Monitoring and Evaluation

Short Manual

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Content of the Manual

1. Objective of the Manual

This manual serves as a short text to provide basic information on Monitoring and Evaluation for all those working in the health sector at the federal and state level in Sudan. It cannot replace a 2 or 3 week short course on M&E, which is advisable for all those, whose primary task is directly related to M&E.

2. Basic Concepts

2.1. Monitoring

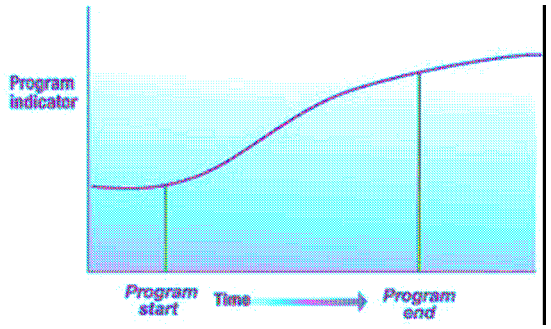
Monitoring is the continuous and systematic data collection on specified indicators to provide management and main stakeholders of an intervention with indications of progress toward achieving objectives and outputs as well as use of allocated funds. In operational terms, monitoring refers to the process of regularly checking on the status of a programme or tasks by comparing the actual implementation against a pre-established workplan, including whether the tasks or planned activities are being completed as intended, whether they are being conducted within the timeframe specified, and whether the budget is being spent as planned.

2.2. Evaluation

Evaluation is the systematic and objective assessment of a project, a disease programme, a policy, or even the whole sector strategy as to the relevance of its design, effectiveness and efficiency of implementation, its impact and sustainability. An evaluation report usually includes lessons learned and recommendations for improvement. Evaluation is primarily directed at measuring progress toward the achievement of pre-established objectives and the intended impact generated as a result. This can include measuring the extent to which the changes that have occurred are attributable to the policy, programme or project.

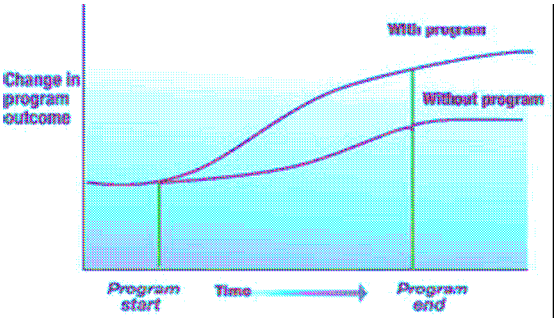
2.3. Differences between Monitoring and Evaluation

Measurement	**Monitoring**	**Evaluation**
Purpose	Improve efficiency, adjust the work plans	Improve effectiveness, impact and future strategies
Content	Descriptive	Assesses reasons why objectives were (not) achieved, causal relationships, attribution
Action	Keeping track	Assessment
Level	Measures lower levels of the logframe (inputs, activities and outputs/outcomes)	Measures higher levels of logframe (outputs/outcomes, objectives and impact)
Timeframe	Shorter timeframe (quarterly or annual progress)	Longer timeframe (several years)
Frequency	Continuous, regular; and at beginning to provide baseline	At mid-term or end-term of a project, programme or plan
Tools	Focuses mainly on measuring indicators, using HIS, progress reports, field observation and rapid assessment	Uses multiple tools, such as monitoring of indicators, interviews, studies, surveys, triangulation
Agent	Done internally	Done internally and/or externally or joint



The program indicator being measured on the "Y" axis could be any element of the program that needs tracking, such as the cost of supplies, the number of times the staff provide certain information to clients, or the percentage of clients who are pleased with the services they received.

A graphic illustration of programme monitoring over time could look like this.



A graphic illustration of programme impact evaluation would look like this. The height of the orange line between the blue lines indicates the additional impact attributable to the program at the end of its lifetime.

Source: M&E fundamentals – A Self-Guided Minicourse. Measure Evaluation, Jan 2007.

2.4. M&E Plan

An M&E plan can be a document, but usually is a chapter in a strategic plan (such as the FMoH 5-year health strategy or an action plan of a disease programme), that describes the procedures that will be implemented to determine whether or not the objectives of the work plan or strategy are met. It spells out which information the M&E system will collect, from which sources, how often, who is responsible for it, how the quality is assured, and how this information will be used to improve performance. It will also indicate how the plan or strategy will be evaluated, by whom and how often.

2.5. M&E Framework or Matrix

An M&E Framework or Matrix is a document, based on the logical framework of the plan or strategy, that includes the objectives, the outputs or results to be achieved for each objective and the activities to be implemented for each output. The logframe itself usually also includes assumptions or

risks, as well as the budget needed to implement the activities (see Section 4). The M&E Framework or Matrix does not include assumptions and budget, but rather includes indicators which will measure progress on objectives, outputs and activities. It should also include a baseline value for each numerical indicator and a target (at a certain date), the source of information (SOI), the means of verification (MOV), the frequency with which the indicator will be measured, as well as which organisation or department is responsible for measuring the indicator (collecting the data). More information on indicators can be found in Section 9.

