



Mission Report

THE PROVISION OF TECHNICAL ASSISTANCE GDDS MODULE ON HEALTH: REPORT ON SECOND EXPERT VISIT TO LESOTHO

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Prepared for:

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Project for Anglophone Africa**

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1. INTRODUCTION

The Lesotho Bureau of Statistics and the Department of Health Planning and Statistics are under constant pressure to produce relevant up to date Health Statistics. They have identified a fully functional and operational health data warehouse as a requirement in order to store and retrieve relevant health data necessary for data analysis and dissemination.

To this end the Department of Health Planning and Statistics requested Technical Assistance for the creation of a data warehouse.

This mission is the follow-up of the two previous missions. The first, a scoping mission completed by Mr. Etienne de Fortier report and the second, a user analysis mission completed by Mr. Gareth Daniel.

The specific objectives and deliverables for this mission were detailed in the Terms of Reference (refer to Annexure 2: Terms of Reference).

The basic objectives and deliverables for this mission are however stated below.

Specific issues to be covered during the consultancy were the following:

Objectives / activities of mission

- To finalize the functional specification required for the design of a data warehouse
- Implement a data ware house that will contain data from all data sources to facilitate data sharing and easy retrieval of data by users from all corners
- Implement the import tools that will be used by the various districts to upload their individual databases to the central data warehouse.

Specific outputs for the consultancy were the following

- Report in detail on all relevant conditions identified.
- Functional Specification
- Health Statistics Data Warehouse
- Custom Developed Import Tools

2. IMPLEMENTATION OF THE CONSULTANCY

The consultancy was implemented by Mr. Gareth Daniell from **GeoSpace International**. Twenty Seven (27) work days were allocated for the mission, and ran from the 2nd March 2009 to 20th April 2009. The mission included 2 separate site visits. The first site visit ran from 2nd March 2009 to 13th March and the second site visit ran from 6th April 2009 to 17th April 2009.

3. ACKNOWLEDGEMENTS

The consultant would like to thank the Lesotho GDDS Coordinator, 'M'e Malehloa Molato and the head of the IT Department, Mr Mokoena Lesenyeho for their time and support during the consultancy.

Special thanks to Ms. Mahlape Ramoseme and Mr. Teboho Koma for their enthusiasm, assistance and positive attitude during the consultancy as well as arranging the meetings and all necessary documentation.

The consultant would also like to thank the General Data Dissemination Project of the World Bank for sponsoring the consultancy.

4. PROGRAM CONTEXT

With financial support from the Department for International Development (DFID) of the United Kingdom, the World Bank is implementing a project to assist 21 Anglophone Africa countries to participate in the General Data Dissemination System (GDDS). Participating countries are being assisted to participate in the GDDS through two separate, but linked projects both financed by DFID. The IMF is providing project management and technical support in the area of economic and financial statistics. The World Bank is providing technical support in the area of socio-demographic statistics.

Technical assistance is being provided through the World Bank to help countries implement plans for improvement in population, health, agriculture, labor market, justice and security, management of statistical systems, GIS and small area statistics. The GDDS framework developed by the IMF provides the framework for the detailed elaboration of long-term statistical development strategies. Participating countries have already expressed their requests for technical assistance and both the IMF and the World Bank have developed their assistance strategies.

Lesotho was one of the countries which asked for technical assistance in the field of Health Statistics.

5. LESOTHO DEPARTMENT OF HEALTH PLANNING AND STATISTICS (HPSD) DATA WAREHOUSE NEEDS

Information Technology is currently playing a crucial role in the creation of Statistical Health data in Lesotho. Information technology is used as a data capturing and analysis tool. The use of Information Technology as a data capturing and data creation tool mean that a vast amount of data is created over a very short space of time. The Department of Health and Statistics has been utilizing the current data capturing tools for more than a year and a lot of relevant data has therefore been created on daily, weekly and monthly basis. The data is stored and analyzed in separate database files and Microsoft Excel worksheets. The HPSD does not want the entire data capturing process or applications to be redesigned, but assistance is required assimilating this data into a central data store and then producing accurate and timely reports from this central store. A fully functional data warehouse is therefore a necessity for the Lesotho HPSD to successfully store and retrieve the data.

6. CHALLENGES FACING THE LESOTHO DEPARTMENT OF HEALTH PLANNING AND STATISTICS (HPSD)

The HPSD faced the following challenges regarding Health Statistics.

