

Health Management Information System in Malawi: Issues and Innovations

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Abstract

The main problem in the current health information systems is not a lack of information but insufficient use of available information. Therefore, Malawi is establishing a health management information system (HMIS) starting from institutionalising a very simple monitoring process in the health system. In this process, districts convert facility specific existing data to relevant indicators, monitor the trend, compare against targets or expected values, compare among facilities, discuss the reason for deviating from expected value, incorporate corrective measures in their next monthly and quarterly plans. The same procedures are being followed at national level. It has been realised that this process is essential for developing a better understanding of the value of information in management and that this will lead to establishing an information culture in the entire health delivery system. Within the new HMIS, a client-held health booklets system has been introduced, aiming at improving the quality of health care to individual clients. Though these booklets are sold in a cost recovery scheme, they are in great demand and have shown their positive effects on quality and access of care.

1. Background

In 1999, the Ministry of Health and Population (MOHP) published the document “To the Year 2020: A Vision for the Health Sector in Malawi”. This document intends to guide the development of the health sector for the next two decades. Establishing a flexible, accessible, comprehensive Health Management Information System (HMIS) in which existing information systems are integrated, was an important target of the long-term policy. This paper presents an overview of the process and the content of HMIS in Malawi and highlights major observations and lessons learned from implementing it.

The fourth National Health Plan 1999-2004, developed on the Ministry’s long term policies, aims at achieving the objectives of expanding the range and quality of health services; improving general health status of the population; increasing access to health care facilities and basic health care services; developing human resources; improving efficiency and equity in resource allocation; strengthening collaboration and partnership, and increasing overall resources in the health sector.

Sector-wide approach, decentralisation, hospital autonomy and diversification of resource base, including cost sharing, are some of the major strategic approaches to achieve the planned objectives.

To ensure that the planned health targets are achieved, a systematic monitoring system was imperative. However, the existing health information system was unable to ensure timely data entry, analysis and feedback to the facilities. The data quality was also questionable. At the district level, data collection to monitor and evaluate performance was not a priority. Information related to disease surveillance, vital statistics, maternal child and reproductive health indicators, and tracking of financing and expenditure was neither systematised nor easily accessible for proactive analysis and planning purposes. Thus MOHP ability to track progress towards the planned objectives and targets was severely limited. Such absence of an information culture posed a major challenge to the development of HMIS in Malawi.

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2. Strategies for design development and establishment of HMIS

2.1 Participation, consensus building and collaboration

Collaboration among different stakeholders has been the main strategy of the development of HMIS in Malawi. The HMIS has been designed through a systematic process of consensus building. Different stakeholders have agreed to basket funding to strengthen and sustain the system. Christian Health Association of Malawi (CHAM), the second largest health service provider in the country is fully participating in HMIS. Private facilities are also encouraged to be involved in the system.

2.2 National Capacity Building

National team has led the designing, testing, implementing and strengthening the system. Everybody involved in the delivery of health services provided orientation training on purposes, tools and techniques of the system. Facilitators of the process are exposed to different kinds of training, seminar, conferences, workshop and higher studies based on the needs for their specific jobs. At least three persons obtain MPH in HMIS related subjects and some others have short-term training in HMIS abroad. All health workers currently in the system receive training in HMIS. The HMIS is included in the curriculum of health training institutions in Malawi. With such arrangements all those already in the system as well as new comers will have basic knowledge and skills of HMIS.

2.3 Step-by-step Development

The HMIS development process follows the following major steps:

Building consensus on development of integrated HMIS;

Defining and endorsing indicators for routine monitoring;

Designing HMIS instruments including user's manual and training materials;

Testing of instruments in series;

Launching the HMIS Nation-wide in Phases; and,

Developing an appropriate 'information culture'.

3. Conceptual design of the system

3.1 Principals

All stakeholders agreed on the following four principles to guide the design of the system:

Integration: Programme specific vertical information systems are integrated into one health service information system. Five independent routine management information systems namely health services; finance; drugs and supplies; physical assets, including buildings, equipment, and vehicles; and human resources, including staffing and in-service training; are gradually strengthened as sub-components

Decentralisation: Analysis of data takes place at the level where it is generated. Simple analytic tools are introduced for this purpose. As part of the health sector reforms and the civil service reforms, the districts and the district health management teams play a pivotal role in the health service delivery. Districts formulate their local policies, plan their activities annually and are solely responsible for the delivery of health services.

Simple: Manual operation of the procedures remains crucial. Health workers are able to draw registers and forms manually. A simple calculator is sufficient to aggregate and analyse data. The system would not stop functioning simply because of shortage of printed stationeries or breakdowns of computers. However, it fully benefits from modern technology at higher levels, to facilitate data aggregation, analysis and report generation.