3. Why Monitor and Evaluate?

We gather and analyse information about strategies, plans, programmes and projects, because we want to :

- know which interventions work and which do not or which work better (and maybe why)
- track progress towards achieving targets and objectives
- know how much the health services cost and how cost-effective they are

In short, because we want to know how well we are performing.

This information can be used to support :

- evidence-based policy-making, priority setting & planning
- performance-based budgeting (PBB)
- results-based management
- improving efficiency of services
- enhancing transparency and accountability

In short M&E can be used **to improve the performance of the system and thus the health of the population**.

There is no inherent value in M&E. The M&E system generates **information**. Only if that information is **relevant**, **reliable**, **timely**, properly **analysed** and **used** for decision-making, will it contribute to improved performance of the health system, which in turn will improve the health of the population (assuming that the health services we supply are effective).

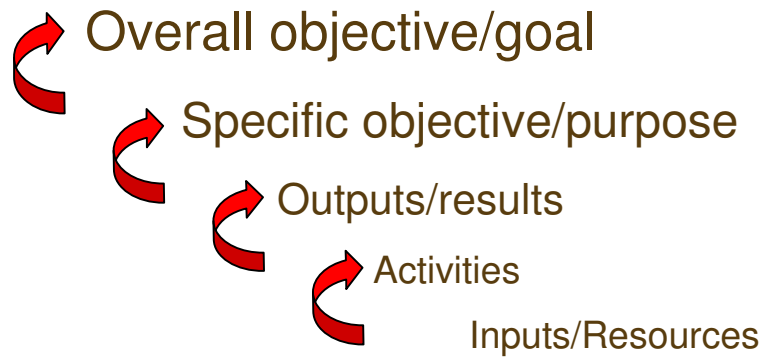
- Which information is **relevant** to collect will be discussed in Section 5 : What to monitor?
- How to ensure that information is **reliable** and **timely** will be dealt with in
    - Section 7 : How to monitor?
    - Section 8 : Data sources
    - Section 9 : Indicators
- **Analysis** and **utilisation** of information will feature in Section 10
- The additional value of evaluation will be discussed in Section 11

4. Relation to Plans and Logical Frameworks

Monitoring is very much linked to strategic or action plans, because these specify the objectives, results and activities that need to be followed up. Most strategic plans or action plans have a logical framework (**logframe** for short), which clarifies how the resources used are linked to the final impact (called the **result chain**), which assumptions are made and which implementation risks exist.

4.1. Monitoring Each Level of the Logframe

A good strategic or action plan has a logical structure, whereby each level is logically related to the next:



This can be translated as :

- IF adequate inputs/resources are provided, THEN activities can be undertaken (process)
- IF the activities are undertaken, THEN results can be produced (output)
- IF results are produced, THEN the objective will be achieved (outcome) and
- IF the objective is achieved, THEN this should contribute towards the overall goal (impact)

An important pre-condition for effective M&E is that the structure of the plan is indeed logical, meaning that there is a causal relationship between the levels. Because if there are gaps in the logic, the pathway will not lead to the desired effects.

For each of the levels of the logframe all specific entries have indicators. An example of what that looks like is given in the following table.

Goal	Objective	Output	Activity	Input	Indicator
1. Improve maternal health					Maternal mortality
	1.1. Decrease fertility				Total fertility rate
		1.1.1 Number of couples using modern contraceptives increased			Contraceptive prevalence rate or Couple Years of Protection (CYP)
			1.1.1.1 Make modern contraceptives free of charge	Sufficient financial resources	Ministerial decree signed
			1.1.1.2 Train PHC staff in FP counseling	• Qualified trainers • Money for venue, per diem, transport etc.	% of PHC staff trained
			1.1.1.3 Conduct IEC campaign	• Knowledge • Finances	Frequency of radiospots aired
	1.2 Make pregnancy safer				

It is important to realise that the implication in the table is that conducting an IEC campaign, train staff and make contraceptives free of charge will actually have an impact on the number of couples who choose to use modern contraceptives. Sometimes research might be necessary to estimate how strong that possibility is. Much will also depend on the content of the messages and the training. Which are the messages that will sway people's opinion or attitude? What elements should counseling possess to make couples decide to use modern contraceptives? And lastly is there any

evidence (from other countries for example) that the economic law that says that demand will go up when price goes down also holds for contraceptives? The next link in the result chain is the link between output and objective. How strong is the evidence that when more couples use modern contraceptives, the fertility rate will actually go down? Again there are many issues that could cause trouble here. For example, people might have a wish to have many children, but use the contraceptives to space them (although choosing Couple Years of Protection as the indicator should take care of that). More importantly, people need to use the contraceptives correctly to not get pregnant, so that boils down to proper information and discipline. Lastly the link between the objective and the goal. Does getting less children really improve maternal health? As long as pregnancies in developing countries cause so many women to die in childbirth or get serious complications, the answer is certainly yes, but once EmOC is easily available, affordable and of high quality, the relation might need to be reconsidered.