- The design and creation of an integrated and properly designed central database
- Creation of pre-determined data analysis structure
- Creation of data communication protocol
- Insufficient IT staff quota

The department was aware of these challenges and the request for technical assistance was the first step in addressing them.

Currently, the only major challenge still faced by the HPSD is the problem of insufficient staff.

7. OVERVIEW OF MEETINGS AND DISCUSSIONS

Please refer to Annexure 1: Overview of Meetings Held for the meetings and discussions that took place.

8. ASSESSMENT OF CURRENT SITUATION

A successful operational data warehouse consists of the following components:

- Data
- IT Infrastructure
 - Hardware
 - Software
 - Communication
- People
- Method

During earlier missions an assessment was done based on the above mentioned components, and a proposed data warehouse was designed. During this mission the earlier findings were confirmed and elaborated upon where applicable and are discussed separately.

Data

Relevant Statistical Health data is captured on a daily, weekly and monthly basis.

The following data is collected:

Inpatient.mdb

- Inpatient data
- Outpatient data
- Mental patient data

Dental.mdb

- Dental patient data

MaternalRegister.mdb

- Maternity patient data
- Antenatal Care patient data

TBQuarterly.mdb

- Tuberculosis patient data

HIVSummary.mdb

- HIV patient data

The data is captured at facility and hospital level on a daily basis on a tally-sheet by Nurses or doctors. A monthly summary sheet is then amalgamated from the daily tally-sheets by a clerk or nurse and submitted to the office of the health information officers (Statisticians) for the 10 different Districts. The District Health Information Officers use Microsoft Access to capture the data. Several front end applications were developed by the Lesotho HPSD to facilitate the capturing process. Different front end applications are used to capture the various data sets. The data is sent to the Statistics Unit at central level in Maseru on a monthly basis. Analysis is done at District level as well as at Headquarters. At the moment the different datasets are only merged for Analysis purposes.

IT Infrastructure

A full assessment could not be made of all 10 Districts as a site visit was only possible to one of the districts. According to verbal commitments from the MOHSW staff though, the other districts operate on a very similar basis to the one that was visited. Adequate hardware and software is in place for the data capturing process at District Level as well as head office. All the District Officers do have a workable computer, Microsoft Access 2003 with different front-end applications is used to capture the data. Most of the District Officers however do not have access to Email and Internet at the moment and the data is transferred to head-office through manual means.

The Department of Communications is in the process of rolling-out a Government Network that will connect all Government Departments in Maseru as well as the Districts. Internet Access will also be provided.

The department does not have any immediate plans in place to upgrade to the latest versions of Microsoft Access and Excel and the data warehouse will be implemented using Microsoft SQL Express.

People

An assessment of the current staff component could only be made at the head-office. The District Health Officers that capture the data on Microsoft Access have been trained by Head Office and are constantly given additional training and updates on their performance when they deliver the data to Head office. The capturing of new data, maintenance of the data as well as the analysis of the data does not seem to be a problem at District Level or at Head Office. The current IT specialists do have an abundance of skills. The existing front end applications were developed and are currently being updated and maintained by them. The biggest problem regarding IT support is a shortage of staff. Only four IT specialists are currently employed, one of which is at management level and are therefore not able to commit his time to day to day IT support.

Method

Method requires that once the people, hardware, software and data is in place, the following must be implemented or should exist for the warehouse to achieve its full potential and provide relevant deliverables:

- In the short term, method will imply the specific data creation, collection and warehousing strategy
- In the long term, method will also include the specific data analysis, data dissemination and data access strategies and protocols

As the purpose of this mission is to implement a data warehouse, very little of the method is currently in place.

9. FUNCTIONAL SPECIFICATION

Please refer to *Annexure 4: Functional Specification* for the full specification

9.1 Introduction

The current data and workflow processes did not allow for efficient and effective data and statistics to be distributed by the HPSD.

The various districts each collect their own data and the main objective of the data warehouse is to collate and store this data in a central repository at the HPSD. It is important to note that some of the source databases are in a current state of development and maintenance. Therefore instead of a typically rigid “star design” for the data warehouse, a more flexible “snowflake design” was used.

Star vs. Snowflake schema

In both the star and snowflake schema the focus is on the speedy retrieval of data for reporting and analysis purposes rather than focusing on the efficiency of data manipulation.

