General Data Dissemination System (GDDS) Project - Phase 2
Socio-Demographic Statistics Project for Anglophone Africa

Module on Health Statistics

Report on the Provision of Technical Assistance to Mauritius

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Mauritius Health Information System Development Strategy and Plan

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Executive Summary

The use of the HMN assessment tool by a multi-sectoral team of Mauritian information experts has encouraged a broad-based discussion between a number of ministries about the existing HIS, its strengths and weaknesses, and particularly the possibility if improving what is already a functional and effective system. The strategic planning process included a review of the assessment results, identification of the priority HIS systems and HIS problems and a detailed inventory of ongoing HIS strengthening processes. The team developed a strategic vision and a set of basic principles, clarified HIS objectives and necessary interventions to achieve them together with broad phases for implementation.

The HIS in Mauritius has a long tradition of good censuses and civil registration, a core set of indicators with a solid system of high quality data collection from facility level upwards using both personal, resource and service records. This is backed up by a strong set of population surveys and a recently introduced national health Accounts.

The major weaknesses identified are in the area of data management and computerization, use of data both for policy and planning and for decentralized service management.

Through a combination of a clearly defined vision and appropriate and implementable objectives, the strategic plan outlines a process for application of the DART principles (Decentralisation, Action orientation, Responsiveness and Transparency) to strengthen the HIS in the areas of leadership and governance, strengthening of the HIS workforce, improving the use of data, improving the use of information and communication technology and coordinating. The basis of the plan is strengthening the national coordination mechanisms, decentralization of data analysis and use to the regional HIS offices. This will require empowerment and redeployment of the HIS workforce and computerization of all levels

Next steps will be development of a detailed implementation plan, defining of resource requirements and detailed costing. These will be carried out by the HIS core team and a number of specialist working groups, after which the strategic plan will be formally approved and budgeted.

1 The Current HIS Situation

A Assessment Results

The HMN assessment, performed in December 2009 by a multisectoral team of Mauritians, supported by a World Bank consultant and using the HMN assessment tool (version 4) showed a HIS of which any country can be proud. As can be seen in the table below, human resources, infrastructure and financing are more than adequate, indicators are well developed and widely used, data sources (census, vital registration, service and personal records) are excellent and the products of information use are of world class.

Resources	**72%**
Policy and planning	38%
Institutions, human resources & financing	85%
Infrastructure	87%
Indicators	**70%**
Data sources	**80%**
Census	82%
Vital statistics	99%
Population-based surveys	85%
Health & diseases records	88%
Health service records	62%
Resource records	64%
Data management	**10%**
Information products	**90%**
Dissemination & use	**57%**

The team was constructively self-critical and found problems in the areas of

1. Data management, where there are no central data warehouses and no written protocols and guidelines or metadata dictionary
2. Policy and planning, where coordination of data collection is weak and data is not overtly used for evidence based decision making
3. Data use for action and dissemination is weak, as there is minimal use of data below national level and weak , relatively infrequent dissemination of data

The majority of the strategic plan focuses on these three problem areas, using the DART principles of Decentralisation, Action orientation, Responsiveness and Transparency. None of these weaknesses were unknown and planning has been driven by the ministry officials in the Health Statistics Unit and medical Records Office, their professional activity fanned by the Minister of health's dynamic support for improved data use for decision making.

B SWOT Analysis

Strengths

The Mauritius HIS is one of the best in Africa and has the potential to get much better with the current political leadership, emphasis on performance based budgeting and performance appraisal. The Civil/Registration system (births, deaths, etc) is complete, Hospital service and disease surveillance data is available, ICD-10 is applied to hospital discharged patients data and causes of deaths and Health Statistics Annual Reports are available on the website. Data is collected on OPD waiting times, surgery waiting lists, cancer registration, etc and is used at central level for monitoring, evaluation and management

Weaknesses

The greatest weakness is data management, with no central data warehouse at any level and no good networking system. There is no written set of procedures for data management or a metadata dictionary. A lot of collected data is not analysed and data is not optimally used at local or regional level. There are some gaps in respect to private health sector data, mainly on immunisations, private consultations.

Plan for improvement/opportunities

The leadership in MoHQL and the CSO wants to improve further and through a collaborative approach has achieved consensus for change by applying the DART1 principles, development of analytic capacity of health workers at all levels and appropriate computerization throughout the system through an intersectoral E-business Plan (in collaboration with the Central Informatics Bureau). A detailed list of ongoing and planned activities is listed in annex ? ?

A World Bank Mission has conducted an HIS assessment and a strategic plan to achieve HMN compliance, consisting of a HIS assessment, development of a common vision and clear objectives of HIS with a budgeted Action Plan. Advocacy for a better use of data is being done through workshops, production of leaflets, posters, newsletters etc.

Co-ordination among data producers (CSO, civil status and MOHQL) is improving and top-level collaboration further strengthened through a series of national and decentralized data use mechanisms. Recruitment and training in epidemiology is to be strengthened in order to provide overall leadership within the MoHQL

At facility level, a workload monitoring system is being established in hospital records office to improve timeliness and a records system standard, and procedures will consolidate data collection in all hospitals. Capacity building of regional health records Officers is planned to enable them to analyse data and prepare monthly reports on performance indicators to for monitoring service delivery.

2 Priority HIS Information Categories and Subsystems

A core team of 15 staff from MoHQL, CSO and CIB was formed to review the assessment results, verify the scores and identify priority HIS subsystems and major problems based on mapping of low-scoring questions. Low-scoring questions were identified, turned into problem statements and key strategic interventions identified to resolve the problems (See annex ??) and prioritized. The interventions were then categorized into

[1] Decentralised, Action oriented, Responsive, Transparent

1. Leadership and coordination
2. Health workforce
3. Data use and dissemination
4. Data management and computerization
5. Surveys

They also develop the draft HIS vision and write the draft strategic plan over a week.
Simultaneously an inventory of ongoing and planned HIS activities was developed.
These draft documents were then presented to the wider HIS stakeholder group at a one-day workshop, for adaptation and review. A final draft was then produced and circulated electronically to all stakeholders for comments, changes, additions and improvements, after which this document was produced for budgeting and detailed implementation planning.

Based on these interventions, key persons responsible were identified and the timing of the intervention was planned.
The final stage will be approval by top management and implementation nation-wide

3 Vision, and Objectives

A Vision

The HIS Vision is to produce high quality health information to use at all levels for evidence based decision making to improve health services

B Objectives:

1. A **Coordinated intersectoral approach** to decentralized collection, analysis, dissemination and use of information guided by a national steering committee, coordinated by a common framework for surveys and data collection and a national decentralization plan and implemented by regional HIS committees.
2. **The Health workforce** at all levels will be skilled in management and use of the HIS. A particular emphasis will be on appointing a national epidemiologist who will support setting up and upskilling regional health information offices. In addition, an extensive training program (in-service, pre-service and international) will ensure empowerment of HIS officers and general health workers in all aspects of the information cycle.
3. **Decentralised** analysis and use of information for regional monitoring and management of health services using indicators from the PBB, MDGs. A strong focus will be placed on dissemination and feedback of analysed information using maps and graphs to make information understandable to all data users, including the general public.
4. An appropriate and modern **computer system**, networked and connected at all levels to provide information to all stakeholders in an interesting and relevant way, through close collaboration with the ministry of technology and the E-health business plan
5. Improved **management** of data through structured procedures and guidelines

4 Critical Assumptions and Risks

The main assumptions underpinning the successful implementation of the National Health Strategic plan include:

1. Continued peace and political stability in the country;

2. Availability of adequate numbers of appropriate, well motivated and committed health workers;
3. Macroeconomic stability and sustainable economic growth, leading to increased funding to the sector, improved per capita income and reduction in poverty levels;
4. Increased Government prioritization and funding to monitoring and evaluation of the health sector;
5. Timely and appropriate attention to implementation of all health priority areas.