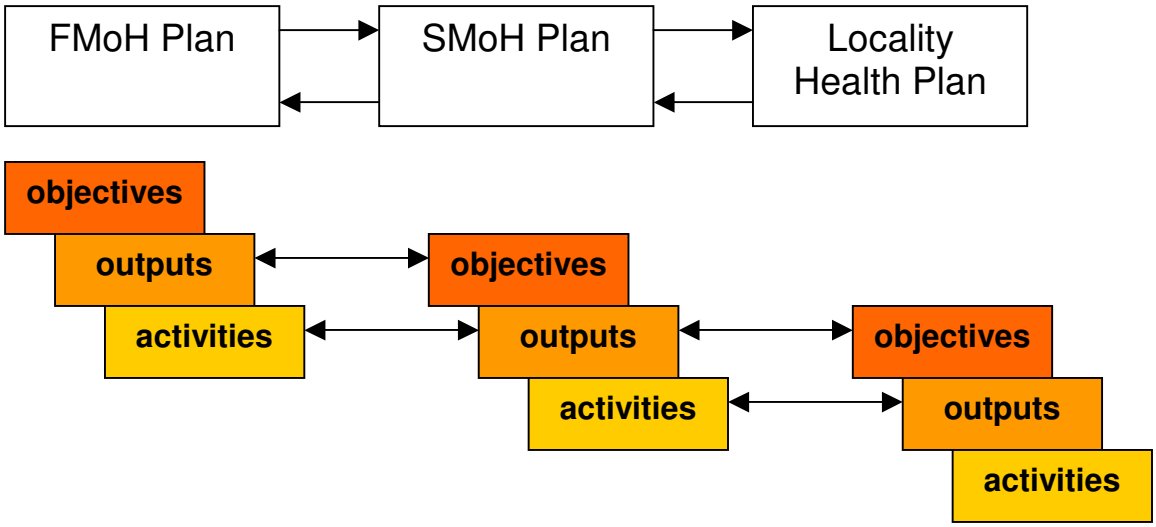
The message here is that one can have excellent indicators that precisely measure the goal, objective, output or activities, but that does not guarantee impact. Impact is dependent on how strong the result chain between the inputs and the impact is. And every chain is as strong as its weakest link. Therefore it really pays off to spend sufficient time to make a well-thought out logical framework for every (strategic or action) plan, programme or project and ensure that indicators really measure the activities, outputs and objectives correctly.

4.2. The Cascade of Logframes

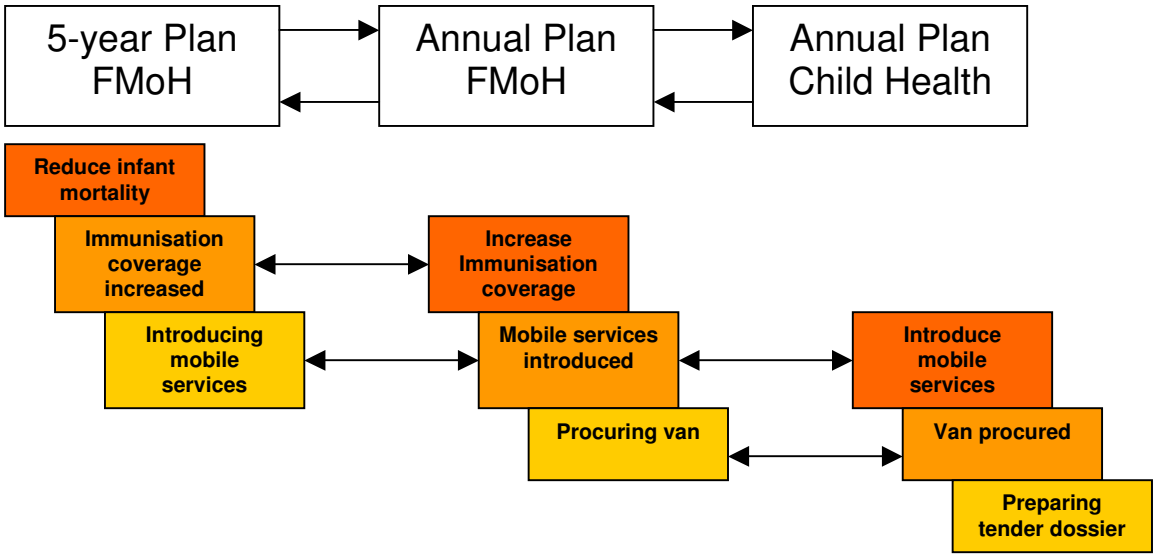
A logframe should be made for every major plan at federal, state or locality level. But plans and logframes will be different at different levels of the health system. Ideally the plans of different administrative levels are related, but they differ in the amount of detail they contain. The lower the level, the more detail. Locality level plans will contain detailed activities within each output. But these activities will not feature in the plan of the SMoH. Rather the outputs of the locality plans will translate into activities in the SMoH plan. In turn the outputs of the SMoH plans will be the activities of the FMoH plan[1]. Similarly the annual plan of the FMoH or SMoH will have less detail than the 5-year strategy and the plans of specific disease programs. But the beauty is that in this way everybody from high to low will be working towards achieving the same agreed goals and objectives.