Action Orientation: There is a direct link between data collection, analysis and decision-making at all levels of the health pyramid. The HMIS provides information for policy development, programme planning and operational management. The System collects only the information needed for decision making, send reports only to those managers who use the information for decision-making and send the reports only when they are needed for decision-making. Routine actions within each level are depicted in the following diagram.

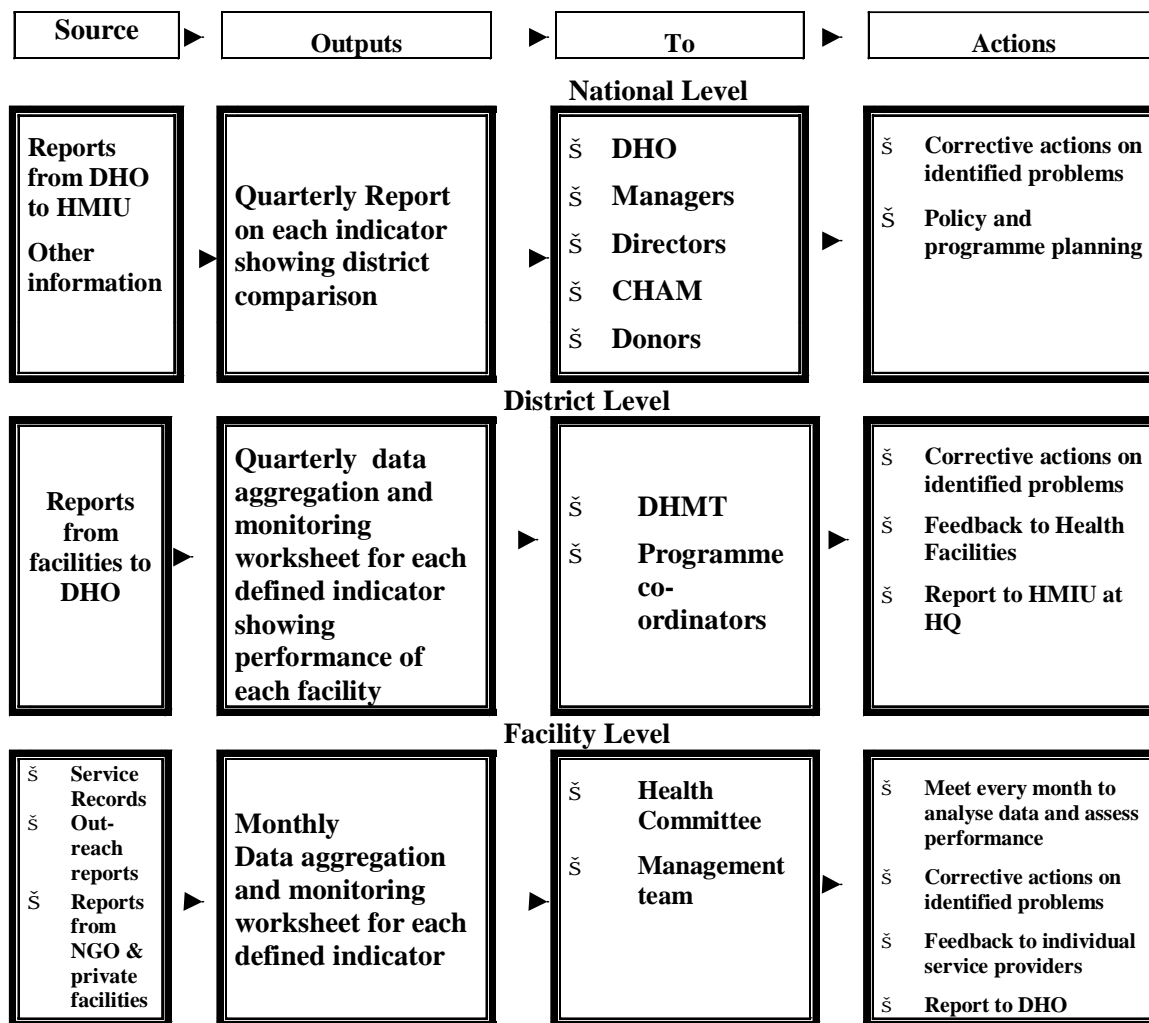
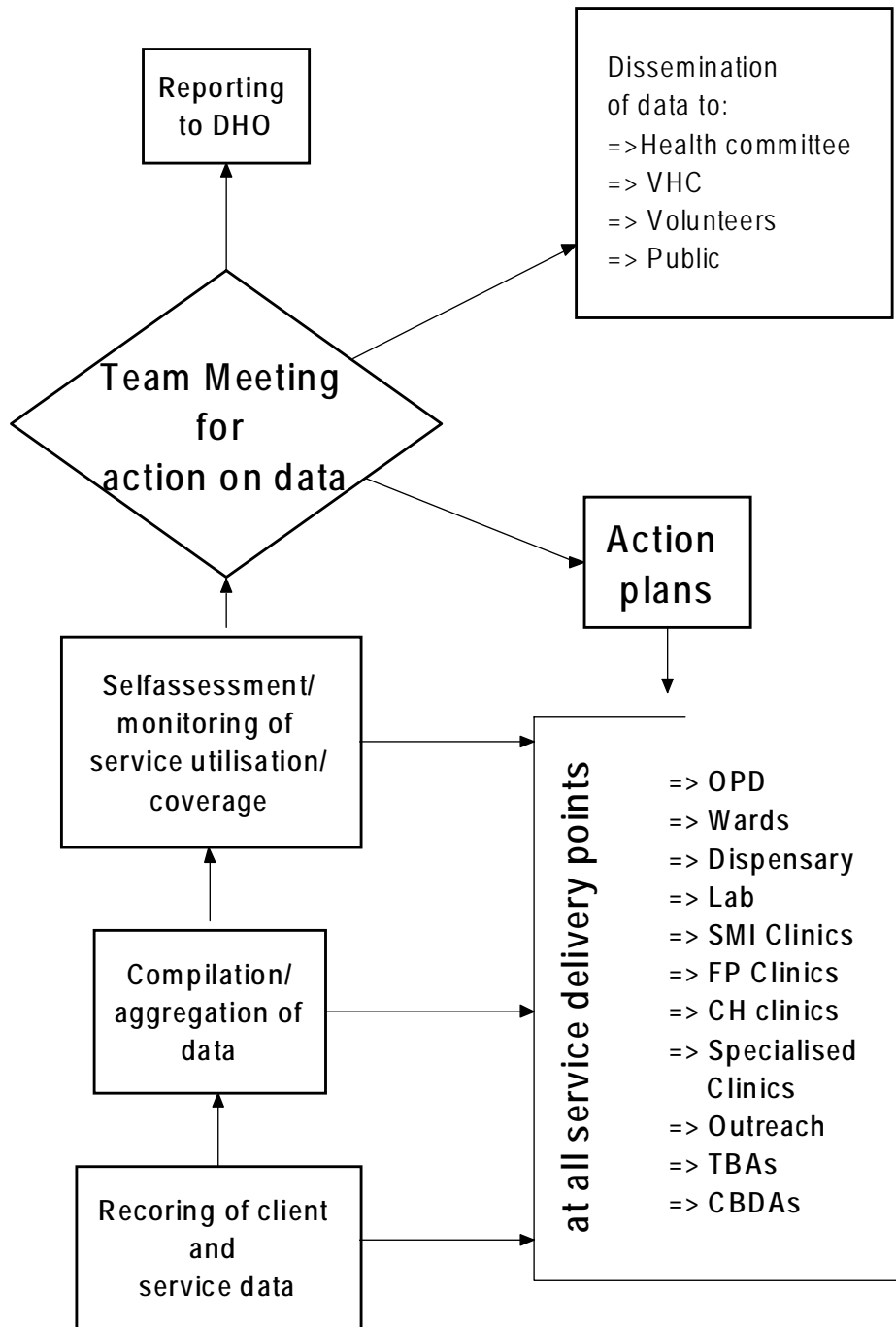