5 Strategies for Strengthening Priority HIS Functions

Strategies for strengthening the HIS will be grounded on national decentralisation policies, using improved ICT to improve action orientation on the basis of information based decision making and ensuring a system that is responsive to the needs of users and transparent implementation

1 Leadership, governance:

The leadership of the HIS reform process will be placed high on the agenda of all responsible ministries and the overall strategy coordinated through the Intersectoral HIS Steering Committee which will meet quarterly. Their role will be to direct the HIS strategic plan development and implementation, to develop an overall plan for information use in line with national decentralization, develop detailed guidelines and authorisation and set national benchmarks for service delivery, program performance and resource allocation. A Regional intersectoral HIS Committee will be established to guide decentralized implementation of the strategic plan and to monitor progress.

The MoHQL will establish a national M&E coordinating unit under a national M&E officer that includes HRO, Lab, Demography and HS unit etc. At regional level a regional health information office will be established with full time, adequately trained staff and adequate equipment. Similarly the CSO, Civil Status office and other ministries will strengthen human and infrastructure of regional structures Under the coordination of the CSO, a coordinated Multi-year health survey plan will be developed and implemented

2 HIS Workforce

The HIS workforce will be decentralized, with regional level strengthened to perform many of the routine analysis functions currently performed at national level and data entry performed at facility level where possible.

A **National M&E officer** will be appointed in the MoHQL to drive the HIS reform and support regional HIS, if necessary using an expatriate until a suitable local candidate is trained and available. National level will concentrate on policy, planning and evaluation while providing guidelines and feedback to decentralized offices.

The key to implementation of the plan will be strong **Regional health information offices** with adequately skilled HIS staff who have adequate training and equipment. Initially the MoHQL will upgrade the existing Regional MRO statistics unit while establishing key staff posts for 5 regional health information offices (M&E officer, MRO, Statistician, Database Administrator) and defined scheme of duties.

There is a need to revise scheme of duties/job description for all HIS officers and include HIS functions in job descriptions for clinical staff

Trained staff will be reallocated to AHCs to enter data onto computers for both AHC and CHCs, to perform basic local analysis and provide feedback to facility management.

HIS staff at all levels will need training in data analysis and information use within this decentralized system. This will include both pre-service and in-service training.
A Pre-service training program for HIS officers will be established at MIH / University and internationally. An in-service training program for HIOs will be developed to ensure continuous in-service HIS training program for all health workers at MIH. This will provide formal training to upgrade M&E, epidemiological and statistical competences for HIS officers and provide opportunities for exposure to centres of excellence abroad

A National **Human resource database** will be set up that covers all health workers, both in service and entering service (public and private). Each health worker will have a unique identifier

3 Data Use

Data is currently used by managers to monitor service delivery at national level but not at regional level and below. The HIS strategic plan will stimulate regional analysis of health statistics using national benchmarks for comparison
National level will continue to provide overall guidance to regions through policies, plans and national benchmarks, and high-level analysis.
Regional Information offices will be staffed and equipped to analyse data monthly on selected indicators, disaggregated by health facility. They will report monthly according to national guidelines. Regions will produce quarterly reports focusing on MDGs and PBB indicators as well as annual reports. Regional level will use routine HIS for resource allocation as documented part of PBB and other planning and review processes as well as for service delivery management
Facilities (CHC, AHC, mediclinics and hospitals) will enter data onto the database and will perform local analysis and use of data to improve local management and planning of service delivery

4 Data management, computerisation

Data management got the lowest score in the HMN assessment, yet paradoxically will be the easiest component to improve and much of the groundwork has already been done in the E-business plan.
An integrated **Data warehouse** will be set up at national and regional level using the HMN- approved integrated free open source database. This database will need minor adaptation to suit Mauritius and existing data can be relatively easily imported into the warehouse, which will act as a central repository for all health-related information and include a facility register of both Public and private facilities, with unique codes allocated to each facility
Technicians in the MoH and CIB will need training in maintenance and use.

Data management procedures, protocols will be written to fit with existing Mauritian standards and procedures by adapting HMN templates. A **metadata dictionary** based on international best practices will also be written based on existing practices.

At local level, the existing **Medical Record system** functioning at JNH will be upgrade extended to all hospitals in line with the E-business plan which will define HIS requirements and ensure adequate and appropriate computerization and networking of all levels, including AHCs which are currently not computerized and have no trained staff

5 Health Surveys

The CSO will develop a coordinated plan to conduct health indicator surveys as part of a multi-ministry, multi year household and facility survey plan.
The survey plan will complement routine HIS data collection and ensure analysis of data by socio-economic status, include health indicators and the national health accounts and ensure that feedback on surveys is widely disseminated and used for advocacy
The survey plan will address weaknesses identified during the assessment such as

1. National health accounts (NHA) will be done more frequent with more participation and better dissemination of results
2. A multi-indicator household survey will include under 5 nutrition, Measles Immunisation and ensure socioeconomic analysis
3. Ensure regular dissemination of HIS data, with focus on MDGs and PBB indicators
4. Annual facility inventory and surveys to assess data quality, with rapid and appropriate feedback to data collectors
5. Routine HIS data will be complemented by routine facility surveys

6 Next Steps: HIS Planning and costing

This strategic plan process has not to date considered the detailed costing of implementation. These will be carried out over the next 3 months by the core team and small technical working groups (Module 3 of the HMN HIS strategic planning process)
This planning will include

1. ***Categories of Resources .*** A discussion of "additional" development and recurrent (operating) resource requirements generated by the HIS strategy, and the basic types of resource needs that will arise.
2. ***Summary of Cost Requirements***. A description and tabular summaries of additional development and operating cost requirements by type, year and plan period.
3. ***Expected Products, Milestones and Benefits***. A detailed description of the main products of the strategic interventions and the activities supporting each priority category of information and subsystem, the performance benefits being derived and how they will be managed and monitored

7 Conclusion

The HMN assessment has identified a strong and dynamic HIS in Mauritius that with minimal adjustments could be the best in its middle income country category.
Given the inherent strength of the Mauritian HIS and the strong national leadership from a number of different ministries, the implementation of this strategic health plan should be achieved within the timeframes set and address the weaknesses identified through the HMN assessment, making Mauritius fully compliant with the HMN framework.

The inter-ministry coordinating systems are in place and need to be followed through.
The decentralization policies are an integral part of the National Development Plan ; management at all levels is aware of the need to strengthen the use of available health information and to develop a culture of evidence based decision making. The country has a strong human resource base, a long tradition of data collection and the resources and vision to implement any plan.
What is required is appointment of a few key personnel to manage a dedicated effort to develop human resources through ongoing in-service and pre-service training, to implement the existing E-business plan to develop a national data warehouse and improve ICT at all levels of the system and to develop the

information culture through mandatory use of data for planning, monitoring and evaluation, particularly at the peripheral and regional levels of the health system.

Annex 1 Results of HMN Assessment

1 Methodology

The approach was a combined one, with a mixture of group work at a workshop (70 participants in 4 groups) and a series of meetings with individual experts (TB, NHA, Immunisation, Vital registration etc) and groups of experts (medical records officers, HIS unit, CSO,) In addition, a number of sites were visited (Regional health offices, Hospitals, Area health Centres, community health Centres, CSO offices) to see the reality on the ground and to get an impression of the skills and needs of front-line workers, middle managers and policy makers

Groups were given the tool to complete and hand back with a combined score and detailed comments; with individuals the tool was followed as an interview tool and responses marked during a discussion.