[1] Not all outputs have activities at lower levels. An example is legislation, which is usually only prepared at he national level.

This is called a **cascade of logframes** in the same way folders and subfolders are organised in your computer, and can be graphically shown as follows :



Example : The FMoH has in its 5-year strategy a goal to Improve child health. One of the specific objectives to reach that goal is to Reduce infant mortality. One of the outputs of that objective is to Increase immunisation, and one of the activities that will result in increased coverage is Introducing mobile services to reach the remote areas. We can see in the picture below how the logframe becomes more detailed when we move from the 5-year strategic plan to the FMoH Annual Plan, to the Annual Plan of the Child Health Department. The activity in the 5-year strategic plan becomes the objective in the Annual Plan of the Child Health Department.



5. What to Monitor?

In Section 3 it was mentioned that information has to be **relevant**. Relevant information is information that will tell us whether we are on the right track to achieve our objectives. In order to collect this information we have to measure inputs, process and impact and be able to relate these to each other : which inputs do we need to produce the services that will improve health; how can we best deliver those services; what are the results of plans, budgetary allocations and management; and what is their impact on the health of the population. What we measure are the indicators that we agreed upon.

Following the cascade of logframes it follows that at each administrative level indicators for activities, outputs and objectives will be measured, but they will not be the same at each level. Higher level plans focus more on the broad issues. The activities in the 5-year strategic plan are major activities (such as "train 40% of MCH staff on IMCI before end 2011"), that need to be much more detailed out in lower level plans. At the federal level we will measure the percentage of MCH staff actually trained in the whole country. At the state level, staff will have many detailed activities to do, such as calculate how many staff needs to be trained, hire trainers, book venues, make a budget, make certificates, enter training info into the HRH database etc. At that level there will be detailed indicators for all these (sub)activities.

Examples of which plans can/should be monitored or evaluated:

- The 5-year development plan for the whole country
- The 5-year strategic plan for the health sector
- The 5-year development plan for a state
- The 5-year strategic health sector plan for a state
- The locality health plan
- The health facility business plan
- Specific sub-sector plans (EPI programme, malaria etc.)
- Specific projects, a contract with a provider
- Expenditures at different levels

6. Who Should Monitor?

The short answer is : everybody who wants to know whether the work they do is progressing and making any difference. Every technical staff member of the FMoH, a SMoH or a locality health team likely works against an annual plan. They might even have individual targets to achieve. So monitoring starts with tracking progress on your own tasks.

Over and above that, monitoring is done by special persons or a team, who are specifically charged with monitoring the whole plan. At the FMoH the M&E Section is responsible for monitoring the 5-year health strategy and the annual work plans. Each directorate or department is responsible to monitor its own plans and forward information to the M&E Section that is relevant for tracking progress on the 5-year strategic plan and annual work plan. Directorates, Departments and Units collect more information than needs to be forwarded to the M&E Section. Most of the information they collect is needed to track progress on their own detailed plans. This information they can analyse and use themselves. Only the higher level information needs to be forwarded to the M&E Section. Some bigger programmes, such as the HIV/AIDS, malaria and TB programmes, MCH and EPI have their own M&E officer(s), others designate one of the staff to do this task. In the end it is the responsibility of the Director or Head of Section to monitor the work plan or long term strategy of the Department or Section.

Each SMoH should have at least 2 full-time M&E officers, who monitor the 5-year SMoH strategy and the annual work plan. As most programmes at this level do not have specific M&E staff, it is the task of the trained M&E staff at the state level to support the departmental staff in monitoring their own more detailed programmes.

Each locality will have a designated M&E staff in the future, who will monitor the annual locality health plan. At this level monitoring can possibly be combined with HIS tasks.

7. How to Monitor?

In Section 3 it was mentioned that information has to be relevant, **reliable** and **timely**. Relevance was discussed in section 5. In this section we look at how we can generate data that are reliable and

timely. We discuss medical records, ICD-10 coding, data entry, data flow through the system, data dictionaries, denominators, baseline data, and completeness, as well as timeliness[2].

7.1. Medical Records

For many indicators the primary data are entered in the medical records of patients or in register books. It follows that data can only be as reliable as the entries in the records or registers are. Accuracy is key here. Entries will be more reliable if they are made immediately after a patient is seen, rather then at the end of the day, or worse once per week or month. The entries should be made by the medical staff that has seen the patient, not by administrative personnel.