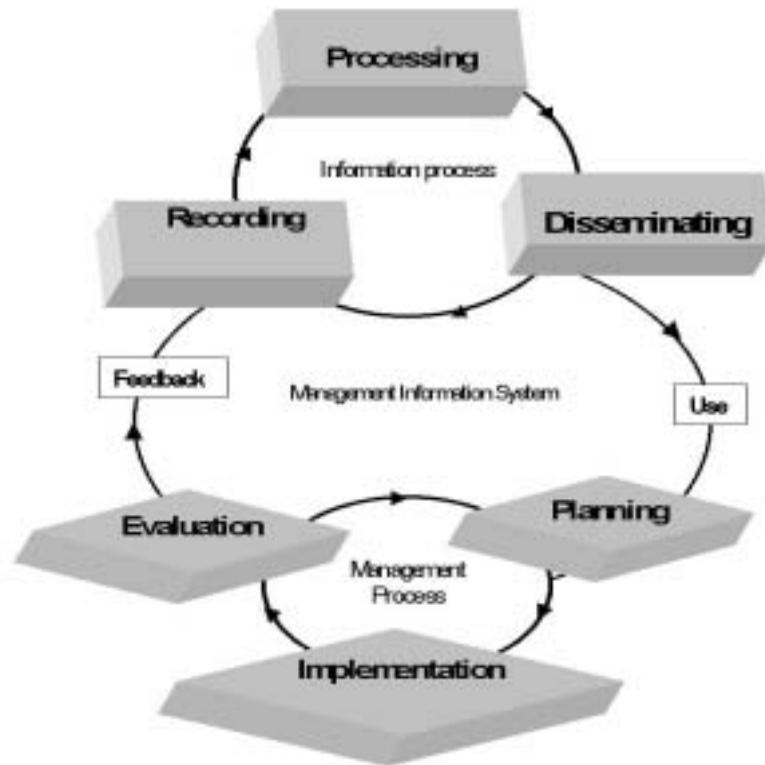
Diagram showing information process at facilities