All responses were scored and entered onto the Excel tool with different respondents in different columns and comments where appropriate.

2 Results using HMN tool version 4

Overall the HIS in Mauritius is highly adequate, with particular strength surveys, disease record system s being the census, Vital Registration system,

Detailed results are available electronically and the following is a summary of scores, followed by a narrative

Resources	**72%**
Policy and planning	38%
Institutions, human resources & financing	85%
Infrastructure	87%
Indicators	**70%**
Data sources	**80%**
Census	82%
Vital statistics	99%
Population-based surveys	85%
Health & diseases records	88%
Health service records	62%
Resource records	64%
Data management	**10%**
Information products	**90%**
Dissemination & use	**57%**

A National HIS resources

Planning and policies

Legislation, regulations and procedures exists and are enforced, but enforcing in the private sector is a problem.

There is no specific HIS strategic plan but there is an overall E-business strategic plan that SHOULD cover HIS, but has not been developed with sufficient input from users.

There is no national or sub national committee to monitor or coordinate the HIS and HIS meetings are not regularly held … yet the system functions well without it. The MoHQL put together meetings to organise this assessment, but it is not standard practice

Financial and human resources

"Many of our staff do not understand basic medical terminology they work with every day"
Chief Records officer, Mr. Monohur

Central Statistical Office (CSO) coordinates census and vital registration, is highly skilled and has more than adequate capacity to design, perform and analyse census and vital registration systems. They work closely with MoHQL, though formal structures are weak. Within the MoHQL, the HIS is split between medical records and Information, resulting in some duplication. There is adequate number of staff (>500) in the medical records office and in the statistical office (?? … .), but overall leadership is weak as there is no epidemiologist in the country to manage the overall M&E framework.

Skill level appears reasonably good and there is acceptable turnover at all levels. Training is mainly in-service training and there are no formal courses or advanced diploma or degree courses. Staff at all levels need more training on computers and data use, for technical staff to be more efficient

Infrastructure

The basic supplies and forms are there for data collection to function. Computerisation is surprisingly weak, with no central data warehouse, old computers, databases 15 years old (Dbase 3) that do not "speak to each other" and local networking poor, though all regions have internet. Computers rarely break down, but when they do, in-house support sometimes takes a long time to act
Budget is adequate but need central permission to buy computers and basic networking equipment.

Way forward:

1. Set up technical committee to oversee M&E framework.
2. Develop overall HIS strategic plan to integrate with E-business plan
3. Strengthen decentralised data analysis and use
4. Modify data flow to go to regions for collation and analysis
5. Implement monthly report by hospitals and regions
6. Appoint epidemiologist to drive data use process
7. Train regions on data use
8. Upgrade computer system
9. Immediate implementation of patient registration system
10. Set up central data warehouse -
11. Training of all levels on data use and computers

B Indicators

The information system is data driven rather than action driven, and, though there are indicators, they are not selected according to explicit criteria and are not widely used, as evidenced by the fact that MDGs are not well known and do

not form the core of the HIS. CSO does not have access to data on all MDGS for its reports.

Indicators are centrally selected and in practice not all stakeholders are involved … particularly programs, regional directors, medical superintendents and NGOs, should have more say on developing indicators that are useful to them

Feedback is weak, only through ANNUAL reports. This should be done weekly or monthly.

> "Our weakness is that, while we have the information, we do not provide feedback to the people who provide us with the data"
> Chief Statistician, Mr. Jeannody

Way forward

1. In collaboration with all stakeholders, develop a core set of indicators that are MDG-focused and useful at all levels
    a. Monthly reports on these indicators from regions
    b. Regular feedback from central level on indicators
2. Training of staff to analyse and interpret indicators

C Data sources

Census

There is a long tradition of census in Mauritius, with the first census performed in 1848 and a Census every 10 years since then, with the next census due in 2010. No mortality questions are included, there was no post enumeration survey, as household surveys do continuous cross checking and the vital registration system covers 98% of deaths and births.

Data is analysed and interpreted locally within a year, producing reports that break down data by age, gender, and locality with descriptive statistics available down to district level. Micro-data are widely available for non-commercial purposes, with specific reports being produced on request.

Census data is widely used at national and regional level, but not at district level.

Civil Registration

> "Vital registration in Mauritius is not just the best in Africa, it is among the best in the world"
> Hamish Bundhoo, Director of Statistics

Civil registration for births and deaths dates back to the 18th century under French rule, with amendments in 1982 when marriages were added to the system. The system today is excellent and covers >98% of all births and deaths, eliminating the need for census mortality questions and crosschecks. Cause of death is certified by doctors using ICD10, with an "ill-defined" category of 6.5%

Data is collected, processed and analysed locally at 48 stations. Widely available 6 monthly reports break down data into age, gender and locality but not socio-economic status.

Again, continuous multiple households performing regular data quality control through continuous cross checking with local surveys and census

There is no need for sample registration system, Demographic surveillance system or verbal autopsy

Population surveys

"Most of our routine service data and vital registration is so good that we feel there is no need to carry out special surveys"
Mrs. Mootoosamy Veelar, Statistician

Mauritius relies on reports from health services and does not do many health – related surveys, as it is felt that service data and vital registration is sufficiently good to not need surveys.
Surveys that have been done include a multipurpose survey, specific NCD and HIV surveys and an occupational health survey. These show excellent local survey capacity, done to full international compatibility with data available on request. Socio-economic data is there but analysis does NOT disaggregate for socio economic status. Ministries collaborate, but coordination should be more structured. Planning of surveys is felt not to be well coordinated and this should be a key function of the multi-ministry technical committee

Individual Record

There is an excellent disease surveillance system, strengthened after the 2006 Chikungunya outbreak. However the Mapping culture is weak.
There is a good notifiable disease system with excellent (100%) reporting from all levels of the system and epidemics dealt with at regional level.
Laboratory results are reported for Hepatitis, syphilis, HIV and for outbreak verification.
Hospital records are excellent, with an impressive system of retrieving facility based records before patients come for follow up medical clinics, ICD10 classification of every hospital discharge and death
Bulletins are published annually and widely available.
Integration of data capture forms is reasonable, but could be better standardized and coordinated into one composite form for each facility / reporting unit.

Service Records

The public sector data collection system is fine, but the private sector is a problem. Great emphasis is placed on hospitals, while the PHC units have a relatively weak system.
Data analysis is very centralized. Decentralized analysis and use at regional and institutional level should be the principal focus of the strategic plan
Supervision tends not to focus on information use and there has not been a facility survey to assess service quality.
There are staff at all levels but they do not have two year training or formal in-service training, though most of them get regular hands-on in-service training.
Feedback is very weak, coming only in the form of an **annual bulletin** published regularly every year. Proposals have been made (April 2007) to improve the format of the annual report by increasing analysis and changing layout.

Resource Records

A facility database is there and is regularly updated, but there is no unique clinic identifier and no GPS coordinates (with ministry of housing but NOT used in MoHQL). Maps / GIS are not widely used to display health data. There is only one map with health facilities that is widely distributed, but staff and services are NOT mapped.