7.2. ICD-10 Coding

For hospitals it is also of paramount importance to assign an ICD-10 code to all admitted patients. This is by no means a simple exercise and necessitates proper training on the part of the medical staff responsible for coding. The coding is used to gain understanding of the relative frequency of medical problems seen in the hospitals. This is not only essential to estimate the burden of disease, but also the budget that hospitals need, as the costs of diagnosis and treatment of different diseases is not the same.

7.3. Data Entry in HIS Books

From the medical records or registry books the data has to be transferred to the HIS forms or forms specifically made for the vertical programmes. Again accuracy is key here. If handwriting is not clear, the entry should be checked with the staff who entered the information. All entries and calculation (summation usually at the health facility level) should be checked a second time or even better, by another person. As this work takes about two days per month at the HC and BHU level it is not necessary to have a statistician to do this. Actually this work is best done by the clinical staff themselves, because they have more knowledge about the syndromes and diseases and understand what is written in the record or registry and will therefore easier notice errors. At the hospital level a statistician will usually do the data entry on the forms.

[2] This section refers only to reliability in the HIS. Information generated through other sources are discussed in Section 8 on Data Sources.

7.4. Data Flow through the System

From the health facility the forms are forwarded to the locality, from there to the SMoH (SHIC) and lastly to the FMoH (NHIC). At each level the data are more collated/summarised. Just as with Sections and Departments in the FMoH, it is likely that in the future not all information collected at the HF level needs to be forwarded to the locality, because autonomous HFs need to collect a lot of information, necessary for facility management, which will not be relevant to the locality. Similarly the localities would not forward all the information they collect to the state level, and the state level would not forward all its information to the federal level. At the moment most information collected at the lower levels ends up at the federal level. This is due to the fact that lower levels are not completely decentralised yet, or do not yet have the capacity to make their own plans and to decide which information they need to collect to monitor those plans and manage the organisation. When more responsibility is decentralised, more information will be used at the lower levels and less information will need to be forwarded to the higher levels.

7.5. Data Dictionary

For reliability of data it is important that all data collectors measure any indicator correctly and in the same way. This can be achieved by producing a data dictionary, consisting of data sheets for each indicator to be used for M&E. Each data sheet contains the definition of the indicator, what it is supposed to measure, how it is measured or calculated, how often it should be measured etc. The data dictionary should be available at all levels of the health system and the NHIC/SHIC should ensure that everybody who collects and calculates data is familiar with its contents. Training is absolutely essential to ensure this.

7.6. Denominators

Of particular importance is the calculation of population denominators, such as 1000 live births, women 15-49 etc. Ideally these data should be available through a census and/or vital registration for each level of the administration, where data are collected. In the case of Sudan that is down to the locality level. In order to correctly calculate for example vaccination rates, each locality should have up-to-date information about the number of babies, children <5 and pregnant women in their locality.

7.7. Baselines

Monitoring can provide information on progress towards achieving targets and objectives. But for progress to be measured, it is necessary to have a reliable baseline. Collecting baseline data is often forgotten or done too late. When the baseline value of an indicator is not available one cannot measure how much it has changed. The baseline value should be established before activities that might change the value take place. If the baseline value is established later, the impact of the activities or strategy might be underestimated, because change for the better might have already occurred before the baseline value was established.

7.8. Completeness and Timeliness

Data do not necessarily need to be collected from all HFs, but they do need to be representative of all HFs. Unless a carefully designed system of sentinel sites is introduced, it is important to strive for the highest possible percentage of HFs regularly and timely reporting. And this should not only include public HFs, but also those run by NGOs or private-for-profit providers.

Health facilities should have some time to prepare the paperwork involved in transfering the data onto the HIS forms, just as the locality and state levels need time to summarise and calculate the data they receive from the lower levels. When operating manual systems each level should be allowed several weeks to process the necessary forms, so that it might take around 6 weeks to reach the federal level. Once the whole system is computerised and all levels are on e-mail, the process can be speeded up.

When improving completeness and timeliness of reporting is difficult, it is worthwhile to experiment with carrots and sticks, being positive and negative incentives for HFs, localities and states. Another possibility is to pilot a sentinel system.

8. Data Sources

Data sources are all the different information systems that generate data . Apart from the HIS, other important data sources are : surveys, surveillance systems, financial studies, vertical programmes, input monitoring, census and vital registration, as well as research.

8.1. Health (Management) Information System

The HIS, discussed above, is one of the most important data sources in most countries and also in Sudan, because it captures service statistics, which give an indication of health service utilisation. How often and for which complaints people seek health services sheds some light on the burden of disease. It also provides us with many intermediate indicators, that measure how many services have been provided, for example number of vaccinations, number of ANC visits, number of caesarians etc.