3.2 Meaning of HMIS

To understand the meaning and concept of HMIS is crucial for successfully establishment of HMIS. The literature shows an existing confusion on its scope of work. In Malawi, the

MOHP has defined HMIS as a process of collecting, processing and disseminating information on management, health services, health status, and using them to improve the management (planning, monitoring, evaluation) of programmes and services. According to this definition, the information has to be used in the management process. Above diagram depicts the concept of this working definition.

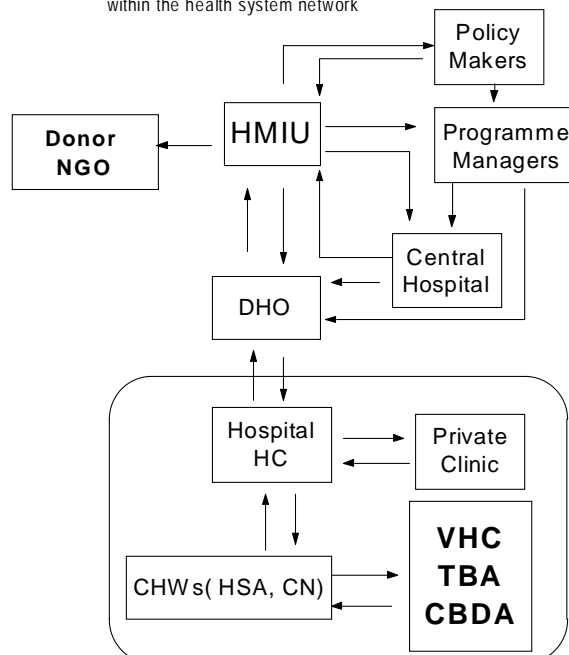


3.3 Upward, downward and lateral communication

Community Health Workers (CHWs) discuss on community health indicators in their monthly Village Health Committee (VHC) meetings.

Facility staff meets monthly to review their progress and to discuss ways to improve their work and prepare next month's work plan. The extended DHMT meets monthly to review last quarterly progress and prepare work plans for the next quarter and see its implementation. At headquarters level the HMIU provides quarterly district comparative reports to all stakeholders including to DHO. Each technical programme provides feedback to the district on matters

Diagram showing information flow within the health system network



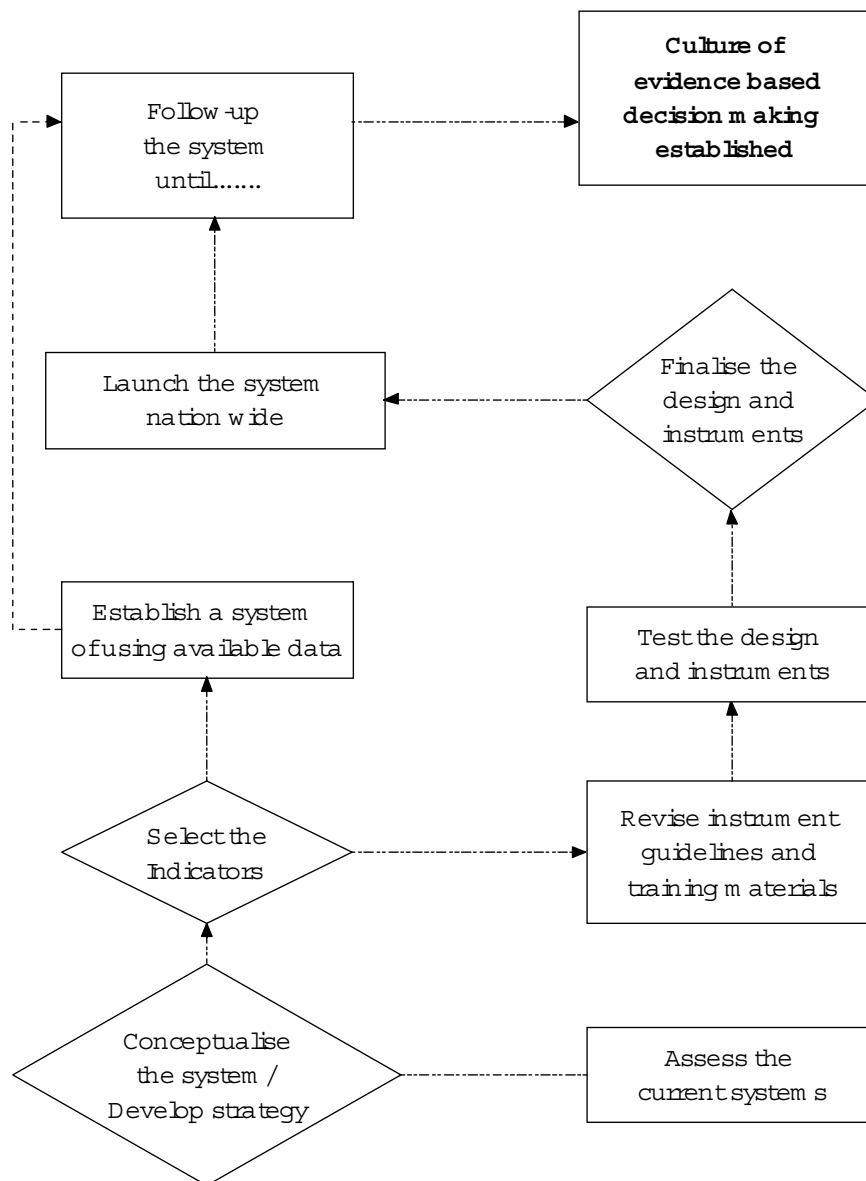
arising from quarterly HMIS reports. The adjacent diagram depicts how the information flows within the health pyramid.

