivate?**
3. **Where do you want to go? Set interim targets for the next financial year**
4. **How will we get there? Shortly describe priority actions to achieve your interim targets.**

The colour-coding in table 11 is used to assist managers in identifying best practices and areas where support is needed in terms of health care results. It further helps to explore what the potential reasons for unacceptable results may be in terms of inputs and processes.

- **Green means target achieved – congratulations, continue your good work**
- **Blue means improvement is needed**
- **Red means critical, immediate intervention is required.**
- **Black means unrealistic values – validate and explain**

Table 11 ***Colour-coded HIV/AIDS-related indicator values by district in Province X for 2009***

Colour-coded PMTCT-related indicators in province x for 2009

Districts	Results (Proxy)			Outputs/coverage, Processes and Inputs in % (availability, accessibility, acceptability & use of facilities and services/interventions)									
	Impact	Outcome		Prevent unplanned pregnancy	Prevent HIV in Babies				Facilities providing specific services/interventions				
	Facility mortality under 5 years rate - % of separations/admissions (T5)	Baby PCR test positive around 6 weeks rate (T 5%)	Antenatal client HIV 1st test positive rate (B 20%)	Couple year protection rate (B 40%)	Baby Nevirapine uptake (T 100%)	Antenatal client Nevirapine uptake (T100%)	Antenatal client initiated on AZT during antenatal care (T100%)	Baby PCR test around 6 weeks uptake	Caesarean section rate (B15)	Born before arrival rate (B5%)	Delivery rate in facility (T 90%)	Antenatal coverage (T 95%)	HepB 1 vaccine coverage (T95%)
District 1	10	7	27	34	99	56	60	86	20	10	83	91	99
District 2	15	7	28	31	100	59	68	96	18	11	83	104	74
District 3	7	11	24	28	103	57	41	72	22	8	82	81	60
District 4	11	6	28	47	105	65	60	90	15	11	68	76	92
District 5	9	4	21	35	97	62	27	53	0	22	41	70	77
Province x	10	8	26	35	102	60	56	85	18	10	76	85	80

(T is used as abbreviation for Target and B as abbreviation for Benchmark)

- **Were these exercises of value?**
- **Can we use this approach to improve services / interventions that may contribute towards meeting international and national goals and objectives? Discuss.**
- **What additional support do you as managers need to assist you in optimizing evidence-based decision-making/management?**

Also remember that the same principles can be applied to assess best practices, critical areas and inequities in sub-districts as well as in hospitals and/or other health care facilities in terms of any other priority health problem.

Now that we worked through the examples, we are prepared to start using an evidence-based health management approach aimed at increasing life expectancy, reducing maternal and child mortality, combating HIV, STIs and TB and strengthening the effectiveness of the health system in the areas where you work.

The Power of Measuring Results

If you do not measure results, you cannot tell success from failure

If you cannot see success, you cannot reward it

If you cannot reward success, you are probably rewarding failure

If you cannot see success, you cannot learn from it

If you cannot recognize failure, you cannot correct it

If you can demonstrate results, you can win… support

(Adapted from Osborne and Gaebler, 1992, Reinventing Government)

ANNEXURE

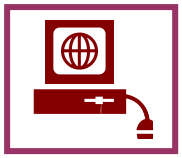
ANNEXURE 1

LEGAL AND ETHICAL ISSUES IN EVIDENCE-BASED MANAGEMENT

Performance information is important because it indicates how well an organization is meeting its aims and objectives (monitor service delivery for budget allocations), and which policies and processes are working. To ensure that public service delivery is as efficient and economical as possible, performance information is required from all government institutions. There are policy and legal requirements aimed at improving public sector financial and performance information management as well as enhancing accountability. Let's look at two:

- **Constitution of the Republic of South Africa (Act No 108 of 1996)**

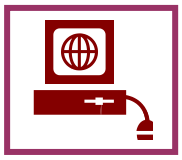
  Section 92 of the Constitution states that "members of the Cabinet are accountable to Parliament for the exercise of their powers and the performance of their functions" and that they must "provide Parliament with full and regular reports concerning matters under their control". Section 133 provides for the accountability of members of the executive council (MECs) of a province to the provincial legislature.



Constitution of the Republic of South Africa (Act No 108 of 1996)
Internet: *www.info.go.za/documents.constitution/1996/a108-96*

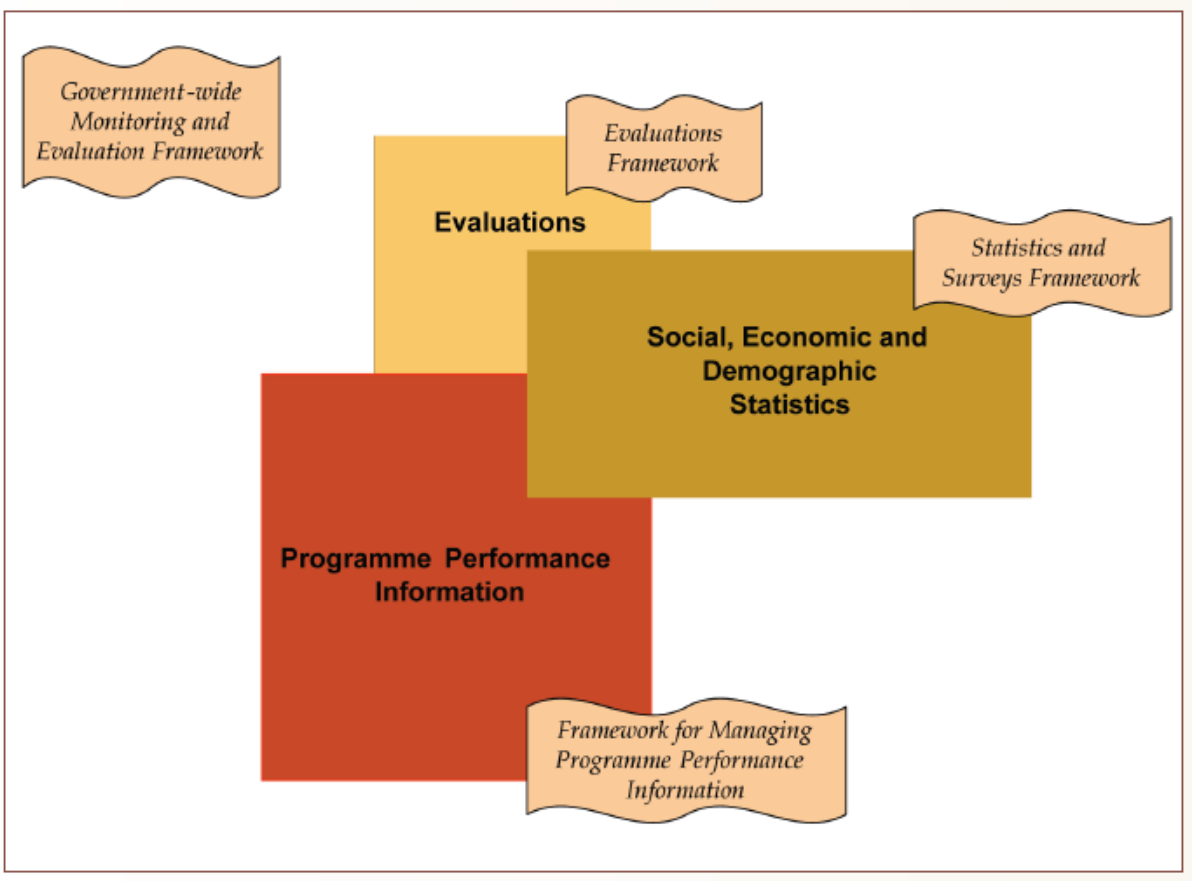
- **The Government wide Monitoring and Evaluation System**

  In 2004, the Presidency developed the Government wide Monitoring and Evaluation Framework. The system has three components:
  - Program performance information
  - Social, economic and demographic statistics
  - Evaluations. (See figure 1.1 below)



The Government wide Monitoring and Evaluation System
Internet: www.thepresidency.gov.za

Figure 1.1: Components of the Government-wide Monitoring and Evaluation System (National Treasury 2007: 3).