Human Resources

There is a regularly updated national human resources database that tracks the number of health professionals working in the public and the private sector by major professional category, but not the annual numbers graduating from health-training institutions.
There is however a problem to get data from the Private sector

Financing and expenditure

> "The NHA was very well done, but it was only once, and a long time ago"
> HIS Statistician, Mr. Rujjoo

The NHA was conducted once, in 2006 for 2001/2. NHA findings are not widely known or easily accessible. All knowledge of this activity appears to be concentrated in the hands of one person … when he was away nobody else seemed to know anything!!

Financial records are available on general government expenditure on health and private expenditure on health. There is a system for tracking budgets and expenditure by financial agents disaggregated by regional level
Inadequate numbers of qualified, long-term staff are deployed to work on the National Health Account (NHA)
Because it has only been done once, NHA has NOT been used for policy formulation and resource allocation. However it does provide information on financial sources, financial agents; providers; and functions and on health expenditure by major diseases, health programme areas, geographical and administrative region as well as target populations

Equipment, supplies and commodities

Each public sector facility is required to report at least annually on the inventory and status of equipment and physical infrastructure and least quarterly on its level of supplies and commodities
However **this system is weak** and periodicity and completeness of reporting is inadequate and there are NOT sufficient and adequately skilled human resources to manage the system.
Reporting systems for different supplies and commodities are not integrated and managers at national and regional levels are not able to routinely reconcile data on the consumption of commodities with data on cases of disease reported.

Way forward

1. A collaborative, multiple indicator cluster survey to cross-check key service indicators
2. Analysis by socio-economic status for births and deaths and for individual and service records.
3. Improve public sector reporting
4. Empower regions to do decentralised analysis and use of service data using indicators
5. Improve data analysis from PHC units
6. Improve feedback of information to data users and collectors.
    a. monthly written feedback to hospitals and programs
    b. During supervision

7. Strengthen capacity of all HIS staff
    a. Regular, formal training for HIS staff at all levels,
    b. Continue current hands-on in-service training
    c. Institutionalise formal, structured institutional training for HIS staff (Certificate, Diploma, Degree)
8. Facility database strengthened through
    a. GPS coordinates and a unique identifier for each reporting unit
    b. Infrastructure, Staff and equipment linked to facility
9. Geographical Information System linked to HMIS database to show
    a. service, infrastructure and staff distribution
    b. Population distribution related to infrastructure
10. NHA to be conducted annually
11. An integrated and regular equipment and Inventory reporting system for institutions incorporated into the strategic plan and managed by regions

D Data management and computerisation

Data management is the weakest component of the Mauritian HIS, scoring only 10%

"The JNH record system could be easily set up in this hospital and would make everyone more effective but we do not have the authority to implement it here"
Senior MR Officer Mr. Kedoo

There is no written set of procedures for data management (data collection, storage, cleaning, quality control, analysis and presentation)
The country does not have an integrated data warehouse containing data from population-based and institutional data sources (including health programs) and there is no user-friendly reporting utility accessible to users
There is no metadata dictionary that provides definitions about data use in indicators, specification of collection methods used, periodicity, geographical designations (urban/rural), analysis techniques used and possible biases
Unique Identifier codes are not used in different databases and there is no complete relational table available to merge them.

"I use a computer at home, but at work I do not use one as I have not been taught to use the laboratory system "
Principal Technician Mrs. Jugessur

Reports suggesting improved computerization have been circulating for years, and an expensive attempt was made at one hospital (Nehru) but was not adequately followed through and a lot of money was wasted. Everyone is now waiting for the E-business strategic plan, which is going to "solve all the problems" … In the meantime, computerization is surprisingly weak for such a data-rich country and the many small things such as simple local networking and developing gateways between systems, which could improve computerization are not being done, while everyone awaits the E-business plan.

Way forward

Computerisation should be tackled urgently, starting small and growing incrementally, building on the systems that exist already and using skills that are there already, rather than waiting for a "big bang" solution to all problems.

1. Stimulate a culture for computerising existing data by building on and supporting what already exists in the medical records office at Nehru Hospital and the cardiac centre e.g.
    a. Networking existing computers
    b. Making printed labels for clients attending special clinics
    c. Linking laboratory and medical records
    d. Putting computer use into the scope of work of OPD and ward staff
2. Develop written procedures for data management
3. Set up an integrated data warehouse at national and regional level
4. Develop a metadata dictionary with data definitions
5. Ensure that there are unique identifier codes for database elements
6. Develop human resource capacity to adequately manage data
7. Consideration should be given to Free open-source systems that can be locally adapted, rather than expensive "black box" commercial packages where the MoHQL does not have access to the source code.

E Data Quality

Data quality is generally highly adequate for service delivery. Virtually the only weakness is the fact that there is a consistent lack of breakdown by socio-economic status. Data for health expenditure is hampered because there is no regular national Health Accounts

Under 5 Mortality

Under 5 mortality is captured by ongoing, international-standard vital registration of >98% of child deaths reported annually using ICD10 for the past 10 years, with minimal variation- a slow improvement from 19.4 in 1990 to 15.3 in 2008.
Reports are not broken down by socio-economic status

Maternal Mortality

Maternal mortality is also covered by 100% registration, followed by local investigation into causes and reported annually for the past 10 years, again showing consistent improvement but with some variations because the numbers are so small (6 maternal deaths in 2007). Data quality is crosschecked by civil Status data, police reports and household surveys.

HIV prevalence

HIV in Mauritius is mainly among injecting drug users, who have regular random sampling. In addition the ANC population (17,000 tests) is screened anonymously (0.25% in 15-24 year olds), blood is tested (40,000 tests) and approximately 10% of the population is screened voluntarily. Reports are published annually with no major discrepancies

"The socio-economic data is there if we want to analyse it, but it is not in the reports"
CSO Statistician Mrs. CassimAli

Measles Vaccination

Coverage can be estimated from routine administrative statistics submitted by 90% of immunizing health facilities (7% private). These statistics are systematically reviewed at each level for completeness and consistency, and inconsistencies investigated and corrected. To calculate coverage, reliable estimates of population are available and projections are published monthly and annually.
Coverage has not been measured by household surveys in the past 5 years but an annual estimate is published, based on administrative statistics and data is consistent between reports
Coverage is based on 90% submission rates and is disaggregated by: sex, age and locality but NOT socioeconomic status (income, occupation, education of parents);

Attended deliveries

The percentage of deliveries attended by a skilled health professional can be estimated from routine administrative statistics submitted by 90% of health facilities and are reviewed at each level for completeness and consistency, with inconsistencies investigated and corrected.
The percentage of deliveries attended by a skilled health professional has NOT been measured by national household surveys in the past 5 years. However estimates have been published monthly for the past 10 years and datasets are remarkably consistent, being based upon 98% coverage
Most recent estimate disaggregated by age and locality but not socioeconomic status

Tuberculosis Treatment

There are approximately 100 TB cases a year, mainly in diabetics and chronic alcoholics. Newly diagnosed cases are treated for 2-3 months in a special hospital during the intensive phase, after which they are treated on DOTS, supervised by both family and health workers.
Data from quarterly reports is regularly analysed and shows no discrepancies over time, except that the previous 2:1 male to female ratio is now increasing to 3:1. There is 9% HIV cross infection, a very low level and only 1 case of drug resistance has been identified.

Government health Expenditure

The NHA was done in 2006 for 2001-2 using international standards, using “off the shelf” records with consistent definitions of expenditure (audited reports) on health across components and over time, using ICHA codes. Another NHA is planned for 2009, but is plagued by staff shortages.
Disaggregated estimates of general government expenditure are available by regional level and include externally funded government expenditure by source of funding (only 0.4%). Detailed information on sources and statistical methodologies are available and departures from international guidelines, adjustments carried out and their estimates are recorded.
Thus a good NHA, but it is not done sufficiently regularly or sufficiently well known outside of the health Economist office.