Immediately after the end of each fiscal year all in-charges of facilities meet with the extended DHMT to review annual performance of facilities and of the district as a whole. Similarly, all DHOs meet with the headquarters to review district and programme specific performances. All stakeholders take part in this national annual performance review.

4. Process of designing, launching, establishing and sustaining the system

The following diagram shows the overall picture of how the system is conceptualised, designed, tested, launched and established.

Diagram showing the 10 steps of
HMIS design, development and establishment



4.1 Assessing the strengths and weaknesses of current systems

The process of evolving programme specific information systems into integrated and comprehensive HMIS started with an assessment of strengths and weaknesses of the current systems in use. The findings of the assessment were disseminated to all stakeholders including donors, NGOs, all technical programmes within the Ministry and central hospitals. The Ministry organised series meetings for different stakeholders to develop consensus on the design of HMIS. All stakeholders unanimously agreed on the following guiding principles for design and implementation of the system.

4.2 Endorsing the national HMIS strategy and implementation plan

With the consensus of all collaborating partners, MOHP endorsed a national HMIS strategy and implementation plan. The strategy aims at establishing an information culture in the entire health delivery network in the country. Its focus is on using of the available information for better planning and implementation of health services and rather than introducing tools to generate more information. The ten steps involved in the process are depicted in the above diagram.

4.3 Selecting indicators

The process of designing the HMIS tools began with the stakeholders agreeing on a basic set of indicators for routine monitoring. A total of 65 input, process and output indicators for routine monitoring of coverage and quality of health services and management were agreed upon and disseminated nation-wide to all stakeholders. Of these indicators, 15 are related to coverage of services; 1 to nutritional status of children under five; 1 to OPD utilisation rate; 9 to reported new cases, 1 to voluntary counselling and testing; 2 to TB detection and cure rate; 3 to utilisation of hospital beds; 7 to inpatient death rates; 4 to availability of drugs, medical supplies, vaccines and food stuffs; 4 to water and sanitation; 6 to human resources and 5 to budget allocation and cost sharing and remaining are related to supervision, management meeting, reporting status of HMIS reports and use of vehicles. Most indicators are used at all levels. A few indicators apply to a specific level(s) only. Health centres and hospitals monitor most indicators monthly. They also monitor 49 diseases and disease categories for which the diagnosis criteria are defined. The district and national level monitor quarterly. As part of the 65 indicators some diseases are monitored quarterly at district and national levels. The following are the national indicators

1	Percentage of pregnant women starting antenatal care during the first trimester	10	Percentage of women attending first postnatal care within 2 weeks of delivery
2	Average number of antenatal visits	11	Percentage of postnatal women who have received Vitamin A supplementation within 2 weeks of delivery
3	Percentage of pregnant women received adequate TT doses	12	Percentage of women of childbearing age (WCBA) using modern family planning methods (CPR)
4	Percentage of pregnant women received iron supplementation	13	Percentage of new family planning acceptors
5	Percentage of pregnant women received sulphamethoxazole (SP)	14	Percentage of fully immunised children
6	Percentage of deliveries attended by trained health personnel	15	Percentage of expected doses of vitamin A given to under 5 children
7	Percentage of deliveries attended by trained traditional birth attendants (TBAs)	16	Percentage of under-weights in the under-fives attending clinic
8	Percentage of women with obstetric complications treated in obstetric care facility	17	OPD utilisation rate
9	Caesarean section rate	18	Reported new cases of acute flaccid paralysis (AFP)
		19	Reported new cases of leprosy