A number of institutions are involved in this **Government wide M&E Framework** for performance information management. They are:

- **The Presidency and Premiers' Offices**

  - Provide the political input,
  - Provide input into selecting and defining performance indicators to ensure that all institutions gather the information that the Presidency requires to monitor, evaluate and report on the effectiveness of government policies and local, provincial and national performance,

- **The National Treasury and provincial treasuries**

  Under sections 215 and 216 of the Constitution, the National Treasury is responsible for prescribing the formats of budgets, and for measures to ensure transparency and expenditure control in each sphere of government.

- **National departments responsible for concurrent functions**

  They also need to play a supporting role, helping provincial departments to manage (M&E) performance information, and provide systems training. This will ensure some degree of standardization.

- **The Department of Public Service and Administration (DPSA)**

  The DPSA assists government departments to implement their management policies, systems and structural solutions within a generally applicable framework of norms and standards to improve service delivery.

- **The Department of Provincial and Local Government (DPLG) and provincial department of local government**

  The DPLG is responsible for developing and implementing an integrated monitoring and evaluation and reporting system for provincial and local government departments and municipalities, and for supporting the successful implementation of the Government wide Monitoring and Evaluation System (National Treasury 2007: 18, 19).

An ethical approach to performance information management (collecting, use and presentation of data) is essential.

Ethical principles should guide decision making regarding the appropriate use of data and should be based on basic human rights principles. Government and organizations at all levels of the healthcare system should have a written policy and procedures concerning paper-based and electronic data collection, storage, transfer and release. All the staff must understand the policy and sign an agreement to implement it. Government must also develop strategies to address stigma and social exclusion of individuals (UNAIDS 2006: 1 – 4).

For protecting data, three interrelated concepts are important:

- **Privacy** is both a legal and an ethical concept. An individual has control over the use of his/her personal information and this provides a framework within which confidentiality and security are implemented.

- **Confidentiality** relates to the right of individuals against unauthorized disclosure of their information, during data handling. This has an impact on whether informed consent is required from individuals before information can be used for monitoring and evaluation. Confidentiality policies and procedures should be in place and include the appropriate use of information. It also has to take ethical and legal issues as defined by privacy laws and regulations into consideration.

- **Security** is a collection of technical approaches that address issues covering physical, electronic, and procedural aspects of information protection. Security aspects should include identification of potential threats to the systems and the data as well as development of strategies and resources needed to manage each of the identified threats (UNAIDS 2006: 7).

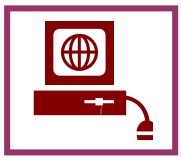
The SA National Health Act 61 of 2004 (Section 14 and 15) stipulates that all information concerning a user, his/her health status, treatment or stay in a health establishment is confidential. No person may disclose such information unless:

- The user consents to disclosure in writing; or
- A court order or any law requires disclosure; or
- Non-disclosure of information represents a serious threat to public health (HST & HISP 2005: 29).

Although information on individual patients should be handled based on the above requirements, information is needed to diagnose and treat people, to prevent spread of diseases and to optimize

public health. Important public health information should be available to the public, health care providers, managers at all levels of the health care system and the general public. While personal information cannot be disclosed, aggregated data (for example the total number of patients on ART) can and should be made available to all relevant role players.

The Promotion of Access to Information Act 2 of 2000 stipulates the right to access records of public and private bodies in part 2 and 3 of the act. Public health information is no secret. More information can be downloaded using the link below.



Promotion of Access to Information Act 2 of 2000
Internet: *www.info.gov.za/gazette/acts/2000/a2-00.pdf*

ANNEXURE 2

DATA QUALITY PLAN EXAMPLE

Name of indicator	Data quality issues	Actions taken or planned to address this limitation	Additional comments	Timelines	Individuals responsible for specific actions	Remedial actions
	List possible risks to the quality of data collected. Consider the various criteria for data quality: *validity, *reliability, *integrity, *precision, *timeliness.	How will the identified risks be managed?				

Adapted from MEASURE Evaluation M&E training material

The following issues should be considered when considering the various possible risks to data quality when coming up with a data quality plan:

- ✓ Source of data for the indicator
- ✓ Strengths and weaknesses of the indicator definition
- ✓ Any limitations to the data handling process
- ✓ How the data is collected (who, what, when)
- ✓ How is the data collated or aggregated and reported
- ✓ Is the data analyzed; how
- ✓ How is the data protected (storage, cleaning, audit)
- ✓ Feedback mechanisms
- ✓ Mechanisms for follow up

ANNEXURE 3 – PMTC DATA ELEMENTS AND INDICATORS

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

Private Bag X828, PRETORIA, 0001, Hallmark Building, 226 Vermeulen Street, Pretoria
Tel (012) 312 0097/8 Fax (012) 312 3188

Dear Colleague

RE: PMTCT INDICATORS FOR MONITORING AND EVALUATION (M&E)

1. Attached find the indicators, and associated data elements, which the national DOH will use to undertake M&E of the PMTCT programme during 2010/11 and the implementation of the new PMTCT guidelines which come into effect on 1 April 2010.

2. This indicators are not new and hopefully will already be in place and operational in most places where PMTCT services are delivered.

3. It is recognised that these indicators will not please everyone; some will want more and some will want fewer. A pragmatic decision has been made to use these indicators for the 2010/11 financial year. During the course of the year a thorough review of these indicators will be undertaken with a view to streamline and integrate these indicators with other maternal and child health indicators.

4. Improved data collection tools, in the form of antenatal and maternity registers, will soon be distributed to all provinces and partners who are working in this area.

5. These indicators will form part of the national indicator dataset (NIDS) and will be systematically collected through the district health information system (DHIS). It is envisaged, based on information received from provinces, that there will be quarterly written feedback on the performance of the PMTCT programme.

6. We would welcome your constructive feedback as we jointly strive to improve PMTCT.

Yours sincerely

DR EDDIE MHLANGA
CLUSTER MANAGER: MATERNAL, CHILD AND WOMEN'S HEALTH
DATE: 26 March 2010

PMTCT Monitoring and Evaluation

Background

1. The PMTCT programme is one of the most important programmes in the whole health system as a well-implemented programme has the potential to virtually eliminate paediatric HIV within a few years; to decrease maternal morbidity and mortality; as well as to impact positively on all aspects of maternal, newborn and child health.

2. The President on World AIDS day, 1st December 2009, announced an invigorated national response to the HIV epidemic. This was followed by more detailed announcements on the national response by the Minister of Health, Dr Motsoaledi and repeated in his press conference announcement on 25 March 2010. Included in this response are new guidelines for the PMTCT programme.

3. To ensure that the programme is implemented effectively in all facilities a reliable monitoring and evaluation (M&E) system is an essential component.

4. These M&E indicators and data elements complement the revised (1st April 2010) PMTCT guidelines and aim at providing the M&E of these PMTCT guidelines.

5. These indicators have already been largely implemented in the provinces and have been minimally revised to take into account the new requirements contained in the PMTCT guidelines.

6. These indicators will be reviewed during the course of the 2010/11 year with a view to streamlining and integrating them into the MCWH programmes. The long term view is for PMTCT to disappear as a special programme and to become normalised as part of the overall PHC services offered at all facilities.