8.2. Population Surveys

Surveys are studies in which data or opinions are collected from a sample of the population considered to be representative of a whole group. This sample can be drawn from the whole population, but also from subsets of the population or groups at risk for a specific disease. Surveys have the advantage that they capture information from the demand side, while service statistics only capture information from the supply side. Household or community surveys include morbidity and mortality information from people who *did* and from people who *did not* visit health services. Examples of surveys are :

- Sudan Household Health Survey
- HIV/AIDS behavioral survey
- Nutritional survey
- National Health Accounts
- Tuberculin survey
- Prevalence surveys for communicable diseases
- Health workforce survey

8.3. Disease Surveillance

Disease surveillance is the ongoing systematic collection and analysis of data and the provision of information which leads to action being taken to prevent and control a disease, usually one of an infectious nature. In a surveillance system all diagnosed cases of diseases included in the surveillance system are reported, either provider-based (all or sentinel sites) or laboratory-based. Infectious Disease surveillance is related to the notification system. But the tool can also be used for the monitoring of noncommunicable diseases (NCD), injuries and accidents, risk factors for disease etc. The WHO STEPwise approach to Surveillance of NCD Risk Factors (STEPS) uses a standard

survey instrument and a methodology that can be adapted to different country resource settings. The approach to chronic disease risk factor surveillance provides an entry point for low and middle income countries to get started on chronic disease surveillance activities. It is also designed to help countries build and strengthen their capacity to conduct surveillance.

8.4. Input monitoring

WHO has supported ministries of health to set up a National **Human Resources for Health Observatory**, in order to set up a database on human resources and keep it up-to-date. This is basically health system input monitoring, while the HIS monitors health system outputs. Other important inputs to monitor are infrastructure and drugs. This is not routinely done in most countries. Sometimes **health facility surveys** are used to monitor essential inputs. The necessity for input monitoring is directly related to the process of decentralisation. The more responsibility and power lower levels will get the more they will be interested in monitoring inputs into the system, because these data are essential to the efficiency of service provision. At that point it is less necessary to regularly monitor these inputs at the higher levels. A special case of input monitoring are regular financial studies, that monitor the costs of interventions and the flow of funds through the system.

8.5. Financial studies

National Health Accounts (NHA) describe all flows of funds, both public and private, domestic and foreign, involved in the health system: it makes an inventory where funds in the health sector are coming from – the sources – through which channels they are disbursed – the agents – to which providers and what the money is used for (the functions). In a summary matrix several dimensions can be shown: total expenditures by financing sources, financing agents, providers or functions (preventive, curative or rehabiliatative care e.g.). NHA can show how much money is going around in the sector, how much is spent on what, and whether that reflects the priorities set in the policies and plans. All this can also be compared to the data of other countries. It can be an important tool, both for planning and for M&E.

A **Public Expenditure Review** (PER) analyses the allocation and management of public expenditure. A Health PER may cover all government expenditure in the sector or focus on a few priority sub-sectors or programmes (e.g. infectious diseases or child health).They can be used to

inform strategic planning and budget preparation and to identify ways in which to improve the efficiency and effectiveness of resource allocations.

A **Public Expenditure Tracking Survey** (PETS) is a quantitative survey of the supply side of public services. The unit of observation is typically a service facility and/or local government i.e. frontline providers like clinics. A PETS traces the flow of resources from origin to destination and determines the location and scale of anomaly. It highlights not only the use and abuse of public money, but also give insights into cost efficiency, decentralization and accountability.

Costing studies are done to gain insight into the (total) costs of diagnosis and treatment of different diseases, benefit packages of insurances, or prevention interventions. Ideally they should include all direct and indirect costs to all parties concerned (including to the patients). Additionally costing studies are often done to calculate the incremental costs of scaling up a service or expanding a package. Knowing what service delivery costs is not only important for budgeting, but also for priority setting and resource allocation.

8.6. Vertical programmes

In almost all countries the big vertical programmes (in particular those funded by global health intiatives, such as the GFATM, the Gates Foundation, GAVI etc.) collect data through their own systems. Historically these programmes were already vertical, but just when a big move towards integrating them horizontally into the health system had been agreed in the nineties, large amounts of funding became available in the new millennium, related to the MDGs, which basically kept them vertical. Due to the fact that HISs in many countries are weak, the regular HIS usually often does not provide the completeness and accuracy in data collection that the vertical programmes need to fulfill their obligations to their donors. So rather than waiting for the HIS to improve, they strengthened their own vertical information systems even further, supported with money from their donors, paying for salary top-ups, cars, fuel, computers, etc. etc. making it possible to train staff at all levels, perform close supervision and follow-up non-response, at the same time paying incentives for good performance.