20	Reported new cases of neonatal tetanus	47	Percentage of positions of doctors filled
21	Reported new cases of measles in under 5 population	48	Percentage of positions of nurses filled
22	Reported new cases of sexually transmitted infections (STI)	49	Percentage of positions of clinical officers filled
23	Reported new cases of HIV	50	Percentage of positions of medical assistants filled
24	Volunteer counselling and confidential testing (VCCT) for HIV	51	Percentage of positions of health assistants filled
25	Reported new cases of clinical malaria	52	Percentage of positions of health surveillance assistants (HSAs) filled
26	Reported new cases of diarrhoea in under 5 population	53	Percentage of other recurrent transactions (ORT) budget received
27	Reported new cases of pneumonia in under 5 population	54	Percentage of budget spent in each sub-programme
28	TB cases detection rate	55	Percentage of income from cost sharing
29	TB cure rate	56	Percentage of drug and medical supplies expenditure spent at health centres
30	Bed occupancy rate	57	Percentage of cumulative drug expenditure to date
31	Bed turnover rate	58	Percentage of health centres with functioning communication equipment
32	Average length of stay	59	Percentage of health centres with functioning water supply
33	Inpatient death rate of malaria	60	Percentage of health facilities with functioning medical waste disposal facilities
34	Inpatient death rate of diarrhoea	61	Percentage of active village health committees
35	Inpatient death rate of pneumonia	62	Percentage of management meetings conducted
36	Inpatient death rate of malnutrition	63	Percentage of health facilities supervised by Management Team
37	Inpatient death rate of TB	64	Percentage of completeness of reporting
38	Direct obstetric death rate in the facility	65	Percentage of timeliness of reporting
39	Inpatient death rate of all causes		
40	Availability of vital drugs		
41	Availability of vaccines		
42	Availability of essential medical supplies		
43	Availability of categories of foodstuff		
44	Percentage of the households with access to safe drinking water		
45	Percentage of households with san plat latrines		
46	Percentage of availability of vehicles for programme activities		

The tertiary care facilities have a sub-set of 25 indicators, which are as follows:

A	Percentage of patients seen by specialists within 4 weeks of appointment	O	Percentage of extended management meetings conducted bi-monthly
B	Percentage of operations performed within 7 days of admission	P	Percentage of hospitals supervised on the 4 main areas of speciality
C	Cure rate	Q	Percentage of availability of vehicle for patient related activities
D	Reported new cases of confirmed HIV positive cases	R	Percentage of students successfully completed practical training in the hospital
E	Inpatient death rate of all causes	S	Percentage of research findings incorporated in hospital work plans
F	Direct obstetric death rate in the facility	T	Percentage of positions of specialists filled
G	Bed occupancy rate	U	Percentage of positions of doctors filled
H	Bed turnover rate	V	Percentage of positions of nurses filled
I	Average length of stay	W	Percentage of positions of clinical officers filled
J	Percentage of income from cost sharing	X	Percentage of positions of technicians filled
K	Percentage of budget spent in programmes	Y	Percentage of positions of account and admin personnel filled
L	Percentage of cumulative drug expenditure to date		
M	Availability of key essential drugs		
N	Availability of key medical supplies		

The tertiary care indicators are to monitor the achievement of the following objectives:

š	To reduce mortality		
š	To increase cure rate		
š	To increase the number of specialists	š	To expand the number of diagnostic services

- Š To increase the type of services offered
- Š To improve effectively and efficiently the use of hospital beds
- Š To reduce waiting time for specialist clinics and operations
- Š To provide practical training for trainee doctors, clinical officers, nurses and other cadres
- Š To supervise and offer specialist services to district hospitals
- Š To gradually increase the budget from cost sharing
- Š To ensure rational use of resources
- Š To conduct and coordinate research activities
- Š To ensure availability of key drugs at all times
- Š To increase user's satisfaction of the services
- Š To increase provider's satisfaction of the services

4.4 Use available information before embarking for comprehensive HMIS

Recording, processing and disseminating information alone cannot result in effective and efficient management output. Therefore, the new HMIS started with a process of maximising the use of available information. A national workshop was organised for all 27 District Health Officers (DHOs) to look into their data sets in relation to the 65 indicators. Availability and quality of data varied from district to district. A monitoring system was established in each district on the basis of available data in the district.

5. HMIS instruments

A total of 16 HMIS instruments were devised to improve the quality of data collection, aggregation, analysis, monitoring and reporting at each level of the health pyramid. Three of them are kept by the client at home and other 13 are kept at facilities.