Indicators and data elements

1. The 16 priority indicators are contained in the Table 1 and the associated 20 data elements are contained in Table 2.

2. These indicators and data elements are the core of the NIDS which will be routinely monitored. There are however a number of additional data elements and indicators which can be automatically calculated by the DHIS (e.g. population coverage indicators), which managers can obtain from the DHIS if they want additional programme information.

Table 1: PMTCT Priority Indicators

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
1	**Antenatal client HIV 1st test rate** Short: ANC HIV 1st test rate Def: Antenatal clients HIV tested for the first time during current pregnancy as a proportion of antenatal clients eligible for first HIV tests.	%	95 NSP p 73	**Antenatal client HIV 1st test** Short: ANC HIV 1st test Def: Antenatal client eligible for HIV testing (NOT known positive) who was tested for the first time during her current pregnancy. Antenatal clients should preferably be tested at first antenatal visits but may be tested for the first time at a subsequent follow-up visit. Source: All facilities providing ANC	**Antenatal client eligible for HIV 1st test CALC** Short: ANC eligible HIV 1st CALC Def: Antenatal clients with unknown HIV status are eligible for first HIV tests. This is all antenatal first visits MINUS first visit clients on HAART MINUS first visit clients known HIV positive but NOT on HAART. Include clients who tested negative in previous HIV tests. Source: DHIS calculated
2	**Antenatal client HIV 1st test positive rate** Short: ANC HIV 1st test pos rate Def: Antenatal clients tested HIV positive as a proportion of antenatal clients HIV tested for the first time during current pregnancy.	%		**Antenatal client HIV 1st test positive** Short: ANC HIV 1st pos test Def: Antenatal client who tested positive for the first HIV test done during her current pregnancy. Comment: Count ONLY once on the day the HIV test was confirmed positive. Source: All facilities providing ANC	**Antenatal client HIV 1st test** Short: ANC HIV 1st test Def: Antenatal client eligible for HIV testing (NOT known positive) who was tested for the first time during her current pregnancy. Antenatal clients should preferably be tested at first antenatal visits but may be tested for the first time at a subsequent follow-up visit. Source: All facilities providing ANC

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
3	**Antenatal client CD4 1st test rate** Short: ANC CD4 1st test rate Def: HIV positive antenatal clients (NOT on HAART) CD4 tested for the first time during current pregnancy as a proportion of antenatal clients eligible for first CD4 tests.	%	95 NSP p 81	**Antenatal client CD4 1st test** Short: ANC CD4 1st test Def: HIV positive antenatal client (NOT on HAART) who was CD4 tested for the first time during her current pregnancy (preferably on the same day her HIV status was confirmed positive). Comment: All antenatal clients with known HIV positive status and NOT on HAART should have a CD4 count test done, preferably on the same day their HIV status is confirmed positive. Source: All facilities providing ANC	**Antenatal client eligible for CD4 1st test CALC** Short: ANC eligible CD4 1st CALC Def: Antenatal clients with positive HIV status (NOT on HAART) who are eligible for first CD4 tests. This is all antenatal clients who tested positive for first HIV tests PLUS clients re-tested positive at 32 weeks or later PLUS first visit clients known HIV positive but NOT on HAART. Source: DHIS calculated

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
4	**Antenatal client INITIATED on AZT during antenatal care rate** Short: ANC initiate AZT rate Def: HIV positive antenatal clients (NOT on HAART) initiated on AZT during antenatal care as a proportion of antenatal clients (NOT on HAART) who tested HIV positive during current pregnancy. Comment: Numerator data is collected during antenatal care only and NOT at point of delivery.	%		**Antenatal client INITIATED on AZT** Short: ANC initiate AZT Def: HIV positive antenatal client (NOT on HAART) who was initiated on AZT at any stage during her current pregnancy BEFORE going into labour. This data should be collected during antenatal care only and NOT at point of delivery. Source: All facilities providing ANC	**Antenatal client HIV test positive but NOT on HAART - total CALC** Short: ANC HIV pos tot CALC Def: Antenatal client (NOT on HAART) who tested HIV positive during her current pregnancy. This is all antenatal clients (NOT ON HAART) who tested positive for first HIV tests PLUS clients re-tested positive at 32 weeks or later. Source: DHIS calculated
5	**Antenatal client initiated on HAART rate** Short: ANC initiate HAART rate Def: HIV positive antenatal clients initiated on HAART as a proportion of HIV positive antenatal clients with CD4 counts under the specified threshold and/or WHO staging of 4. Comment: Align with ART indicators	%	100	**Antenatal client initiated on HAART** Short: ANC initiate HAART Def: HIV positive antenatal client who was initiated on HAART during her current pregnancy. Comment: This may be viewed as an ART data element but is crucial for monitoring effective implementation of the PMTCT program. Source: All facilities providing HAART services	**Antenatal client eligible for HAART** Short: ANC eligible HAART Def: HIV positive antenatal client with a CD4 count under the specified threshold and/or a WHO staging of 4. Source: All facilities providing ANC

Indicator		Type	Target/ Bench mark	Numerator	Denominator
6	**Antenatal client HIV re-test at 32 weeks rate** Short: ANC HIV retest 32 wk rate Def: Antenatal clients re-tested for HIV at 32 weeks gestation (or later) as a proportion of antenatal clients tested negative for first HIV tests done during current pregnancy. Comment: Used as a proxy indicator as it is not cost effective to monitor the cohorts with paper-based systems.	%	100	**Antenatal client HIV re-test at 32 weeks or later** Short: ANC HIV 32 wk re-test Def: Antenatal client who was re-tested for HIV at 32 weeks gestation or later after testing negative for HIV during an earlier antenatal visit. Comment: Each ANC client whose first HIV test was negative should be re-tested at 32 weeks or later to detect late sero-converters. The period between the first test and re-test should be at least 6 weeks. If the 32 week re-test result is not available on the ANC card, the woman must be re-tested during labour. Source: All facilities providing ANC and delivery services	**Antenatal client HIV 1st test negative CALC** Short: ANC HIV 1st neg test CALC Def: Antenatal client who tested negative for the first HIV test done during her current pregnancy. This is all antenatal clients who were tested for HIV for the first time MINUS those that tested positive at their first test. Source: DHIS calculated

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
7	**Antenatal client HIV re-test positive at 32 weeks rate** Short: ANC HIV retest pos 32 wk Def: Antenatal clients re-tested positive for HIV at 32 weeks gestation (or later) as a proportion of antenatal clients re-tested for HIV at 32 weeks (or later).	%		**Antenatal client HIV re-test positive at 32 weeks or later** Short: ANC HIV pos 32 wk re-test Def: Antenatal client who was re-tested positive for HIV at 32 weeks gestation or later after testing negative for HIV during an earlier antenatal visit. Comment: Count ONLY once on the day the HIV test was confirmed positive. Source: All facilities providing ANC and delivery services	**Antenatal client HIV re-test at 32 weeks or later** Short: ANC HIV 32 wk re-test Def: Antenatal client who was re-tested for HIV at 32 weeks gestation or later after testing negative for HIV during an earlier antenatal visit. Comment: Each ANC client whose first HIV test was negative should be re-tested at 32 weeks or later to detect late sero-converters. The period between the first test and re-test should be at least 6 weeks. If the 32 week re-test result is not available on the ANC card, the woman must be re-tested during labour. Source: All facilities providing ANC and delivery services
8	**Antenatal client on AZT before labour uptake** Short: ANC AZT uptake Def: HIV positive antenatal clients (NOT on HAART) on AZT for any period before labour as a proportion of live births to HIV positive women.	%		**Antenatal client on AZT before labour** Short: ANC on AZT before labour Def: HIV positive antenatal client (NOT on HAART) who was on AZT for any period during her current pregnancy BEFORE going into labour. This data should be collected at point of delivery only and NOT during antenatal care.	**Live birth to HIV positive woman** Short: Live birth HIV pos woman Def: Live birth to HIV positive woman. Includes babies born before arrival (BBA) at health facilities and babies born outside health facilities. Live birth is a baby, irrespective of the duration of the pregnancy, who breathes or shows any other signs of life after birth.