A typical star design consists of a single fact table and several dimension tables with just a single relationship joining the main fact table with the dimension table. The star schema is especially suited for speedy retrieval of data since there are less “joins” required when writing the query that retrieves the data

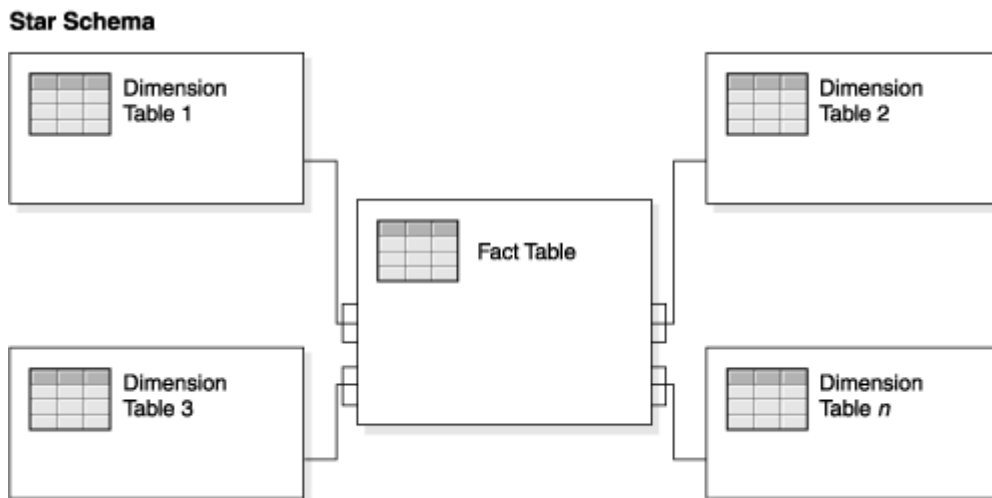


Figure 1 A Typical Star Schema

A snowflake design on the other hand still has a fact table as the central focus, but several levels of dimension tables are implemented and is more reminiscent of a normalized data base. Normalization splits up data to avoid redundancy (duplication) by moving commonly repeating groups of data into a new table. Normalization therefore tends to increase the number of tables that need to be joined in order to perform a given query, but reduces the space required to hold the data and the number of places where it needs to be updated if the data changes.

Snowflake Schema

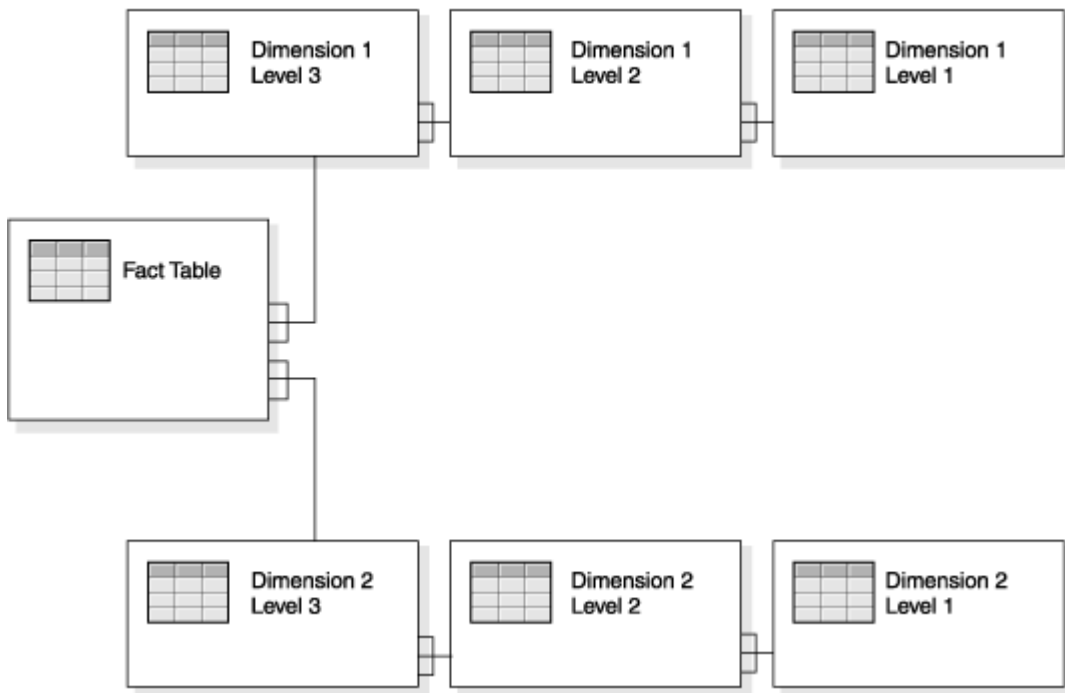


Figure 2 A Typical Snowflake Schema

The final design is based on the following constraints:

- Use the current data capturing tools as source
- Use open source and/or freeware as far as possible

A successful implementation of a data warehouse results in the following goals being achieved:

- Improve quality of data across all districts
- Eliminate inconsistent reports and reporting methods between districts.
- Provide capability for data sharing.
- Make aggregated data available in report format to interested parties for further analysis and/or integration.