5.1 Client health booklets

Three client health booklets (child health profile, woman health profile and general health profile) are introduced in all public and private health facilities to improve the quality of health care. All booklets contain records of updated client history, assessment of current problems and types of care given. The child health booklet is issued at birth. It contains specific information on immunisation, vitamin A and growth monitoring. A male child can use the same booklet for his entire life, as long as there is space to record the assessment and care provided. For men, the general health booklet can be annexed to their child health



profile for continuous recording the diagnosis and care provided. The girl child, however, will use a woman health booklet when she reaches puberty. The woman health booklet contains specific information on tetanus toxoid injection, family planning services, antenatal check-ups, obstetric history and postnatal services as well as her general history. Though the MOHP health services in Malawi said to be free, these booklets are sold at cost price to ensure re-supply of booklets. The MOHP, though interested, was initially hesitant to introduce the cost recovery system for these booklets for fear that people might remonstrate against it. Introducing these “profiles revolving funds” at facility level, was done in stages: from three health facilities to 20 and 43 health facilities including a largest central hospital in Malawi. Surprisingly, these booklets are in great demand. It should be noted that the similar booklets are already successfully used in the network of Christian Health Association of Malawi. Observations on the use of client health booklets are discussed in this paper under lessons learned in 8.2.

52 Registers

There are nine registers to record the details about the client. These registers are the only data source on health problems and service at the facility. A register is designed to provide data mainly for indicators. However, there are sufficient data at facility level for a number of cross variable analysis. At the end of each day data are aggregated. Aggregated data show where the people come from, what their main reported problems are, and what preparations are needed for the next working day. When facility staff sincerely looks into their daily aggregates and act as directed by information the evidence-based decision-making becomes an established habit.

5.3 Data aggregation and monitoring tools

Simple tools have been introduced at the facility and district level to aggregate data and to monitor the indicators. No report can be prepared without analysing the data at the level it is generated. Facilities use two printed poster size sheets: one for data aggregation for each indicator and another for calculated rates and ratios. At district level one uses A3 sheets for each indicator to monitor rates/ratios by facility. In this way districts can easily detect the performance rank of their facilities and can develop interventions to support their weaker facilities.

The worksheets contain current status, year-end targets, monthly or quarterly targets and achievements. If the achievement of each month or quarter is less than anticipated, corrective actions can be taken in time to ensure that the year-end targets are achieved.

A sample of monitoring worksheet is shown below.

				Monthly achievements in absolute numbers													
Facilities name	Current status	Year end target	Monthly target	July	August	September	October	November	December	January	February	March	April	May	June	Annual total	Annual coverage
Monthly total																	
Cumulative total																	
Cumulative coverage																	

5.4 Reporting forms

Two separate quarterly reporting forms, one for reporting from health facility to district and another from district to headquarters, have been devised. A few differences exist in content of reporting of these two levels: Some information reported from facilities to the district are not reported to headquarters where as districts add a few more information in its report from the data it generates at district level. Preparation of report is just to transfer information from data aggregation and monitoring sheets. The report contains both the numbers and rates/ratios to ensure that rates/ratios are correctly calculated at the lower level.

Indicator Number	Indicator Name	Numerator	Data	Constant Multiplier ×	Rates Ratios
		Denominator			
1	Percentage of pregnant women starting antenatal care during the first trimester	Number of pregnant women starting antenatal care during their first trimester		100	
		Number of expected pregnant women in the catchment area			

Community based data is collected by community health workers in a diary using the facility based monitoring format. Health facilities receive reports from the private practitioners operating within their catchment area. These reports are adapted locally according to the type of service rendered by the private clinic.