Private Expenditure

This was carried out as part of the NHA in 2006 for 2001-2 and was done according to the same high international standards. A committee included all role players (including customs and private insurance) and used NHA guidelines throughout. Four matrices were produced according to ECSA – HC standards as proposed in an Arusha workshop.

Workforce Density

This information is not widely known and this component needs to be addressed in the strategic plan. No informant was able to give reliable information about such a survey.

Risk factor

A population-based national **smoking** prevalence survey has been done annually for the past 10 years
Like all Mauritian surveys, these are not disaggregated by socioeconomic status but by demographic characteristics and locality.

Way Forward

1. NHA done at least every two years and results made more available
2. Multi-indicator cluster survey to cross-check service data results
3. Workforce survey needs to be done
4. Other surveys to be disaggregated by socio-economic status

F Data dissemination and use

Data dissemination and use is weak, considering how much good quality is available. Promotion of a culture of information use through a process of decentralization, action orientation, responsiveness and transparency is highly recommended

"We have a good culture of collecting data, but we do not have a culture of using it"
Chief Demographer, Mr. Sunkar

Demand and analysis

Graphs and Maps are **not** widely used to display information at administrative offices or at health facilities.

Policy and Advocacy

Integrated HIS summary reports on indicators (including MDGs) are distributed only annually and then not to all relevant parties

Planning and priority setting

Health information (population health status, health system, risk factors) is used in the National planning and resource allocation processes (e.g. annual integrated development plans, medium-term expenditure frameworks.)

"Every month we get asked for information we have already sent to head office"
MRO, Dr Jeeto Hospital

There is a program based budgeting process, but no long-term health strategic plan and no annual health sector review is performed

Resource Allocation

> "Data flow is a one way street. We send the data to the ministry, but never hear what the results are"
> Medical superintendent, Dr Rampete

HIS information is used by some regional management teams to set resource allocations in the annual budget processes.
There is a strong tradition of using HIS information to advocate for equity and increased resources to disadvantaged groups and communities by documenting their disease burden and poor access to services

Implementation and action

Managers at regional health offices do not regularly use health information for health service delivery management, continuous monitoring and periodic evaluation. This is done only at national level.
Similarly it is only at national level that health information is regularly used for health service delivery management, monitoring and evaluation and it is only at National level that information on health risk factors is systematically used to advocate for the adoption of lower-risk behaviour by the general public and by targeted vulnerable groups

Way Forward

1. There is an urgent need to decentralize the analysis and use of health information for management, monitoring and evaluation of service delivery.
2. Regional offices should be strengthened and Medical Records officers trained to do this analysis, rather than just sending data upwards
3. Graphs should be more used to present information locally
4. A Geographical Information System should be established as a matter of urgency to portray the vast amounts of available information on maps.
5. Feedback should be provided by all levels to the levels below, using key performance indicators (PBB and MDG) rather than raw data
6. Collaboration with CSO should be strengthened to enhance accuracy of MDG reporting
7. Annual budgeting (MTEF, resource allocation etc) at regional level should incorporate analysis of routine health data
8. Annual health reviews should be held at which there is active participation and presentation by regional and AHC staff as well as programs, planers and policy makers
9. The role of MOHQL should change from data entry and basic analysis to more sophisticated quality control, trend analysis and statistical projections
10. An epidemiologist or data use expert should be employed to guide this process. While a Mauritian is being trained, the MoHQL should consider employing an expatriate to support overall HIS strengthening.

Annex 2: HIS Vision, Objectives

HIS Vision

To produce high quality health information for evidence-based decision making at all levels to improve health services

Objectives:

1. Coordinated approach to standardized collection, analysis, dissemination and use of information involving public and private sectors
2. Health workforce at all levels skilled in data management and use of the HIS
3. Decentralised analysis and use of information for timely monitoring, evaluation and management of health services using standardized indicators and benchmarks.
4. Appropriately computerised system networked and connected at all levels
5. Improved management of data through structured procedures and protocols

HIS Vision Elements

HIS Computerisation	**Decentralized information use and dissemination**
Data warehouse established at national and regional level	Regional health information management offices established, staffed and equipped
Computers effectively networked to facilitate transmission of data	Integrated, MDG and PBB oriented regional summary reports produced
Data entered at AHC level	Decentralised, local analysis of data at each level, including socio-economic aspects
Appropriate electronic patient record systems, smart cards, Picture archiving and communication systems (PACS)	National benchmarks produced for regional comparison based on standardized indicators
Good maintenance of databases	Information used for planning and PBB
Use of SMS for appointment scheduling	Improved access to analysed information through user-friendly retrieval and reports
Health Workforce skilled	**Coordination**
HIS staff trained in supervision and database management	Data management system standardized, coordinated and strengthened
Staff trained in computers and data use	Clear definitions of medical terminology
Pre-service HIS training courses established at MIH, MU	Overall plan for health surveys (facility and population based)
Plan for ongoing in-service training of all health workers	Manuals and guidelines written for standardized collection, analysis and use of data
International training in epidemiology, monitoring and evaluation	Involvement of private sector in all aspects

Annex 3: Current HIS Strengthening Activities

	Activity	Products	Date	Agency
1	**Surgical operations coding**	Records of hospital discharges include surgical operations coded according to the Australian International Classification of Health Interventions (ICHI). Presently no data is available by type of operations in private hospitals.	2008.	MRO
2	**Combined Health Statistics for Mauritius and Rodrigues**	In line with international reporting requirement, one integrated report is published for both Mauritius and Rodrigues. Most health indicators required for MDGs are available on the website. It is planned to include all health indicators on the Annual Report as from 2008	2007	HSU
3	**National Sexual and reproductive Health Strategy**	The planned activities include legal & policy review, advocacy, capacity building, service delivery and research. Surveys will compile indicators for monitoring and assessment, including some MDGs	2009-15	Demography unit MoH
4	**MOHQL Registry system**	A computerized network system registers all incoming mails and files for rapid retrieval of information and movement of files. Implement system at regions in 2009.	2007	MoHQL
5	**National health accounts**	The second NHA report for Mauritius for the financial year 2005/6, will be conducted, including private stakeholders. A more regular NHA and improved accessibility through the website, is also on the agenda.	2006, 2009	NHA Committee
6	**ICD-10 coding & booklet**	The MoHQL shifted from ICD-9 to ICD-10, for morbidity (03) and mortality (05), A Booklet on how to properly complete the Cause of Death Certificate distributed to all doctors in 2006, to be repeated in 2009. Training workshops organised for Health Records and Statistics staff. Data - capture forms modified, including for private clinics.	2003 ongoing	HSU/ HRO
7	**Cancer registry**	A National Cancer Registry, compiles all newly diagnosed and/or treated cases of cancer in Mauritius. A simplified questionnaire is used to collect data from private pathologists. ICD-10 and ICD-oncology are used for coding and classification purposes. The 2005 data was published in the 2007 Health Statistics Report: (2006-8 in 2010)	1995	Cancer Registry /MIH / Central Lab
8	**Health personnel database**	The HR Division of the Ministry of Health, the Medical Dental Council and Nursing Council are the main information sources for the database on health personnel. Data on health personnel employed by Private Clinics are also compiled. Data for 2007 is on the MoHQL website.	2007	MoHQL Medical council Nursing council
9	**Disease surveillance**	Every new case of 32 infectious diseases must be notified. Weekly and Monthly Reports are disseminated to main stakeholders. The disease surveillance information system was strengthened during the Chikungunya epidemic in 2006.	2006	HSU/ HI / CDC unit
10	**M & E for HIV/AIDS**	National HIV/AIDS Strategic Plan 2006-2011 set up a Monitoring & Evaluation System that was assessed in 2008 and enhanced for 2009.	2006	AIDS Unit/ NAS
11	**Programme - based budgeting**	Monitoring and evaluation of performance needs timely and accurate data required to track actual performance against plans.	2006	H Econom