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
	Comment: This data is collected at point of delivery only and NOT during antenatal care.			Source: All facilities providing delivery services	Source: All facilities providing delivery services
9	**Antenatal client Nevirapine uptake** Short: ANC NVP uptake Def: HIV positive antenatal clients (NOT on HAART) who took Nevirapine during labour as a proportion of live births to HIV positive women. Comment: This data is collected at point of delivery only and NOT during antenatal care.	%	95 NSP p 73	**Antenatal client Nevirapine taken during labour** Short: ANC NVP taken in labour Def: HIV positive antenatal client (NOT on HAART) who took Nevirapine during labour. This data should be collected at point of delivery only and NOT during antenatal care. Comment: Even if the antenatal client received Nevirapine at a primary health care facility during antenatal care, ONLY clients who took Nevirapine during labour should be counted for this element. Source: All facilities providing delivery services	**Live birth to HIV positive woman** Short: Live birth HIV pos woman Def: Live birth to HIV positive woman. Includes babies born before arrival (BBA) at health facilities and babies born outside health facilities. Live birth is a baby, irrespective of the duration of the pregnancy, who breathes or shows any other signs of life after birth. Source: All facilities providing delivery services

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
10	**Antenatal client delivering on HAART rate**	%	70	**Antenatal client on HAART on delivery** Short: ANC client deliver on HAART Def: HIV positive antenatal client who was on lifelong ART at delivery in facility providing delivery services (including BBAs) Comment: This may be viewed as an ART data, but is crucial for monitoring effective implementation of ART guidelines in pregnant women Source: All facilities providing delivery services	**Antenatal client eligible for HAART** Short: ANC eligible HAART Def: HIV positive antenatal client with a CD4 count under the specified threshold and/or a WHO staging of 4. Source: Antenatal records transferred to labour records
11	**Baby Nevirapine uptake** Short: Baby NVP uptake Def: Babies (including BBAs and known home deliveries) given Nevirapine within 72 hours after birth as a proportion of live births to HIV positive women.	%	100	**Baby given Nevirapine within 72 hours after birth** Short: Baby NVP <72 hrs Def: Baby born to HIV positive woman who received Nevirapine within 72 hours after birth. Also count babies not delivered in health facilities (BBAs and known home deliveries) who were given Nevirapine within 72 hours after birth. Source: All facilities	**Live birth to HIV positive woman** Short: Live birth HIV pos woman Def: Live birth to HIV positive woman. Includes babies born before arrival (BBA) at health facilities and babies born outside health facilities. Live birth is a baby, irrespective of the duration of the pregnancy, who breathes or shows any other signs of life after birth. Source: All facilities providing delivery services

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
12	**Baby Co-Trimoxazole around 6 weeks uptake** Short: Baby Co-Trim 6 wk uptake Def: Babies initiated on Co-Trimoxazole around 6 weeks after birth (to prevent opportunistic infections) as a proportion of live births to HIV positive women. Comment: Used as a proxy indicator as it is not cost effective to monitor the cohorts with paper-based systems.	%	100 NSP P81	**Baby initiated on Co-Trimoxazole around 6 weeks** Short: Baby Co-Trim 6 wk Def: Baby born to HIV positive woman who was initiated on Co-Trimoxazole around 6 weeks after birth to prevent opportunistic infections. Source: All facilities	**Live birth to HIV positive woman** Short: Live birth HIV pos woman Def: Live birth to HIV positive woman. Includes babies born before arrival (BBA) at health facilities and babies born outside health facilities. Live birth is a baby, irrespective of the duration of the pregnancy, who breathes or shows any other signs of life after birth. Source: All facilities providing delivery services
13	**Baby PCR test around 6 weeks uptake** Short: Baby PCR 6 wk uptake Def: Babies PCR tested around 6 weeks after birth as a proportion of live births to HIV positive women. Comment: Used as a proxy indicator as it is not cost effective to monitor the cohorts with paper-based systems.	%	100	**Baby PCR test around 6 weeks** Short: Baby PCR 6 wk test Def: Baby born to HIV positive woman who was PCR tested for the first time around 6 weeks after birth. Babies PCR tested for the first time between 4 and 12 weeks must be included. Do NOT include repeat tests. Comment: Babies born to HIV positive women must be PCR tested when they get their first vaccinations 6 weeks after birth. Because sick babies may be tested before 6 weeks and some may receive their first vaccinations after 6 weeks, it was agreed to count PCR tests done between 4 and 12 weeks under PCR test	**Live birth to HIV positive woman** Short: Live birth HIV pos woman Def: Live birth to HIV positive woman. Includes babies born before arrival (BBA) at health facilities and babies born outside health facilities. Live birth is a baby, irrespective of the duration of the pregnancy, who breathes or shows any other signs of life after birth. Source: All facilities providing delivery services

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
				around 6 weeks. Source: All facilities providing PCR testing	
14	**Baby PCR test positive around 6 weeks rate** Short: Baby PCR pos 6 wk rate Def: Babies tested PCR positive around 6 weeks after birth as a proportion of babies PCR tested around 6 weeks.	%	5	**Baby PCR test positive around 6 weeks** Short: Baby PCR pos 6 wk Def: Baby born to HIV positive woman who tested PCR positive around 6 weeks after birth for the first PCR test. Babies PCR tested for the first time between 4 and 12 weeks must be included. Comment: Count ONLY once on the day the HIV test was confirmed positive. Source: All facilities providing PCR testing	**Baby PCR test around 6 weeks** Short: Baby PCR 6 wk test Def: Baby born to HIV positive woman who was PCR tested for the first time around 6 weeks after birth. Babies PCR tested for the first time between 4 and 12 weeks must be included. Do NOT include repeat tests. Comment: Babies born to HIV positive women must be PCR tested when they get their first vaccinations 6 weeks after birth. Because sick babies may be tested before 6 weeks and some may receive their first vaccinations after 6 weeks, it was agreed to count PCR tests done between 4 and 12 weeks under PCR test around 6 weeks. Source: All facilities providing PCR testing

	Indicator	Type	Target/ Bench mark	Numerator	Denominator
15	**Baby HIV antibody test at 18 months uptake** Short: Baby HIV 18 m test uptake Def: Babies tested for HIV antibodies around 18 months after birth as a proportion of babies who tested PCR negative around 6 weeks after birth. Comment: Used as a proxy indicator as it is not cost effective to monitor the cohorts with paper-based systems.	%	100	**Baby HIV antibody test at 18 months** Short: Baby HIV 18 m test Def: Baby born to HIV positive woman who was tested for HIV antibodies (rapid or ELISA) 18 months after birth. This should include babies who previously tested PCR negative as well as those not PCR tested. Source: All facilities	**Baby PCR test negative around 6 weeks CALC** Short: Baby PCR neg 6 wk CALC Def: Baby born to HIV positive woman who tested PCR negative around 6 weeks after birth for the first PCR test. This is all babies who were PCR tested for the first time around 6 weeks MINUS those that tested positive at their first PCR test. Source: DHIS calculated
16	**Baby HIV antibody test positive at 18 months rate** Short: Baby HIV pos 18 m rate Def: Babies tested positive for HIV antobodies around 18 months after birth as a proportion of babies tested for HIV antibodies around 18 months.	%	5	**Baby HIV antibody test positive at 18 months** Short: Baby HIV pos 18 m Def: Baby born to HIV positive woman who was tested positive for HIV antibodies 18 months after birth. Comment: Count ONLY once on the day the HIV test was confirmed positive. Source: All facilities	**Baby HIV antibody test at 18 months** Short: Baby HIV 18 m test Def: Baby born to HIV positive woman who was tested for HIV antibodies (rapid or ELISA) 18 months after birth. This should include babies who previously tested PCR negative as well as those not PCR tested. Source: All facilities