8. Testing, Launching and Follow-up

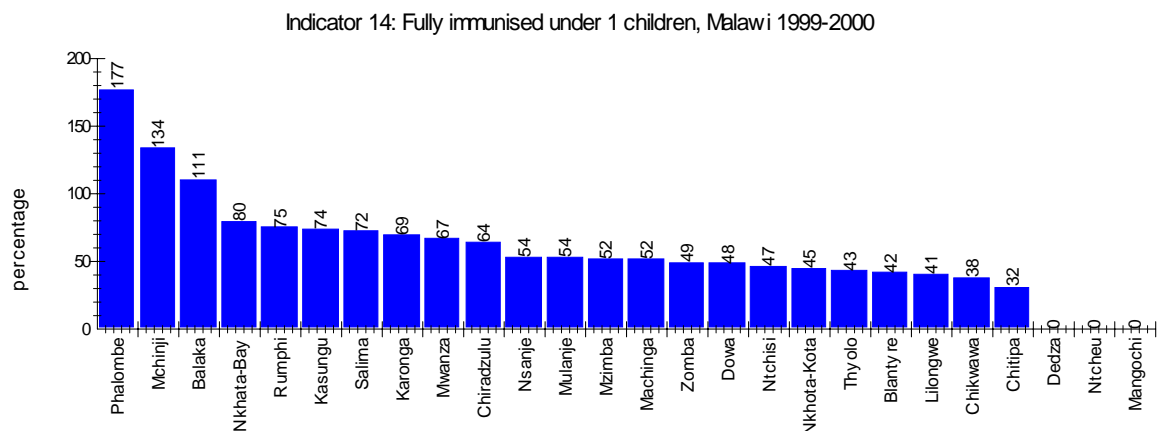
HMIS tools and procedures are briefly tested, quickly launched nation-wide in shortest possible time and systematically and strategically followed-up for long time until the evidence based decision making turns out into a habit of each health personnel and into a culture of the health system. All health workers go through a series of real life exercises during 5 days thorough training in order to understand the value of HMIS process. Each participant starts with demarcating the catchment area and deriving the target population for their respective facilities. They do real exercises on data based needs assessment, resources allocation, prioritisation, target setting, monitoring the targets and disease trends. The training has been considered as only a starter. It does not intend to cover everything. Instead, supervision and follow-up visits are carried out to each facility 2 rounds in each month for first three months, 1 round in each month for subsequent nine months and once in every quarter until the HMIS is fully practised everywhere. Time allocation to each stage is shown in the following diagram.

Design & testing	Nation-wide Launching	Constant supervision & follow-up until the HMIS becomes a culture
18 month	6 month	3 to 5 years or even more

6. Key lessons learned at the early stage

6.1 Use of available data

1. Appropriate use of available data is the best **pre-condition** for introducing a system to generate additional information. Failure to use currently available data is obviously an indication of failure of new system in attaining the main purpose of a HMIS.
2. People can understand the value of information only if they use it in making decisions. Having the knowledge of the HMIS alone is insufficient to understand the real purpose of HMIS. The real exercises on problem analysis, resource allocation and target setting and monitoring are necessary. Services utilisation rate is one of the several criteria that the MOHP applies in 2001-2002 resource allocation to the districts. This small decision has shown its effects on the quality of data. Thus, if data is used the quality will be inevitably improved.
3. Annual health statistics reports were unavailable at district and national level for many years. With an input of a five-day training for two persons from each district and a new data aggregation and monitoring tool all districts could generate quarterly and annual reports on health services and disease statistics. HMIS can be effective if appropriate tools, procedures and supports are available.
4. The graph below is from the annual performance review report 1999-2000. The quality of data is questionable. However, this graph raises many questions to programme managers and districts. Effects of publication of this graph are already reflected in the



quality of data in quarterly reports. It is important to publish the report to allow the reporter learn from mistakes.

6.2 Use of client health booklets

In the period of six months it has been observed that the use of the client health booklets has tremendous positive impact on the quality of individual client care, which can be summarised in the following points:

Correct diagnosis: history of the client has to be updated during each visit. Going through the history and past records on assessment and care, it becomes extremely easy to

complete the assessment of current problems of a client. Since the diagnosis is recorded in the booklet, which the client keeps, a provider is more likely to be careful in making the right diagnosis.

Quick diagnosis: a provider asks about the current problem and goes through the history and past records. As all the required details are in the same booklet, the diagnosis is obviously quicker than going through taking the history and reading scattered documents.

Saving time for client and provider: a provider goes through the record instead of asking the client several questions about the past problems and the types of care given. However, more time is required at the first visit to establish the profile of a client by issuing booklets and taking the history.

Self-assessment by client: the booklets serve as education tool. Literate client can read their own health history and become aware of their problems and to take precautions. Even illiterate guardians can track the growth development of their children. .

Controlling of fake recording of drug consumption: Malawi has immense problems with drug pilfering. The drugs dispensed and the balances in stock generally do not match with the quantity received. The booklet records actual drugs prescribed. Clients might raise their voice if there are differences between the amount prescribed and actually dispensed to them. Using of the booklets might reduce the volume of drug pilferage.

Create environment for cost sharing: the gaps between the government's ability to provide drugs and the actual demand are very wide. Given the current economic growth of Malawi it is unlikely that the government will be able to meet the total drug requirements. Therefore, cost sharing is the only way to ensure the uninterrupted availability of drugs at health facilities. Clients purchasing booklets, establishes a habit to pay for services and supplies. . This provision opened the door to promote further cost sharing schemes.

Freedom for client to select any clinic or provider: a facility-based personal health record system compels clients to visit the same facility even if they are dissatisfied with the quality of care given. As the booklet is always with the client, the client has the freedom to seek health services from any trusted provider or facility. Freedom to select a provider is important for increased client satisfaction. .

Acceptance: the client health booklets are well accepted by the communities even though a client has to pay for it. Even people who did not have any health problem bought them for their future use.