8.7. Census and vital statistics

A **Census** is a door-to-door study, done to establish how many people live in a country. Data are usually broken down by administrative division (state, locality, village), by age, gender, ethnicity etc. This information is essential for the comparison of health indicators, because it provides the denominators for the calculation of rates and percentages. For example: if we want to compare the number of midwives between the localities within a state, it is not informative to know only the absolute number of midwives, because the number of people in localities differ, or more precise the number of women of reproductive age differ. In order to have relevant information, we need to know how many midwives there are per 10,000 women of reproductive age for example.

Because a census is usually only done once every 10 years, it is important to have reliable estimates about births and deaths, the so-called vital statistics, in order to estimate the size of the population in the years between censuses. **Vital statistics** are derived from birth and death registrations. If death certificates are reliably filled out they also can shed light on causes of death.

8.8. Research

Although usually not included as a source of M&E information, specific studies can provide important information for planning and priority setting and can also be useful in the context of evaluation. Some countries commission specific studies before the joint (annual) review, in order to be better equipped with evidence when discussing progress against plans.

9. (Performance) Indicators

9.1. Type of indicators

A lot of resources are used as inputs for health services, both human resources, knowledge (from research) and financial resources. **Input** indicators measure the amount of resources that go into the health system. In order to know whether these resources are well spent, we want to track the effect of the health services on the health of the population. In order to do so, we measure some key health status indicators directly. Examples are life expectancy, morbidity, disability and mortality indicators. These are called **impact** indicators. All these together measure the burden of disease for the total population or for specific groups. And the final goal of all countries' health systems is to decrease the burden of disease. But we also measure how many services have been provided, because we know or assume that these services lead to improvement in health. Examples are the average number of ANC

visits a pregnant woman receives, vaccination coverage or the number of bednets distributed. Such indicators are called **intermediate or process** indicators.

9.2. Selecting indicators

One of the most critical steps in designing an M&E system is selecting appropriate indicators. Indicators are quantitative or qualitative measures to assess change in inputs/resources, outputs/activities, outcomes and impact of an intervention (related to the levels in the logframe). For each indicator baseline and target values for a specified date should be set. The source of information to establish the progress toward achievement of the target or lack thereof should be agreed, as well as the frequency with which the indicator will be measured.

The indicator should be valid, that is, it should actually measure the objective, output or activity. This seems obvious, but in practice this is quite a challenge. In general it is more difficult to formulate good indicators for higher level objectives and outputs than for activities. For activities it is usually easy to identify correct indicators, especially when they are very detailed. For example : a training activity usually has an indicator such as *percentage of midwives trained.* As a rule of thumb percentages are better to use in indicators than absolute numbers, in particular when the denominator changes all the time (population, number of midwives etc.). Only when percentages are used can the value of indicators be compared between locations and over time. However, absolute numbers can be used when the denominators are small and not prone to change, such as the number of states or localities within a state. For example : *number of localities that have a vehicle for supervision of health facilities.* If the activity to provide localities with a vehicle is an activity in only one state, the absolute number will suffice, but when all states have this in their plan, the federal level will likely change the absolute number in a percentage, to make it easier to comprehend and to compare the progress in different states.

It is much more difficult to identify a good indicator for an output such as "Health personnel within the public system redistributed and retention policies developed to counter geographical and rural/urban imbalances". How do we meausre redistribution and retention? The number of staff redistributed would not tell us anything about whether they were actually redistributed from surplus areas to areas in need. It would also not tell us that they were retained, because a common problem is that redistributed staff does not report for duty at their new station, or that they disappear after a short time. We could for example use : *percentage of employed health workers of each cadre, compared to staffing*

norms. The word employed should be verified by the person being on the payroll, and the comparison of the percentages between different locations and over time should give us information on whether rural areas are now better served.

9.3. Detail of indicators

As discussed above in Section 4.2 the level of detail of logframes and indicators depends on the administrative level (federal, state, locality, health facility), but is also dependent on whether one is responsible for the sector as a whole or for a specific programme. At the national and state sector level one would want to assess whether objectives have been met and what impact this has had on the health of the population. Lower administrative levels or programmes would be more focused on intermediate outputs and activities.

9.4. Numerical and non-numerical indicators

An example of a numerical indicator is "the percentage of households using iodised salt", where the baseline may be 10% at the beginning of the project or programme and the target 30% to be reached at the end of the project. But not all activities or outputs have numerical indicators. For example an activity such as "to conduct a training needs assesment" or an output such as "legislation adopted" cannot be given a numerical value. What is useful in such cases is to indicate the **deadline** by which the activity should be done or output should be achieved.