Table 2: PMTCT Priority data elements to be collected by facilities

	Data element	Data element short	Definition	Comment	Point of collection/Source
1	**Antenatal client on HAART at 1st visit**	ANC on HAART 1st visit	HIV positive antenatal client who is on HAART at the time of her first antenatal visit.	This element indicates the women who fell pregnant while on HAART.	Source: All facilities providing ANC
2	**Antenatal client known HIV positive but NOT on HAART at 1st visit**	ANC known HIV+ not HAART	Antenatal client with known HIV positive status but NOT on HAART at her first antenatal visit. In the absence of documented proof, verbal confirmation of HIV status is acceptable and a CD4 count test must be done.		Source: All facilities providing ANC
3	**Antenatal client HIV 1st test**	ANC HIV 1st test	Antenatal client eligible for HIV testing (NOT known positive) who was tested for the first time during her current pregnancy. Antenatal clients should preferably be tested at first antenatal visits but may be tested for the first time at a subsequent follow-up visit.		Source: All facilities providing ANC
4	**Antenatal client HIV 1st test positive**	ANC HIV 1st pos test	Antenatal client who tested positive for the first HIV test done during her current pregnancy.	Count ONLY once on the day the HIV test was confirmed positive.	Source: All facilities providing ANC
5	**Antenatal client CD4 1st test**	ANC CD4 1st test	HIV positive antenatal client (NOT on HAART) who was CD4 tested for the first time during her current pregnancy (preferably on the same day her HIV status was confirmed positive).	All antenatal clients with known HIV positive status and NOT on HAART should have CD4 count tests done, preferably on the same day their HIV status is	Source: All facilities providing ANC

	Data element	Data element short	Definition	Comment	Point of collection/Source
				confirmed positive.	
6	**Antenatal client INITIATED on AZT**	ANC initiate AZT	HIV positive antenatal client (NOT on HAART) who was initiated on AZT at any stage during her current pregnancy BEFORE going into labour. This data should be collected during antenatal care only and NOT at point of delivery.		Source: All facilities providing ANC
7	**Antenatal client eligible for HAART**	ANC eligible HAART	HIV positive antenatal client with a CD4 count under the specified threshold and/or a WHO staging of 4.		Source: All facilities providing ANC ANC records to be transferred to labour records at delivery facilities
8	**Antenatal client initiated on HAART**	ANC initiate HAART	HIV positive antenatal client who was initiated on HAART during her current pregnancy.	This may be viewed as an ART data element but is crucial for monitoring effective implementation of the PMTCT program.	Source: All facilities providing HAART services
9	**Antenatal client delivering on HAART**	ANC client deliver on HAART	HIV positive antenatal client who was on lifelong ART at delivery in facility providing delivery services (including BBAs)	This may be viewed as an ART data, but is crucial for monitoring effective implementation of ART guidelines in pregnant women	Source: All facilities providing delivery services

Data element		Data element short	Definition	Comment	Point of collection/Source
10	**Antenatal client HIV re-test at 32 weeks or later**	ANC HIV 32 wk re-test	Antenatal client who was re-tested for HIV at 32 weeks gestation or later after testing negative for HIV during an earlier antenatal visit.	Each ANC client whose first HIV test was negative should be re-tested at 32 weeks or later to detect late sero-converters. The period between the first test and re-test should be at least 6 weeks. If the 32 week re-test result is not available on the ANC card, the woman must be re-tested during labour.	Source: All facilities providing ANC and delivery services
11	**Antenatal client HIV re-test positive at 32 weeks or later**	ANC HIV pos 32 wk re-test	Antenatal client who was re-tested positive for HIV at 32 weeks gestation or later after testing negative for HIV during an earlier antenatal visit.	Count ONLY once on the day the HIV test was confirmed positive.	Source: All facilities providing ANC and delivery services
12	**Antenatal client on AZT before labour**	ANC on AZT before labour	HIV positive antenatal client (NOT on HAART) who was on AZT for any period during her current pregnancy BEFORE going into labour. This data should be collected at point of delivery only and NOT during antenatal care.		Source: All facilities providing delivery services
13	**Antenatal client Nevirapine taken during labour**	ANC NVP taken in labour	HIV positive antenatal client (NOT on HAART) who took Nevirapine during labour. This data should be collected at point of delivery only and NOT during antenatal care.	Even if the antenatal client received Nevirapine at a primary health care facility during antenatal care, ONLY clients who took Nevirapine during labour should be counted for this element.	Source: All facilities providing delivery services

Data element		Data element short	Definition	Comment	Point of collection/Source
14	**Live birth to HIV positive woman**	Live birth HIV pos woman	Live birth to HIV positive woman. Includes babies born before arrival (BBA) at health facilities and babies born outside health facilities. Live birth is a baby, irrespective of the duration of the pregnancy, who breathes or shows any other signs of life after birth.		Source: All facilities providing delivery services
15	**Baby given Nevirapine within 72 hours after birth**	Baby NVP <72 hrs	Baby born to HIV positive woman who received Nevirapine within 72 hours after birth. Also count babies not delivered in health facilities (BBAs and known home deliveries) who were given Nevirapine within 72 hours after birth.		Source: All facilities
16	**Baby initiated on Co-Trimoxazole around 6 weeks**	Baby Co-Trim 6 wk	Baby born to HIV positive woman who was initiated on Co-Trimoxazole around 6 weeks after birth to prevent opportunistic infections.		Source: All facilities
17	**Baby PCR test around 6 weeks**	Baby PCR 6 wk test	Baby born to HIV positive woman who was PCR tested for the first time around 6 weeks after birth. Babies PCR tested for the first time between 4 and 12 weeks must be included. Do NOT include repeat tests.	Babies born to HIV positive women must be PCR tested when they get their first vaccinations 6 weeks after birth. Because sick babies may be tested before 6 weeks and some may receive their first vaccinations after 6 weeks, it was agreed to count PCR tests done between 4 and 12 weeks under PCR test around 6 weeks.	Source: All facilities providing PCR testing

Data element		Data element short	Definition	Comment	Point of collection/Source
18	**Baby PCR test positive around 6 weeks**	Baby PCR pos 6 wk	Baby born to HIV positive woman who tested PCR positive around 6 weeks after birth for the first PCR test. Babies PCR tested for the first time between 4 and 12 weeks must be included.	Count ONLY once on the day the HIV test was confirmed positive.	Source: All facilities providing PCR testing
19	**Baby HIV antibody test at 18 months**	Baby HIV 18 m test	Baby born to HIV positive woman who was tested for HIV antibodies (rapid or ELISA) 18 months after birth. This should include babies who previously tested PCR negative as well as those not PCR tested.		Source: All facilities
20	**Baby HIV antibody test positive at 18 months**	Baby HIV pos 18 m	Baby born to HIV positive woman who was tested positive for HIV antibodies 18 months after birth.	Count ONLY once on the day the HIV test was confirmed positive.	Source: All facilities

ANNEXURE 4 - ADDITIONAL PROXY INDICATORS FOR PMTCT PROGRAM MONITORING

Additional PROXY Indicators that can be used to assist with monitoring PMTCT services and potential shortcomings

NB! The DHIS contains public health facility data only. Public health facilities are used by 75-85% of the SA population. DHIS data serves as estimates and proxies to monitor trends and informing public health care management decisions down to local level between official surveys and other research.