9.2 Solution Overview

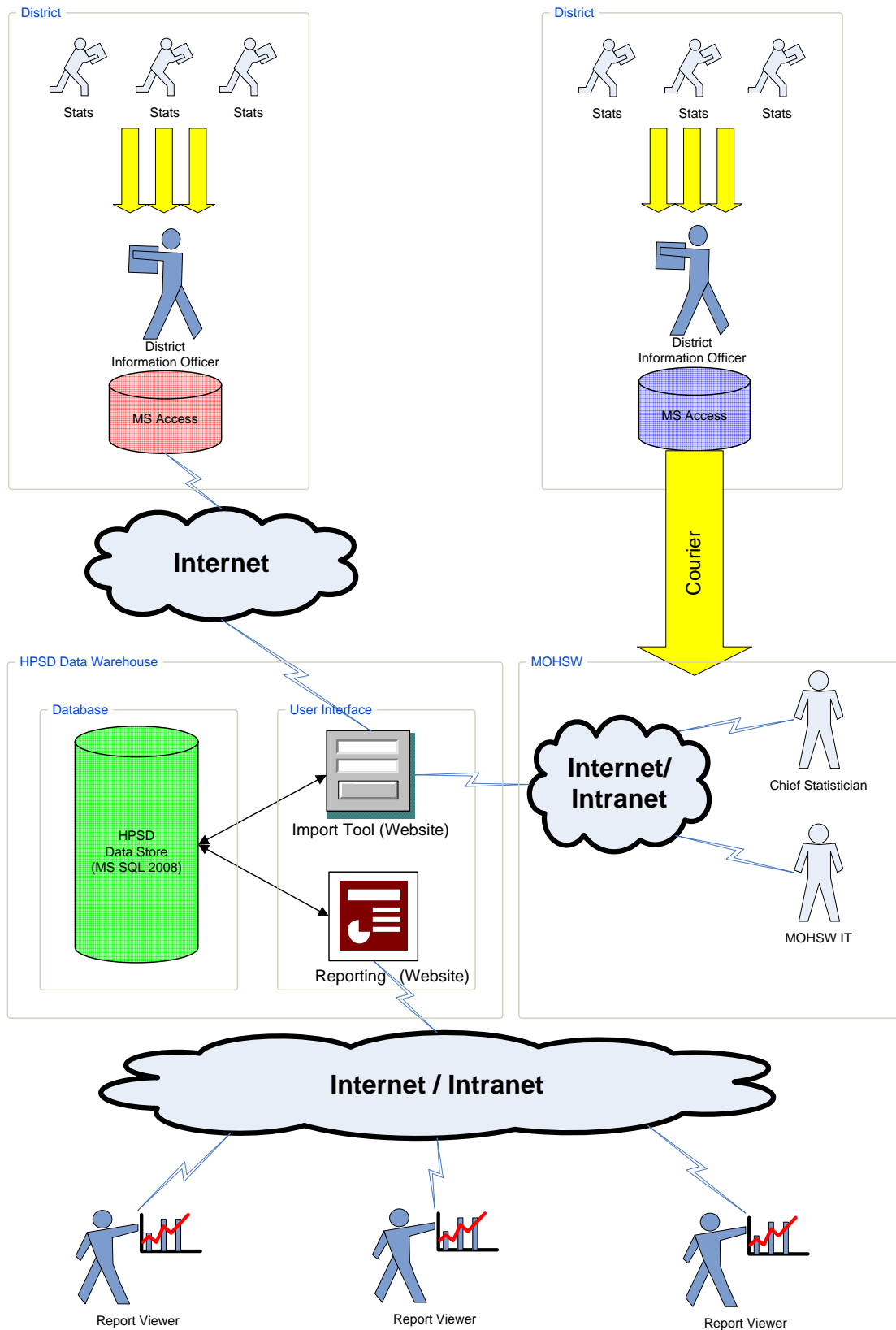


Figure 3 - Data Warehouse User Overview

| User / Role Player | Description |
|------------------------------|--|
| Nurse or Clerk | <p>These users won't interact with the data warehouse directly. However, the process starts with them, and for this purpose they are included in the overview for completeness.</p> <p>This person is responsible for capturing the relevant stats on tally-sheets on a daily and weekly basis and passing it on to the District Information Officer.</p> |
| District Information Officer | <p>The District Information Officer receives the raw data on the hand written tally sheets. This data is captured into the relevant MS Access database by means of a front-end application.</p> <p>Once completed the District Information Officer uploads the data for the attention of the Chief Statistician at the MOHSW Head Office.</p> <p>Where districts don't have Internet access, the data is transported by motor vehicle on a disk. The disk is given to the IT Officer who then uploads the MS Access database via the import tool on behalf of the relevant district.</p> |
| Chief Statistician | <p>The statistician responsible for receiving the data analyses the database for correctness, and requests amendments if not satisfied.</p> <p>If satisfied, the database is approved (via the Import Tool).</p> <p>Once approved, the IT Officer is able to affect the import (via the Import Tool).</p> |
| IT Officer | <p>The IT Officer uploads the MS Access database into the data warehouse by means of the import tool. If the Chief statistician has not yet approved the database, the upload option is not available to the IT Officer</p> <p>Access to this functionality is limited to certain users only. Typically these users would be IT officers at the MOHSW.</p> |
| Report Viewer / End User | <p>Anybody that has been granted access to the reports (potentially including other role players).</p> <p>Access to reports is controlled via a username and password. Based on the username, the report viewer may have access to report on 1 or more districts' data.</p> |

Table 1 – Data warehouse users

9.3 User Interface

9.3.1 Overview