9.5. Indicators (and targets) should be SMART

An acronym has been created to remember key characteristics that a good indicator should have :

- **Specific**: qualify exactly what should be achieved, where and by whom and quantify the achievement (where possible)
- **Measurable**: the information can be reliably, cost-effectively and timely collected
- **Attainable**/achievable: targets are realistic within the given timeframe
- **Relevant**: measure the activity, output or objective correctly (validity)
- **Time-bound**: state when the achievement must be reached

10. Analysis and utilisation of information

10.1. Analysis

Section 3 stressed the notion that M&E is not a goal in itself, but only useful if the information it generates is used. It also gave an overview of what M&E can be used for. But before we can use the information we need to analyse it. Raw data as collected first have to be collated and summarised. The HIS does this, and the Central Bureau of Statistics does this for example for survey results. But even these summaries do not yet provide us with the kind of information we can use. In most cases they have to be compared. If you want to know how equitably staff is distributed over the country, you need to compare the indicator we formulated above (*percentage of employed health workers of each cadre, compared to staffing norms*) for the states or within the states for the localities. But usually that is not enough, because the states and localities most likely did not have the same starting point, i.e. the percentage of employed doctors and nurses, midwifes and lab assistants were different to begin with, so progress can only be assessed by comparing it to the baseline. So you need to also include changes over time in your analysis by comparing the value on the same indicator for the same locations for different years. Now you might notice for example that states who had a better baseline value, progressed more than the states who had a lower baseline value. That means that the difference became larger : inequity increased, rather than decreased. That poses the question why. Maybe the states with the higher baseline value also have more recruitment skills, or more money to offer staff in remote areas higher incentives or… You can then discuss your hypotheses with others and/or check them with data on staff training and available budgets. All of this together is analysis. The outcome of this analystical process is the kind of information that is useful.

10.2. Utilisation

The information generated by the M&E system can be used to support evidence-based policy-making and priority setting, or to adapt plans and processes. It can also be used for performance-based budgeting, results-based management and enhancing transparency and accountability. All of these will improve overall performance of the sector.

M&E is also important to track the cost-effectiveness of health interventions. The health sector takes up a lot of human and financial resources, so we want to make sure we use those efficiently. M&E can also create transparency with regard to use of resources, and make health systems accountable to the government, parliament and the population.

M&E can also provide information on performance of organisations or departments, in as far as these are responsible for achieving specific results. Performance of different organisations, locations or over time can be compared.

It is important to realise that using information is not something done only at the state or federal level. Information can and should be used at all administrative levels of the health system, including at the health facility level. As mentioned earlier, the more power is decentralised the more lower levels of the system will feel the need for information, because they wil need to plan, set priorities, make their books balance etc. When the need for information is felt and experience shows its usefulness, the motivation to collect the necessary data will increase. When the only reason to collect data is to forward it to higher levels, while not having or feeling any use for it at the level where it is collected, the problems of completeness, timeliness and accuracy will never be solved completely.

Needless to say that proper analysis of data and understanding how the information can be used to improve performance of the health system, needs to be learned. Training is essential.

11. Evaluation

Evaluation can provide information on what works and what not (and maybe why) and what works better or is more cost-effective. Especially impact evaluation has more characteristics of a study, where comparison is important, for example between different locations, with or without an intervention, in order to assess whether any measured impact can be attributed to
the intervention. But the distinction between monitoring and evaluation is not always clear-cut. Monitoring can also enable comparison. When a strategy is implemented in the whole country monitoring data can enable comparison between the effects on tracer indicators between different states or localities. Especially when the strategy is not implemented everywhere at the same time, but subsequently, monitoring and comparing the data between the locations can also provide very useful information to assess the impact of an intervention.

12. Costs of M&E

Monitoring and evaluation imply many activities, for which skills and funds are necessary. Depending on which activities are considered to be part of M&E, the budget necessary for M&E will differ. As a rule of thumb the organisation Measure Evaluation asserts that 5-10% of the implementation budget for a programme or project should be set aside for monitoring and evaluating it. At the federal level, when the HIS, surveillance system and household surveys as well as financial studies etc. are included in the budget as M&E costs, this percentage could even become higher. This sounds like a lot of money and it is. But in the long run without M&E health services might turn out to be more expensive, because we do not know whether we are on the right track to reach our goals and whether we are getting there in the most cost-effective way.

13. Overview of M&E documents

In Sudan the following documents relate (or will relate) to the M&E function :

- Federal M&E Strategy (long term)
- Federal and State M&E Action Plans (rolling medium-term) and budget estimates
- Federal, State, Locality and Facility Annual M&E implementation plans and budgets
- Terms of reference for the M&E section as a whole and job descriptions of individual staff at federal, state, locality and HF levels
- M&E capacity building plan, based on gaps between required skills and knowledge to fulfill the ToR and actual capacity (includes training needs assessment)
- Indicator matrix of all plans and policies to be monitored, including baseline, targets, source of information and if needed means of verification
- Data dictionary or set of datasheets, spelling out all the key information for each indicator
- Evaluation plan, identifying the before-and-after comparison of baseline, mid-term, and final evaluation measurements.
- Reporting flows and formats for both monitoring and evaluation linked to each level of management, as well as to the agreed system for feedback and management review.
- A feedback and review plan setting out the measures to be taken to ensure timely decision making by management and other stakeholders based on M&E findings.