	Indicator	Indicator type	Target or Benchmark	Numerator	Denominator	Indicator Description
1	Antenatal coverage (ANC cov)	%	90	Antenatal 1st visits	Potential antenatal clients in population	Women who have ANC 1st (booking) visit as % of expected pregnant women. PROXY for availability, accessibility, acceptability and utilization of facilities providing ANC services
2	Antenatal visits before 20 weeks rate (ANC < 20w cov)	%	40	Antenatal 1st visit before 20 weeks	Antenatal 1st visits	Women who have a ANC 1st (booking) visit before 20 weeks pregnant as % of all ANC visits. PROXY for ANC health promotion success
3	Births before arrival (BBA) rate	%	5	Babies born before arrival	Total births	The number of births before arrival (in cars, taxis and ambulances) as percentage of total births. PROXY for availability and accessibility of delivery services AND quality of health education to pregnant women
4	Caesarean section rate	%	> 10	Caesarean sections	Delivery in facility	Number of caesarean sections as percentage of total deliveries. PROXY for measuring the availability, accessibility acceptability and use of advanced delivery services AND hospitals performing surgical procedures under general anesthesia
5	Couple year protection rate (CYPR)	%	40	Contraceptive years dispensed (including sterilizations)	Female target population 15-44 years	Estimates the percentage of women protected against pregnancy using modern contraceptives. PROXY for MDG contraceptive prevalence rate
6	Delivery rate in facility	%	90	Delivery in facility	Deliveries expected in population	The percentage of expected deliveries that take place in health facilities. PROXY for MDG births attended by skilled health personnel.
7	DTP-Hib 1st dose coverage	%	90	DTP-hib 1st dose	Children under 1 year in the population	The percentage of children who received their DTP-Hib 1st dose vaccination at 6 weeks of age. PROXY for measuring availability, accessibility, acceptability and use of PHC facilities

	Additional PROXY Indicators that can be used to assist with monitoring PMTCT services and potential shortcomings NB! The DHIS contains public health facility data only. Public health facilities are used by 75-85% of the SA population. DHIS data serves as estimates and proxies to monitor trends and informing public health care management decisions down to local level between official surveys and other research.					
	Indicator	**Indicator type**	**Target or Benchmark**	**Numerator**	**Denominator**	**Indicator Description**
8	Facility Infant mortality rate (FIMR)	1K	15/1,000 estimated live births (MDG)	Under one year deaths reported by public health facilities	Estimated live births in population	Number of under one deaths reported by public health facilities per 1,000 estimated live births. PROXY for MDG infant mortality rate (IMR)
9	Facility maternal mortality ratio (FMMR)	100K	38/100,000 estimated live births (MDG)	Maternal deaths reported by public health facilities	Estimated live births in population	Number if maternal deaths reported by public health care facilities per 100,000 estimated live births. PROXY for MDG maternal mortality rate (MMR)
10	Facility under five mortality rate (FU5MR)	1K	20/1,000 estimated live births (MDG)	Under five year deaths reported by public health facilities	Estimated live births in population	Number of under 5 deaths reported by public health facilities per 1,000 estimated live births. PROXY for MDG under five mortality rate (U5MR)
11	Lab CD4 result turn-around time under 6 days rate	%	95 (NSP:80)	CD4 results received within 6 days	Blood drawn for CD4	CD4 blood results received at the facility within 6 days of sending the samples as % of total CD4 samples sent to laboratories (exclude Saturdays and Sundays)
12	Male condom distribution rate	Number	11	Male condoms distributed	Male population 15 years and older	The number of male condoms distributed per male 15 years and older. PROXY MDG Condom use rate.

Annexure 5: MANUAL PRESENTATION OF HEALTH INFORMATION

Learning outcomes
On completion of this sectional participants will be able to:

- Use data/information to produce hand –drawn graphs and charts to present information

1. INTRODUCTION

Pivot tables can be produced on Excel to enable data to be viewed at different levels and over different periods. Graphs, lists and maps can also be generated electronically to display data/information.

The reality is that not all managers at all levels have access to computers, but it is still possible to generate manual presentations of data to use in evidence based health management.
Hand drawn graphs enables meaningful discussion with facility teams and will strengthen utilization of information and increase understanding of information system.
Graphs in facilities should show all important activities and be prominently displayed to enable staff members and the public to see at a glance how the facility is performing its services.
Supervisory visits should focus on information analysis, interpretation and action plans.
The supervisor should bring feedback on the previous month's data and interpret it with staff and compile action plans based on that. It also provides the opportunity to check the quality of data and build skills of staff to manage and use information and data.
The community served by the facility is represented by a clinic committee. If information is shared with them, coordinated action can be taken to improve service delivery with a positive impact on health status.
Each facility should have a set of graphs illustrating coverage and quality of integrated, comprehensive services it provides in its programs. Start with one graph from each program and extend from there. Add data each month before the report is sent to the next level.

2. VALUE OF GRAPHS

To compile hand drawn graphs makes it easier to see and interpret information. This ensures that information is fully understood. It tells a story that would have been difficult if one only sees a mass of figures in front of you.
By representing figures in graphs, one is able to:

- Summarize data
- Detect trends over time
- Search for patterns among large amounts of data
- Analyse the relationships between variables or different data elements

Therefore one is personally involved in information management and become more aware of the importance of evidence based health management at facility level.
By physically preparing graphs and charts, data quality is assessed. It is easier to identify outliers or gaps and errors.
Indicators can be scanned for consistency (indicators similar over reporting period covered in table), completeness (indicators reflect activities carried out in facility) and common sense (indicators are in normal range and progress toward target set for facility)

3. GOLDEN RULES FOR GRAPHS

- Never put too much information on one graph, usually one indicator to one graph

- Keep graphs clear and simple
- Never mix different activities, stick to one group of people (e.g. male of reproductive age) or disease (e.g. TB patient tested for HIV) or services (e.g. antenatal client HIV 1st test rate)
- Graphs must be labeled and easily readable: clear heading, labels on the axes (vertical and horizontal) and with legend explaining each of the lines or bars or proportion of pie graphs
- Select scales that fill the entire graph on both axes
- Show target line or reference point to indicated where you are aiming at
- Use colours or shading or markings to distinguish between lines and bars – this must also be reflected in the explanatory legends
- Prepare as neatly as possible – graph paper is not always available, but a ruler can be used to draw straight lines or a saucer for pie charts – remember this reflects the quality of service in your facility!