	Activity	Products	Date	Agency
	framework	Several health indicators have been developed for the PBB Framework July 2008-July 2009.		ics Unit
12	**Monitoring and Evaluation officer**	An M&E officer is needed for advanced interpretation of health indicators. The WHO has been asked to provide epidemiology training to local health personnel to ensure analysis of data from 2009 onwards.	2009	MoHQL / WHO
13	**Computerisation at Central Supplies Division,**	A Computerized Inventory Control System at the Central Supplies Division for stock control of drugs and disposables. It is planned to upgrade the system in 2009 and implement in all hospitals and Area Health Centres.	2000	Supplies Division
14	**Central health laboratory computerisation project**	The Central Health Laboratory Computerisation Project has a software designed by State Informatics Ltd (SIL) and is used for entry of request and results of lab tests. It is planned to develop modern, comprehensive medical laboratory information Management System in 2009.	1994	Central lab
15	**Website of the Ministry of Health & Quality of Life**	The 1994 website was upgraded in 2005 as the main point of entry to access Government information, including health. The website includes services offered by hospital/ health centre, legislations, publications, statistics and advice to travelers.	2005	MRO
16	**Smart card**	It is planned to replace the National Identity Card by a smart Card as from 2010. Data stored in the card will include medical information of each citizen. This will facilitate the retrieval of basic information for intervention, including medical treatment.	2010	Min of IT
17	**Computerised personnel system**	The Ministry of Civil Service Affairs system stores establishment data of all civil servants. It is planned to implement the system in the MHQL in 2009. The system will process appointment, promotion, leave application, posting etc.	2009	Min Civil Service/ HR Unit
18	**Telemedicine**	The telemedicine Centre, based at the Cardiac Centre, was launched in 2008. Services include tele-consultation and Continuous Medical Education.	2008	Cardiac Centre
19	**Training of health records staff**	All new recruits are given a 3-month on the job training with some theoretical sessions (proposed to be 6 months). Refresher courses are planned for the other grades in the near future.	2008	MRO
20	**Medical records – enhancement of annual report**	Graphical presentation of data for the last five years were introduced for easy comparison and interpretation. The report includes activity of all service departments of all public hospitals and Health Centres	2006	MRO
21	**E- business strategic plan**	To improve the work processes of the MoHQL, an E-business Strategic Plan was developed for networking of Health Institutions, including Private sector. Necessary approvals are being sought for the implementation of the Strategic Plan.	2008 - 15	MoHQL / CIB
22	**JNH integrated information system**	The JNH Integrated Information System has several modules implemented successfully (e.g. Medical Records Division, Pharmacy), but not all modules are operational. About 40 PCs use the system concurrently. The system is based on an Oracle 7 system in a Unix environment.	1993	MoHQL
23	**Cardiac centre computerisation**	An Integrated Hospital Management System at the Cardiac Centre consists of various modules from the Medical	200 7	Cardiac Centre

	Activity	Products	Date	Agency
		Records to management of staff, stores, linen etc. The system is an Oracle database in a Unix environment.		
24	**Medi – clinic integrated information system**	The Medi-Clinic System consists of 4 modules, Medical Records, Nursing, Pharmacy and Diagnosis. Paperwork has been reduced to less than 10 %. The system will be replicated to 7 Area Health Centres	1998	MRO
25	**Housing and population Census**	Housing and Population Censuses are conducted every ten years. (2000 and 2010). Information on health are the availability of toilet facilities, bathing facilities and means of refuse disposal. Demographic, fertility and disability characteristics were collected in 2000 and will be retained for the 2010 census.	Ongoing	CSO
26	**Continuous multi purpose household survey**	The Continuous Multi Purpose Household Survey collects data on the socio-economic characteristics of the population, to measure the labour force, employment and unemployment. The 2008 survey contains a module on 'Occupational health'.	2008	CSO
27	**The Millennium Development Goals indicators**	Data on MDG indicators available on the CSO website which coordinates the reporting to international organizations. 17 other indicators have been defined at the national level and are on the website	2008	CSO
27	**Vital Registration Computerisation**	Enhancement of vital registration through computerization of the civil Status Offices		CSO
29	**Social Aid**	Reporting of Social Aid beneficiaries Social Register Mauritius Basic Retirement Pension		MSS
30	**Disability**	Computerization of disability database		MSS
31	**Health Newsletter**	Launching of a periodical newsletter by the MoH in 2009	2009	HSU
32	**Road Traffic Report**	Report from police unit on car accidents		Police
33	**Police annual report**	Report contains data on road accidents, injuries, fatalities, murders, suicides, poisoning		
34	**Domestic violence**	Report on domestic violence and child abuse		MoWR
35	**Post |Mortems**	Reports on post mortems sent to relevant hospitals		MoHQL
36	**Blood Transfusion computerisation**	System to link Blood transfusion service to all regional blood banks to track transfusion activities	2008	NBTS / CHL

Annex 4 HIS SWOT Analysis

Strengths

- Civil/Registration system (births, deaths, etc) is complete
- Hospital service and disease surveillance data is available
- ICD-10 applied to hospital discharged patients data and causes of deaths
- Health Statistics Annual Reports available o website
- Data collected on OPD waiting times, surgery waiting lists, cancer registration, etc
- Data used at central level for monitoring, evaluation and management

Weaknesses

- No set of procedures for data management
- Data not optimally used, mainly at local and regional level
- A lot of data not analysed
- Data gaps in respect to private health sector, mainly on immunisations, private consultations.
- Absence of a good networking system
-

Opportunities

The World Bank mission builds on existing HIS strengthening activities to provide an opportunity for achieving full **HMN Compliance** with a minimum of effort. The process of Assessment, HIS strategic plan development, clarification of a vision with clear strategic objectives for the HIS has resulted in a budgeted action plan that with strong leadership can provide, a mechanism for achieving consensus about the way forward and be used for advocacy to get the necessary resources to implement the decentralized system.

Leadership of the HIS strengthening process is already there, with the Minister providing strong guidance. This political direction needs to be translated into broad-based intersectoral support by ensuring that the existing steering committee, technical working groups, HIS committees meet regularly and function effectively. At national level it is essential that a senior Monitoring and evaluation officer/ epidemiologist is appointed to manage a restructured national M&E unit that combines all data gathering units into a

Upskilling the workforce will be an essential component, supporting training institutions at MIH and the university of Mauritius to develop a comprehensive training program of both in-service and pre-service training that should ensure that

- Medical Records department employees upgrade their existing skills by
  - Identifying those who are already computer literate and using them to drive the computerization process,
  - Encouraging those who are interested to become computer literate through hands-on use of software at work
- Graduates in all health disciplines understand the importance of use of information for improving service delivery
- Employees at all level are empowered to use information to improve service delivery, planning, monitoring and evaluation

A strengthened HIS will of itself provide **advocacy** for a better use of data through increasing use of data for evidence based decision making that is disseminated through holding national and regional workshops, production of useful and relevant reports, newsletters and material for planners, decision makers and politicians.