Data warehouse users interact with the data warehouse by means of a website that is hosted at the MOHSW. This website may be on the same server as the data warehouse itself or on a separate web server.

The web site prompts the user for a username and password, which will be used to identify if the user is a district-level user or MOHSW user.

9.3.2 Import Tool

Ideally the district-level data is uploaded to the MOHSW via a web site. When the district does not have Internet access, the data is transported to the MOHSW by disk and a MOHSW IT Officer uploads the data on behalf of the district.

Access to the web site is controlled via a username and password. Upon logging in to the system, the relevant security permissions is determined and access to screens and functions is controlled based on the user's assigned roles and rights.

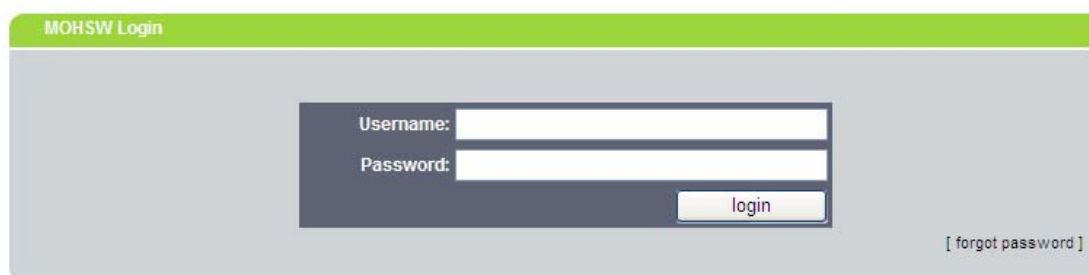


Figure 4 – Import Tool login

District level users are only able to see the data files they have already submitted to the MOHSW and upload new ones. If a file has not yet been imported into the data warehouse, the district-level user is allowed to delete it and replace it with another file.

Statistics Data Files

| File Description | File Type | Date Uploaded | Delete |
|------------------|-----------|-------------------|---------------------------------------|
| May 2009 | InPatient | 2 Jun, 2009 09h34 | Data Already Imported |
| June 2009 | Dental | 3 Jul, 2009 08h12 | Data Already Imported |
| July 2009 | HIV | 1 Aug, 2009 09h31 | <input type="button" value="delete"/> |
| August 2009 | TB | 6 Sep, 2009 08h12 | <input type="button" value="delete"/> |

| Upload New File | | |
|----------------------|---|---|
| File Description | File Type | File |
| <input type="text"/> | Dental <input type="button" value="v"/> | <input type="text"/> <input type="button" value="Browse..."/> <input type="button" value="Upload"/> |

Figure 5 – Import Tool user interface for district-level users

MOHSW users are able to see all districts' uploads as well as action the import. In addition, the Chief Statistician is able to download the file for verification before importing it. Once a data file has been imported into the MOHSW data warehouse, the district user will no longer be able to delete it.