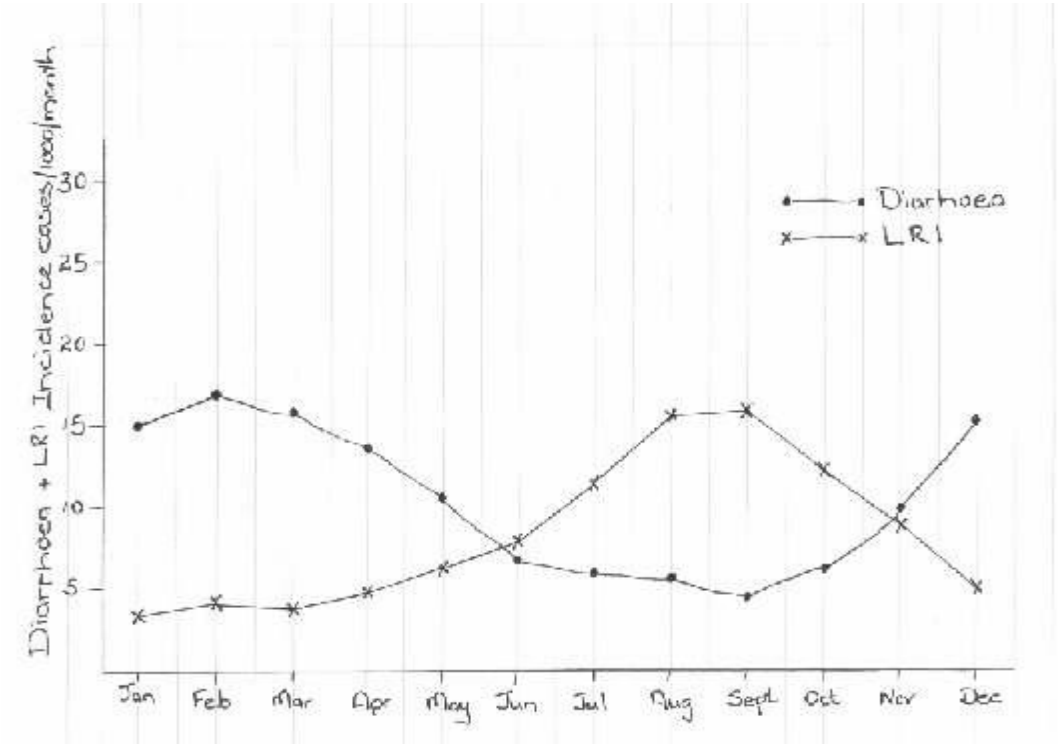
4. TYPES OF GRAPHS

The four main types of graphs that are used in DHIS, their use, advantages and disadvantages are discussed and example of each is given.

Type of graph	Use	Advantages	Disadvantages
Line graphs Data is plotted as points joined to form a continuous line. The horizontal X-axis Is usually time and the vertical Y- axis is the variable (or indicator) that is displayed	It shows patterns or trends of related activities over time and are useful if more than one data item has to be displayed	One of the easiest graphs to draw and understand Good to make comparisons over time	Can be confusing if too many lines are drawn Total figures are not shown

Example of hand drawn line graph:

Incidence of Diarrhea and Lower Respiratory rate March 2010 for Clinic Y

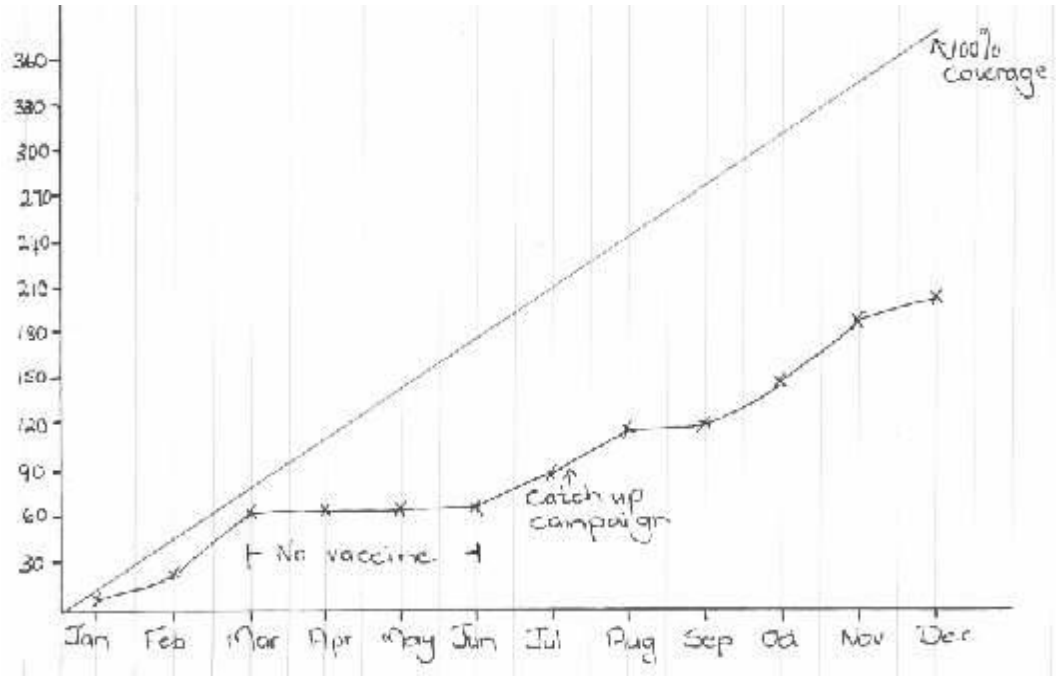


Source: DHIS

Type of graph	Use	Advantages	Disadvantages
Cumulative coverage graphs Activities for month are added to cumulative total of the preceding months and this total is compared to the target line to see whether the target is being reached	Shows progress towards a fixed target each month	Slower progress over time Shows total accomplishment	Requires monthly addition Confusion may occur between # and %

Example of hand drawn cumulative line graph:

Immunisation coverage fully immunized by age 1 Year 2008 for Clinic XX

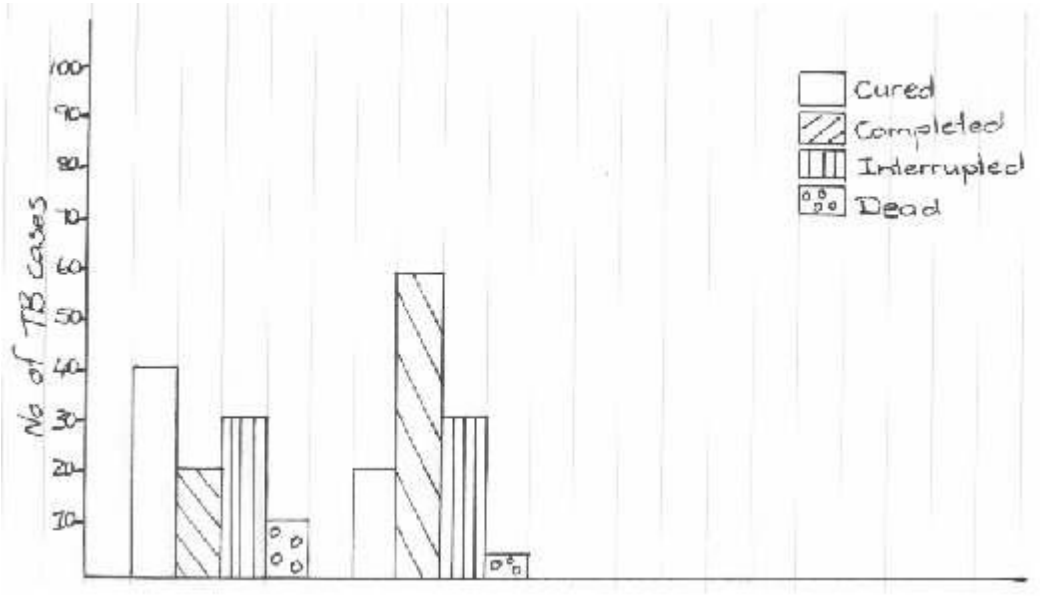


Source: DHIS

Type of graph	Use	Advantages	Disadvantages
Bar graphs Vertical or horizontal bars placed on either axis. The one axis should represent a quantitative variable and the other quantitative or qualitative variable	Displays the percentages or proportions of data that can be of different categories	Easy to draw each month Easy for comparison and identifying trends	Cumulative total Many items may become confusing