The **E-business Plan** provides for a phased implementation of a computerized system, starting with upgrading and strengthening existing computerized activities, plucking the "low hanging fruits" such as effectively networking existing computers, using the HMN-recommended DHIS software to get functioning data warehouses at national and regional level, modernizing the best of the existing medical records system functioning at JNH and the cardiac centre, ensuring that the computerized outputs of the laboratory system are linked to the data warehouse

Improved co-ordination among data producers

Recruitment/training in epidemiology

The establishment of records system standard, and procedures to consolidate data collection in all hospitals

Capacity building of Regional Health Records Office staff in view to enabling them to prepare Monthly Reports containing performance indicators to be used for monitoring.

Annex 5: Low scoring Questions, problems, interventions

Question	Problem Statement	Proposed intervention
	POLICY & RESOURCES	
Country Statistical Office and Ministry of Health have established **coordination mechanisms**	Intersectoral coordination mechanisms exist but are not fully functional	Intersectoral steering committee to meet regularly to direct HIS strategic plan implementation
At regions there are designated full-time **health information officer** positions and they are filled	There is no regional health information office with full time staff	Establish regional health information office with adequate staff and equipment
HIS capacity building activities have occurred over the past year for health facility staff (data collection, self-assessment, analysis, presentation)	HIS staff do not have adequate training either pre-service or in-service.	Set up pre-service training program for HIS officers . Ensure continuous in-service training program
Are computers available at the relevant offices at national, regional, and district levels to permit rapid compilation of sub-national data?	Computers exist, but are not networked	As part of E-business plan, ensure adequate and appropriate computerization and networking of all levels
	DATA SOURCES	
In the past 5 years, a nationally-representative survey has measured the percentage of the relevant population receiving key maternal and child health services	MCH surveys have not been conducted	Conduct regular surveys as part of MCH strategy, under health Survey plan
There are meetings and a **multi-year plan to coordinate** the timing, key variables measured and funding of nationally representative population-based surveys which measure health indicators	There is no multi-year coordination plan for health surveys to measure health indicators	CSO to coordinate plan to conduct multi-indicator health surveys
There is a systematic approach to evaluating the **quality of services** provided by health facilities. This includes both: (a) **systematic standardized supervision** with reporting of findings to regional and national levels; and (b) a health facility survey of a nationally-representative sample every 5 years	a) Quality of services is not systematically supervised at regional and district level b) A health facility survey is not conducted every 5 years	a) Service quality supervision system to be instituted using routine data b) Health facility surveys to be conducted regularly
There are mechanisms in place at national and sub-national levels for **supervision and feedback on information practices**	Routine HIS data needs to be complemented by routine facility surveys	Annual facility surveys done to assess data quality, with rapid and appropriate feedback to data collectors
Districts or regions **compile their own monthly, and annual summary reports**, disaggregated by health facility	Regions and districts do not analyse their own data disaggregated by health facility	Regions and districts to be supported to analyse their own data through creation of Regional Health Information Management offices
There is a national roster of public and private sector health facilities. Each health facility has been assigned a **unique identifier code** that permits data on facilities to be merged.	A facility register exists, but it is only for public and has unique identifier codes only for hospitals	Allocate unique codes to each facility (Public and private) in the database

Question	Problem Statement	Proposed intervention
There is a national **human resources (HR) database** that tracks the number of health professionals by major professional category working in either the public or the private sector	HR database exists (at Medical and Nursing councils) but is not centralized and weak for the private sector	Set up one centralized HR database covering all health workers, both in service and entering service
There is a system for tracking budgets and expenditures from all sources of finance disaggregated by sub national / district level	National health accounts is done, but not frequently enough or with sufficient participation. Results are not adequately disseminated	More frequent NHA, with more participation and better dissemination of results
	DATA MANAGEMENT	
There is a written set of **procedures** for data management including data collection, storage, cleaning, quality control, analysis, and presentation for target audiences,	No written data management procedures or metadata dictionary exists	Write data management guidelines and metadata dictionary, preferably using HMN templates
The HIS unit at national and regional level is running an integrated **"data warehouse"** containing data from all data sources (population-based and facility-based), and has a user-friendly reporting utility	No data warehouse exists at any level	Use HMN recommended data warehouse (DHIS), which is free open source software and functions in other African and Asian countries. Get training in maintenance and use. Import relevant data into warehouse
INFORMATION PRODUCTS		
Underweight in children (<59 months) data collection methods used for most recent data	A survey on nutrition for over 5 years has been conducted (2004). No under 5 survey for last 10 years	Include under 5s as part of MCH household survey and ensure socioeconomic analysis
Measles coverage can be estimated from routine administrative statistics submitted by at least 90% of immunizing health facilities.	Private sector does not report on measles. No survey on measles coverage has been conducted	Include as part of MCH household survey and ensure socioeconomic analysis
DISSEMINATION AND USE		
Integrated HIS summary reports covering at least a minimum set of core indicators, including of MDGs are distributed **regularly to all** relevant parties	Summary reports exist for individual programs and an annual integrated report exists. However regular, integrated MDG-focused reports are not made	Quarterly reports by regions focusing on MDGs and PBB indicators to be produced
Health information (population health status, health system, risk factors) is demonstrably used in the planning process, e.g. for annual integrated development plans, medium-term expenditure frameworks, long-term strategic plans, and annual health sector reviews	Information is used at national level but not at regional level	Use routine HIS at regional level as documented part of PBB and other planning and review processes
REGIONAL health workers analyze health statistics in their REGION, compare them with national benchmarks and act accordingly.	Regional analysis not done	Stimulate regional analysis of health statistics using national benchmarks for comparison
HIS information is widely used, by REGIONAL management teams to set resource allocation in the annual budget processes	Resource allocation done nationally but not at regional level	Stimulate regional use of health statistics for resource allocation in PBB process

Question	Problem Statement	Proposed intervention
HIS information is used to **advocate for equity** and increased resources to disadvantaged groups and communities by e.g. documenting their disease burden and poor access to services.	Most health data is not analysed for socio-economic status	Include socioeconomic status analysis in all surveys and use data for advocacy.
Managers at **all levels** use health information for local health service delivery management, planning and monitoring	Data currently used at national but not regional level and below	Stimulate data use for service delivery management at regional and district level
Care-providers **at all levels** use health information for local service delivery, planning and monitoring	Data not used at facility level	Encourage improved analysis and use of data for planning at CHC, AHC, mediclinics and hospital level

Annex 6: HIS Subsystem Objectives and Interventions

1 Leadership, governance:

HIS subsystem: Leadership, governance			
Problem Indicator	**Value**	**Performance Improvement Objectives**	**Year**
HIS Steering Committee meetings	?	HIS Steering Committee meets quarterly	2009
Functional regional health information office	0	5 Regional information offices established	2009
Multi-year health survey plan	0	Survey plan developed and implemented	2009

Priority Problems	**Proposed Intervention**	**Who**	**When**
Inter-sectoral coordination mechanisms exist but are not fully functional (I.A.5)	Intersectoral **steering committee** to meet regularly to direct HIS strategic plan development and implementation	PS / Dir CSO	Mar 09
There is no regional health information office with full time, adequately trained staff (I.B.3)	Upgrade existing **regional Statistical office** of MRD to Regional health information office, with adequate staff and equipment	CHRO/ CHS/ RHD	Jun 09
	Establish coordinating unit under national M&E officer/ epidemiologist that includes HRO, Lab, Demography and HS unit etc.	SCE	Sept 09
There is no multi-year coordination plan for health surveys to measure health indicators (III.C.4.1)	Develop coordinated plan to conduct health surveys	Dir CSO/ DGHS	Apr 09
	Establish Regional HIS Committee	RHD/ DGHS	Apr 09
	Ensure regular meetings of HIS technical working group/ Core Team	DGHS/ PS	Jan 09
	Develop overall plan for decentralized HIS with detailed guidelines and authorisation	DGHS/ Dir CSO/ RHD	Jan 10
	Set national benchmarks for service delivery, program performance and resource allocation	DGHS/ CHS/ CHRO	Jun 09