Statistics Data Files

| District | File Description | File Type | Date Uploaded | Download | Verify | Delete | Import |
|-----------------|----------------------|------------|----------------------|--|---------------------------------------|---------------------------------------|---------------------------------------|
| Maseru | May 2009 | Dental | 2 Jun, 2009 09h34 | <input type="button" value="download"/> | Verified | Data Already Imported | Data Already Imported |
| Maseru | June 2009 | Dental | 3 Jul, 2009 08h12 | <input type="button" value="download"/> | Verified | Data Already Imported | Data Already Imported |
| Maseru | July 2009 | Inpatient | 1 Aug, 2009 09h31 | <input type="button" value="download"/> | <input type="button" value="verify"/> | <input type="button" value="delete"/> | <input type="checkbox"/> |
| Maseru | August 2009 | OutPatient | 6 Sep, 2009 08h12 | <input type="button" value="download"/> | <input type="button" value="verify"/> | <input type="button" value="delete"/> | <input type="checkbox"/> |
| Mafeteng | May 2009 | Dental | 2 Jun, 2009 09h34 | <input type="button" value="download"/> | Verified | Data Already Imported | Data Already Imported |
| Mafeteng | June 2009 | HIV | 3 Jul, 2009 08h12 | <input type="button" value="download"/> | Verified | Data Already Imported | Data Already Imported |
| Mafeteng | July 2009 | TB | 1 Aug, 2009 09h31 | <input type="button" value="download"/> | <input type="button" value="verify"/> | <input type="button" value="delete"/> | <input type="checkbox"/> |
| Mafeteng | August 2009 | Inpatient | 6 Sep, 2009 08h12 | <input type="button" value="download"/> | <input type="button" value="verify"/> | <input type="button" value="delete"/> | <input type="checkbox"/> |
| | | | | | | | <input type="button" value="Import"/> |
| Upload New File | | | | | | | |
| District | File Description | File Type | File | | | | |
| Maseru | <input type="text"/> | Dental | <input type="text"/> | <input type="button" value="Browse..."/> | <input type="button" value="Upload"/> | | |

Figure 6 – Import Tool user interface for MOHSW users

9.3.3 Reporting

Along with uploading/importing data files, users are also able to generate and view reports from the data warehouse user interface. The report generation is done utilizing standard Microsoft SQL Express query tools.

District-level users are only able to view reports that relate to their data, while MOHSW users are able to view reports for the entire Lesotho. The report functions are standard

10. ACTIVITIES

The first mission report of Mr. Etienne de Fortier specified certain short and long term activities for the creation of a data warehouse. Certain of these recommended activities have been achieved while others must still be completed. This consultancy focused on the short term activities needed for the creation of a data warehouse.

10.1 Short term activities

The main goal for all the short term activities is the establishment of a data warehouse at the Head office to enable the Department to store, update, query, retrieve and disseminate the data. The establishment of the data warehouse consists of the following activities:

- Project management
- User Analysis or Scoping of requirements
- Functional Specification
- System Design
- Implementation
- Installation
- Testing
- Training

Project Management

Completed

Project management has been conducted throughout the consultancies.

User Analysis & Functional specification

Completed

A user analysis was conducted during the second mission and a functional specification has been produced.

Please refer to *Annexure 4: Functional Specification*

System Design, Implementation, Installation, Testing and Delivery

The following table depicts what has been achieved by the different role players in the creation of the data warehouse.

| Task | Consultant | MOHSW/HPSD |
|--------------------|------------------------------|-------------------|
| System Design | Completed | Completed |
| Implementation | Completed Sample Development | In Progress |
| Installation | Completed on DEV server | In Progress |
| DEV Testing | Completed DEV testing | In Progress |
| Final/User Testing | N/A | Not Started |

Due to a shortage of available resources at the Ministry of Health and Social Welfare (MOHSW) and HPSD in particular, there was insufficient time to complete the Implementation, Installation, Testing and Delivery phases. The consultant was able to assist by creating a foundation for the Implementation and Installation and provided advice for the completion of the remainder of the data warehouse wherever possible.

11. Further Recommendations

11.1.1 Staff Training

The IT department has been strongly advised to invest in formal training in order to improve the skills of their IT staff. This is in the best interest of the long-term success of the data warehouse.

11.1.2 Outsourced Assistance

In order to conclude the implementation, installation and delivery of the data warehouse and conclude all the short-term objectives, it is advised that the HPSD request outside assistance with the development of the data warehouse. The MOHSW IT specialist however needs to be actively involved in this process.