Example of hand drawn bar graph

TB outcomes for clinic X for 2009

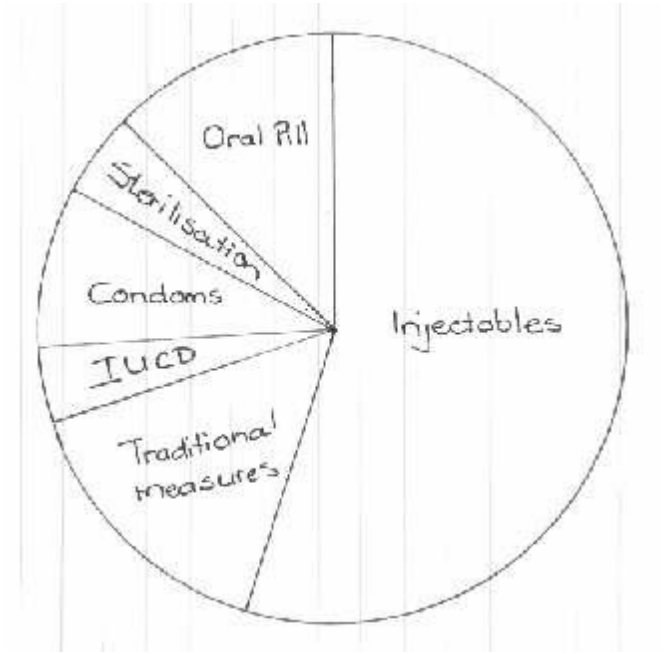


Source: DHIS

Type of graph	Use	Advantages	Disadvantages
Pie charts A circle is drawn and then to draw slices, get figures expressed as % of the whole and then calculate angle needed by multiplying by 360)	Shows proportion of activity as part of the whole	Shows the "whole" at a glance Size relates to importance or majority	Difficult to plot angles No change in time – just for a specific period

Example of hand drawn pie graph:

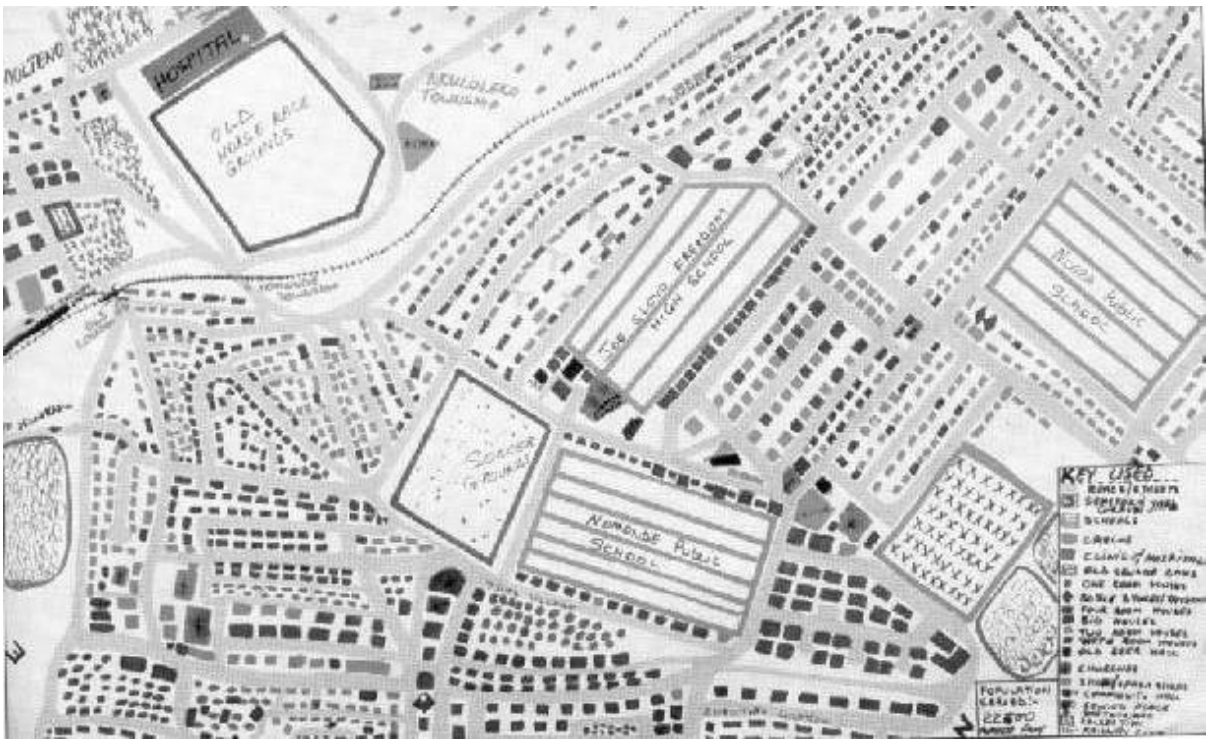
P users' contraceptive choice during 2001, Xmilea clinic



Source: DHIS

5. MAPS

Maps are used to understand the catchment area of a facility. On can draw a map to display population, geography, resources, economic activities and other issues in the environment.
This kind of information is not readily accessible in any format. The Health Information officer can assist with information required to develop map.



The EQUITY Project has developed 15 steps in mapping that can be followed (Heywood and Rohde undated:74).
This will make the process to be followed to compile a map much easier.

12 STEPS FOR A RURAL MAP	
Step 1	Organise a meeting of the clinic team, include clinic staff, the clinic committee, the environmental health officer and community health workers. Invite members of District health management team. Ensure that the meeting includes persons who would be able to describe where most patients come from and people who know names of communities and localities
Step 2	Discuss the purpose of the mapping: • To gain information about communities, their environment and use of service • To locate on a map features which are related to health of the community • To determine all the communities from which patients come to the clinic • To estimate the population served by the clinic and then to determine coverage rates of services • To understand the geographical and other factors which make access to clinic difficult • To use the information in future work e.g. Investigating outbreaks
Step 3	Read the sheet of notes and definitions before starting to fill in the form for mapping a clinic catchment area
Step 4	List all localities on the form and complete all columns
Step 5	When the clinic is not busy, extract names of localities and number of patients attending from each area during the last complete month. Count the total and the number attending from each locality and work out percentage of the total who comes from each place. Two months is preferable and even better would be if extractions can be from one dry month and one wet month. Two people should work together, one reading out address of each patient while other ticks it off. If community members are present, be careful not to mention patients names, but only addresses

Step 6	List the names of localities thought to contribute most patients on the form and the names of localities from which large numbers of patients (or greater %) actually came. These constitutes the greater part of the catchment area
Step 7	Try to identify these places on any printed large scale map you have already obtained
Step 8	If the area is hilly, walk to a high area with knowledgeable local people and get them to point out where the localities are situated. If there is a central road, drive up and down on it to determine where villages (localities) are
Step 9	Draw these on a map with the clinic in the middle, north at the top, east on right, west on left and south at the bottom. Put in roads and indicated distances from where to where. Put in names of localities and schools, shops, roads and other identified places
Step 10	When census maps and the population census is available, draw the catchment area again more to scale and write the population for each village
Step 11	Discuss your map with clinic staff and with the community/clinic committee. You might want to sketch in corrections and changes and when you feel you have the entire area portrayed on the map, sketch a “final version” incorporating all the corrections and modifications
Step 12	Make sure you fix the map on the wall in a permanent place in the clinic
Additional steps for an urban area	
Step 13	In an urban area the clinic often has a catchment area which includes high density formal areas, low density upper economic areas, informal settlements and perhaps nearby farms or settlements along roads leading to the town
Step 14	An additional step after listing the names on the form and extracting addresses from the register, is to drive around the town and obtain and idea of its layout in relation for informal settlements
Step 15	Many urban areas have printed municipal maps. Sketch you clinic catchment area using a coloured pencil. As an urban area often has several clinics, sketch in the catchment area for each using different colours. Fill in the map in different colours sowing taxi routes, churches, shops, sports fields and the local names of different areas

Each individual learner will receive a printout of a pivot table with their facility's data. Use this data to prepare a hand drawn graph.
These graphs will be displayed and discussed by the bigger group afterwards

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