2 HIS Workforce

HIS subsystem: - HIS Workforce			
Problem Indicator	**Value**	**erformance Improvement Objectives**	**Year**
l health information office	0	5 Regional information offices established and functional	2010
taff with adequate HIS training each year	0	National Human resource database set up	2011
M&E officer	0	Pre-service training program for HIS officers established	2011
		In-service training program for HIOs	2010

Priority Problems	Proposed Intervention	WHO	WHEN
There is no regional health information office with full time, adequately trained staff (I.B.3)	Upgrade Regional MRO statistics unit	CHRO/ RHD/DHS /	Jun 09
	Establish key staff posts for 5 regional health information offices (? MRO, Statistician, Database Administrator) and define scheme of duties / Job description	DGHS/ RHD	Jan 10
	Revise scheme of duties / Job description for all HIS officers and include HIS functions in job descriptions for clinical staff	CEO/ HR Unit/ CHRO	Jun 09
	Train HIS staff in decentralized system, data analysis and information use	CHRO/ RHD	Jun 09
No national M&E offocer/epidemiologist to manage HIS reform	Appoint National M&E officer / Epidemiologist to drive HIS reform and support regional HIS (use expatriate until local available)	DGHS	Jun 09
HIS staff do not have adequate training either pre-service or in-service. (I.B.5)	Set up pre-service training program for HIS officers at MIH / University and internationally.	DGHS/ MIH / UoM	Jan 2011
	Ensure continuous in-service HIS training program for all health workers at MIH	CHRO/ CHIS	Jan 2010
	Reallocate trained staff to AHC to enter data for AHC and CHCs	CHRO	Jan 2010
Human Resource database exists (at Medical and Nursing councils) but is not centralized and weak for the private sector (III.F.1.3)	Set up one centralized HR database covering all health workers, both in service and entering service (public and private). Ensure each health worker has unique identifier	SCE / E-Business	Jan 2011
	/ Formal training program to upgrade M&E, epidemiological and statistical competences for HIS officers	SCE / DGHS	Jun 09
	Provide opportunities for exposure to centres of excellence abroad	SCE	Sept 09

3 Data Use

HIS subsystem: - Data Use			
Problem Indicator	**Value**	**Performance Improvement Objectives**	**Year**
Functional Regional Information offices	0	Regional offices staffed and equipped	
Reports done by regional offices	0	Regions analyse and report data monthly	
		Regions do quarterly integrated reports	
		Facilities use analysed data to improve local service delivery	

Priority Problems	**sed Intervention**	**WHO**	**When**
Regions and districts do not analyse their own data disaggregated by health facility (III.E.3.2)	Health Information offices to analyse their according to guidelines	RHD/CHS /CHRO	July 09
Summary reports exist for individual programs and an annual integrated report exists. Regular, integrated MDG-focused reports are not made (VI.B.2.)	o produce (quarterly) reports focusing on d PBB indicators	RHD/ M&E /CHS /CHRO	Oct 09
Information is used at national level but not at regional level (VI.C.1) (VI.D.2)	ne HIS at regional level for resource as documented part of PBB and other and review processes	RHD/PHE/ M&E	July 09
Regional analysis is not done (VI.C.2)	regional analysis of health statistics using benchmarks for comparison	CHS/ RHD	July 09
Data currently used by managers to monitor service delivery at national level but not regional level and below (VI.E.1)	and district level use data for service management	RHD/ M&E	July 09
Data is not used by care providers to monitor service delivery, planning and monitoring at facility level (VI.E.2)	IC, mediclinics and hospital analyse data g to level) and use it for management and of service delivery	RHD /RHIO	Jan 10

4 Data management, computerisation

bsystem: Data management, computerisation

Problem Indicator	Value	rmance Improvement Objectives	Yea r
Data management score on assessment	10%	Data warehouse at national level	200 9
Data warehouse at national level	0	Data warehouse at regional level	200 9
Data warehouse at regional level	0	Written data management procedures and protocols	200 9
Written data management procedures	0	Metadata dictionary	200 9
Metadata dictionary	0		

Priority Problems	posed Intervention	Who?	When?
There are no written data management procedures (IV.A.1)	Write data management guidelines and protocols, using HMN templates	CSO/ CHRO/ CHS	Jun 09
No metadata dictionary exists(IV.A.1)	Write metadata dictionary, using HMN templates	CSO/ CHRO/ CHS	Sept 09
No data warehouse exists at national or regional level (IV.A.2, IV.A.2)	Use HMN recommended data warehouse (DHIS), which is free open source software. Get training in maintenance and use. Import relevant data into warehouse	CSO/HRO/ CHS /CIB / CISD	Jun 09
Functional Medical Record system in not been extended to all hospitals	Upgrade existing functional computerized medical record systems and install in all hospitals	CHRO/ E-business	Mar 09
Computers exist, but are not networked	As part of E-business plan, define HIS requirements and ensure adequate and appropriate computerization and networking of all levels	MoH / CIB	Jan 10
AHCs not computerized and no trained	Network computers for all AHCs and train staff	MoH / CIB / E business	Jan 10
The facility register is only for public and has unique identifier codes only for (III.F.1.1)	Expand existing facility database to include Public and private facilities. Allocate unique codes to each facility	E business	Jun 10

5 Health Surveys

HIS subsystem: - Health Surveys			
Problem Indicator	**Value**	**Performance Improvement Objectives**	**Year**
Multi year plan to measure health indicators	0	Household surveys conducted to include health indicators	2009
Number of facility surveys to complement HIS data	0	Facility surveys conducted according to plan	2009
National health accounts not conducted annually	3 years	National health accounts conducted 2-yearly	2009
		Feedback on surveys widely disseminated	2010

Priority Problems	Proposed Intervention	By whom	When
There is no multi-year coordination plan for health surveys to measure health indicators (III.C.4.1)	Develop coordinated plan to conduct health indicator surveys	Dir CSO/ DGHS	Apr 09
National health accounts is done, but not frequently enough or with sufficient participation. Results are not adequately disseminated (III.F.1.6)	NHA more frequent 2 yearly with more participation and better dissemination of results	PHE	Oct 09
Data from health surveys are not analysed by socio-economic status (VI.D.3)	Include socioeconomic status analysis in all surveys and use data for advocacy.	CSO / DGHS	Feb 09
A survey on nutrition for over 5 years has been conducted (2004). No under 5 nutrition survey for last 10 years (V.A.5.1.)	Include under 5 nutrition, Measles Immunisation as part of MOH multi-indicator household survey and ensure socioeconomic analysis	MOH / CSO	Jan 10
Private sector does not report on measles immunization coverage. No survey on measles coverage has been conducted (V.B.7.1)	Ensure regular dissemination of HIS data, with focus on MDGs and PBB indicators	DGHS/ CSO	Sep 09
MCH surveys have not been conducted (III.C.1.1)	Annual facility inventory and surveys to assess data quality, with rapid and appropriate feedback to data collectors	DGHS/ CHS /CHRO	Sept 09
Routine HIS data is not complemented by routine facility surveys (III.E.1.2) (III.E.2.5)			