The consultant has already implemented a technical foundation for both the data warehouse and import tools. The suggestion is for the HPSD to build on that foundation, in-house, as far as possible and then seek assistance with specific technical challenges, rather than outsourcing the task completely.

11.2 Potential Future Actions

Once the issues in section 11 (Further Recommendations) and section 12 (RISKS), discussed later in this document, have been addressed the success and future of the data warehouse will be in very good standing.

As per the initial report by Mr. E. de Fortier of August 2008, the HPSD then has the option of extending the data warehouse to introduce some or all of the following actions.

Rolling out of data warehouse at District Level

Microsoft SQL Express can be deployed at District Level to import the information captured in Microsoft Access and export the merged data for analysis purposes. Every district will therefore have a separate data warehouse that is updated with the latest Microsoft Access captured data on a monthly basis. The different district Microsoft SQL Express data warehouses will then be sent to the head office to be imported into the central level Statistics Unit data warehouse based on Microsoft SQL Server in Maseru.

Estimated Duration for Development: ***5 days per District***

Front end data capturing application

The existing front end application based on Microsoft Access can be changed so that the data is captured into a central Microsoft SQL Express data store at each district. The front end application design should incorporate future plans like data capturing via intra and internet. It would be advised if this action is to be considered, that the front-end applications be re-written so that they are web-based and can be deployed over the Internet.

Estimated duration for front end application development: ***Several Weeks (in-house development)***

Ongoing Training

Extra training in the new data warehouse, front end data capturing application and data analysis at District level is essential.

The IT Personnel together with the relevant personnel of the Ministry of Health and Social Welfare must ensure that all District staff members are well versed in the use of the new data warehouse, front end data capturing application and data analysis software.

Estimated duration for Training: ***5 days (continuous process)***.

Protocols

As with any data set, pre-determined protocols regarding data access need to be established. This is very important especially when the data warehouse is made available first via the Departments own network and intranet but also later on the internet.

Estimated duration for Protocol Setup: ***5 days (continuous process)***.

12. RISKS

There are certain critical issues which needs to be addressed for the data warehouse to reach its full potential, if they are not addressed the data warehouse faces the risk of failure. These are:

12.1 Source databases and applications

The source databases and corresponding front-end applications are not designed according to best practices. They are not correctly normalized and some databases include redundant tables etc. There is a risk of data inconsistency once imported. However, the risk of data inconsistency appears to be minor since the users are well trained in preventing bad data being captured. There is also a chief statistician in the process double-checking the data before it's imported.

Many of the source databases are still "works in progress". Most are however either very close to their final design or haven't changed in a long time. The TB data capturing system has already been redesigned though. The old TB database was used for the specification of the data warehouse as the user says that just the front-end capturing tool is changing to .Net and the DB is remaining the same.

12.2 IT department

The IT department support staff quota is not optimal at the moment. The IT software specialists currently employed by the Department do have the required skills necessary for the creation of the data warehouse; however the lack of sufficient IT resources poses a serious risk for the maintenance and support of the data warehouse. The data warehouse creation activities required the services of a dedicated IT specialist for the duration of the project. Unfortunately this did not materialize due to the shortage of the IT staff quota which in turn hampered the progress of the implementation and installation of the data warehouse.

It is of extreme importance that the IT staff focuses all their attention for the near future on the completion of the data warehouse.

The IT support shortage could be solved with the use of external assistance, however it is not the ideal solution and the Department should ideally look to solve the problem in-house. One of the MOHSW's goals from the start is that they gain the necessary skills to maintain and enhance the data warehouse themselves, and this will not be the case if the development is outsourced completely. The creation of a data warehouse with the added functionality is currently putting extra strain on the IT department though.

The maintenance and support of the data warehouses at District Level and at Headquarters is of utmost importance. The central data warehouse as well as the subsequent analysis and reporting depends on the constant updating of the warehouses with new data from the Districts. Maintenance and support is therefore not limited to headquarters only, but must also be provided at District level. The potential lack of IT support poses a serious risk to the success of the data warehouse in the short term but also to the successful upkeep of the warehouse in the long run. The shortage of IT support staff therefore poses a short term as well as a long term risk for the successful creation and maintenance of the data warehouse.

The Department is well aware of the IT staff shortage. Sustainable plans must now be put in place in order for the risk to be minimized.

12.3 Training

The recommendation for the creation of a data warehouse and future development at District and headquarter level is based on a phased approach. New technology and method will be deployed at District level. The District Health Information officers are responsible for the capturing, analysis and reporting at District Level. Training of the District Health Information Officer responsible for the data capturing, analysis and reporting is thus very important to ensure that they keep up with the changing data warehouse technology and method. The IT staff also need to be constantly trained on new technology and developments in order to ensure that the data warehouse and the related functionality are updated accordingly. A training program should be developed as part of the data warehouse roll-out.

13. TRAVEL AND ACCOMMODATION ARRANGEMENTS

There were no problems regarding the travel and accommodation arrangements.

14. FINAL REFLECTIONS

The HPSD made sure that, through all their efforts, the consultancy could be completed as effectively as possible. The challenge is to ensure that issues raised in 11 (Further Recommendations) and 12 (RISKS) are addressed and any long term plans for the HPSD data warehouse are set in motion. With just a small amount of outsourced assistance all the short-term objectives of the consultancy can be met, and the HPSD data warehouse's long-term objectives can become viable too. The professionalism in all aspects of their work is noteworthy and the future of Lesotho Health is in very capable hands.

15. ANNEXURES

15.1 Annexure 1: Overview of Meetings Held

Phase 1 Meetings

| | |
|------------------|--|
| When | 2 nd March |
| Attendees | Ms. M. Ramoseme – Chief Statistician Mr. M. Lesenyeho - IT Manager Mr. T. Koma - IT Specialist |
| Overview | Introduction and discuss general mission objectives |

| | |
|------------------|--|
| When | 2 nd March |
| Attendees | Ms. M. Ramoseme – Chief Statistician |
| Overview | Discuss & finalize the work plan for the mission |

| | |
|------------------|---|
| When | 3 rd March |
| Attendees | 50+ delegates from all stakeholder groups |
| Overview | EPOS Analysis Report Presentation |

| | |
|--|-----------------------|
| When | 4 th March |
| Attendees | |
| 15 delegates from all stakeholder groups | |
| Overview | |
| Clarification of, and changes requested to, the EPOS Analysis Report | |

| | |
|---|------------------------|
| When | 13 th March |
| Attendees | |
| Mrs. M. Makhakhe - Director Health Planning and Statistics Department Mrs. M. Mohapi - PPP Coordinator Mr. J. Nkonyana - Head M&E Dr. D. Rumisha - M&E Technical Advisor Ms M. Ramoseme - Chief Statistician Mr. M. Lesenyeho - IT Manager | |
| Overview | |
| Phase 1 - Debriefing | |

Phase 2 Meetings

| | |
|--|-----------------------|
| When | 6 th April |
| Attendees | |
| Ms. M. Ramoseme – Chief Statistician Dr. D. Rumisha - M&E Technical Advisor | |
| Overview | |
| Introduction and discuss general mission objectives | |

| | |
|---|-----------------------|
| When | 7 th April |
| Attendees | |
| Mr. T. Koma - IT Specialist | |
| Overview | |
| Introduction and discuss general mission objectives | |

| | |
|------------------|--|
| When | 9 th April |
| Attendees | Mr. T. Koma - IT Specialist Ms. R. Selebalo - IT Specialist |
| Overview | Code Review, Training and technical assistance |

| | |
|------------------|--|
| When | 15 th April |
| Attendees | Mr. T. Koma - IT Specialist Ms. R. Selebalo - IT Specialist |
| Overview | Code Review, Training and technical assistance |

| | |
|------------------|--|
| When | 16 th April |
| Attendees | Mr. T. Koma - IT Specialist Mr. M. Lesenyeho - IT Manager |
| Overview | Code Review, Training and technical assistance Evaluating the next steps for the data warehouse |

| | |
|------------------|--|
| When | 16 th April |
| Attendees | Mrs. M. Makhakhe - Director Health Planning and Statistics Department Dr. D. Rumisha - M&E Technical Advisor Ms M. Ramoseme - Chief Statistician Mr. T. Koma - IT Specialist Ms. R. Selebalo - IT Specialist |
| Overview | Final Debriefing |

| | |
|------------------|--|
| When | 17 th April |
| Attendees | Mr. T. Koma - IT Specialist |
| Overview | Code Review, Training and technical assistance |

15.2 Annexure 2: Terms of Reference

Refer to:

- *"Lesotho_Health_MissionT2_Edefortier_report.doc"*
- *"TOR_Lesotho_Geospace_Health_DWS1.doc"*
- *"TOR_Lesotho_Geospace_Health_DWS2.doc"*

15.3 Annexure 4: Functional Specification

Refer To:

- *"Lesotho_Health_Data_Warehouse_Functional_Specification_Apr09.doc"*